A foundation monograph of *Convolvulus* L. (Convolvulaceae)

by
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Abstract

ex Hallier f.) J.R.I. Wood & R.W. Scotland, **stat. nov.**, *Convolvulus hystrix* subsp. *inermis* (Chiov.) J.R.I. Wood & R.W. Scotland, **stat. nov.,** *Convolvulus rotterianus* subsp. *stocksi* (Boiss.) J.R.I. Wood & R.W. Scotland, **comb. et stat. nov.,** *Convolvulus calvertii* subsp. *ruprechtii* (Boiss.) J.R.I. Wood & R.W. Scotland, **stat. nov.,** *Convolvulus cephalopodus* subsp. *bushiricus* (Bornm.) J.R.I. Wood & R.W. Scotland, **stat. nov.** The status of various infraspecific taxa is clarified and numerous taxa are lectotypified. This account represents a new initiative in terms of taxonomic monography, being an attempt to bring together the global approach of the traditional monograph with the more pragmatic and identification-focussed approach of most current floras while at the same time being informed by insights from molecular systematics.

**Keywords**

Convolvulaceae, global revision, lectotypification, monograph, morning glories, new species, new taxa

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Introduction

The approach adopted in this study arises from a consideration of what taxonomists should be focussed on in the 21st century. Our knowledge of flowering plant diversity comes primarily from taxonomy that has accumulated piecemeal through studies that are geographically restricted. A limitation of this approach to the taxonomy of any widespread or sizeable group is that species usually comprise a combination of restricted endemic species, just over half of all species of flowering plant are single country endemics (WCSP 2014) and widespread species, and accurately delimiting and distinguishing species in these two categories demands a global perspective (Thomas et al. 2012). Extensive sampling across the entire range of a taxon’s geographical distribution is also important if substantial and existing levels of synonymy are to be accurately detected (Govaerts 2003; Scotland and Wortley 2003; Wortley and Scotland 2004).

In contrast to the geographical focus of floristic projects, monographic studies at a global level have been undertaken by individual botanists or teams of botanists (Thomas 1999; Thomas et al. 2012) and these studies are viewed as the ‘gold standard’ for achieving accurate species delimitation, effective identification keys and the optimal treatment of variation. Such monographs are usually associated with intensive studies of many aspects of plant systematics including phylogeny, conservation and anatomy, and in consequence tend to be few in number and mostly deal with relatively small plant groups. A potential way to make more rapid taxonomic progress with species-rich groups of plants is to combine the accuracy that comes from a global monographic treatment of plant variation with the more focused and practical aims of regional floristic projects.

To speed up the taxonomic process while retaining the extensive specimen sampling of a global monographic treatment we believe it is necessary to focus on species delimitation at the expense of other aspects of the traditional monograph. This can be achieved as long as the pragmatic and heuristic nature of taxonomy is appreciated. In
other words, for many groups we can rapidly assess specimen level variation, write keys and delimit species without devoting large amounts of time to infra-specific levels of variation and hybridisation and similar issues. Our approach, however, is quite different from many traditional flora projects as we have made full use of electronic tools and technologies, DNA sequencing and basic phylogeny estimates for the group. We use the term “Foundation Monograph” for our approach.

This monograph of *Convolvulus* represents what can be achieved in a 12 month period with an experienced botanist working 75 per cent of the time on the taxonomy, a 3 month DNA barcoding project plus additional student input, and a team of four people meeting to discuss relevant issues and progress along the way.

**Our methodology and its implications**

We faced two severe constraints in preparing the *Convolvulus* monograph: time and money. This meant that there was no opportunity for field work during the research for the monograph, no possibility of obtaining extensive loan material from a large number of herbaria and limited funds to visit other institutions. There was no time to carry out intensive studies into infraspecific taxa or study variation in populations of individual species over and above that evident from the herbarium samples available. However, we did have some advantages. The first was the proximity of the two major collections in London at Kew (K) and the Natural History Museum (BM), and the second rapid communication through e-mail and the sending of digital images from all over the world. Once the project was underway it became possible to make decisions which allowed us to maximise the benefits of the few visits and loans we required to see type material and a sufficient range of specimens of individual species to make taxonomic decisions. Thus visits were made to Edinburgh (E) and Vienna (W) because of their rich holdings in Middle Eastern material, to St Petersburg (LE) for its holdings from former Soviet Central Asia and to Paris for its collections from North Africa. All four institutions were additionally rich in type material. It would have been desirable to visit other herbaria, particularly Montpellier (MPU) and Geneva (G), but we had to work within budget and time constraints and nearly all the type material in these herbaria was duplicated elsewhere or could be viewed online. Small loans of up to six specimens in each case totalling about twenty five specimens were received from European herbaria (B, E, GOET, M, P, URT, W). Digital images from many herbaria (B, C, E, FI, FT, G, GOET, LISE, KW, M, MA, MPU, PRE, UPS) enabled us to see almost all type material. Australia and North America presented particular difficulties in species delimitation but we were able to receive more substantial loans of sufficient material from AD, BRI and TEX to facilitate more informed taxonomic decisions.

For species delimitation and the preparation of descriptions we examined specimens and made use of the available literature. Dissection of flowers and fruiting capsules was carried out where possible, but care was taken not to damage types or unusual material and capsules are rare or unknown in many species. In species delimitation
we gave additional weight to authors who had extensive experience in the genus and knowledge of the species in the field as we were acutely aware that our field knowledge was limited to certain geographical areas. Thus, we have followed the treatment of (Johnson 2001) for Convolvulus in Australia in most particulars despite having some doubts about the characterisation of several species. However, in general we have made our own decisions based on the evidence of the material we have seen and believe that our broader approach from looking at the genus worldwide will provide useful insights. We would nevertheless emphasise that we do not believe in reinventing the wheel and we have made use of any insight available to us whether in the literature, on herbarium sheets, by personal observation or any other source, and, with permission, we have also made use of the illustrations that accompanied (Sa’ad 1967), which we believe will add to the utility of this work.

Our desire to produce a concise account of the genus in a limited time has of necessity resulted in the exclusion of certain elements common to many monographs. We have accepted subspecies and the more significant varieties but have accounted for all the recognised infraspecific taxa scattered through the literature down to the level of variety. Forms and subvarieties are not accounted for and are only cited when also treated as the basionym of a taxon of higher rank. For reasons of budget and time we have only seen and cited representative specimens of each species. To cite and map all known collections of each species would be an impossible task within our constraints. A glance at the Flora of Iran (Nowroozi 2002) or the Flora of Southern Africa (Meeuse and Welman 2000) will give an idea of how many records there are of each species in these two countries and how daunting a task comprehensive global distribution details would be. All that we would claim is the level of information we provide is at least comparable to that of Flora Europaea and similar to regional Floras and not much less than in most national floras.

**Generic delimitation**

The use of the name Convolvulus predates Linnaeus by well over a century but the first formal description of the genus was in Species Plantarum (Linnaeus 1753) where 31 species were accepted. However, Linnaeus’ concept of the genus was very broad and contained elements which were early removed to other genera, namely Argyreia Lour., Ipomoea L. and Evolvulus L. The modern definition of the genus was essentially established by the end of the 18th century based on the filiform stigmas, axillary flowers subtended by small bracteoles and the bilocular ovary. Webb and Berthelot (1844) separated off some species from the Canary Islands as Rhodorhiza Webb on the basis of the short style, the abortion of one locule and the irregular dehiscence of the capsule. However, all these characters are found in other species of the genus, the short style correlating with a conical ovary. Consequently both Choisy (1845) and Peter (1891) included Rhodorhiza within Convolvulus and this decision is confirmed by modern molecular studies. Another group of species was separated off by Robert Brown (Brown 1810) as Calystegia and his decision was
followed by most subsequent authors (Choisy 1845; O’Donell 1959; Sa’ad 1967) on the grounds of its large bracteoles, which are adjacent to the calyx, and different pollen grains (Hallier 1893). However, many North American authors never accepted this division and molecular studies do not support it.

Prior to beginning this monograph of *Convolvulus* we were aware that *Calystegia* was nested within *Convolvulus* and, therefore, *Convolvulus* as treated in this monograph is paraphyletic (Carine et al. 2004; Stefanovic et al. 2002). Molecular work completed as part of the monograph encompassed broader sampling of both genera and the data support the hypothesis that *Calystegia* is a monophyletic group nested within *Convolvulus* (Williams et al. 2014). *Calystegia* may be distinguished from *Convolvulus* by its pollen (polypantoaperturate versus equatorially triaperturate), stigmas (globose versus linear/clavate) and bracteoles that are large and inflated and enclose the calyx in *Calystegia* whereas in *Convolvulus* they are typically small and often remote, large bracteoles only occurring in *Convolvulus scammonia* and *C. pseudoscammonia*. Taxonomically, the European species of *Calystegia* have been treated by (Brummitt 1972) with molecular data supporting taxon circumscriptions proposed therein (Brown et al. 2009). Most of the diversity in *Calystegia* is distributed in North America and the taxa in this region have been treated by (Brummitt submitted) for the *Flora of North America*. Thus, *Calystegia* is a clearly defined subgroup within *Convolvulus* that has been treated at a more or less global-level by a single author. For these reasons we decided to pursue a pragmatic approach excluding *Calystegia* from this monograph of *Convolvulus*. For those who would consider all taxonomy should be based on monophyletic taxa, this issue is readily resolved by re-naming all species of *Calystegia* as *Convolvulus*. The necessary combinations are already available for most of the taxa concerned.

**Geographical distribution**

Species of *Convolvulus* are distributed on all the main land masses of the world but the genus is most diverse in areas with a Mediterranean climate and in semi-desert regions of around the same latitude. It is principally a genus of dry, stony and sandy habitats from sea level to around 3000 m. In the tropics it is almost entirely absent within 15° of the equator except on mountains with one major exception—the Horn of Africa where there is a local centre of diversity. It is largely absent from smaller islands with two notable exceptions on either side of the African continent, Socotra to the east and the Canary Islands to the west, both of which are local centres of diversity in the genus. With the exception of the cosmopolitan weed, *Convolvulus arvensis*, the genus is absent at latitudes higher than 45°N. There are centres of diversity with similar number of species on all three major southern hemisphere land masses, Australia, southern Africa and South America. In the northern hemisphere, the genus is poorly represented in North America, where it is largely represented by *Calystegia* and is virtually absent from East Asia. Conversely it is most diverse in the Irano-Turanian regions of Central Asia with the greatest number of species being found in Iran.
Discovery

The European species of *Convolvulus* were largely known by the end of the 18th century and only a few, very localised species, not all generally accepted, have been described subsequently, the most recent being *C. mairei* (Halacsy 1907), *C. suendermanii* (Bornmüller 1938), *C. sericocephalus* (Juzepczuk 1950), *C. argyrothamnos* (Greuter 1967) and *C. fernandesii* (Silva and Teles 1980). Most American and South African species were known by the middle of the 19th century and only a trickle of new species has been found subsequently in these areas, the most recent being *C. ensifolius* (Ferreira et al. 2013) in South America and *C. carrii* (Turner 2009) in North America. The travels and collections of Boissier, Kotschy and Aucher-Eloy showed that the Middle East was especially rich in *Convolvulus* and Boissier’s monumental *Flora Orientalis* (Boissier 1875) summarises their achievement by listing 66 species. Further exploration has confirmed that this region is the main centre of diversity in *Convolvulus* and the travels and publications of Bornmüller, Davis and Rechinger amongst others have resulted in a steady increment to the number of species known from this region. The 50 years before the First World War revealed the presence of considerable *Convolvulus* diversity in North Africa and Central Asia. Outstanding among a number of important French collectors was Rene Maire, who during the course of a long career found new species of *Convolvulus* across North Africa from Libya to Morocco. At the same time the species of Central Asia were being discovered, with M.Popov completing the work begun by Schrenk, Regel and Schmalhausen. South Africa was known as a centre of diversity in *Convolvulus* in the early 19th century but only since the end of the 19th century has botanical exploration shown the Horn of Africa and the island of Socotra to be the only truly tropical centre of diversity in the genus. Recent publications (Sebsebe 1993; 1999; Thulin 2005) have added considerably to species numbers from this region. Very recently (Johnson 2001) has made considerable progress in unravelling the complex group of species found in Australia. It now seems unlikely that any new centres of diversity in the genus will be discovered.

We have treated 190 species of *Convolvulus* worldwide and do not believe that the final number of species is likely to much exceed 200 even after more intensive study. During the course of preparing this monograph only four new species have been described and only two of these were, in fact, first found in the last thirty years.

Economic importance

*Convolvulus* is of relatively little economic importance. Several species are reported to be of importance for grazing in desert conditions including *C. oxyphyllus* and *C. pilosellifolius* in Arabia (Dickson 1955) and *C. hamadae, C. eremophilus, C. divaricatus* and *C. dorycnium* subsp. *subhirsutus* in Central Asia (Grigoriev 1953). Several species produce attractive flowers and are cultivated in suitable climates, most commonly *C. tricolor* and *C. valentinus* and, to a lesser extent, *C. althaeoides* and *C. cneorum*. The Canary Island species *C. floridus* and *C. scoparius* are sometimes planted, especially the
former. Both species are the source of a fragrant oil obtained from the distillation of their roots and stem, known as Rhodium (oil) or rosewood (bois de rose). *C. scammonia* has roots that produce a pale brown exude used as a laxative, known as scammony. On the negative side, *C. arvensis* is a widespread and persistent weed, which is difficult to eradicate once established and has a considerable negative economic impact. Other species are occasionally reported as weeds, such as *C. pilosellifolius*, which can occur amongst cotton (Grigoriev 1953).

**Molecular systematics**

Molecular data formed an integral component of our approach. Silica gel dried (10%) and herbarium (90%) material were used to sample 130 species of *Convolvulus* and 18 species of *Calystegia* for the plant barcoding regions *matK* and *rbcL* (CBOL Plant Working Group 2009), together with the nuclear ribosomal Internal Transcribed Spacer region (ITS) that has been proposed as a third barcoding marker (China Plant BOL Group 2011). For fifty-one taxa, data was obtained from one or more of the markers for two or more accessions. Whilst a high level of sampling was achieved overall, sampling of taxa in central Asia was limited, reflecting the lack of suitable material for molecular work for many of the species endemic to this region.

Molecular data were used in conjunction with morphology to resolve species delimitation in a number of complexes and to inform decisions regarding infragenetic classification and the systematic order used in the taxonomic treatment (Williams et al. 2014).

At the species level, molecular data supports the distinction of a number of geographically separate but morphologically similar species pairs such as *C. althaeoides* (Mediterranean) and *C. capensis* (South African) and *C. demissus* (South American) and *C. sagittatus* (African). Molecular data also support the separation of *C. chinensis* from *C. arvensis* and of *C. aschersonii* and *C. namaquensis* from *C. sagittatus* (Williams et al. 2014). Distinct clades were resolved within *C. lineatus* and *C. oxysepalus* by DNA sequence data. However, we were unable to correlate these infraspecific groupings with morphology or geography. Further work may be necessary to accurately delimit these widespread and morphologically variable taxa. We have discussed this in the text under each individual species.

The phylogenetic and biogeographic implications of the results are discussed elsewhere (Williams et al. 2014). However, a summary cladogram is provided in Figure 1. The results concur with those of (Carine et al. 2004) in highlighting the non-monophyly of infragenetic groups proposed originally by (Boissier 1875) and elaborated by Peter (1891), Petrov (1935) and Sa’ad (1967) and in recognising two major clades within the genus (Figure 1, Clades X and Y). Clade X comprises species that are mostly annual or perennial herbs, sometimes woody at the base and typically with a trailing or climbing habit and leaves that are distinctly petiolate. *Calystegia* (Clade D) is resolved in this clade. Clade Y mostly comprises erect shrubs, with indistinct petioles.
Within Clade X, there is a strong geographical signal with Australasian (Clade E) and South American (Clade F) clades of *Convolvulus* resolved within a paraphyletic tropical African grade G. Other groups resolved within Clade X include subclade C, comprising blue-flowered annuals that are largely Mediterranean in distribution but include also *C. simulans* from North America. Taxa in this clade do not exhibit the distinctly petiolate leaves typical of Clade X more generally. Subclade B, comprises western Mediterranean and Macaronesian taxa (the latter exhibiting a woody habit), many of which have blue flowers, and clade A, centred on the Red Sea, is a morphologically diverse assemblage of species including taxa with dense capitulate inflorescences, blue flowers and/or clavate stigmas. Three species of *Convolvulus* (*C. kossmatii*, *C. sembaensis* and *C. socotranus*) previously treated in *Seddera* (Sebsebe and Mill 2009) were recently transferred to *Convolvulus* on the basis of molecular sequence data (Luna et al. 2014). They are resolved in this clade and exhibit the clavate stigmas found in a
number of members of the group. The remaining taxa in Clade X constitute a grade of Eurasian taxa (H) that includes *C. arvensis*.

Clade Y is restricted to the Eurosiberian region and three major subgroups are resolved within it. The first (Clade I) comprises species that are often fastigiate in habit and have flowers that are not aggregated into heads. The second (Clade J) comprises species that are typically subshrubs with sericeous leaves, pubescent seeds and often a spiny habit. The third clade (Clade K) comprises species with leaves that are typically tomentose and flowers that are borne in heads.

Whilst some attempt has been made above to correlate morphological traits with the clades resolved in the molecular analysis, it should be noted that the fit is imperfect. We have been unable to identify unique, un-reversed morphological synapomorphies for any of the groups highlighted in Figure 1 with the notable exception of *Calystegia*, a situation that reflects a more widespread problem in Convolvulaceae wherein high levels of homoplasy have rendered super-specific classification problematic (Austin 1998; Manos et al. 2001). Given the nature of the morphological variation, we are unable to propose an adequate infragenetic classification (Carine and Scotland 2002).

As noted above, there were pragmatic grounds for excluding *Calystegia* from this treatment. Nevertheless, the molecular data do support the inclusion of *Calystegia* within *Convolvulus*, in agreement with Carine et al. (2004) and Stefanovic et al. (2002).

The molecular results have been used to establish a framework for the linear sequence of species adopted in the taxonomic account. Efforts have been made to establish an order that maximises morphological similarity between adjacent species within the constraints of relationships inferred using molecular data. Species that are not sampled for molecular data were placed on the basis of their morphology. Within major groups, the molecular sequence has occasionally been abandoned so as to place species which are known to hybridise next to each other or to place species with close morphological similarity together. The sequence used is as follows:

Old world species with petiolate leaves and mostly twining/trailing stems (Grade H)
Southern African species (Grade G)
New world species (Clade F)
Australasian species (Clade E)
North west African (mostly) and Canary Island species (Clade B)
Annual mostly blue-flowered species (Clade C)
Red Sea group, often with bluish flowers and/or clavate stigmas but very diverse in habit (Clade A)
Old world species with mostly separate flowers, often fastigiate in habit, not spiny (Clade I)
Old world species with sericeous leaves, often undershrubs, sometimes spiny (Clade J)
Old world species with flowers in heads, leaves commonly tomentose, rarely spiny (Clade K)
Species concept

The species concept is problematic in *Convolvulus*. While there are a small number of species that are outstandingly distinct (*C. persicus* from the Caspian and Black Seas, *C. floridus* from the Canary Islands, *C. assyricus* from Turkey and *C. kilimandschari* from East Africa are good examples) and many that are perfectly adequately delimited although having close relatives, there are a large number of species clusters where the boundaries of individual species are far from satisfactory. This will be apparent in any region where *Convolvulus* is reasonably diverse, whether South America, Australia, Central Asia, the Canary Islands, Southern Africa, the Horn of Africa, Arabia, Turkey or elsewhere. It is apparent in the long synonomies of several species such as *C. althaeoides*, *C. sagittatus* and *C. prostratus*. It is also apparent in the many species that historically have been subsumed in other species such as *C. libanoticus*, *C. mazicum* and *C. subsericeus* in *C. cantabrica* or the inclusion of all Australian species in *C. erubescens*. It can also be seen in the placement of a number of infraspecific taxa which have been moved by different authors from one species to another, such as var. *melliflorus* which has moved between *C. valentinus* and *C. supinus*.

Notes are provided to indicate where plants intermediate between two species are known to occur. The status of these intermediates is rarely known with certainty. Hybrids are only well documented in a few cases (Carine et al. 2007, Aykurt and Sümbül 2011b, for example) and may be common, but this cannot be confirmed at the present time. Clearly detailed population studies and experimental work may clarify uncertainties over the years, but quite obviously evolution of species is taking place both in the island context of the Canaries and Socotra and across continents. We have tried to provide solutions to these problems on a consistent and pragmatic basis and the notes indicate where we have had difficulties. We have accepted as a ‘good’ species any that is distinct over most of its range and have indicated when intermediates are known. A very strict species concept could result in a series of species collapsing into each other ending in a counter-intuitive and uninformative taxonomy. In any case it is not clear in most cases whether these intermediates are hybrids or not. We have tried to avoid excessive resort to subspecies and varieties, but these ranks are necessary in quite a few cases.

An important and perhaps surprising problem in species delimitation is that a considerable number of species are only known from a handful of collections and in several cases from the type only. Moreover, many specimens are inadequate. Only in a few cases do we know what the rootstock is like and in many species the capsule and seeds are unknown. This makes any taxonomy based on capsule and seed characters difficult to formulate and, where it has been attempted, difficult to use or evaluate, as in the case of the Australian species. Good field observations are also lacking in many cases. We do not know the flower colour or the potential height of many species as these details are often not recorded.

Very few new species are described in this monograph. This is mainly a reflection of the fact that *Convolvulus* is an essentially temperate genus which has been
well-studied over the years. We have avoided describing new species based on single collections, however odd, which belong to a species complex. Santos 544 from Angola is unmatched by any other collection but is clearly part of a complex group of species centred on *C. sagittatus*, so has been noted but not described. The same is true of Bramwell & Humphries 3448 from the Canary Islands. Conversely three species, *C. iranicus*, *C. xanthopotamicus* and *C. peninsularis* have been described because their relationships are clear and they separate from related species by one or more ‘strong,
qualitative’ characters. We have, however, described one new species from a species complex, *C. austroafricanus*, but in this case there are a good number of specimens and it has a distinct geographical range (Figure 2).

For the reasons expressed in the previous paragraphs it should be emphasised that the status of a number of species remains uncertain until further collections and more detailed study in the field is possible. We are not completely convinced that *C. lindbergii* is distinct from *C. eremophilus* or *C. rectangularis* from *C. lanjouwii* or *C. semhaensis* from *C. kosmatii* or that *C. jordanensis*, *C. spicatus*, *C. schimperi* and *C. cephalopodus* merit recognition as separate species. Other examples could be found from Australia, America and elsewhere. In contrast, *C. sagittatus* is so variable that it is quite possible that some populations merit recognition as separate species but intensive genetic studies are clearly needed within this complex to explain the variation and introgression between species and forms.

At the infraspecific level, we have utilised the ranks of subspecies and variety:

The rank of **subspecies** is used to separate two closely related and usually intergrading taxa which are geographically separated but may have an overlapping range. Usually they are separated by one or two characters. Characteristically they behave as distinct species through much of their range.

The rank of **variety** is used for a distinct infraspecific taxon which is either known from a single location or group of close-by locations within the broader range of the species or occurs sporadically over the whole or, at least, most of the range of the species but with no obvious geographical patterning.

**Morphological characters and their use in species delimitation**

During our studies we have noted a range of characters of use in species delimitation. Their value is discussed below and we have provided lists of distinctive features, which may be of use in identification. It should be noted that the lists are not always exhaustive as information is not available for all species and not all useful characters are clearly defined.

**Habit.** Species of *Convolvulus* may be herbs or undershrubs. Herbs may be perennial or annual, entirely herbaceous or somewhat woody below, twining, trailing or more or less erect. Undershubs may be cushion-forming, fastigate, liana-like, erect and unarmed; or low compact and spiny; or low, compact and unarmed. Habit is therefore of great use in species delimitation and some of these distinctive habits are geographically restricted.

All southern hemisphere species are perennial trailing or twining herbs with cordate, hastate or sagittate, petiolate leaves with the partial exceptions of *C. hasslerianus* and *C. randii* which are often (but apparently not always) erect herbs. In the northern hemisphere there is much greater diversity of life form and habit although trailing perennial herbs similar in habit to southern hemisphere species are well-represented. Amongst the distinct forms are:
• Annual herbs: *C. fatmensis*, *C. coelesyriacus*, *C. siculus*, *C. pentapetaloides*, *C. simulans*, *C. gharbensis*, *C. humilis*, *C. tricolor*, *C. meonanthus*, *C. rhyniospermus*, *C. rotterlianus*. *Convolvulus rhyniospermus* may occasionally perenniate. Several Australian species regarded as perennials may be (at least sometimes) annual. These include *C. crispifolius*, *C. eyreanus* and *C. recurvatus*. *C. capituliferus* and *C. grantii* have been interpreted as annuals but appear always to be perennial. None of the annuals are obviously twiners. They are characteristically slender, entirely herbaceous and with a poorly developed rootstock. Many have recurved fruiting peduncles.

• Erect (or at least ascending) herbs: *Convolvulus pseudoscammonia*, *C. hasslerianus* (apparently sometimes twining), *C. randii* (sometimes twining).

• Trailing or twining herbaceous perennials, which may be woody below, with hastate, sagittate or truncate leaves: *C. scammonia*, *C. durandoi*, *C. arvensis*, *C. mairei*, *C. chinensis*, *C. mathmensis*, *C. steppicola*, *C. galaticus*, *C. germaniae*, *C. cassius*, *C. betonicifolius*, *C. longipedicellatus*, *C. stachydifolius*, *C. althaeoides*, *C. palaestinus*, *C. pitardii*, *C. glaucorum*, *C. vidalii*, *C. lanjouwii*, *C. rectangularis*, *C. dryadum*, *C. supinus*, *C. sabatius*, *C. valentinus*, *C. vollesenii*, *C. bidrensis*, *C. capituliferus*, *C. stenocladus*, *C. subspathulatus*, *C. grantii*, *C. sarmentosus* (perhaps), all American and southern hemisphere species except *C. simulans* (annual), *C. kilimandschari* (liana), *C. hasslerianus* and *C. randii* (both usually erect herbs). Most of these species seem to be normally trailing herbs but a few show strong evidence of usually being twiners although this might be an artifice of their preferred habitat. Common twining species include *C. farinosus* from Africa and *C. remotus* from Australia.

• Lianas: *C. canariensis*, *C. massonii*, *C. volubilis*, *C. lopezsocasii*, *C. fernandesii*, *C. kilimandschari*.

• Unarmed non-twining, non-fastigiate shrubs: *C. persicus*, *C. floridus*, *C. scindicus*, *C. fruticulosus*. The first three are commonly erect whereas the last is more or less prostrate in form.

• Erect unarmed undershrubs with stiff, thin, woody, subfastigiate branches and (usually) few, relatively small leaves: *C. scoparius*, *C. scopulatus*, *C. socotranus*, *C. sericophyllus*, *C. hildebrandtii*, *C. peninsularis*, *C. leptocladus*, *C. eremophilus*, *C. lindberghii*, *C. hamadace*, *C. erinaceus*, *C. divaricatus*, *C. tujuntuensis*, *C. subsericus*, *C. chondriloides*, *C. gracillimus*, *C. kurdistanicus*, *C. kotteanus*, *C. sarothrocladus*, *C. pseudocantabrica*, *C. dorycium*.

• Low cushion plants with branched woody rootstock: *C. assyricus*, *C. mazicum*, *C. boissieri*, *C. suendermannii*, *C. libanoticus*, *C. carduchorum*, *C. cataonicus*, *C. phrygium*, *C. aitchisonii*, *C. asyrensis*, *C. ammannii*, *C. tragacanthoides*. These intergrade with species like *C. lineatus*, *C. calvertii* and *C. holosericeus*, which may be cushion-like in form but with erect stems.

• Spiny undershrubs can be divided into three subgroups:
a) Only the old lower branchlets spinescent: *C. lanatus*, *C. tragacanthoides*, *C. grigorjevii*.

b) All (or most) branches spinescent: *C. kossmatii*, *C. semhaensis*, *C. caput-medusae*, *C. oxyphyllus*, *C. ulicinus*, *C. spinifer*, *C. virgatus*. In all of these except *C. virgatus* the flowers are sessile. A few other species have sometimes been interpreted as having spinescent branches including *C. turrillianus*, *C. oxysepalus*, *C. erinaceus*, *C. hamadae* and *C. sericophyllus* and a few others are rarely subspinescent, such as some forms of *C. prostratus*.

c) Branches and peduncles (where present) spinescent, sterile lateral spines (formed from abnormal sterile peduncles?) also present: *C. fruticosus*, *C. gortschakovii*, *C. spinosus*, *C. argyracanthus*, *C. acanthocladus*, *C. iranicus*, *C. leiocalycinus*, *C. verdcourtianus*, *C. trabutianus*.

**Underground Parts.** These are poorly known. *Convolvulus arvensis* is well-known for producing extensive underground rhizomes, which explain its persistence as a weed of cultivation. Many herbaceous species put down a shallow tap root, from which thin adventitious side roots develop. The perennial species of desert and semi desert regions commonly have a thickened woody rootstock which allows survival in the long periods between rain and from which annual, herbaceous or near herbaceous stems arise. *C. hasslerianus* and perhaps *C. randii* have a xylopodium which allows them to survive savannah fires.

**Leaf and Stem Indumentum.** There is much variation in indumentum, with the majority of species hairy in some form. Sa’ad (1967: 25 ff.) drew attention to different hair structures in *Convolvulus* but she did not make use of this in species delimitation and we have made no use of it either. Instead, we have indicated below some indumentum features which we have found of taxonomic importance. In the majority of species the indumentum of the leaves, stem, bracts, bracteoles and sepals is similar although varying somewhat in density. However, in a few species the indumentum of the sepals (and occasionally also that of the bracteoles) is strikingly different to that of the leaves. Reference in this part is consequently to the indumentum of the leaves and stem unless otherwise indicated. It should also be noted that some species are glabrescent, the older parts glabrous while the younger parts are hirsute to some degree.

- Leaves velvety-tomentose: *C. galaticus*, *C. germanicae*, *C. althaeoides* subsp. *tenuissimus*, *C. eyreanus*, *C. crispifolius*, *C. thomsonii*. The distinction between this and the next category is not very clear.

- Leaves densely sericeous/canescent: *C. lanuginosus*, *C. cneorum*, *C. krauseanus*, *C. lineatus*, *C. oleifolius*, *C. argyrothamnos*, *C. holosericeus*, *C. calvertii*, *C. ammannii*, *C. xanthopotamicus*, *S. tragacanthoides*, *C. spinifer*, *C. grigorjevii*, *C. fruticosus*, *C. hermanniae*, *C. carrii*, *C. randii*, *C. lindbergii*, *C. boissieri*, *C. suendermannii*, *C. caput-medusae*, *C. mazicum*.

- Very finely sericeous and often somewhat glabrescent: *C. sericophyllus*, *C. kossmatii*, *C. semhaensis*, *C. gracillimus*, *C. vollesenii*, *C. subspathulatus*, *C. jefferyi*. 
Villous-tomentose perennials (dense longish hairs), characteristically woody at the base but with more or less herbaceous branches (always associated with flowers in heads): *C. aitchisonii*, *C. asyrensis*, *C. lanatus*, *C. secundus*, *C. spicatus*, *C. schimperi*, *C. jordanensis*, *C. cephalopodus*, *C. euphraticus*, *C. reticulatus*, *C. cephalophorus*, *C. stapfii*, *C. kotschyanus*, *C. pyrotrichus*, *C. prostratus*, *C. pilosellifolius*, *C. calvertii*, *C. elymaticus*, *C. commutatus*, *C. schirazianus*.

Plants glabrous or nearly so (several of these are sometimes partially puberulent): *C. scammonia*, *C. pseudoscammonia*, *C. durandoi*, *C. arvensis*, *C. chinensis*, *C. lopezsocasii*, *C. demissus*, *C. laciniatus*, *C. montanus*, *C. ensifolius*, *C. microsepalus*, *C. remotus*, *C. angustissimus*, *C. waitaha*, *C. dregeanus*, *C. bidentatus*, *C. namaquensis*.

Sepal indumentum strikingly different from that of stem and leaves: *C. acanthocladus*, *C. hamrinensis*, *C. oxyphyllus*, *C. ulicinus*, *C. urosepalus*, *C. iranicus*, *C. oxysepalus*, *C. turrillianus*, *C. virgatus*, *C. glomeratus*, *C. scopulatus*, *C. sericocephalus*, *C. boissieri* subsp. *compactus*, *C. cephalophorus* (not as strongly as in other species).

**Leaves and Bracts.** In this treatment, no great distinction is generally made between bracts and leaves. In the great majority of cases the leaves which subtend flowering peduncles (i.e. bracts) are almost identical to the lower stem leaves and differ only in their progressively smaller size towards the apex of the stem. Only in a few cases, principally those species where the inflorescence appears terminal, have we made a clear distinction between leaves and bracts.

In terms of leaf shape and molecular phylogeny the genus can be divided into two main natural groups, which are mostly easily separated apart from a few Somali or Socotran species. The first group (Species 1–106) has leaves with cordate, truncate, sagittate or hastate leaf bases and clearly demarcated petioles; basal leaf auricles are frequent. Leaves may be entire, undulate, crenate, dentate or sinuate-lobed. Included are a small number of petiolate species with rounded to broadly cuneate leaf bases, which include *C. persicus* and a few species from East Africa including *C. oppositifolius*, *C. rhyniospermus*, *C. capituliferus*, *C. stenocladus*, *C. jefferyi*, *C. bidrensis*. All trailing and twining species belong to this first group. The second group (Species 107–190) have leaves that are gradually narrowed at base and lack a distinct petiole. This group is most diverse in Central Asia and does not occur in the southern hemisphere or the Americas. It includes all cushion plants, most spiny species, most species with a sericeous or canescent indumentum and all species of a fastigiate habit. Leaves are usually linear, oblanceolate, oblong or elliptic and are usually entire, although undulate leaves occur in some fastigiate species and especially in the herbaceous *C. grantii*.

Amongst unusual leaf features are

- Leaves abruptly contracted to a subsessile base: *C. hasslerianus*, *C. ensifolius*, *C. hystrix*, *C. ocellatus*. 

• Twining/trailing plants with strongly dimorphic leaves include most Australasian species and the following but the list is not exhaustive: *C. althaeoides*, *C. palaestinus*, *C. glauorum*, *C. vidalii*, *C. dregeanus*, *C. sagittatus* (sometimes), *C. capensis* (?), *C. chilensis*, *C. equitans*, *C. maireanus*, *C. assyricus*, *C. grantii*.

• Leaf auricles bifurcate or otherwise divided: *C. chilensis*, *C. bonariensis*, *C. equitans*, *C. aschersonii*, *C. steppicola*, *C. chinensis*.

• Leaves equilaterally triangular in form: *C. scammonia*, *C. chinensis* subsp. *triangularis*, *C. dryadum*, *C. farinosus* (commonly).

**Inflorescence.** Inflorescence structure is quite diverse in the genus and is of taxonomic importance. Flowers are arranged in axillary cymes but this structure is not always obvious. Most commonly, cymes are clearly pedunculate with paired bracteoles at the branching point(s). In this account the peduncle is measured from the base where it arises from the main stem to this branching point. The term pedicel is used above this point. Pedicels are often very variable in length on a single inflorescence especially when the cyme has a clearly monochasial structure. Bracteoles are mostly small, sometimes caducous and relatively unimportant in distinguishing species.

• Inflorescence terminal: *C. turrillianus*, *C. oxysepalus*, *C. scindicus*, *C. maireanus*, *C. calvertii*, *C. commutatus*, *C. schirazianus*, *C. elymaiticus*, *C. lineatus*, *C. xanthopotamicus*, *C. spinifer*, *C. grigorjevii*, *C. krauseanus*, *C. oleifolius*, *C. cneorum*, *C. lanuginosus*, *C. gharbensis*, *C. humilis*.

• Axillary pedicellate flowers with peduncle absent or very short: *C. vidalii*, *C. pitardii*, *C. glauorum* (somewhat so), *C. fruticulosus*, *C. boedekerianus*, *C. ocellatus*, *C. randii*.

• Flowers sessile, solitary or paired: *C. hamrinensis*, *C. oxyphyllus*, *C. socotranus*, *C. hystrix* (subsp. *ruspolii* only), *C. kossmatii*, *C. semhaensis*, *C. caput-medusae*, *C. seriophyllus* (near sessile), *C. argillicola*.

• Inflorescence paniculate in form: *C. floridus*. Several other species could sometimes be interpreted as having a paniculate inflorescence including *C. aucheri*, *C. cantabrica*, *C. pilosellifolius* and *C. prostratus*.

• Inflorescence racemose in form: *C. seriophyllus*, *C. bildebrandtii*, *C. peninsularis*, *C. leptocladus*.

• Peduncles paired (at least sometimes): *C. rufescens*, *C. thomsonii*.

**Sepals.** The calyx consists of five separate overlapping sepals, which are commonly somewhat similar in size and shape but often slightly unequal. The two outer sepals are nearly identical; the middle is commonly asymmetric with two halves unequal and the inner pair similar to each other. All sepals may be scarious marginally, but the inner sepals often have wider scarious margins and are less hirsute than the outer pair. The sepal margins are entire or sometimes slightly undulate. In several species, the lower part of the sepal is more or less colourless and contrasts with the distinct green apical portion. In general the size and relative size of the inner and outer sepals,
sepal shape, texture and indumentum are all of taxonomic importance. Unusual sepal structures include:

- Outer sepals noticeably shorter than inner sepals: *C. scammonia*, *C. pseudoscammonia*, *C. spinosus*.
- Outer sepals conspicuously larger than inner sepals: *C. gortschakovii*.
- Sepals conspicuously accrescent: *C. argillicola*.
- Sepals very lax (not appressed to base of corolla): *C. leiocalycinus*.
- Sepals spathulate (and reflexed): *C. durandoi*.
- Sepals rectangular: *C. rectangularis*, *C. lanjouwii*.
- Sepals with a conspicuously different coloured apex: *C. prostratus*, *C. pilosellifolius*, *C. cantabrica*, *C. aucheri*, *C. betonicifolius*, *C. tricolor*, *C. cataonicus*, *C. carduchosum*, *C. germaniciae*, *C. volubilis*, *C. massonii*, *C. oppositifolius*, *C. lineatus*.
- Sepals mostly > 10 mm long: *C. lilloi*, *C. hasslerianus* (South America), *C. carrii* (North America), *C. bidrensis*, *C. thomsonii*, *C. kilimandschari*, *C. capensis*, *C. natalensis*, *C. argillicola*, *C. bullerianus* (Africa), *C. massonii*, *C. lopeszocasii* (Atlantic Islands), *C. scammonia* (inner sepals), *C. glomeratus* var. *sachalitarum*, *C. holosericeus*, *C. sericocephalus*, *C. fruticosus*, *C. gortschakovii*, *C. betonicifolius*, *C. supinus*, *C. persicus*, *C. phrygius*, *C. kotschyanus*, *C. commutatus*, *C. lanatus*, *C. secundus*, *C. schimperi*, *C. aitchisonii*, *C. oxysepalus*, *C. cephalopodus*, *C. reticulatus*, *C. stapfii*, *C. cephalophorus*, *C. urosepalus*.
- Sepals all very short, < 5 mm long: *C. arvensis*, *C. mairei*, *C. durandoi*, *C. fatmensis*, *C. vidalii*, *C. coelesyriacus*, *C. humilis*, *C. floridus*, *C. microsepalus*, *C. crispifolius*, *C. recurvatus*, *C. elementii*, *C. vecricus*, *C. waitaha*, *C. assyricus*, *C. dorycnium*, *C. sericophyllus*, *C. sarmentosus*, *C. grantii*, *C. bildebrandtii*, *C. peninsularis*, *C. leptoclados*, *C. eremophilus*, *C. erinaceus*, *C. chondriloides*, *C. gracillimus*, *C. iranicus*, *C. verdcourtianus*.

**Corolla.** The corolla of all *Convolvulus* species is funnel-shaped. The short basal tube is usually more or less included in the calyx while the expanded part is strongly exserted and usually conspicuous. It is undulate to 5–lobed, although it is not completely certain how constant this distinction is. On the exterior, there are 5 darker coloured and usually hirsute bands which terminate at the apex of each corolla lobe. These are referred to as midpetaline bands. They do not extend to the basal, cylindrical portion of the corolla. Corolla colour is sometimes of taxonomic importance but it is difficult to assess from dried specimens and so has been used with caution. Some species apparently always have a white corolla such as *Convolvulus persicus* and *C. erinaceus* and its allies whereas others such as *C. chinensis* and *C. dorycnium* seem always to be pink-flowered but there is uncertainty about how constant this character is in many species.

- Corolla often or always deeply lobed: *C. rufescens*, *C. crenatifolius*, *C. bonariensis*, *C. montanus*, *C. bullerianus*, *C. argillicola*, *C. multifidus*, *C. farinosus*, *C. aschersonii*, *C. recurvatus*, *C. elementii*, *C. vecricus*, *C. waitaha*, *C. assyricus*, *C. dorycnium*, *C. sericophyllus*, *C. sarmentosus*, *C. grantii*, *C. bildebrandtii*, *C. peninsularis*, *C. leptoclados*, *C. eremophilus*, *C. erinaceus*, *C. chondriloides*, *C. gracillimus*, *C. iranicus*, *C. verdcourtianus*. 

- Corolla yellow (or cream): C. scammonia, C. pseudoscammonia, C. supinus, C. pa-
  laestinus, C. natalensis, C. bullerianus.
- Corolla blue or bluish: C. sabatius, C. valentinus (?), C. siculus, C. pentapetaloides,
  C. humilis, C. gharbensis, C. simulans, C. tricolor, C. meonanthus, C. subspathulatus,
  C. jefferyi, C. capituliferus, C. canariensis, C. fruticulosus.
- Midpetaline bands glabrous: C. scammonia, C. pseudoscammonia, C. durandoi, C.
  siculus, C. simulans, C. dregeanus, C. montanus, C. laciniatus (sometimes), C. wait-
  aba, C. rhyniospermus, C. capituliferus (almost).

Stamens. Stamens are unequal in length. The main taxonomic character of interest is in the filaments. Sessile or very shortly stipitate glands are present on the lower expanded part of the filaments in all annual species, and trailing and twining species from the Mediterranean and Central Asian regions. They are absent from species with cuneate or attenuate leaf bases and apparently from the twining and trailing species from the southern hemisphere.

Style and stigma. The length of the undivided portion of the style is provided in the descriptions but this may well be more variable than the dimensions given as we have not generally examined the style of many examples of each species. More significant is the relative length of the undivided portion of the style to that of the stigmas. In a number of species, the stigmas are almost as long as the undivided style although they are usually much shorter. The stigmas are weakly exserted from the corolla in a number of species (C. crenatifolius subsp. montevidensis, C. equitans), possibly because the corolla is somewhat wider than in most other species. These species are also unusual for the persistence of the style on the ripening capsule.

In most species the stigmas are linear-filiform and co-extensive with the style arm. In a small group of Socotran species previously placed in Seddera (Convolvulus koss-
matii, C. socotranus, C. semhaensis) the stigmas are clavate and shorter than the style arm (Luna et al. 2014). Ellipsoid stigmas are found in a number of species in the same clade (C. glomeratus, C. hystrix etc.) and upwardly thickened stigmas occur in various other species, notably C. leiocalycinus and several South African species. Several South American species also have short, rather thick stigmas (C. demissus, C. chilensis). This last species is unusual in exhibiting rather different stigmas on different plants, linear stigmas 3.5 mm long occurring on some plants while oblong stigmas c. 1.5 mm long occur on others. The frequency or significance of this variation is unknown. In most plants both stigmas in each pair are equal but occasional specimens have been observed where they are asymmetric. This does not seem to be species specific.

- Stigmas 3: C. maireanus.
- Stigmas not coequal with style arm: C. kossmatii, C. socotranus, C. semhaensis.
- Stigmas thickened, oblong to ellipsoid in form, much shorter than style: Convolvu-
  lus leiocalycinus, C. persicus, C. hystrix, C. glomeratus, C. virgatus, C. oppositifolius,
C. subspathulatus, C. scopulatus, C. capensis, C. namaquensis, C. bidentatus, C. chil-
• Stigmas equalling or longer than style: C. ulicinus, C. aschersonii, C. chondrilloides,
• Style sometimes hirsute immediately below stigmas: C. equitans, C. carrii.
• Ovary (and usually the capsule) hirsute at least at apex: Convolvulus hermanniae
  subsp. erosus, C. ocellatus (sometimes), C. semhaensis (sometimes), C. hildebrandtii
  C. oxysepalus, C. koeianus, C. leptocladus, C. peninsularis, C. hildebrandtii, C. trabutianus, C. sarmentosus, C. grantii, C. prostratus, C. pilosellifolius, C. aucheri,
  C. calvertii, C. ammannii, C. oleifolius, C. holosericeus, C. assyricus, C. libanoticus,
  C. phrygius, C. cephalopodus, C. jordanensis, C. spicatus, C. secundus, C. lanatus,
  C. schimperi, C. kotschyanus, C. reticulatus, C. pyrrotrichus, C. fruticulosus, C. sabatius,
  C. valentinus, C. durandoi, C. pentapetaloides, C. humilis, C. massonii, C. volubilis,
  C. trabutianus.
  C. calvertii, C. ammannii, C. oleifolius, C. holosericeus, C. assyricus, C. libanoticus,
  C. phrygius, C. cephalopodus, C. jordanensis, C. spicatus, C. secundus, C. lanatus,
  C. schimperi, C. kotschyanus, C. reticulatus, C. pyrrotrichus, C. fruticulosus, C. sabatius,
  C. valentinus, C. durandoi, C. pentapetaloides, C. humilis, C. massonii, C. volubilis,
  C. trabutianus.

Style and ovary indumentum. The indumentum of the ovary, ripening cap-
sule and style is of considerable taxonomic importance. Style indumentum correlates
closely with that of the ovary but there are cases where the ovary is hirsute and the
style glabrous (Convolvulus hermanniae subsp. erosus). However, we know of no cases
where the lower part of the style is hirsute but the ovary is glabrous. Two North Ameri-
can species (Convolvulus equitans, C. carrii) are unique in that the upper part of the
style, immediately below its division into two arms, is pilose but only in some of the
specimens we have seen. In both these cases the ovary is glabrous and the character,
although interesting, appears not to be of taxonomic significance.

Ovary indumentum has been used extensively in species delimitation by Sa’ad, Rech-
ingher and others. Indeed (Rechinger 1963) uses the presence or absence of ovary hairs as
one of the first dichotomies in the key to species in Flora Iranica. It has been noted as the
principal but not the only character to distinguish several pairs of species including Con-
volvulus lanuginosus/C. calvertii and C. oxysepalus/C. turrillianus. However, others have
discounted its importance (O’Donell 1957: 169) or ignored it altogether (Meeuse 1958).
Our own studies suggest that it is often species specific but there are many cases where
the presence or absence of ovary hairs does not correlate either with other morphological
differences or with geographical distribution. This is certainly the case with C. ocellatus
from Southern Africa, C. hildebrandtii from Somalia and Socotra and C. leiocalycinus
from the Iranian region as well as with a number of species from Madeira and the Ca-
nary Islands. More controversially, we have adduced that indumentum differences are
not significant in separating several hitherto recognised species, which we have included
within C. eremophilus. Where some geographical patterning is obvious, we have accepted
existing taxonomic decisions (as in the separation of C. spicatus from C. cephalopodus) or
recognised subspecies (as in the South American C. hermanniae subsp. hermanniae and
subsp. erosus), although no additional characters seem to separate these taxa
Capsule and seeds. The fruit is a capsule and is ovoid, subglobose or somewhat ellipsoid and acuminate in shape. It has the same indumentum as the ovary. The base of the style is persistent in some species. The dehiscence is loculicidal. The capsule is basically bilocular and 4-seeded with trigonous seeds. However, unilocular capsules and single seeds occur quite frequently by abortion and may sometimes be species specific. The shape of the seed is more or less ellipsoidal if only one seed is present. Seeds may be glabrous or variously hairy. The surface may be smooth, reticulate or tuberculate.

Despite the great variety of fruit characters there are severe practical limitations in their use for taxonomic purposes, particularly in the herbarium. Most specimens are collected in flower and capsules and ripe seeds are often missing. Still more serious is the fact that for a large number of species the capsule and seeds are unknown. Given the small number of fruiting specimens available it is often impossible to be certain whether single seeded or 2–4-seeded capsules are species specific or the result of chance abortion. Our observations of seed ornamentation do not always agree with those of other authors and it is not always easy to be sure whether this is the result of natural variation, wrong identification or observation using different strengths of magnification. Consequently, caution should be exercised in relying on distinctions based solely on seed characters. Some generalisations include:

- Many fastigiate species are 1-seeded (C. scopulatus, C. erinaceus, C. dorycnium, C. eremophilus, C. divaricatus, C. pseudocantabrica) but 1-seeded capsules are also known in C. floridus, C. hystric and C. commutatus.
- All herbaceous petiolate species have glabrous seeds, the seeds commonly being tuberculate or rugose, sometimes more or less reticulate with raised wavy lines as in several African species C. kilimandschari, C. farinosus and C. sagittatus.
- Capsules and seeds are usually found in abundance on annual species.
- Capsules and seeds are usually present on herbaceous petiolate species.
The following character lists may prove useful although they are not necessarily exhaustive:

- Peduncles reflexed in fruit (most common in annual and Australian species): *C. mairei*, *C. fatmensis*, *C. palaestinus*, *C. coelesyriacus*, *C. germanicae* (†), *C. pitardii*, *C. vidalii*, *C. glaouorum*, *C. siculus*, *C. pentapetaloides*, *C. tricolor*, *C. simulans*, *C. microsepalus*, *C. recurvatus*, *C. graminetinus*, *C. crispifolius*, *C. eyreanus*, *C. angustissimus*, *C. waitaha*, *C. stenocladus*.
- Seeds hirsute: *C. acanthocladus*, *C. fruticosus*, *C. dorycnium*, *C. chondrilloides*, *C. eremophilus*, *C. erinaceus*, *C. divaricatus*, *C. tujuntauensis*, *C. pseudocantabrica*, *C. floridus*, *C. calvertii*, *C. commutatus*, *C. cantabrica*, *C. cneorum*, *C. lanuginosus*, *C. lineatus*, *C. oleifolius*, *C. holosericeus*, *C. assyricus*, *C. libanoticus*, *C. asyrensis*, *C. cephalopodus*, *C. reticulatus*, *C. prostratus*, *C. pilosellifolius*, *C. rotterianus*, *C. lanjouwii*, *C. sericophyllus*, *C. sarmentosus*, *C. hildebrandtii* (sometimes), *C. verdcourtianus*, *C. xanthopotamicus*, *C. ammannii*.
- Seeds smooth, glabrous: *C. leiocalycinus*, *C. hystrix*, *C. lanatus*, *C. chondrilloides*.

**Dichotomous keys**

Keys for the identification of *Convolvulus* species are provided on a regional basis. This ensures that keys are relatively short and the user has only a small number of species to consider if facing difficulties in deciding to which species a particular specimen belongs. Subspecies are only keyed out where more than one occurs in a particular region. Efforts have been made to ensure that similar or confusable species are contrasted in couplets, rather than being placed far apart by the use of an arbitrary character. The following 14 regional keys are provided:

1. South America  
2. North America  
3. Australia  
4. New Zealand  
5. Southern Africa (Botswana, Lesotho, Namibia, South Africa, Swaziland)  
6. Tropical Africa (Sahel south to Angola, Mozambique and Zimbabwe, including Socotra and Madagascar)  
7. North Africa (Morocco, Algeria, Tunisia, Libya, Egypt, Mauritania and Niger)  
8. Atlantic Islands (Azores, Canaries, Cape Verde, Madeira)  
9. Europe (Flora Europaea area)  
10. Levant (Turkey, Cyprus, Syria, Lebanon, Palestine/Israel, Jordan)  
11. Arabian Peninsular (including Socotra and Kuwait)  
12. Indo-Iranian Region (Afghanistan, Bhutan, India, Iran, Iraq, Nepal, Pakistan)  
13. Former Soviet Union  
14. East Asia (Burma/Myanmar, China, Japan, Korea, Mongolia, Eastern Siberia).
Regional keys to Convolvulus species

1. Key to species in South America

1. Erect cerrado perennial with woody xylopodium; leaves sessile or subsessile.......................... 55. C. hasslerianus
   – Twining, trailing or prostrate herbs of varied habitats; leaves distinctly petiolate.......................... 2
   2. Outer sepals 3–6 mm long........................................... 3
   – Outer sepals 6–14 mm long........................................... 4
   3. corolla <1 cm long; outer sepals 5–6 mm long.................. 47. C. schulzei
   – corolla 2–3 cm long; outer sepals 3–4.5 mm long................ 4. C. arvensis
   4. Leaves deeply palmatisect or pinnatisect, the segments usually very fine.............................. 48. C. laciniatus
   – Leaves entire, weakly lobed, dentate or crenate, the basal auricles entire or bifid, never palmatisect or pinnatisect ............................................................... 5
   5. Outer sepals 10–14 mm long; corolla 2.5–4 cm long........... 53. C. lilloi
   – Outer sepals 7–10 mm long; corolla 1–3 cm long.................. 6
   6. Prostrate plants; leaves < 3 cm long, usually much less; flowers solitary (rarely paired) ........................................................... 7
   – Prostrate or twining plants; leaves mostly >3 cm long; flowers in 1–many-flowered cymes.................. 9
   7. Leaves suborbicular, glabrous or nearly so; corolla with glabrous midpetaline bands .......................... 50. C. montanus
   – Leaves ovate-deltoid, pubescent; corolla with hirsute midpetaline bands................................. 8
   8. Leaves entire or very shallowly lobed (Chile) .................. 46. C. demissus
   – Leaves incised-dentate (Peru) ..................................... 51. C. incisodontatus
   9. Corolla (1.5–)2–3 cm long, pink; leaf auricles usually bifid ... 44. C. chilensis
   – Corolla 1–2.5 cm long but, if more than 1.5 cm corolla cream; leaf auricles entire, rarely bifid and, if so, corolla < 1.5 cm long ........................ 10
   10. Leaves linear oblong, glabrous, petiole < 6 mm long, flowers always solitary................................................. 54. C. ensifolius
   – Leaves ovate, deltoid or strap-shaped, pubescent or hirsute, petiole > 5 mm long, flowers 1–many............................................................... 11
   11. Ovary and capsule apically pilose; plant commonly white-pilose............................................. 49. C. hermanniae subsp. erosus
   – Ovary and capsule glabrous; plant variously hairy to subglabrous ........................................ 12
   12. Corolla 1.6–2.5 cm long, cream; flowering stems slender, c. 1–1.5 mm thick ............................ 52. C. crenatifolius subsp. montevidensis
   – Corolla 1–1.8 cm long, white or pink; flowering stems relatively stout, 2–3 mm thick .................. 13
   13. Leaves usually 4–5 times as long as broad, puberulent, the auricles sometimes bifid.......................... 45. C. bonariensis
Leaves ovate-deltoid, 2–3 times as long as broad, usually hirsute, the hairs more or less spreading, the auricles never bifid ........................................ 14

Inflorescence of (1-)3–7-flowered cymes; peduncles 1.5–12 cm long; corolla pinkish ........................................ 52. C. crenatifolius subsp. crenatifolius

Flowers solitary or paired; peduncles 1–3(-6) cm long; corolla white ............ ........................................................................................................................................ 49. C. hermanniae

2. Key to species in North America

1 Annual. Leaves narrowly oblong-oblancoolate with a long petiole-like base; corolla 5–6 mm long ........................................................... 92. C. simulans

– Perennial. Leaves various but never narrowly oblong-oblancoolate with a long petiole-like base; corolla more than 10 mm long ........................................ 2

2 Corolla pink, 1.8–4.5 cm long, leaves strongly dimorphic, the upper leaves deeply incised (naturalised in California) ................... 22. C. althaeoides

– Corolla < 2.5 cm long but, if longer, white; leaves not dimorphic; upper stem leaves not deeply incised ........................................ 3

3 Outer sepals 3–4.5 cm long; corolla 3–4 times longer than calyx, usually pink ..................................................................................... 4. C. arvensis

– Outer sepals 6–11 mm long; corolla mostly about twice as long as calyx but, if much more, white ........................................ 4

4 Sepals mostly 9–11 mm long; corolla > 2 cm long ........................................ 5

– Sepals < 8 mm long; corolla < 1.8 cm long ........................................ 6

5 Leaves and stem white-tomentellous; leaves abaxially with prominent raised veins ........................................................................................ 43. C. carrii

– Leaves and stem not white-tomentellous; leaves lacking prominent raised veins ............................................................................ 42. C. equitans var. lindheimeri

6 Leaves ovate-deltoid, neither lobed nor deeply incised, auricles simple; outer sepals narrowed to base; peduncles with 1–5 flowers ........................ 7

– Leaves deeply lobed or incised and/or auricles deeply bifid; outer sepals often truncate to auriculate at base; peduncles with 1–2 flowers, rarely more .... ................................. 42. C. equitans

7 Corolla 1.3–1.8 cm long; leaf margin incised-dentate; sepals reddish-brown .... ........................................................................................................ 52. C. crenatifolius

– Corolla 1–1.5 cm long; leaf margin usually entire or undulate; sepals not reddish-brown ........................................................................ 36. C. farinosus

3. Key to species in Australia

1 Corolla more than 1.5 cm long ................................................................. 2

– Corolla less than 1.5 cm long ..................................................................... 3
Leaves usually strongly dimorphic and/or with narrowly linear segments; sepals > 4 mm long.......................................................... **66. C. angustissimus**
- Leaves not or only weakly dimorphic, the segments never linear; sepals < 4.5 cm long..............................................................**4. C. arvensis**

2 Sepals less than 3 mm long ............................................ **56. C. microsepalus**
- Sepals more than 4 mm long, often much more ........................................... **4**

3 Fruiting pedicels straight or sinuate, never recurved.................................................. **5**
- Fruiting pedicels recurved ........................................................................... **8**

4 Leaves with central lobe entire or undulate; basal auricles distinct, not intergrading with sinuate-margined central lobe; corolla 1–1.5 cm long.............. **58. C. remotus**
- Leaves with central lobe dentate, sinuate or dissected, the basal auricles variously lobed or dentate .............................................................................. **6**

5 Flowers usually solitary, peduncles solitary; seeds winged; corolla 7–9 mm long .......................................................... **61. C. clementii**
- Flowers usually in small axillary cymes, peduncles sometimes paired in leaf axils; seeds unwinged; corolla 9–15 mm long.............................................. **61. C. clementii**

6 Corolla < 10 mm long; stems stout, coarsely hairy ........................................... **62. C. tedmoorei**
- Corolla > 12 mm long; stems relatively slender, softly pubescent or glabrous; corolla 1.2–1.5 mm .......................................................... **65. C. erubescens**

7 Leaves sericeous-tomentose with appressed hairs, basal lobes usually not prominent.................................................................................................. **9**
- Leaves glabrous to roughly pubescent with spreading hairs; basal lobes usually prominent............................................................................... **10**

8 Peduncles very short, < 12 mm long ............................................. **59. C. crispifolius**
- Peduncles > 12 mm long ........................................................................... **60. C. eyreanus**

9 Sepals glabrous to sparsely hairy.................................................. **57. C. graminetinus**
- Sepals pubescent, often densely so .......................................................... **57. C. graminetinus**

10 Seeds winged; corolla 7–9 mm long ............................................. **63. C. recurvatus**
- Seeds unwinged; corolla 9–12 mm long.................................................. **64. C. wimmerensis**

11 Corolla > 2 cm long ................................................................ **4. C. arvensis**
- Corolla < 2 cm long........................................................................... **4**

4. Key to species in New Zealand

1 Leaves dimorphic on the same plant, some being ovate-deltoid in form, others being deeply laciniate with filiform lobes .......................................................... **2**
- Leaves more or less uniform in shape, generally ovate to suborbicular in form ........................................................................... **3**

2 Sepals 6–8 mm long; peduncles not reflexed in fruit .......... **67. C. fractosaxosus**
- Sepals 4–6 mm long; peduncles reflexed in fruit ........... **57. C. graminetinus**

3 Corolla > 2 cm long ................................................................ **4. C. arvensis**
- Corolla < 2 cm long........................................................................... **4**

4 Corolla relatively small, < 14 mm long; plant subglabrous with only a few hairs, these especially on petioles .................................................. **69. C. waitaha**
- Corolla 15–19 mm long; plant pubescent ........................................ **68. C. verecundus**
5. Key to species in Southern Africa

1. Flowers sessile; corolla scarcely exceeding calyx; calyx strongly accrescent in fruit ............................................................... 31. C. argillicola
   – Flowers pedicellate and/or pedunculate; corolla much exceeding calyx; calyx not markedly accrescent in fruit ........................................... 2

2. Calyx < 6 mm long ............................................................................................................. 3
   – Calyx 6–15 mm long ....................................................................................................... 6

3. Corolla 2–4 times longer than the calyx; leaves usually < 2 cm long ............ 4
   – Corolla only slightly exceeding calyx; leaves usually > 2 cm long .................. 35. C. aschersonii

4. Leaves ovate-deltoid, sagittate, never lobed ........................................ 4. C. arvensis
   – Leaves usually lobed or segmented but, if entire, linear-oblong ............. 5

5. Plant completely glabrous, even on the exterior of the corolla; flowers pedunculate ................................................................. 28. C. dregeanus
   – Plant pubescent; flowers pedicellate but peduncles absent or very short ..... 29. C. boedeckerianus

6. Peduncles short or absent, flowers solitary ..................................................... 7
   – Peduncles always present, short or long, 1–5-flowered ................................ 9

7. Leaves with 5–9 linear or filiform lobes; corolla lobes obtuse or rounded .... 30. C. multifidus
   – Leaves usually palmately-lobed, rarely entire, brownish-villous, margins inrolled; sepals obtuse ......................................................... 32. C. ocellatus

8. Leaves always entire, silvery-sericeous, margins not inrolled; sepals acute ...... 33. C. randii
   – Leaves usually palmately-lobed, rarely entire, brownish-villous, margins inrolled; sepals obtuse ......................................................... 32. C. ocellatus

9. Corolla < 15 mm long .................................................................................................. 10
   – Corolla > 15 mm long ............................................................................................... 13

10. Leaves broadly to narrowly triangular to ovate, the base truncate, sagittate or hastate but auricles not lobed .......................... 11
   – Leaves palmately-lobed with the central lobe much longer than the auricles, which are usually bilobed ........................................ 12

11. Flowers solitary; petioles short; plant decumbent to erect, rarely twining; corolla indistinctly lobed ........................................ 37. C. sagittatus
   – Flowers in cymes of 1–6; petioles to 6 cm, plant usually twining; corolla lobed ................................................................................. 36. C. farinosus

12. Central lobe of leaf broad, coarsely serrate to pinnatisect; plant roughly hairy ........................................................................ 34. C. austroafricanus
   – Central lobe of leaf linear-oblong (rarely broad), entire; plant glabrous to finely pubescent ................................................................. 35. C. aschersonii

13. Leaves linear with hastate base ................................................................................. 14
   – Leaves various, usually pinnately to palmately lobed or triangular-ovate ... 15

14. Sepals obtuse; corolla shallowly lobed .................................................................. 25. C. bidentatus
A foundation monograph of *Convolvulus* L. (Convolvulaceae)

6. Key to species in Tropical Africa

1. Undershrub with woody spinescent branches ........................................... 2
   – Plant unarmed although stems sometimes stiff and woody.................. 6
2. Leaves abruptly narrowed at base; flowers in subsessile clusters ............ 3
   – Leaves cuneate at base, flowers solitary or paired, not pilose............... 4
3. Stems and leaves hirsute; flower clusters usually 2–6-flowered; corolla > 12
   mm long; bracteoles 3–5 mm wide ........................................... 104. *C. hystrix* subsp. *hystrix*
   – Stems and leaves glabrous to thinly pubescent; flower clusters 1(-2)-flowered; co-
     rolla 8–10 mm long; bracteoles 1–2 mm wide ... 104. *C. hystrix* subsp. *ruspolii*
4. Flowers shortly pedicellate, solitary or paired; stigmas linear (Somalia) ....
   ................................................................................ 108. *C. verdcourtianus*
   – Flowers sessile, solitary; stigmas clavate (Socotra)............................. 5
5. Ovary glabrous; sepals broadly obovate-elliptic .................................. 106. *C. kossmatii*
   – Ovary hirsute; sepals oblong-lanceolate ........................................ 107. *C. sembaensis*
6. Annual herb; plant entirely herbaceous ............................................... 7
   – Perennial herb or undershrub ................................................................ 10
7. Lamina ovate, abruptly narrowed into a distinct petiole ......................... 8
   – Lamina oblong, lanceolate or oblong (rarely ovate), sessile or narrowed at
     base with petiole not clearly demarcated ......................................... 9
8. Leaves crenate; sepals obtuse; corolla pink ........................................ 7. *C. fatmensis*
   – Leaves entire; sepals acute; corolla blue ........................................ 87. *C. siculus*
9. Flowers 3–6 in sessile axillary clusters .............................................. 93. *C. rhyniospermus*
   – Flowers up to 3 in pedunculate cymes ............................................ 110. *C. rottlerianus*
10. Corolla large, 2.5–4 cm in length; mountain liana ................................ 23. *C. kilimandschari*
    – Corolla < 2 cm in length; low herb if occurring on mountains............... 11
11. Flowers arranged in few- to many-flowered heads, these pedunculate or ses-
    sile, the flower bases often concealed by bracts ................................ 12
    – Flowers solitary or in lax cymes with pedicels clearly developed, flower bases
      usually easily visible ......................................................... 21
12 Leaves linear, < 5 mm long. Undershrub .................. 103. *C. scopulatus*
- Leaves oblong or lanceolate, > 10 cm long. Herbs or undershrubs .......... 13
13 Bracts and calyx glabrous ..................................................97. *C. bidrensis*
- Bracts and calyx variously hirsute ........................................... 14
14 Flower heads subsessile; peduncles < 5 mm long.......................... 15
- Flower heads distinctly pedunculate with peduncles > 10 mm long ....... 18
15 Corolla pale pink or white; woody below .................................. 16
- Corolla blue; herbaceous ...................................................... 17
16 Leaves abruptly narrowed into a short petiole up to 6 mm long; sepals uniform in colour .............................. 104. *C. hystrix* subsp. *inermis*
- Leaves gradually narrowed to base; sepals bicoloured, pale basally, green at the apex ............................................................... 111. *C. prostratus*
17 Leaves obovate, pubescent, up to 10 mm wide; sepals 5–7 mm long ........ 94. *C. capituliferus*
- Leaves oblong-oblancoate, sericeous, < 6mm wide; sepals 8–9 mm long ..... 98. *C. vollesenii*
18 Leaves linear, cuneate at base; bracts linear, appressed to flower head..... 96. *C. stenocladus*
- Leaves suborbicular, ovate, lanceolate or oblong; bracts neither linear nor appressed to flower head ................................................................. 19
19 Leaves suborbicular; plant densely covered in brownish sericeous hairs .... 99. *C. subspathulatus*
- Leaves lanceolate, ovate or oblong; plant not sericeous ..................... 20
20 Leaves usually basally cordate; bracts and sepals villous with brownish hairs; flowers usually whitish ........................................... 101. *C. glomeratus*
- Leaves basally truncate to subhastate; bracts and sepals pubescent; corolla blue .......................................................... 95. *C. jefferyi*
21 Leaves sessile, the base of the lamina attenuate at the base .................. 22
- Leaves petiolate, lamina hastate or sagittate, well demarcated from the petiole ..26
22 Flowers solitary, sessile; stigmas clavate, shorter than the style arm ......... 105. *C. socotranus*
- Flowers grouped into cymes or, if solitary, pedunculate; stigmas linear .... 23
23 Inflorescence racemose in form with very shortly pedunculate cymes .......... 114. *C. sericophyllus*
- Inflorescence paniculate or cymose; flowers with long peduncles .............. 24
24 Herbaceous plant; leaves with sinuate or undulate margins; basal rosette present ....................................................... 115. *C. grantii*
- Herbaceous plant becoming woody with age; leaves entire; basal rosette absent .......................................................... 25
25 Basal leaves villous, ephemeral; bracts linear .................................. 117. *C. bildebrandtii*
- Basal leaves sericeous, persistent; bracts oblong to oblaneolate .............. 116. *C. sarmentosus*
26 Corolla 2–5 times as long as calyx; sepals <4.5 mm long ........ 4. *C. arvensis*
A foundation monograph of *Convolvulus* L. (Convolvulaceae)

35 – Corolla up to twice as long as calyx; sepals usually > 5 mm long ......... 27

27 Leaves crenate; fruiting peduncle reflexed ................................. 7. *C. fatmensis*

– Leaves not crenate; fruiting peduncles not reflexed ....................... 28

28 Erect or twining plant; leaves sericeous with prominent veining on abaxial surface (Zimbabwe) ............................................................ 33. *C. randii*

– Trailing or twining herb, veining on abaxial surface of leaf not prominent .... 29

29 Flowers in 1–7-flowered cymes; peduncles 1.5–12 cm long; corolla < 1.2 cm long .................................................................................. 30

– Flowers usually solitary; peduncles 1–3(-6) cm long; corolla > 1.2 cm long .... 32

30 Central lobe of leaves coarsely dentate; stems and leaves roughly hirsute ...... ................................................................. 34. *C. austroafricanus*

– Central lobe of leaf entire to undulate; stems and leaves farinose to softly pubescent ........................................................................ 31

31 Leaves ovate to triangular; auricles not bifurcate ................... 36. *C. farinosus*

– Leaves oblong or strap-shaped; auricles commonly bifurcate .... 35. *C. aschersonii*

32 Plant densely pubescent to submentose; leaf margins shallowly lobed; outer sepals 9–11 mm long .............................................................. 38. *C. thomsonii*

– Plant thinly to densely pubescent; leaf margin usually entire; sepals 6–8 mm long .............................................................................. 37. *C. sagittatus*

#### 7. Key to species in North Africa

1 Annual herbs; plants slender, herbaceous, never rhizomatous or woody at the base ..................................................................................................... 2

– Perennial herbs or undershrubs, usually robust, the base woody or, if herbae-
ｃeous, rootstock rhizomatous ...................................................................... 11

2 Flowers densely clustered, peduncles and pedicels, absent or, if present, very short ..................................................................................... 3

– Flowers solitary or in lax cymes ................................................................ 5

3 Flower 3–6 in axillary clusters; corolla pale pink (Sahara) ....................... 93. *C. rhyniospermus*

– Flower clusters terminal (formed from the uppermost leaf axils); corolla blue .... 4

4 Corolla c. 1 cm long; ovary and capsule hirsute; some flowers usually present
in uppermost leaf axils (Mediterranean) .................................................... 91. *C. humilis*

– Corolla 1.5–2.5 cm long; ovary and capsule glabrous; flowers all terminal (Morocco) ................................................................................. 86. *C. gharbensis*

5 Leaves petiolate; leaf blade abruptly narrowed to a truncate or cordate base .. 6

– Leaves clearly sessile or leaf blade gradually narrowed to base ............... 8

6 Flowers blue; leaves entire, fruiting peduncle not strongly recurved .......... 7

– Flowers pinkish, leaves crenate; peduncle strongly recurved in fruit .......... 7. *C. fatmensis*

7 Pedicel absent, bracteole adjacent to calyx ................................ 87. *C. siculus subsp. siculus*
– Pedicel present, bracteole distant from calyx... 87. *C. siculus* subsp. *elongatus*

8 Corolla 7–10 mm long, entirely blue ........................................88. *C. pentapetaloidal*
– Corolla 14–40 mm long, usually blue, white and yellow banded ...........9

9 Capsule pubescent; sepals with distinct, different coloured lower and upper portions, pubescent (*C. tricolor*) ...........................................................10
– Capsule glabrous; sepals without distinct upper and lower areas, glabrous to pubescent ........................................89. *C. meonanthus*

10 Upper portion of sepals acute to acuminate, longer than basal portion ....
..................................................................................90. *C. tricolor* subsp. *cupanianus*
– Upper portion of sepals obtuse to acute, shorter than or equalling the basal portion ........................................90. *C. tricolor* subsp. *tricolor*

11 Plant with spinescent branches, at least below ........................................12
– Plant unarmed ..........................................................................................

12 Plant subglabrous to densely sericeous (Morocco and Algeria); flowers solitary or in ebracteate clusters ........................................109. *C. trabutianus*
– Plant densely pilose to tomentose (Egypt); flowers in bracteate heads ......13

13 Leaves < 15 mm long, abruptly narrowed at base; all branches spinescent ....
............................................................................................104. *C. hystrix*
– Leaves 1–3 cm long, tapered at base; only the old basal, often leafless branches spinescent ...........................................................176. *C. lanatus*

14 Leaves attenuate at base and lacking a distinct petiole; plants never twining...15
– Leaves hastate, sagittate or (less commonly oblong), abruptly narrowed into a distinct petiole; plants twining or not ........................................24

15 Mature stems woody and divaricately branched ..........167. *C. dorycnium*
– Mature stems not woody except below, not divaricately branched...........16

16 Stems and leaves with spreading hairs ..........................................................17
– Stems and leaves appressed hairy and more or less sericeous with silvery hairs........................................................................21

17 Sepals with a pale lower portion and green apex; flowers separate or in few-flowered clusters; leaves mostly pilose or pubescent, sometimes subtomentose .... 18
– Sepals uniform in colour; flowers in dense heads; leaves densely tomentose (Sinai)...........................................................................................................20

18 Ovary and capsule hirsute; corolla c. 2 cm long ..........146. *C. cantabrica*
– Ovary and capsule glabrous; corolla <1.5 cm long .................................19

19 Sepals oblong–oblanceolate, acute; inflorescence lax with some flowers separate ..........................................112. *C. pilosellifolius*
– Sepals lanceolate or ovate, acuminate; flowers clustered into heads ........
........................................................................................................111. *C. prostratus*

20 Leaf margin undulate; plants apparently prostrate ......180. *C. schimperi*
– Leaf margin entire; plants ascending to erect ................178. *C. spicatus*

21 Cushion plant; flowers solitary or paired, very shortly peduncled ..........22
– Plants not cushion–forming; flowering stems mostly > 5 cm long, flowers in lax terminal groups ... 23
<table>
<thead>
<tr>
<th>Question</th>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper surface of leaves glabrous (Morocco)</td>
<td>159. C. mazicum</td>
<td></td>
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<tr>
<td>Upper surface of leaves at least thinly pubescent (widespread)</td>
<td></td>
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<tr>
<td>Plant usually &lt; 25 cm high; extreme base of leaf widened and scarious;</td>
<td>156. C. lineatus</td>
<td></td>
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<tr>
<td>plant hirsute or glabrous</td>
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<tr>
<td>Plant usually 20–50 cm high; extreme base of leaf not widened and</td>
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<tr>
<td>scarious; sepals with spreading hairs only</td>
<td>156. C. lineatus</td>
<td></td>
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<tr>
<td>Leaves almost completely entire, occasionally lobed at base</td>
<td>25</td>
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<tr>
<td>Leaves undulate, dentate, sinuate–lobed or incised</td>
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<tr>
<td>Inner sepal longer and more prominent than outer sepals; plant</td>
<td>26</td>
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<td>completely glabrous</td>
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<td>Inner sepal equalling or shorter than the outer sepals; plant</td>
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<td>hirsute or glabrous</td>
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<td>Corolla yellow, 3–4 cm long; outer sepals oblong–obovate without</td>
<td>1. C. scammonia</td>
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<td>recurved apex (East Mediterranean)</td>
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<tr>
<td>Corolla pink &lt; 2.3 cm long, outer sepals sphathulate with reflexed</td>
<td>3. C. durandoi</td>
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<tr>
<td>apex (Algeria)</td>
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<tr>
<td>Stem base herbaceous; plant usually glabrous to adpressed pubescent</td>
<td>28</td>
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<tr>
<td>Stem base woody, plant pubescent, often densely so</td>
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<td>Sepals &lt; 5 mm long</td>
<td>4. C. arvensis</td>
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<tr>
<td>Sepals &gt; 6 mm long</td>
<td>37. C. sagittatus</td>
<td></td>
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<tr>
<td>Corolla yellow or yellowish; stigma much shorter than style;</td>
<td>85. C. supinus</td>
<td></td>
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<tr>
<td>petioles all very short, more or less 1 mm</td>
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<tr>
<td>Corolla blue or white; stigma and style more or less equal or stigma</td>
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<tr>
<td>only slightly shorter; petioles &gt; 2 mm</td>
<td></td>
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<tr>
<td>Leaves more than twice as long as broad, usually acute; bracteoles</td>
<td>83. C. valentinus</td>
<td></td>
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<tr>
<td>0.5 mm wide</td>
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<tr>
<td>Leaves less than twice as long as broad, rounded; bracteoles 1–3.5 mm</td>
<td></td>
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<tr>
<td>wide</td>
<td>84. C. sabatius subsp. mauritanicus</td>
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<tr>
<td>Flowers in compact pilose axillary heads; stigma clavate</td>
<td>101. C. glomeratus</td>
<td></td>
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<tr>
<td>Flowers solitary or in lax cymes or, if clustered, at apex of stem;</td>
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<tr>
<td>stigma linear</td>
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<td></td>
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<tr>
<td>Sepals &lt; 5 mm long</td>
<td>7. C. fatmensis</td>
<td></td>
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<tr>
<td>Sepals &gt; 5 mm long</td>
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<tr>
<td>Flowers clustered at the apex of a peduncle–like stem; stigmas</td>
<td></td>
<td></td>
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<tr>
<td>commonly three</td>
<td>73. C. maidanus</td>
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<tr>
<td>Flowers not clustered, solitary to several; stigmas 2</td>
<td></td>
<td></td>
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<tr>
<td>Perennial herbs with herbaceous base; flowers 1–several; peduncle not</td>
<td></td>
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<tr>
<td>suppressed</td>
<td>35</td>
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<tr>
<td>Woody based plants from Morocco; flowers solitary, peduncle</td>
<td></td>
<td></td>
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<tr>
<td>commonly short</td>
<td>39</td>
<td></td>
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</tbody>
</table>
35 Leaves undulate to sinuate, not dimorphic..............................................36

– Leaves (or some of them) deeply incised, commonly dimorphic with basal leaves differing markedly from upper stem leaves .................................................................37

36 Flowers solitary; leaves truncate (NW Africa) ........................................ 71. C. dryadum

– Flowers up to 5; leaves cordate (East Mediterranean) ...................... 14. C. stachydifolius

37 Corolla yellow..................................................................................15. C. palaestinus

– Corolla pink or white .............................................................................38

38 Leaves sericeous, the segments of the upper leaves linear........................................................................................................22. C. althaeoides subsp. tenuissimus

– Leaves pubescent to pilose, the segments of the upper lanceolate to oblong-elliptic ........................................................................................................22. C. althaeoides subsp. althaeoides

39 Corolla purple, the centre white usually with 5 purple spots; peduncles absent; sepals < 5 mm long ..................................................................................................................21. C. vidalii

– Corolla pink or white, lacking a purple-spotted centre; peduncles almost always present; sepals > 4.5 mm long ..................................................................................40

40 Calyx lanceolate in outline; sepals lanceolate to ovate ................. 19. C. pitardii

– Calyx oblong in outline; sepals obovate, obtuse to truncate .......... 20. C. glaouorum

8. Key to species in the Atlantic Islands

1 Leaves sessile; shrubs or woody-based herbs..............................................2

– Leaves abruptly narrowed into a distinct petiole; herbs or shrubs ........ 5

2 Ovary glabrous; leaves not sericeous; flowers of sessile or pedunculate clusters; plant herbaceous with a woody base (Cape Verde) .......... 111. C. prostratus

– Ovary usually hirsute; leaves sericeous; flowers varied but not in sessile or pedunculate clusters; undershrubs or shrubs (Canaries) .............. 3

3 Prostrate hummock-forming undershrub with spinescent branches ........................................................................................................169. C. caput-medusae

– Erect shrubs or herbs, the branches not spinescent................................ 4

4 Leaves oblong, > 0.5 cm wide; inflorescence terminal, paniculate, many-flowered................................................................. 171. C. floridus

– Leaves filiform to linear < 0.5 cm wide; inflorescence unbranched or sparingly branched, axillary and terminal, few-flowered (< 10) ...... 170. C. scoparius

5 Annual herbs, neither twining nor trailing; corolla blue ....................... 6

– Perennial herbs, lianas or undershrubs, twining or trailing the basal parts often woody ................................................................................................. 8

6 Leaves sessile, tapered at base; corolla 3-coloured ...................... 90. C. tricolor

– Leaves abruptly narrowed into a distinct petiole; corolla entirely blue (C. siculus) ........................................................................................................ 7

7 Pedicels absent, bracteole appressed to base of calyx, filiform to more or less lanceolate................................................................. 87. C. siculus subsp. siculus
– Pedicels borne at least 5 mm below calyx, always filiform.................................87. *C. siculus* subsp. *elongatus*

8

– Calyx < 5 mm long, plant entirely herbaceous ...........................................4. *C. arvensis*

8 – Calyx > 5 mm long, base of plant woody, rarely entirely herbaceous ............9

9

– Corolla 10–15 mm long; plant entirely herbaceous (Azores) ..................36. *C. farinosus*

9 – Corolla > 15 mm long; plant woody at base (Madeira, Canaries) ..........10

10

– Leaves dimorphic, upper leaves deeply segmented....................22. *C. althaeoides*

10 – All leaves similar, upper leaves not deeply segmented ..........................11

11

– Leaves strongly hirsute ..............................................................................12

11 – Leaves glabrous or nearly so ......................................................................14

12

– Leaves elliptic, lanceolate, ovate or oblong, finely pubescent to tomentellous
  beneath ....................................................................................................77. *C. canariensis*

12 – Leaves oblong-ovate, densely villous beneath ........................................77. *C. canariensis*

13

– Leaves ovate, outer sepals 10–13 mm long .............................................80. *C. sp. A*

13 – Leaves linear-lanceolate to oblong, sepals 6–9 mm long ...........................81. *C. fruticulosus* subsp. *fruticulosus*

14

– Cymes long-pedunculate; leaves large 4–11 cm long (Madeira) ....75. *C. massonii*

14 – Cymes borne on peduncles < 2 cm long; leaves < 6 cm long .............15

15

– Leaves < 4 × 1.5 cm wide; cymes 1–2-flowered (Gran Canaria)......................81. *C. fruticulosus* subsp. *glandulosus*

16

– Sepals 9–10 mm long; corolla white with pink midpetaline bands (Lan-
  zarote) .......................................................................................79. *C. lopezsocasii*

16 – Sepals 5 mm long; corolla bluish (Tenerife, La Gomera) ..................78. *C. volubilis*

9. Key to species in Europe

1

– Leaves abruptly narrowed at the base into a distinct petiole ..................2

1 – Leaves gradually narrowed at the base, lacking a distinct petiole ........15

2

– Leaves cuneate or truncate at the base ......................................................3

3

– Leaves sagittate or hastate at the base ......................................................8

3

– Robust plant, densely lanate; sepals obtuse .............................................72. *C. persicus*

3 – Slender plant, pubescent; sepals acute to acuminate ..........................4

4

– Annual herb, corolla 7–12 mm long (*C. siculus*) ..................................5

5

– Perennial herb, corolla 1.5–2 cm long ........................................................6

5

– Pedicels absent, bracteole appressed to base of calyx, filiform to more or
  less lanceolate .....................................................................................87. *C. siculus* subsp. *siculus*

5 – Pedicels borne at least 5 mm below calyx, always filiform .......................87. *C. siculus* subsp. *elongatus*

6

– Pedicels 0–3 mm long; leaves ovate to suborbicular ...............................83. *C. valentinus*

6 – Pedicels 3–12 mm; leaves lanceolate to oblong, often falcate ..................7
Calyx with mostly short appressed hairs

84. C. sabatius subsp. sabatius

– Calyx with spreading hairs only

84. C. sabatius subsp. mauritanicus

8 Leaves strongly dimorphic, the upper leaves deeply divided (C. althaeoides)

– Leaves not strongly dimorphic; the upper leaves not deeply divided

10 Leaves sericeous beneath; leaf segments narrow, linear to oblong

22. C. althaeoides subsp. tenuissimus

– Leaves with spreading, often slightly asperous hairs; leaf segments mostly broad

22. C. althaeoides subsp. althaeoides

10 Sepals < 5 mm long

11

– Sepals > 5 mm long

12 Flowers very small; capsule pubescent, borne on recurved peduncles

6. C. mairei

– Flowers usually 15–25 mm long; capsule glabrous, not recurved

4. C. arvensis

12 Corolla < 17 mm long. Portugal

13

– Corolla 25–45 mm long. Eastern Europe

14 Leaves strongly dimorphic, the upper leaves deeply divided (C. althaeoides)

92. C. fernandesii

– Twining or decumbent perennial herb with herbaceous stems; leaves usually triangular, acute, farinose or pubescent; corolla 10–15 mm long

36. C. farinosus

14 Plant glabrous; flowers yellow; sepals emarginate and apiculate

1. C. scammonia

– Plant pubescent; flowers usually pink; sepals acute or acuminate

11. C. betonicifolius

15 Annual herbs; plants entirely herbaceous

16

– Perennial plants, at least the basal portions and rootstock woody

20 Flowers sessile or nearly so, peduncle and pedicel shorter than calyx

91. C. humilis

– Flowers distinctly pedunculate, the peduncle and pedicel several times longer than the calyx

17

– Corolla 7–10 mm long, entirely blue

88. C. pentapetaloides

– Corolla 14–40 mm long, usually blue, white and yellow banded

18 Capsule pubescent; sepals with distinct, different coloured lower and upper portions, pubescent (C. tricolor)

19

– Capsule glabrous; sepals without distinct upper and lower areas, glabrous to pubescent

89. C. meonanthus

19 Upper portion of sepals acute to acuminate, longer than basal portion

90. C. tricolor subsp. cupanianus

– Upper portion of sepals obtuse to acute, shorter than or equalling the basal portion

90. C. tricolor subsp. tricolor

20 Cushion plants with prostrate stems with or without short flowering stems

21

– Plants not cushion forming; flowering stems at least 5 cm high

25

– Flowering stems absent or extremely short

22

– Short but distinct flowering stems present

24 Leaves glabrous above, midrib only distinct

161. C. libanoticus

– Leaves sericeous above, lateral veins distinct (C. boissieri)
Indumentum of sepals more or less spreading and distinct from that of the leaves (Spain) .............................................................. 154. *C. boissieri* subsp. *boissieri*
– Indumentum of leaves and sepals similar (Balkans) .............................................................. 154. *C. boissieri* subsp. *compactus*

Lateral veins distinct (Bulgaria) ........................................... 155. *C. suendermannii*
– Lateral veins not distinct (widespread) .............................. 156. *C. lineatus*

Mature stems woody and divaricately branched .......... 167. *C. dorycnium*
– Mature stems not woody, or only so below, not divaricately branched .......... 26

Plants silvery-sericeous, the hairs appressed ......................... 27
– Plants densely pubescent to pilose, some hairs conspicuously spreading .......... 33

Outer sepals more or less cordate at the base, conspicuously gibbous .............................................................. 153. *C. holosericeus*
– Outer sepals neither cordate basally nor gibbous .................................................. 28

Flowers in dense heads overtopped by bracts, which form a kind of involucre .................................................................................................. 29
– Flowers in lax terminal groups, the pedicels usually obvious ........................................ 31

Ovary and capsule glabrous (Spain and France) ............. 165. *C. lanuginosus*
– Ovary and capsule hirsute ........................................................................ 30

Stem leaves distant, few; sepals all acuminate (Caucasus) .............................................................. 151. *C. calvertii* subsp. *ruprechtii*
– Stem leaves imbricate, numerous, some sepals obtuse (Adriatic region) ........ 166. *C. cneorum*

Cliff plant with long pendent stems .................................. 158. *C. argyrothamnos*
– Plant of open slopes, decumbent to erect .............................................................................. 32

Plant usually < 25 cm high; extreme base of leaf widened and scarious .......... 156. *C. lineatus*
– Plant usually 20–50 cm high; extreme base of leaf not widened and scarious .......... 157. *C. oleifolius*

Inflorescence with flowers clustered at apex of stem .................. 34
– Inflorescence lax ........................................................................ 146. *C. cantabrica*

Sepals densely pilose ........................................................................ 151. *C. calvertii* subsp. *calvertii*
– Sepals with scattered spreading hairs ........................................................................ 152. *C. sericocephalus*

10. Key to species in the Levant

1 Annual herbs; plants slender, herbaceous, never rhizomatous or woody at the base .............................................................. 2
– Perennial herbs or undershrubs, usually robust, the base woody or, if herbaceous, rootstock rhizomatous .............................................................. 91. *C. humilis*

2 Flowers densely clustered at the apex, peduncles and pedicels, absent or, if present, very short .............................................................. 3
– Flowers solitary or in lax cymes ........................................................................ 18. *C. coelestis*
- Sepals acute to obtuse, lacking a distinct terminal mucro.................4
- Leaves petiolate; leaf blade abruptly narrowed to a truncate or cordate base... 5
- Leaves clearly sessile or leaf blade gradually narrowed to base...............8
- Flowers blue; leaves entire, fruiting peduncle not strongly recurved ...........

..............................................................................................................87. *C. siculus*
- Flowers pinkish, leaves crenate; peduncle strongly recurved in fruit ............7. *C. fatmensis*

6 Corolla 7–10 mm long, entirely blue........................................88. *C. pentapetaloides*
- Corolla 14–40 mm long, usually blue, white and yellow banded ...90. *C. tricolor*
7 Leaves distinctly petiolate, base of lamina hastate, sagittate, cordate, rounded or very broadly cuneate...........................................................................8
- Leaves sessile or base of lamina tapering at base.................................22
8 Inner sepals conspicuously longer than outer sepals; plant glabrous (including midpetaline bands); corolla yellow ......................................................9
- Inner sepals equalling or shorter than outer sepals; plant hirsute at least on the midpetaline bands; corolla pink or white (yellowish only in *C. palaestinus*) ..........10
9 Rigidly erect, divaricately branched plant.................................2. *C. pseudoscammonia*
- Trailing plant, stems not divaricately branched .........................1. *C. scammonia*
10 Flowers in axillary, pedunculate, pilose heads...........................101. *C. glomeratus*
- Flowers solitary or in lax cymes, never arranged in dense pilose heads.....11
11 Leaf base broadly cuneate to rounded; undershrub with tomentose leaves and solitary white flowers .............................................................72. *C. persicus*
- Leaf base hastate, sagittate or truncate; trailing or twining herbs, only slightly woody at base; flowers or not, commonly pinkish......................12
12 Sepals < 6 mm long; leaves never deeply incised or lobed...............13
- Sepals > 6 mm long; upper leaves often incised or dentate...............15
13 Leaf margin entire; fruiting peduncles not recurved.................14
- Leaf margin strongly crenate; fruiting pedicels recurved...............7. *C. fatmensis*
14 Sepals < 4.5 mm long, scarious-margined ........................................4. *C. arvensis*
- Sepals 5.5–6 mm long, margins not scarious...........................12. *C. longipedicellatus*
15 Sepals 10–15 mm long, leaf margin entire to obscurely undulate........11. *C. betonicifolius*
- Sepals 6–10 mm long, leaf margin crenate dentate to incised........16
16 Leaves dimorphic, at least the upper ones incised; ovary glabrous; corolla pink or white..............................................................17
- Leaves not dimorphic nor upper leaves incised except sometimes in *C. palaestinus*, which has a yellow corolla; ovary hirsute or glabrous........18
17 Leaves sericeous, the segments of the upper leaves linear..........................22. *C. althaeoides subsp. tenuissimus*
- Leaves pubescent to pilose, the segments of the upper lanceolate to oblong-ellipti ......................................22. *C. althaeoides subsp. althaeoides*
18 Leaves glabrous with a ciliate margin ........................................13. *C. cassius*
- Leaves densely pubescent to tomentose........................................19
19 Corolla yellow; leaves commonly dimorphic..............................15. *C. palaestinus*
– Corolla pink or white, leaves never dimorphic .............................................20

20 Ovary glabrous; sepals obovate to broadly elliptic, leaves sinuate, coarsely pubescent........................................................................14. *C. stachydifolius*

– Ovary hirsute (? rarely glabrous); sepals obovate to elliptic; leaves undulate to crenate, softly tomentose.................................................................21

21 Leaves with spreading hairs; sepals acute; corolla white to pale pink..........

.........................................................17. *C. germanicai*

– Leaves uniformly short-tomentose; sepals apiculate; corolla pink ............

.................................................................16. *C. galaticus*

22 Flowers several in axillary heads; leaves, stem and sepals densely villous ....23

– Flowers in terminal heads (sometimes a few axillary also) or not in head-like structures; stem and leaves glabrous, pubescent, pilose or sericeous.........27

23 Bracts ovate, cordate, up to 3 cm wide; leaves reticulate below .............185. *C. reticulatus*

– Bracts oblong-elliptic or lanceolate, up to 1.5 cm wide; leaves not reticulate below .........................................................................................24

24 Flower heads sessile or subsessile .........................................................25

– Flower heads pedunculate .....................................................................26

25 Lower, old stems spinescent, stems ascending, < 40 cm long...176. *C. lanatus*

– Plant unarmed, stems procumbent, > 40 cm long.................................177. *C. secundus*

26 Bracts linear to lanceolate, < 0.5 cm wide ........................................179. *C. jordanensis*

– Bracts oblong-elliptic or lanceolate 0.5–1.5 cm wide .........................178. *C. spicatus*

27 Plants with branched stems forming a lax open inflorescence ...............28

– Plants with compact terminal inflorescences or cushion plants, never forming a much branched open inflorescence......................................33

28 Corolla white, c. 1 cm long; stem glabrous .......................113. *C. chondrilloides*

– Corolla pink or with pink midpetaline bands, > 1 cm long, stem appressed hairy to pilose...........................................................29

29 Ovary glabrous .....................................................................................30

– Ovary hirsute .......................................................................................32

30 Corolla 1–1.5 cm long; stems flexible, herbaceous, pilose ....................

.................................................................112. *C. pilosellifolius*

– Corolla 2–2.5 cm long; stems stiff and woody, appressed pubescent .......31

31 Sepals at apex abruptly narrowed and mucronate..............................

.................................................................167. *C. dorycnium* subsp. *dorycnium*

– Sepals gradually narrowed to an acute or acuminate apex...................

.................................................................167. *C. dorycnium* subsp. *oxysepalus*

32 Stems and leaves densely spreading pilose; leaves all oblong (Gaziantep region)....................................................................................147. *C. aucharri*

– Stems and leaves pubescent or thinly pilose; leaves variously shaped, often oblong-spathulate near the base of the stem, rarely oblong....146. *C. cantabrica*

33 Leaves and stem adpressed-sericose ..................................................34

– Leaves and stem with spreading hairs (often also sericose) or more or less glabrous .................................................................39

34 Sepals with a conspicuous pouch near base .....................................35
11. Key to species in the Arabian Peninsula (including Socotra)

1 Plants annual; all parts of the plant herbaceous .............................................. 2
   - Plants perennial; plants usually woody below, but, if entirely herbaceous, with perennial rhizomatous roots ................................................................. 4
2 Leaves crenate; sepals obtuse; corolla pink ...................................................... 7. C. fatmensis
   - Leaves entire; sepals acute; corolla blue ..................................................... 3
3 Pedicels absent, bracteole appressed to base of calyx, filiform to more or less lanceolate ................................................................. 87. C. siculus subsp. siculus
   - Pedicels borne at least 5 mm below calyx, always filiform .......................... 87. C. siculus subsp. elongatus
4 Trailing or twining herbs with leaves abruptly narrowed at the base into a distinct petiole; plants not with woody stems nor flowers arranged in head-like clusters ................................................................. 5

- Sepals lacking a conspicuous pouch near base ........................................... 36
- Sepals < 10 × 8 mm ........................................ 153. C. holosericeus subsp. holosericeus
- Sepals > 11 × 11 mm ........................................ 153. C. holosericeus subsp. macrocalycinus

- Dwarf cushion-forming shrublet .................................................................... 37
- Low perennial with woody base and distinct ascending or erect stems .... 38
- Sepals with conspicuous spreading hairs; leaves with forked central vein ... 154. C. boissieri subsp. compactus
- Sepals with appressed hairs; leaves with one simple central vein ................................................................. 160. C. phrygius

- Plant usually < 25 cm high; extreme base of leaf widened and scarious; sepals sericeous and spreading pilose ................................................................. 156. C. lineatus
- Plant usually 20–50 cm high; extreme base of leaf not widened and scarious; sepals with spreading hairs only ........................................................... 39

- Flowers clustered, usually at apex of peduncle-like stem; plants cushion-forming or not ................................................................. 40
- Flowers solitary or clearly separate in a lax terminal cyme; plants strictly cushion forming ...................................................................................................... 44

- Outer sepals bicoloured with a pale base and green apex .......................... 151. C. calvertii
- Outer sepals uniformly coloured ................................................................. 151. C. calvertii

- Corolla < 1.5 cm long .................................................................................. 112. C. pilosellifolius
- Corolla > 1.5 cm long .................................................................................. 42

- Stems, leaves, sepals and ovary glabrous or nearly so .................................. 164. C. carduchorum
- Stems, leaves, sepals and ovary conspicuously pilose .................................. 43

- Plant < 15 cm high; sepals with long caudate apex .................................... 163. C. cataonicus
- Plant usually > 25 cm high; sepals acute to acuminate ............................. 146. C. cantabrica

- Plant with conspicuous spreading hairs; corolla pink .............................. 162. C. assyricus
- Plant subglabrous or thinly appressed pubescent; corolla white or pale pink ...
Herbs or shrubs, never twining or trailing, leaves gradually narrowed at the base, lacking a distinct petiole but if petiolate, stems woody or flowers in head-like clusters .......................................................................................... 9

– Corolla > 15 mm long; flowers usually solitary ............................. 6

– Corolla < 12 mm long; flowers 1–5 in axillary cymes .................... 7

– Sepals < 4.5 mm long; plant usually glabrescent ..................... 4. C. arvensis

– Sepals > 6 mm long; plant pubescent ................................... 37. C. sagittatus

– Leaves crenate; fruiting peduncles deflexed .............................. 7. C. fatmensis

– Leaves not crenate, entire apart from (sometimes) forked auricles or weakly sinuate margins; fruiting peduncles not deflexed ......................... 8

Central leaf lobe ovate to triangular in outline; basal auricles not forked; plant often twining .......................................................... 36. C. farinosus

– Central leaf lobe linear-oblong in outline; basal auricles sometimes forked; plant usually trailing ......................................................... 35. C. aschersonii

– Leaves with lamina abruptly narrowed at base and clearly separate from the (sometimes very short) petiole; stigmas clavate or at least thickened upwards... 10

– Leaves sessile or with lamina attenuate at base with no distinct petiole; stigmas various ................................................................................. 14

Flowers in hirsute heads, the hairs spreading and somewhat concealing the calyx ........................................................................................................ 11

– Flowers solitary; sepals glabrous or sericeous, easily visible (Oman) ............... 70. C. leiocalycinus

– Flower heads pedunculate ................................................................ 12

– Flower heads sessile or nearly so .................................................. 13

Leaves glabrous; stems woody, sometimes spinescent ............. 100. C. virgatus

– Leaves pubescent; stems herbaceous (except below), never spinescent ........ 101. C. glomeratus

Spiny undershrub; leaves all alternate; flower clusters of up to 6 flowers........ 104. C. hystrix

– Unarmed undershrub; leaves often opposite towards branch tips; flowers usually 1–2 together ......................................................... 102. C. oppositifolius

Branches spinescent ........................................................................ 15

– Branches not spiny although sometimes woody and rigid .......... 21

Flowers solitary or clustered, sessile; sterile spinescent peduncles absent .... 16

– Flowers solitary or clustered borne on spinescent peduncles; sterile peduncles often present as spines (Oman) ........................................ 142. C. acanthoclados

Sepals addressed pubescent; stigma clavate, shorter than style arm (Socotra) ... 17

– Sepals with spreading hairs; stigmas linear, co-extensive with style arm ...... 18

Ovary glabrous; sepals broadly obovate-elliptic ................................ 106. C. kossmatii

– Ovary hirsute; sepals oblong-lanceolate ..................................... 107. C. sembaensis

Sepals long-pilose with woolly hairs (Oman) ................................ 189. C. ulicinus

– Sepals densely pubescent to tomentose but lacking long woolly hairs .... 19

Plant with long, slender, spine-tipped branches, short spinescent side shoots absent or very few .................................. 172. C. oxyphyllus subsp. oxyphyllus
Plant with stout spinescent primary branches and numerous short (< 4 cm long), usually stout lateral spine-like shoots ................................................. 20

Leaves with rigid, acute apex, basal leaves not undulate; flowers usually in clusters of > 1, clusters elongating at maturity .................................................................

Leaves with soft obtuse to subacute apex, the basal leaves often undulate; flowers mostly solitary .................................................. 173. C. hamrinensis

Flowers arranged in sessile or pedunculate, pilose clusters .......................... 22

Flowers arranged in a lax open inflorescence or sessile or shortly pedunculate along an elongate axis, not in pilose cluster ................................................... 28

Nearly leafless subshrub with glabrous to adpressed pubescent stem and leaves; leaves minute, linear, < 5 mm long (Hadramaut) ... 103. C. scopulatus

– Leafy plants at least basally; leaves and stem pubescent, pilose or villous; leaves > 2 cm long .............................................................. 23

23

Sepals bicoloured, base colourless, apex greenish; ovary glabrous............. 24

– Sepals uniformly coloured green; ovary hirsute .................................. 25

24

Flowers usually more or less solitary, sometimes clustered; sepals oblong with an acute apex ...................................................... 112. C. pilosellifolius

– Flowers in heads, very rarely solitary; sepals gradually narrowed to an acute to long acuminate apex .................................................. 111. C. prostratus

25

Heads subsessile; dwarf mountain plant with stems < 10 cm high (Asir)...... 183. C. asyrensis

– Heads pedunculate; desert plant with stems usually >15 cm ................. 26

26

– Stems and leaves with long villous hairs; style pilose .......................... 181. C. cephalopodus subsp. bushiricus

– Stems and leaves shortly hairy; style glabrous or nearly so ........................ 181. C. cephalopodus subsp. cephalopodus

27

Sepals bicoloured; base colourless, apex greenish.................................. 112. C. pilosellifolius

– Sepals uniformly green ........................................................................ 28

28

Leaves sinuate margined; basal rosette persistent; plant entirely herbaceous (Abd ul Kuri Island) .............................................................. 115. C. grantii

– Leaf margins entire; basal rosette absent or ephemeral; plant usually woody at least below ................................................................. 29

29

Ovary hirsute; corolla deeply lobed; undershrub to 3 m with very rigid branches and peduncles arising at 90° to each other (Saudi Arabia) .... 120. C. erinaceus

– Ovary glabrous; corolla shallowly lobed; herbs or undershrubs to 50 cm, branching not as above ................................................................. 30

30

Flowers sessile or nearly so, forming a long narrow inflorescence .......... 31

– Flowers borne on conspicuous, often rigid peduncles; inflorescence open 32

31

Flowers solitary (Socotra) ................................................................. 105. C. socotr anus

– Flowers in very shortly pedunculate cymes (Yemen) .......................... 114. C. sericophyllus

32

Peduncles bearing monochasial cymes, inflorescence pubescent (Oman) .... 118. C. peninsularis
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– Peduncles mostly bearing single flowers; inflorescence almost glabrous except sepals ................................................................. 33

33 Basal leaves villous, ephemeral; bracts linear............ 117. *C. hildebrandtii*

– Basal leaves sericeous, persistent; bracts oblong or oblanceolate................................. 116. *C. sarmentosus*

12. Key to species in the Indo-Iranian region

1 Plants annual; all parts of the plant herbaceous................................. 2

– Plants perennial; plants usually woody below, but, if entirely herbaceous, with perennial rhizomatous roots......................................................... 7

2 Lamina ovate, abruptly narrowed into a distinct petiole............. 3

– Leaves oblong, lanceolate or oblong (rarely ovate), sessile or narrowed at base with petiole not clearly demarcated........................................... 4

3 Leaves crenate; sepals obtuse; corolla pink............. 7. *C. fatmensis*

– Leaves entire; sepals acute; corolla blue .................. 87. *C. siculus*

4 Flowers solitary, corolla blue .................................. 88. *C. pentapetaloides*

– Flowers clustered or grouped, very rarely solitary; corolla pinkish ............. 5

5 Flowers 3–6 in sessile axillary clusters................ 93. *C. rhyniospermus*

– Flowers up to 3 in pedunculate cymes.................................................................

6 Sepals glabrous ........................................... 110. *C. rottlerianus subsp. stocksii*

– Sepals adpressed-pilose.......... 110a. *C. rottlerianus subsp. rottleri anus*

7 Trailing or twining herbs with leaves abruptly narrowed at the base into a distinct petiole; plants not with woody stems nor flowers arranged in head-like clusters... 8

– Herbs or shrubs, never twining or trailing, leaves gradually narrowed at the base, lacking a distinct petiole but if petiolate, stems woody or flowers in head-like clusters................................................................. 15

8 Sepals < 5 mm long ........................................... 1

– Sepals > 6 mm long ........................................... 9

9 Leaves crenate; fruiting peduncles deflexed ........... 7. *C. fatmensis*

– Leaves entire; fruiting peduncles not deflexed ........ 4. *C. arvensis*

10 Plant completely glabrous; corolla yellow ................ 1. *C. scammonia*

– Plant pubescent at least on the midpetaline bands and usually elsewhere; corolla variously coloured ................................................................. 11

11 Sepals rectangular in form (Afghanistan)................... 12

– Sepals variously shaped, never rectangular in form (India, Iran, Iraq)......... 13

12 Leaves entire, densely hirsute .................................. 74. *C. lanjouwii*

– Leaves sinuate-margined, sparsely pubescent........ 75. *C. rectangularis*

13 Ovary and capsule hirsute; sepals bicoloured with distinct apical portion; leaves entire to undulate.................................................. 11. *C. betonicifolius*

– Ovary and capsule glabrous; sepals lacking a distinctly coloured apical portion; leaves undulate to sinuate or dentate........................................... 14
Corolla < 1.2 cm long, white or cream (India).................................10. C. rufescens
– Corolla 2.5–3.5 cm long, pink or purplish.............................14. C. stachydifolius
Leaves distinctly petiolate, the lamina clearly separate from the petiole....16
– Leaves sessile or with lamina attenuate or cuneate at base with no distinct
petiole..................................................................................................19
Flowers in pedunculate hirsute heads..............................................17
– Flowers solitary .............................................................................18
Leaves glabrous; stems woody, sometimes spinescent ............100. C. virgatus
– Leaves pubescent; stems herbaceous (except below), never spinescent
.................................................................................................101. C. glomeratus
Spiny undershrub; leaves glabrous to finely sericeous, < 1 cm wide...
...............................................................................................70. C. leiocalycinus
– Unarmed undershrub; leaves tomentose, 1–3.5 cm wide............72. C. persicus
Plant spiny or with spinescent branches.....................................20
– Plant unarmed, although branches sometimes rigid and hard ..........30
Flowers in a terminal cluster towards the apex of the stem ..........21
– Flowers mostly or entirely axillary..................................................22
Ovary and style glabrous; primary branches only spinescent ........188. C. oxysepalus
– Ovary and style hirsute; lateral shoots spinescent as well as primary branches...
.................................................................................................145. C. turrillianus
Flowers borne on spinescent peduncles; sterile spines often also present...23
– Flowers sessile or nearly so; sterile spines usually absent .............27
Outer sepals much shorter than the inner sepals ..................140. C. spinosus
– Outer and inner sepals similar in length..............................................24
Sepals 3–10 mm long .................................................................138. C. fruticosus
– Sepals long-pilose ........................................................................26
– Sepals adpressed pubescent ............................................141. C. argyracanthus
Sepals 4–5 mm long, thinly pilose; corolla 1.5–1.7 cm long
...............................................................................................143. C. iranicus
– Sepals 7–10 mm long, densely pilose; corolla 1.6–2.5 cm long
...............................................................................................142. C. acanthocladus
Sepals 12–15 mm long ...............................................................144. C. urosepalus
– Sepals < 8 mm long ....................................................................28
Plant with long, slender, spine-tipped branches, short spinescent side shoots
absent or very few ........................................................................172. C. oxyphyllus subsp. oxyphyllus
– Plant with stout spinescent primary branches and numerous short (< 4 cm
long), usually stout lateral spine-like shoots ..................................29
Leaves with rigid, acute apex, basal leaves not undulate; flowers usually in
clusters of > 1, clusters elongating at maturity.................................172. C. oxyphyllus subsp. oxycladus
A foundation monograph of *Convolvulus* L. (Convolvulaceae)

Leaves with soft obtuse to subacute apex, the basal leaves often undulate; flowers mostly solitary .......................................................... 173. *C. hamrinensis*

- Flowers arranged in dense terminal or axillary heads or clusters .................. 31
- Flowers variously arranged in a lax, branched inflorescence ......................... 54

31 Heads terminal (occasionally with a few flowers below the terminal head) ........ 32
- Heads axillary, sometimes terminal as well ................................................ 40

32 Plant with woody stems ............................................................................ 33
- Plant with herbaceous stems, woody only at the base ................................ 35

33 Leaves with impressed veins, hairs dense but short; sepals < 10 mm long; Corolla < 1.2 cm long ........................................................................ 190. *C. scindicus*
- Leaves without impressed veins; sepals > 10 mm long; corolla > 1.5 cm long... 34

34 Ovary and style glabrous; stigmas c. 6 mm long................................. 188. *C. oxysepalus*
- Ovary and style hairy; stigmas c. 3 mm long........................................... 145. *C. turrillianus*

35 Plant silvery-sericeous; inflorescence very lax with individual peduncles and pedicels clearly visible ......................................................... 36
- Plant not sericeous or, if somewhat so, inflorescence of dense heads with individual peduncles and pedicels not easily visible ....................... 37

36 Outer sepals with a conspicuous pouch; plant to 30 cm... 153. *C. holosericeus*
- Outer sepals lacking a conspicuous pouch; plant usually < 10cm... 156. *C. lineatus*

37 Leaves linear, < 0.2 cm wide................................................................. 148. *C. schirazianus*
- Leaves oblance-elliptic or oblanceolate, > 5 cm wide............................... 38

38 Stem with spreading hairs ....................................................................... 39
- Stem with appressed hairs ....................................................................... 149. *C. commutatus*

39 Heads solitary, strictly terminal ......................................................... 151. *C. calvertii* subsp. *calvertii*
- Heads with 1–2 flower groups below terminal heads............................... 150. *C. elymaiticus*

40 Lower peduncles absent or < 0.5 cm long; heads sessile or nearly so .......... 41
- Lower peduncles well-developed, > 1 cm long; heads mostly distinctly pedunculate ....................................................................................... 44

41 Cushion herbs from which arise erect flowering stems, ovary comose....
.................................................................................................................. 184. *C. aitchisonii*
- Plants not cushion forming, ovary glabrous or hirsute........................... 42

42 Sepals bicoloured, the base pale, apex green; ovary glabrous................
.................................................................................................................. 111. *C. prostratus*
- Sepals of uniform colour; ovary hirsute at apex ..................................... 43

43 Branches rigid and woody; leaves apiculate; corolla < 1.5 cm long; corolla < 1.5 cm long; flowers usually 1–3................................................. 172. *C. oxyphyllus*
- Branches not noticeably rigid; leaves acute but not apiculate; corolla > 1.5 cm long; heads many-flowered ................................................. 186. *C. stapfii*

44 Ovary glabrous, at least at apex .............................................................. 45
- Ovary glabrous ....................................................................................... 47

45 Sepals 14–16 mm, ovate with a long aristate point, almost half its length.... 187. *C. cephalophorus*
- Sepals 10–12 mm, lanceolate to ovate, acuminate but not long-aristate .... 46
46 Stems and leaves with long villous hairs; style pilose ................................. 181. *C. cephalopodus* subsp. *bushiricus*

– Stems and leaves shortly hairy; style glabrous or nearly so ............................ 181. *C. cephalopodus* subsp. *cephalopodus*

47 Plant densely brown-velvety-tomentose; leaves reticulate .......................... 48

– Leaf indumentum not as above; leaves not reticulate ..................................... 49

48 Stem stout, 4–5 mm wide; bracteoles elliptic, 4–5 mm wide, sepals obovate...... 185. *C. reticulatus* subsp. *waltherioides*

– Stem relatively slender, < 3 mm wide; bracteoles lanceolate, 2–3 mm wide; sepals lanceolate ........................................ 185. *C. reticulatus* subsp. *reticulatus*

49 Sepals bicoloured; base colourless, apex greenish ....................................... 50

– Sepals uniformly coloured green .................................................................... 52

50 Corolla 1.7–2.5 cm long, ovary and capsule hirsute .................................. 146. *C. cantabrica*

– Corolla 1–1.5 cm long; ovary and capsule glabrous .................................... 51

51 Flowers usually more or less solitary, sometimes laxly clustered, sepals oblong with an acute apex ............................................................. 112. *C. pilosellifolius*

– Flowers always in dense heads, sepals tapered to an acute to long acuminate apex .......................................................... 111. *C. prostratus*

52 Only lower heads pedunculate; heads on upper part of stem sessile .......... 53

– All heads distinctly pedunculate except perhaps the uppermost ..................... 182. *C. euphraticus*

53 Bracts < 3 × 1 cm, lanceolate (Iraq–Iran) ..................................................... 174. *C. kotschyanus*

– Bracts mostly 3–4 × 1.2–2 cm, ovate (Afghanistan) ................................. 175. *C. pyrrotrichus*

54 Sepals bicoloured, pale below with a green apex; plants with herbaceous stems, flowers somewhat clustered ......................................................... 55

– Sepals of one colour; plants commonly with woody rigid stems, few leaves and flowers well separated ............................................................ 56

55 Corolla < 1.5 cm long; ovary and capsule glabrous; sepals oblong-ovate... 112. *C. pilosellifolius*

– Corolla 1.7–2.5 cm long; ovary and capsule hirsute; sepals ovate to lanceolate, acuminate ......................................................... 146. *C. cantabrica*

56 Sepals glabrous or nearly so ........................................................................ 57

– Sepals pubescent, canescent or otherwise hirsute .................................... 63

57 Stems completely glabrous ................................................................. 113. *C. chondrilloides*

– Stems adpressed pubescent ............................................................... 58

58 Corolla 1.7–2 cm long, pink ...................................................................... 59

– Corolla < 1.5 cm long, white or very pale pink ........................................... 60

59 Sepals obovate, mucronate, c. 5 mm long ........................................................ 131. *C. pseudocantabrica* subsp. *pseudocantabrica*

– Sepals oblong, acuminate, c. 7 mm long .......................................................... 131. *C. pseudocantabrica* subsp. *askabodensis*

60 Leaves filiform ................................................................................................ 61

– Leaves linear, oblong or ob lanceolate .......................................................... 62

61 Sepals ovate .......................................................................................... 128. *C. kurdistanicus*
A foundation monograph of Convolvulus L. (Convolvulaceae)  

1 Plant an annual herb; flowers solitary, blue ......................... 88. C. pentapetaloides
   – Plant perennial, herbaceous or woody; flowers pink, white or yellow ............ 2

2 Trailing or twining herbs with leaves abruptly narrowed at the base into a distinct petiole; plants not with woody stems nor flowers arranged in head-like clusters ......................... 3
   – Herbs or shrubs, never twining or trailing, leaves gradually narrowed at the base, lacking a distinct petiole but if petiolate, stems woody ............ 7

3 Sepals < 5 mm long .......................................................... 4. C. arvensis
   – Sepals > 5 mm long .......................................................... 4

4 Corolla < 2.8 cm long, pink, flowers usually solitary .................. 5
   – Corolla >2.8 cm long, white, yellowish or pink, flowers usually more than one .......................................................... 6

52

13. Key to species in the Former Soviet Union
Leaves with an elongated strap-shaped central lobe ................................................. 5. *C. chinensis* subsp. *chinensis*
– Leaves triangular in form ................................................................. 5. *C. chinensis* subsp. *triangularis*

Plant completely glabrous; inner sepals longer than outer sepals ....................
.............................................................................................................. 1. *C. scammonia*
– Plant hirsute; inner sepals equaling or shorter than outer sepals ............................ 11. *C. betonicifolius*

Undershrubs with petiolate leaves, the lamina abruptly narrowed at base.... 8
– Herbs or undershrubs with sessile leaves or leaves gradually narrowed into an
indistinct petiole .......................................................................................... 9

Spiny undershrub; leaves glabrous to finely sericeous, < 1 cm wide ...................
.................................................................................................................. 70. *C. leiocalycinus*
– Unarmed undershrub; leaves tomentose, 1–3.5 cm wide .... 72. *C. persicus*

9 Plant spiny or with spinescent branches ........................................................... 10
– Plant unarmed, although branches sometimes rigid and hard .................... 14

10 Flowers in a terminal inflorescence ............................................................ 11
– Flowers axillary ......................................................................................... 12

11 Branches all spinescent; lower leaves oblanceolate-obovate; flowers 1–several
in a terminal cluster .................................................................................... 137. *C. spinifer*
– Only the old lower branches spinescent; lower leaves linear to narrowly oblan-
ceolate; flowers in a terminal cyme ......................................................... 134. *C. grigorjevii*

12 Flowers borne on spinescent peduncles; sterile spines often also present .... 13
– Flowers sessile or nearly so; sterile spines absent ................................. 136. *C. tragacanthoides*

13 Outer sepals glabrous, much larger than the inner sepals .............................. 139. *C. gortschakovii*
– Outer sepals pubescent, equalling or smaller than the inner sepals ............
.................................................................................................................. 138. *C. fruticosus*

14 Flowers arranged in terminal heads or clusters, occasionally with a few flowers
on the stem below the main cluster; stems herbaceous (if woody, see 134. *C.
krauseanus*) ............................................................................................. 15
– Flowers variously arranged in lax, branched inflorescences, stems often
woody ........................................................................................................ 15

15 Leaves, stem and sepals all silvery-sericeous ............................................. 20
– Leaves, stem or sepals with conspicuous spreading hairs, sometimes sericeous
as well .......................................................................................................... 18

16 Inflorescence a compact head, pedicels and peduncles not clearly visible.....
.............................................................................................................. 151. *C. calvertii* subsp. *ruprechtii*
– Inflorescence lax, pedicels and peduncles easily visible ............................. 17

17 Outer sepals conspicuously pouches (Crimea); plant to 30 cm .................
.............................................................................................................. 153. *C. holosericeus*
– Outer sepals lacking a conspicuous pouch; plant rarely exceeding 15 cm ......
.............................................................................................................. 156. *C. lineatus*

18 Stem with spreading hairs ......................................................................... 19
– Stem with appressed hairs .................................................................... 19
19 Sepals with spreading hairs................................. 152. *C. sericocephalus*

– Sepals with appressed hairs................................. 149. *C. commutatus*

20 Low perennial with linear, sericeous leaves; flowers solitary... 132. *C. ammannii*

– Erect or ascending plants with stems usually > 10 cm tall; flowers mostly clustered .......................................................... 21

21 Sepals bicoloured, with pale base and green apex; plants with herbaceous stems and flowers somewhat clustered............................... 22

– Sepals of one colour; plants commonly with woody rigid stems, few leaves and flowers well separated.............................................. 23

22 Corolla < 1.5 cm long; ovary and capsule glabrous; sepals oblong-ovate... ........................................................ 112. *C. pilosellifolius*

– Corolla 1.7–2.5 cm long; ovary and capsule hirsute; sepals ovate to lanceolate, acuminate................................................ 146. *C. cantabrica*

23 Sepals glabrous or nearly so........................................ 24

– Sepals pubescent, canescent or otherwise hirsute ........................................ 26

24 Corolla pink; sepals 5–7 mm long; plant divaricately branched ................ 25

– Corolla white; sepals 4–5 mm; plant not divaricately branched................... 125. *C. eremophilus*

25 Sepals obovate, mucronate, c. 5 mm long ........................................ 131. *C. pseudocantabrica subsp. pseudocantabrica*

– Sepals oblong, acuminate, c. 7 mm long................................................ 131. *C. pseudocantabrica subsp. askabadensis*

26 Stems appressed pubescent, finely sericeous to strigose .................... 27

– Stems densely sericeous, pubescent or pilose, some hairs spreading at least below ... 29

27 Sepals obtuse to rounded; corolla deeply lobed; inflorescence much branched forming an intricate mass................................................. 120. *C. erinaceus*

– Sepals acute, acuminate or obtuse and mucronate, always terminating in a point; corolla at most shallowly lobed; branching not so extensive as to form an intricate mass.......................................................... 28

28 Corolla white, 0.8–1 cm long; ovary pubescent .................. 121. *C. hamadae*

– Corolla pink, > 1.2 cm long; ovary glabrous............................................ 167. *C. dorycnium subsp. subhirsutus*

29 Stem and leaves white-sericeous ........................................ 30

– Stem and leaves not white-sericeous................................................. 31

30 Inflorescence of very dense, axillary clusters; lower leaves clearly oblanceolate; lower branches often somewhat spinescent.......................... 134. *C. grigorjevii*

– Inflorescence scape-like, flowers1-several at apex of stem; leaves strictly linear, branches never spinescent ........................................... 135. *C. krauseanus*

31 Branches slender, not very rigid ........................................ 32

– Branches short, stiff, relatively stout ........................................... 34

32 Leaves linear-lanceolate, up to 3 mm wide; sepals lanceolate, acuminate; stems subsericeous .................................................. 122. *C. subsericeus*
Leaves lanceolate to ovate, 3–15 mm wide; sepals often abruptly narrowed at apex; stems pubescent ................................................................. 33

Stems sparingly branched; corolla > 1.5 cm long, pink; ovary glabrous ...........

.................................................................................. 168. *C. tschimganicus*

Stems much branched; corolla < 1.5 cm long, white or pinkish; ovary usually hirsute ................................................................. 123. *C. divaricatus*

Plant densely pubescent; leaves linear-oblancoate .... 124. *C. tujuntauensis*

Plant thinly pubescent; leaves linear-oblong ........ 125. *C. eremophilus*

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14. Key to species in East Asia

1 Leaves distinctly petiolate, the blade abruptly narrowed onto to the petiole; trailing or twining herbs ........................................... 2

- Leaves lacking a distinct petiole, the blade narrowed at base; undershrubs or perennial herbs with a woody rootstock, neither twining nor trailing. .... 5

2 Sepals < 4.5 mm long ............................................................ 4. *C. arvensis*

- Sepals 5–7 mm long ............................................................ 3

3 Leaves glabrous or nearly so, margin entire ....................... 5. *C. chinensis*

- Leaves densely pubescent to tomentose, margin undulate, crenate or dentate ....

4 Leaf base hastate, often with bifid auricles; sepals 7–10 mm long ..............

.............................................................................................. 8. *C. steppicola*

- Leaf base truncate to subcordate with simple, poorly developed auricles; sepals 6–7 mm long .......................................................... 9. *C. sinuatodentatus*

5 Unarmed perennials woody at base only ......................................... 9.

- Undershrubs with spinescent branchlets ............................................ 6

6 Stems erect, branched; leaves glabrous or adpressed hairy beneath; ovary and capsule glabrous .................................................... 131. *C. pseudocantabrica*

- Stems prostrate to ascending but always low; leaves sericeous; ovary and capsule pubescent ................................................................. 7

7 Leaves oblong-oblancoate, 5–25 mm wide; flowers 1–5 in compact cymes, 1.8–2.5 cm long .............................................................. 156. *C. lineatus*

- Leaves linear to linear oblanceolate, < 5 mm wide; flowers usually solitary, 1–1.6 cm long ................................................................. 8

8 Flowers mostly axillary; outer sepals 4.5–6 mm long; stems herbaceous ....

....................................................................................... 132. *C. ammannii*

- Flowers all terminal on the branches; outer sepals 6–7 mm long; stems somewhat woody and rigid ........................................... 133. *C. xanthopotamicus*

9 Sepals glabrous to thinly pubescent. Outer pair suborbicular, much wider than inner sepals .................................................... 139. *C. gortschakovii*

- Sepals hirsute, all similar in shape and size ........................................ 10
10 Flowers clustered at apex of peduncle-like stem......................**137. C. spinifer**
– Flowers axillary............................................................................................ 11
11 Prostrate cushion plant, the flowering branches without spines...........
.............................................................................. **136. C. tragacanthoides**
– Erect undershrub, flowers borne on spinescent peduncles, usually (always?) with sterile stem spines towards the apex of the flowering shoots ..................................
.................................................................................................................. **138. C. fruticosus**

**Taxonomic treatment of Convolvulus**

**Names**

Accepted names are in bold italics. All names of specific, subspecific and varietal rank in the genus *Convolvulus* are accounted for in the synonomies that are provided for each species. Species now considered to belong to other genera but originally described in *Convolvulus* are not accounted for.

**Specimen citations**

Type specimens and their location are cited for all recognised taxa whether species, subspecies or varieties. We have lectotypified species where we have seen appropriate material for lectotypification but have not lectotypified where there is doubt about the selection of a lectotype. A particular problem relates to the plants described from North Africa by Maire. The types of these species were supposed to have been deposited at the Université d’Alger (AL) and are cited for AL by Sa’ad (1967). However, it seems that portions of the holotypes were removed from Algeria in 1962 and deposited in Montpelier (MPU) and perhaps Paris (P). We are not certain whether material remained in AL or if all or only some was removed.

Wherever possible, at least one specimen is cited for every country where a species is known to occur. Occasionally, a literature record is cited and in a few cases of common species, no specimen is cited as the species is assumed to be present because of its wider distribution. Records requiring confirmation are indicated with a question mark (?). Although cited specimens are limited to those seen by the authors and are representative of the species, some effort has been made to select material that is either widely distributed or likely to be available in the country where the plant occurs. Unfortunately this has not always been possible. The herbaria where these specimens are found are not cited as we are not generally aware of where they are distributed. We have seen all collections in BM, E, K, LE, OXF, P and W and sporadic examples from other herbaria if material has been loaned or images were available online.
Where a species is known from a few countries the country order in which specimens are cited is arbitrary but in cases where a species is known from many different countries the preferred order is as follows: European and Mediterranean countries are arranged from West to East beginning with the Atlantic Islands but southern African countries are arranged from South Africa northwards.

**Literature citations**

We have cited references to where all type specimens were published. We have not cited references to pages in standard floras unless they add to the information in the present monograph by providing additional descriptive material, illustrations or maps. However we have cited recent works where illustrations, paintings, drawings or photographs are provided as these are often a very useful aid to identification, capturing the appearance of a particular species in a way that words do not. We have cited references to relevant literature in the discussion of infraspecific variation and taxonomic problems.


**Type.** *Convolvulus arvensis* L.

**Description.** Spiny or unarmed shrubs or subshrubs or prostrate or erect herbs, stems often twining or trailing. Leaves alternate (rarely subopposite), simple, sessile or petiolate. Flowers variously arranged, solitary or in various kinds of inflorescence, usually cymose in structure although reduced to heads, flower pairs or other arrangements; each flower subtended by a pair of small bracteoles; calyx of 5 free sepals, these usually entire, slightly to very unequal, usually of two similar outer sepals, two similar inner sepals and an asymmetric middle sepal whose two halves are dissimilar; corolla funnel-shaped with a spreading limb and a short glabrous basal tube, the limb with five hirsute external midpetaline bands which terminate in a tooth or lobe; stamens 5, included, inserted at the top of the basal tube, filaments unequal, the basal part slightly dilated, glabrous or minutely glandular, the glands sessile or shortly stipitate, anthers equal, oblong to oblong-sagittate, pollen tricolpate, more or less spherical, colpi long and broad, exine thick; ovary usually ovoid, less commonly globose or conical, hirsute or glabrous, the base with a distinct disc, bilocular, each locule with 2 ovules; styles glabrous or hirsute, filiform divided upwards into 2 (rarely 3) arms, stigmas coextensive with style arms (very rarely slightly shorter), linear or, rarely, thickened upwards and ellipsoid or clavate. Capsule bilocular or by abortion unilocular, the dehiscence loculicidal or from the base, 4-seeded or less by abortion; seeds hirsute or glabrous, smooth tuberculate or obscurely ridged, one side convex and the other flat (see Figure 15: 34, for an example) unless capsule is 1-seeded when shape is ellipsoidal.
Species 1–22. Eurasian and North African species with leaves abruptly narrowed into a distinct petiole.

Nearly all species are trailing or twining perennial herbs with flowers in pedunculate cymes (sometimes reduced to single flowers) arising from the axils of leaf-like bracts. *Convolvulus coelestis* is an annual herb and *C. fatemensis* may sometimes be so. *C. pseudoscammonia* is an erect herb. In a few species leaves are distinctly dimorphic with lower leaves very different in form from those on the upper part of the stem. *C. althaeoides*, *C. pitardii* and its allies, *C. palaestinus* and to some extent *C. galaticus* show this characteristic. Flower colour is quite variable but white, pinkish or pink are the norm. *C. scammonia*, *C. pseudoscammonia*, *C. cassius* and *C. palaestinus* are yellow or yellowish. As far as is known all these species have sessile glands on the dilated part of the filaments towards the base. These are not always easy to see except with a good microscope. Seeds are always glabrous, usually somewhat tuberculate but occasionally smooth.


Figure 3, t. 1–9.


Type. SYRIA, Aleppo [Haleb], P. Russell (whereabouts unknown).

Type. Plate “Convolvulus syriacus s. Scammoniaca syriaca” in Morison (1680: 2, sect. 1 plate 3, f. 5), lectotype (designated by Staples and Jarvis 2006: 1021).

**Description.** Glabrous perennial herb with trailing or twining stems up to 2 m long. Leaves petiolate, 2.5–7 × 1.5–5 cm, deltoid, acute to acuminate, margin entire, base cordate but not cuneate onto the petiole, auriculate with auricles weakly 2 (– 3)-lobed, with one lobe larger than the other; petioles 0.5–4.5 cm long. Flowers 1–5 in pedunculate axillary cymes; peduncles 3.5–16 cm long; bracteoles 3–5 × 0.5–1 mm, linear to linear-lanceolate, acute; pedicels 8–11 mm, so inflorescence rather dense; outer sepals 6–7 × 5 mm, broadly oblong-obovate to rectangular, truncate and minutely mucronate, glabrous, scarious; inner sepals 7–11 × 4.5–6 mm; corolla 3–4 cm, pale yellow, undulate, midpetaline bands glabrous except for a few hairs near the apex; filaments with sessile glands below; ovary glabrous; style glabrous, divided 11–15 mm above the base, stigmas 3 mm. Capsule glabrous; seeds smooth (especially in Iraq) to tuberculate. [Sa’ad 1967: 241; Feinbrun-Dothan 1978: plate 69; Tohmé and Tohmé 2007: 216 (photo); Strid and Strid 2009: 386–387 (plate)]

**Distribution.** East Mediterranean region to Crimea and Iraq: Greece (Aegean Islands only): Rhodes (Rechinger 7441), Chios (Platt 238); Turkey (Balansa 697, Da-
Figure 3. 1–9 C. scammonia 1 leaves 2 bracteole 3 outer sepal 4 middle sepal 5 inner sepal 6 stamen 7 ovary and style 8 capsule 9 seed. 1 from Bourgeau 114 (W) 2–7 from Gathorne-Hardy 547 (E) 8–9 from Rechinger 10708 (W) 10–18 C. durandoi 10 leaves 11 bracteole 12 outer sepal 13 middle sepal 14 inner sepal 15 stamen 16 ovary and style 17 capsule 18 seed 10 & 17–18 from Battandier & Trabut 9 (GOET) 11–16 from Gay 2792 (W) 19–27 C. arvensis 19 leaves 20 bracteole 21 outer sepal 22 middle sepal attached to pedicel 23 inner sepal 24 stamen 25 ovary and style 26 capsule, 27 seed 19–25 from Abdallah et al. 1725 (CAIM) 26–27 from Abdallah et al. 1671 (CAIM) 28–33 C. chinensis 28 leaves 29 outer sepal 30 inner sepal 31 stamen 32 ovary and style 33 sepals enclosing capsule 28 (centre/right) from sin coll. 12/6/1886 (OXF) 28 (left)–33 from Wang 3259 (K) 34–39 C. mairei 34 leaf 35 outer sepal 36 middle sepal 37 inner sepal 38 stamen 39 ovary and style. From Maire & Petitmenig 628 (K) 40–48 C. fatemensis 40 leaves 41 bracteole 42 outer sepal 43 middle sepal 44 inner sepal 45 stamen 46 ovary and style 47 capsule 48 seed 40–46 from Schimper 839 (L) 47–48 from Shalaby & Sharobiem 1637 (CAIM).
vis & Coode 36447, Sintenis 1274); Crimea (Rehmann 606, Callier 323); Iraq (Rawi 23102, Gillett 8236, Wheeler-Haines s.n. [4/6/1960]); Syria (Haradjian 1508, 2711); Lebanon (Breidy et al. LEB-555); Palestine/Israel (Davis 4630); Jordan (Täckholm et al. 8934); Egypt: Sinai (fide Boulos 2000: 251).

Notes. A very distinct, nearly completely glabrous species with a yellow corolla, acutely-angled deltoid leaves and the outer sepals much smaller than the inner sepals. Molecular studies (Williams et al. 2014) show this species and *C. pseudoscammonia* to be the most closely related species to *Calystegia* spp.


Type. Based on *Convolvulus pseudoscammonia* K.Koch


Type. TURKEY, Egin, Sintenis 2864 (lectotype TGM, designated by Sa’ad 1967: 242); isolecotypes B, K!, STU, W!.

Type. TURKEY, Gaue Sber, Koch s.n. (holotype B†).

Description. Perennial herb with tap root and stems somewhat woody below, similar in all details to *Convolvulus scammonia* but stems erect to 60 cm, leaves 1.5–5 × 0.3–0.8 cm, sagittate, the central lobe narrowly oblong-lanceolate, basal auricles small, simple. The peduncles appear always to bear only 1–2 flowers and the bracteoles are filiform, not more than 0.5 mm wide. [Sa’ad 1967: 242; Parris 1978: 218]

Distribution. Northeast Turkey (Sintenis 1335, Stainton & Henderson 5763, Davis & Hedge 30166, Woronov 271, Turkevicz 603, Herrero 1361); Armenia (?).

Notes. Molecular studies (Williams et al. 2014) confirm that this is a distinct species related to but distinct from *C. scamonia*.


Figure 3, t. 10–18

Type. ALGERIA, Durando s.n. (holotype MPU004911!, possibly divided with AL; isotype MPU004912, P00417697!).

Description. Glabrous, trailing perennial herb, the stems angular, reaching at least 75 cm. Leaves petiolate, 1.2–3 × 1–2.2 cm. ovate, apex acute to more or less rounded and mucronate, margin entire, base truncate (below) or cordate (above), the auricles small, triangular-acute, venation reticulate; petioles 1–2.5 cm. Flowers axillary, pedunculate, solitary; peduncles 3–9 cm, commonly flexuose in bud; bracteoles 3–9 × 0.25–0.5 mm, linear-oblanceolate; pedicels 0.5–3.5 cm; outer sepals 4–5 × 2.5–3 mm,
spathulate, the apex abruptly widened above the oblong base, rounded, sparsely ciliate, commonly reflexed; inner sepals 5–6 × 2.5–3 mm, similar in shape but apex emarginate and not reflexed; corolla 1.7–2.3 cm long, pink, weakly lobed, midpetaline bands glabrous; filaments glandular below; ovary conical, glabrous; style glabrous, divided 5–6 mm above the base, stigmas 5–6 mm. Capsule glabrous, style persistent; seeds slightly rugose. [Sa’ad 1967: 224]

**Distribution.** Restricted to the Magreb of northwestern Africa: Algeria (Maire 5944, Gay 2792, Battandier 3823); Tunisia (Simpson 38395); Morocco (?).

**Notes.** A very distinctive species because of its reflexed spathulate sepals and unusual ovate, truncate, reticulate-veined leaves.


Figure 3, t. 19–27

Type. *EGYPT*, Cairo, Forsskål s.n. (syntype C10002044).

Type. Not specified.

Type. *MAURITIUS* (“Isle de France”), *Commerson* s.n (holotype P00608776).

Type. *Icon 237* linked to Schmidt (1793) in Prague University Library.


Type. *CORSICA*, no type cited.

Type. *SPAIN*, Malaga, *C. Agardh* (whereabouts unknown).

Type. a plant cultivated in Kolkata from seed brought from Iran by Malcolm (lectotype, *Icon. 1532* (K) accompanying *Flora Indica*, designated here).


Type. Based on *Convolvulus corsicus* Roem. & Schult.


Type. EGYPT, Cairo, Forsskål s.n. (C10002044, lectotype designated here).


Type. LEBANON, Mount Lebanon, Mergon s.n. (lectotype G-DC, designated by Sa’ad 1967: 218).


Type. GERMANY, Thuringia, Wallroth s.n. (location unknown).


Type. Based on *Convolvulus auriculatus* Desr.


Type. CHILE, J. Style s.n. (holotype G-DC, not seen).


Type. BELARUS, Hainowka, Lindem s.n. with annotation *Convolvulus quinquelobus* (whereabouts uncertain, ?LE).


Type. Southern Brazil, Sello; Uruguay and Argentina, Tweedie: Chile, Maximowicz (all syntypes, whereabouts unknown ?B†).


Type. ALGERIA, Garrouban, Pomel s.n. (isotype MPU005194!).


Type. ALGERIA, Sidi-Bouzid, Djebel-amour, Pomel s.n. (isotype MPU005193!).


Type. SPAIN, Valencia, Pau s.n. (holotype MA?, not seen).


Type. Based on *Convolvulus cherleri* C.Agardh ex Roem. & Schult.


Type. UNITED STATES OF AMERICA, Colorado, C.S.Crandall 4218 (holotype NY; isotype US).


Type. SPAIN, Picos de Europa, Barbey-Gampert s.n. (holotype G, not seen).

**Type.** UNITED STATES OF AMERICA, Michigan, Detroit, Farwell 5950 (isotypes GH00112744, BLH0000114).


Type. MOROCCO, *P. Font Quer* (holotype MPU006711!).


Type. MOROCCO, Mont Amezdour, *E.K. Balls* 2740 (holotype MPU003790!).


Type. PORTUGAL, Serpa, Herdade da Loja, *F. Goinhas Palma* (holotype LISI, not seen).

**Type.** “Europe” (lectotype LINN 218.1!, designated by Meeuse 1958: 695).

**Description.** Perennial herb from an extensive creeping underground rootstock, branched at base with trailing or twining quadrangular stems to about 75 cm long, plant glabrous to sparsely hairy. Leaves petiolate, 1–7 × 0.5–4 cm, broadly to narrowly ovate-deltoid, obtuse or acute, mucronulate, margin entire or undulate, base hastate to sagittate with simple auricles; petioles 1–2.5 cm. Flowers 1–3 in axillary pedunculate cymes; peduncles 1–5 cm; bracteoles 2.5–3 mm, filiform; pedicels 0.6–20 mm; sepals 3.5–4.5 × 2.5–3.5 mm, obovate to oblong, obtuse to mucronulate, scarious-margined; corolla 1.5–2.5 cm long, white or pink, undulate but not lobed, midpetaline bands often dark pink, pubescent; filaments glandular below; ovary glabrous, style glabrous, divided 7–8 mm above base, stigmas 2.5 mm. Capsule glabrous; seeds tuberculate. [Sa’ad 1967: 214; Feinbrun-Dothan 1978: plate 65; Collenette 1999: 226 (photo); Tohmé and Tohmé 2007: 213 (photo); Silvestre 2012: 153; Sell and Murrell 2009: 343–344; Austin and Ghazanfar 1979: 28; Siddiqui 1977: 7 (Figure 2); Breckle and Rafiqpoor 2010: 41 (photo); Pignatti 1982: 389]

**Distribution.** A very common cosmopolitan weed of all temperate regions which also grows in upland regions throughout the tropics.

**Notes.** A very variable species especially in indumentum, leaf shape and flower colour, of which many forms and varieties have been described (Choisy 1845: 406–407, Sa’ad 1967: 215–219; Franco 1984: 98, Sell and Murrell 2009: 343–344, for example). *Convolvulus arvensis* is usually easily recognised by the short sepals, which rarely exceed 4.5 mm, combined with a corolla about five times longer than the calyx. The leaves are usually, but not always, glabrous or nearly so and the auricles are unlobed.

5. *Convolvulus chinensis* Ker-Gawl., *Bot. Reg.* 4: t. 322. 1818. (Ker-Gawler 1818: t 322). Figure 3, t. 28–33

**Type.** CHINA, cultivated plant grown from seed collected by Staunton at “Pechelee” (holotype BM001053866!).
**Description.** Perennial herb with long decumbent stems from a central rootstock to at least 50 cm, glabrous or, on older parts, minutely scabridulous. Leaves petiolate, 3–5 cm long, formed of an oblong, acute, entire central lobe 2–4 mm wide, a broadly cuneate base and horizontally to weakly reflexed auricles, these mostly bifid with acute segments; petioles 4–7 mm. Flowers axillary, pedunculate, solitary; peduncles 3.2–4.5 cm, slightly flexuous; bracteoles 3 mm, linear-filiform; pedicels 4–8 mm; sepals 6–7 × 3.5–4 mm, obovate, obtuse and sometimes mucronate, glabrous, margins scarious, inner sepals slightly larger; corolla 2–2.8 cm long, pink, very shallowly lobed, the mid-petaline bands extended as short teeth, nearly glabrous but with a few hairs near apex; filaments glandular below; ovary glabrous; style glabrous, divided 12–14 mm above base, stigmas 2.5–3.5 mm. Capsule glabrous, seeds glabrous, minutely tuberculate.

**Notes.** We recognise two subspecies:

**5a. Convolvulus chinensis subsp. chinensis**


Type. RUSSIA, Siberia, “Dahurica”, *Fischer* s.n. (B†).


Type. RUSSIA, based partially on *Fischer* specimen (?LE). cited in Cat. Hort. Gorenk. 28. (Fischer 1808).


Type. Based on *Fischer* specimen (?LE); cited in Cat. Hort. Gorenk. 28. (Fischer 1808).


Type. not specified, possibly *Fischer* s.n. (LE, not seen).

**Distinguishing features.** Distinguished by the decumbent habit and distinctive strap-shaped leaves, the central lobe elongated.


**Diagnosis.** A subsp. typo habitu suberecta et foliis triangularibus.


Type. RUSSIA, Altai, Tiuguriuk stream by Katunja River (LE, not seen).

Type. KAZAKHSTAN, “in rupestribus montium Tarbagatai ad torrentium Dschanybek”, Karelin & Kirilloff 328 (holotype LE ex Herb Ledebour!; isotypes BM001035796!, LE ex herb. Fischer!, LE ex herb. Schrenk!, P!).

**Distinguishing features.** Distinguished by its suberect habit and triangular leaves, c. 3–5 × 1.5–4 cm.


**Notes.** *Convolvulus chinensis* is most reliably distinguished from *C. arvensis* by the longer sepals. Additionally the auricles are often bifid, the central lobe oblong and the corolla usually deep pink and slightly larger than in *C. arvensis*. It is often considered to be a form of *C. arvensis* but intermediates are uncommon, mainly being found in the Tibet region, and could be of hybrid origin. Molecular studies (Williams et al. 2014) strongly support the recognition of *C. chinensis* as a distinct species.


Figure 3, t. 34–39.

**Type.** GREECE, Parnassus, Lake Zouvala, *R.Maire* 113 (holotype ?AL, not seen.).

**Description.** Trailing perennial herb with very slender stems 10–30 cm long, vegetative parts densely pubescent. Leaves petiolate, 0.5–1.3 × 0.3–1 cm, suborbicular to ovate with obtuse apex to deltoid with acute apex, margin undulate, base cordate to hastate; petioles 2–9 mm. Flowers solitary, pedunculate, axillary; peduncles 2–11 mm, strongly recurved in fruit; bracteoles 1–1.5 mm, linear; pedicels 2.5–6 mm; outer sepals 2–3 × 1.5–2 mm, oblong-elliptic, somewhat truncate at both ends, pubescent, margins scarious. Corolla 0.8–1 cm long, pink, unlobed, midpetaline bands pubescent; filaments glandular; ovary pilose; style glabrous, persistent, divided 3–3.5 mm above base, stigmas c. 1.5 mm. Capsule borne on a recurved peduncle, pilose; seeds glabrous, obscurely rugose. [Sa’ad 1967: 235]

Notes. A distinctive species, superficially resembling a diminutive *C. arvensis*, with leaves and flower parts all very small. The plant is pubescent in its vegetative parts with a hirsute recurved capsule and a proportionally very small corolla.

Figure 3, t. 40–48.


**Type.** SAUDI ARABIA, Wadi Fatma, *G. W. Schimper* 839 (lectotype LZ, designated by Sa’ad 1967: 226); isolectotypes GOET, HBG, JE, L, LE!, OXF!, P!, W!).

**Description.** Perennial (possibly sometimes annual) herb with trailing stems to at least 50 cm from a slender central tap root; stems glabrescent to pubescent. Leaves petiolate, 1.2–4.5 × 0.6–4 cm, ovate-deltoid, apex obtuse, margin sinuate, base auriculate and cordate; petioles 0.5–3.5 cm. Flowers 1(-3) borne on axillary peduncles; peduncles 7–30 mm, commonly recurved in fruit; bracteoles 2 mm, filiform; pedicels 3–5 mm; outer sepals 3–5 × 3–4 mm, obovate, rounded, glabrous, slightly concave; inner sepals slightly narrower, 2.5–3 mm wide; corolla 0.9–1.3 cm long, pink, distinctly lobed, midpetaline bands brownish, thinly pubescent; filaments glandular below; ovary glabrous; style glabrous, divided c. 2 mm above base, stigmas 1 mm. Capsule glabrous, strongly exserted from the sepals, recurved in fruit; seeds glabrous, smooth (not rugulose as stated by Sa’ad, 1967: 226). [Sa’ad 1967: 226; Feinbrun-Dothan 1978 (plate 67); Collenette 1999: 229 (photo)]

**Distribution.** A widespread Sahara-Sindian species, generally uncommon and very scattered in occurrence but most frequent in Egypt; usually a weed of sandy fields. “Mauretania” (Chudeau s.n. [10/2/1911]); Morocco (Maire 781); Algeria: Ahaggar (Maire 857); Tunisia (Cosson s.n. [22/5/1858]); Libya (Guichard KG/LIB/121); Egypt (Abd El Ghani 5994, Kralik 168); Sudan (El Din 1, Colston 257); Saudi Arabia (Collenette 1753, 7903; Fischer 20, Mandaville 2884); Yemen (Wood 2059); Oman (Radcliffe-Smith 4133); Palestine/Israel (fide Feinbrun-Dothan 1978: 42); Lebanon (?); Iran (Popov 51/11).

Notes. Very distinct species with sinuate leaves and pink, lobed corolla borne on a recurved peduncle. The leaves are sometimes exceptionally small.


**Type.** CHINA, Yunnan, Dali, *Handel-Mazzetti* 6351 (holotype W!; isotype E00067083!).
**Description.** Pubescent perennial herb with (probably) decumbent stems from a thickened rootstock, young growth brownish-tomentose; stems to 60 cm, probably reaching 1 m. Leaves shortly petiolate, 1.1–3.5 cm long, the central lobe 0.2–1 cm wide, linear or oblong, acute, margin entire, undulate, sinuate or more or less dentate, base hastate, the auricles simple or bifid, sometimes intergrading with sinuate leaf margin. Flowers 1–2, axillary, pedunculate; peduncles 1.5–4 cm; bracteoles 3–4 × 0.5 mm, linear or filiform; pedicels 6–15 mm long, straight to slightly bent; outer sepals 7–10 × 4–5 mm, ovate, acuminate, villous with ciliate margins; inner sepals similar but much less hairy; corolla 1.2–1.4 cm long, pink or white, unlobed, midpetaline bands pilose, extended as short teeth; ovary and style glabrous. Capsule glabrous; seeds nearly smooth, glabrous.

**Distribution.** Endemic to SW China: Yunnan (Ducloux 6660, E. Maire 511, 581, Delavay s.n. [8/4/1884]), 1600–2450 m.

**Notes.** Apparently rare and localised and no recent collections seen.


**Type.** MYANMAR/BURMA, Shan plateau, Collett 464 (holotype K!; isotype CAL?).

**Description.** Coarsely pilose perennial herb with decumbent stems from a thickened taproot; stems to 20 cm but probably much more. Leaves petiolate, 1–1.5 × 0.2–0.5 cm, ovate-deltoid, acute, margin sinuate-dentate, base truncate to subcordate, coarsely pilose; petioles 4–6 mm. Flowers axillary, solitary, pedunculate; peduncles 1–1.5 cm; bracteoles 1–2 mm, filiform; pedicels 4–7 mm; outer sepals 6–7 × 2–3 mm, oblong-oblancoolate, acute, pilose on dorsal surface; inner sepals similar but 5 × 3 mm, obovate, scarious-margined; corolla c. 1.3 cm long, colour unknown, apparently weakly lobed, midpetaline bands pilose; ovary glabrous; style glabrous, divided c. 2.5 mm above base; stigmas 2 mm. Capsule not known.

**Distribution.** Myanmar (Burma). Only known from the type collection found at c. 1700 m.

**Notes.** This poorly known species might prove to be a variant of *C. steppicola* but further collections are needed before its status can be assessed.


*Convolvulus flavus* sensu C.B.Clarke (1883: 219) et auct. mult.

**Type.** INDIA, Tamil Nadu/Kerala, Nilgiri Hills, *J.P. Leschenault* s.n. (lectotype P03548937!, designated here).
Description. Perennial scrambling and climbing herb to at least 50 cm, stems pubescent, the hairs reddish on young parts. Leaves petiolate, 2–8 × 2–6 cm, lanceolate to broadly ovate-deltoid, acute and mucronulate, margin variable, undulate to deeply dentate, base broadly cordate in outline but cuneate onto the petiole, auricles entire to deeply dentate, pubescent on both surfaces, especially on the veins beneath; petioles 1.5–3 cm. Flowers 1–2 (-3) in pedunculate, axillary cymes; peduncles often paired, 6–8 mm; bracteoles c. 1.25 mm, caducous, ovate, acuminate; pedicels 8–10 mm, more densely pubescent than peduncles; sepals 6–7 × 3–4 mm, outer sepals obovate-elliptic, abruptly narrowed at apex, apiculate, pubescent, inner sepals similar, obovate, mucronate, scarius-margined, subglabrous; corolla 10–12 mm, white or cream, deeply lobed, mid-petaline bands terminating in a tuft of hairs; filaments glabrous; ovary glabrous, style glabrous, divided c. 5 mm above base, stigmas 1.5–2 mm, linear. Capsule glabrous, seeds glabrous.


Notes. Like the two preceeding species, this is a geographically isolated species. Although quite variable, the leaves are often strongly dentate and the auricles lobed. The corolla is similar to that of the South American species *C. crenatifolius* and *C. hermanniae* as well as to that of *C. sinuatodentatus* from Myanmar. The peduncles are unusual as they are commonly paired. We have not seen recent collections.


*Convolvulus pubescens* Sol., in Russell, Aleppo, ed. 2, 2: 246 1794, illegitimate superfluous name for *Convolvulus betonicifolius* Mill. (Russell 1794: 246).

Type. SYRIA, Aleppo, *Russell s.n.* (holotype BM001014565!).


Type. sin data (holotype C10009605!).


Type. Based on *Convolvulus lanuginosus* Vahl


Type. Icon., Fl. Graec. 2: 77, t. 193 (1816).


Type. CRIMEA, *Steven s.n.* (holotype LE!).

*Convolvulus atriplicifolius* Poir., Encycl. (Lamarck), Suppl. 3 (2): 467.1814. (Poirier 1814: 467).

Type. SYRIA, *de Labillardière s.n.* (holotype FI).
Figure 4. 1–9 C. betonicifolius 1 leaves 2 bracteole 3 outer sepal 4 middle sepal 5 inner sepal 6 stamen 7 ovary and style 8 capsule 9 seed. From Stribrny s.n. (G) 10–16 C. cassius 10 leaf 11 bracteole 12 outer sepal 13 middle sepal 14 inner sepal 15 stamen 16 ovary and style. From Dinsmore 10127 (K) 17–23 C. longipedicellatus 17 leaves 18 bracteole 19 outer sepal 20 middle sepal 21 inner sepal 22 stamen 23 ovary and style. From Manisadjan s.n. (W) 24–32 C. stachydifolius 24 leaf 25 bracteole 26 outer sepal 27 middle sepal 28 inner sepal 29 stamen 30 ovary and style 31 capsule 32 seed 24–30 from Bornmüller 1528b (B) 31–32 from sin coll. (JE) 33–41 C. palaestinus 33 leaves 34 bracteole 35 outer sepal 36 middle sepal 37 inner sepal 38 stamen 39 ovary and style 40 capsule 41 seed 33–39 from Dinsmore 1409 (E) 40–41 from sin coll. (JE).

Type. GREECE, Samos, sin col. (whereabouts unknown).


Type. TURKEY, Pontus Euxinus, Thrke s.n. (holotype B†, possible isotype MO).


Type. TURKEY, between Orfa and Sierek, Kotschy 58 (holotype G; isotype K000852030).


Type. Based on Convolvulus peduncularis Boiss.


Type. Based on Convolvulus peduncularis Boiss.


Type. TURKEY, Egirdir, Heldreich s.n. (G, E00285435, WAG0003915, K!).


Type. TURKEY, Kotschy 373 (lectotype G, designated by Sa’ad 1967: 221); isolecototypes K000852028, P00608770!, W!).


Type. Based on Convolvulus armenus Boiss.


Type. SYRIA, Aleppo, Kotschy 232 (holotype P!).

Type. Cultivated plant grown in Chelsea Physic Garden from seed received from Paris (holotype BM001035798!).

Description. Very variable trailing or twining perennial herb up to 1 m high, stems angled, vegetative parts always hirsute, thinly to densely pubescent, pilose or tomentose. Leaves petiolate, 2.5–8 × 2–6 cm, ovate, apex obtuse or acute, often mucronate, margin entire to undulate, base cordate and cuneate onto the petiole, usually auriculate, auricles rounded to acute, entire or dentate; petioles 0.5–1.5 (-6) cm. Flowers 1–3 (-8) in pedunculate, axillary cymes (often clearly dichasial); peduncles 2–14 cm, very variable from specimen to specimen; bracteoles filiform to linear or linear-oblong-elliptic, acute or acuminate, bicoloured, sometimes slightly constricted below triangular, slightly deflexed dark green apical portion, inner sepals scarious-margined 8–10 × 5–6 mm,
shorter but broader; corolla 2.8–3.6 cm, white, cream, or pink, unlobed, midpetaline bands pilose, sometimes darker coloured; filaments glandular below; ovary pilose, style pilose, divided c. 9 mm above base, stigmas 3 mm. Capsule pilose; seeds papillose. [Sa’ad 1967: 219; Feinbrun-Dothan 1978: plate 66; Tohmé and Tohmé 2007: 214 (photo); Silvestre 2012: 258; Strid and Strid 2009: 388–389 (plate); Pignatti 1982: 389; Grigoriev 1953: 12 (plate)]

**Distribution.** Widely distributed from the eastern Mediterranean region east to the Caucasus and Iran: Greece (Rechinger 8992): Albania (Alston & Sandwith 1730): Bulgaria (Wiesniewski 1161); Turkey (Davis & Polunin 4220); Cyprus (Meikle 2626); Crimea; Russia: North Caucasus (Sokolova 1149, Kozo-Poljansky & Preobrashensky s.n. [5/1915]); Iraq (Al Kaisi et al. 51085); Syria (Kotschy 232); Lebanon (Gombault 4491); Palestine/Israel (Post 460, Heller & Shamash 13434); Iran (Jacobs 6837). Naturalised in Spain, France (Gay s.n.) and Italy (Fiori & Beguinot 2509).

**Notes.** A very variable species in indumentum, leaf shape, peduncle length, number and colour of flowers and size and shape of sepals Attempts have been made by Sa’ad (1967) and Parris (1978) to provide an infraspecific classification but the characters do not correlate well with each other and it seems best to treat this as a single widespread variable species.


Figure 4, t. 17–23.

**Type.** TURKEY, Merzivan, *Manisadjan* s.n. (holotype W!).

**Description.** Presumably trailing herb of unknown length; stems and leaves pubescent. Leaves similar to those of *Convolvulus betonicifolius*, petiolate, c. 2.5 × 2 cm, ovate, obtuse and mucronate, entire, shallowly sagittate with short auricles. Flowers 1–2, pedunculate, axillary; peduncles c. 2.5 cm; bracteoles c. 5 × 0.5 mm, linear, attenuate; pedicels equalling bracts; sepals 6 × 3 mm, oblong-oblanceolate, obtuse and retuse, mucronulate, pubescent, inner sepals glabrous, membranous; corolla 2.5 cm long, colour unknown, midpetaline bands pubescent, unlobed; filaments glandular below; ovary glabrous, style 8 mm long, glabrous, stigmas 5 mm. Capsule and seeds unknown.

**Distribution.** Turkey. Only known from the type collection.

**Notes.** This species is not conspecific with *C. arvensis* as stated in the *Flora of Turkey* (Parris 1978) but differs in the pubescent leaves and the pubescent, 6 mm long, herbaceous sepals which lack a membranous border. Instead it is clearly related to the very variable *C. betonicifolius*, as stated by Sa’ad, but appears to be distinct as we cannot match it with any specimens of *C. betonicifolius*. It differs in the shorter, obtuse and minutely retuse sepals 5–6 mm long, which lack a distinctive apical portion. The ovary is also glabrous.

Figure 4, t. 10–16.

**Type.** SYRIA, Dinsmore 10127 (holotype S; isotype K!).

**Description.** Twining perennial herb, stems angled, glabrous. Leaves petiolate, 3–4 × 2–2.5 cm, ovate-deltoid, obtuse, margin undulate to crenate or weakly lobed, ciliate, base cordate and attenuate onto the petiole, beneath thinly pubescent. Flowers 1–3 in pedunculate axillary cymes; peduncles 4–14 cm, glabrous; bracteoles linear, acute, 6–8 × 1 mm, ciliate; pedicels 0.8–1 cm, thinly pilose with stiff spreading hairs; outer sepals 9–10 × 5–6 mm, oblong-obovate, slightly pandurate, abruptly constricted at apex into a mucro, the apical portion dark-coloured, pilose with stiff brown hairs; inner sepals glabrous, membranous; corolla 3.2 cm, yellow, unlobed, midpetaline bands thinly pilose towards the apex; filaments glandular below; ovary pilose; style thinly pilose, divided 5 mm above the base; stigmas 2 mm. Capsule and seeds not seen. [Sa’ad 1967: 222]

**Distribution.** A rare and very local species of the Syrian border with Turkey, known from a handful of collections: Turkey (?); Syria (“Latakia” fide Parris 1978: 216; Samuelson 5265).

**Notes.** Resembling *C. betonicifolius* and similar species but leaves glabrous except for the ciliate margins, which are crenate up to the apex.


**Type.** SYRIA/IRAQ, Aleppo to Mosul, Olivier s.n. (lectotype G-DC, designated by Sa’ad 1967: 243); isolecotypes P04209089!, P04209090!).

**Description.** Perennial herb with decumbent stems up to 1 m long from a central rootstock, vegetative parts pubescent with crisped, somewhat retorse hairs, occasionally villous to subtomentose. Leaves petiolate, 1.5–6 × 1.5–5.5 cm, ovate-reniform, apex obtuse, margin undulate, crenate-dentate to sinuate-dentate, base cordate and cuneate onto the petiole; petioles 1–4.5 cm. Flowers 1–5 in pedunculate axillary cymes; peduncles 3–9 cm; bracteoles 3–8 mm, filiform; pedicels mostly 1–1.5 cm but sometimes longer resulting in a very lax inflorescence; outer sepals 6–8 × 4–5 mm, obovate or broadly oblong, obtuse, retuse or truncate and mucronate, scarious, pubescent, inner sepals membranous with a truncate base, glabrous or nearly so; corolla (1.5-)2.5–3.5 cm long, pink to purplish, unlobed, midpetaline bands thinly pilose; filaments glandular below; ovary glabrous or with a few apical hairs, style glabrous or sparsely pilose, divided 5 mm above base, stigmas 4 mm. Capsule glabrous; seeds glabrous, strongly tuberculate. [Sa’ad 1967: 243; Feinbrun-Dothan 1978 (plate 70); Tohmé and Tohmé 2007: 216 (photo); Nowroozi 2002: 84 (plate), 105 (map)]

**Notes.** We recognise two varieties which can distinguished by indumentum and floral characters:
14a. *Convolvulus stachydifolius* var. *stachydifolius*

Figure 4, t. 24–32.

*Convolvulus quadriflorus* Hochst., in J.A. Lorent, Wanderungen 335.1845. (Lorent 1845: 335).
Type. Bir, Lorent s.n. (?B†).

**Distinguishing features.** Indumentum of leaves and stem puberulent to pubescent; corolla 2.5–3.5 cm long.

**Distribution.** Eastern Mediterranean region east to Iran, growing as a weed, often in fallow fields: Turkey (Davis 42295, Davis & Hedge 28188); Iran (Wright & Bent 519-103, Koelz 14798, Bélangier 431); Iraq (Guest 1376, 1467, rawi et al. 28127, Bornmüller 1529); Syria (Dinsmore 3651, Gaillardot 2059, Barkoudah 1262); Lebanon (Breidy et al. LEB-409); Palestine/Israel (Dinsmore 7651); Jordan (Dinsmore 10620); Egypt.


Type. SYRIA, Damascus, Gaillardot 2058 (holotype G, not seen).

**Type.** EGYPT, Aucher-Eloy 193 (lectotype W!, designated by Sa’ad 1967: 246).

**Distinguishing features.** Distinguished by its denser villous to tomentose indumentum combined with a smaller corolla about 1.5 cm long.

**Distribution.** Scattered over the range of the species. Examples seen include Maitland 477 (Lebanon), Gaillardot 2058 (Syria), Meyers & Dinsmore 81776 (Palestine/Israel) and Simpson 4714 (Egypt).

**Notes.** *Convolvulus stachydifolius* is usually easily distinguished from similar species by the sinuate-dentate leaves.


Figure 4, t. 33–41

Type. TURKEY (Bithynia) (Boissier 1875b: 107), Pestalozza s.n. (holotype G).

Type. LEBANON, Blanche s.n. (holotype G; isotypes P00836226!, P00836227!, P00836228!).


Type. Based on *Convolvulus palaestinus* var. *stenophyllus* Boiss.

**Type.** PALESTINE/ISRAEL, Boissier s.n. (holotype G; isotype P!).

**Description.** Perennial herb with trailing or twining stems from a woody base 0.4–1 m long; stem and vegetative parts adpressed tomentellous. Leaves petiolate, somewhat dimorphic; lower leaves 3–3.5 × 2–3 cm, broadly to narrowly ovate, acute, margin crenate, base broadly cordate and cuneate onto the petiole; middle and upper leaves with an acute triangular central lobe 3–5 × 0.4–0.6 cm, the margin entire to sinuate, basal auricles deeply lobed with many acute lobes; petioles 0.3–2.3 cm, diminishing in length upwards. Flowers 1–3 in pedunculate axillary cymes; peduncles 1.5–5.5 cm; bracteoles 2–4 mm long, filiform; pedicels 2–8 mm, frequently recurved; outer sepals 8–10 × 4–5 mm, obovate, obtuse, densely pubescent; inner sepals c. 1 mm shorter, obovate-elliptic, rounded and crenate at apex, scarios; corolla 2.2–3 cm long, yellow, unlobed, midpetaline bands shortly pubescent near apex; filaments glandular below; ovary pubescent; style glabrous, divided 8 mm above base, stigmas 2–3 mm. Capsule apically pubescent; seeds verrucose. [*Sa’ad 1967: 238; Feinbrun-Dothan 1978: plate 68; Tohmé and Tohmé 2007: 217 (photo as *Convolvulus stenophyllus*)]


**Notes.** Resembles *C. scammonia* in its yellow flowers but inner sepals slightly shorter than outer sepals and plant tomentellous. The leaves are usually dimorphic; the type shows the ovate lower (or first) leaves while that of *C. stenophyllus* at P has both leaf forms.


Figure 5, t. 1–7.


Type. TURKEY, Tschorukthale, C.Koch s.n. (?B†).

**Type.** TURKEY, Ankara, Rostan s.n. (lectotype G-DC, designated by Sa’ad 1967: 227).

**Description.** Perennial herb with decumbent or prostrate stems spreading from a central tap root and reaching 50 cm, vegetative parts softly tomentose. Leaves petiolate, 1.5–4 × 1–3 cm, ovate to ovate-triangular, apex acute to mucronate, margin undulate, sinuate or, above, weakly 5-lobed, base cordate and shortly attenuate onto
Figure 5. 1–7 *C. galaticus* 1 leaves 2 bracteole 3 outer sepal 4 middle sepal 5 inner sepal 6 stamen 7 ovary and style 1 from Siehe 182 (W) 2–7 from Bourgeois 171 (W) 8–13 *C. germaniacae* 8 leaf 9 bracteole 10 outer sepal 11 middle sepal 12 inner sepal 13 ovary and style. From Haussknecht s.n. (W) 14–22 *C. coelebsiuacus* 14 leaves 15 bracteole 16 outer sepal 17 middle sepal 18 inner sepal 19 stamen 20 ovary and style 21 capsule 22 seed 14 from Davis 2979 (E) 15–20 from Davis 3033 (E) 21–22 from Meyer & Dinsmore 3619 (L) 23–30 *C. althaeoides* subsp. *althaeoides* 23 leaves 24 bracteole 25 outer sepal 26 inner sepal 27 stamen 28 ovary and style 29 capsule 30 seed 23–28 from van Soest 131 (L) 29–30 from Boulos s.n. (CAIM) 31–38 *C. pitardii* 31 leaf and flower showing short peduncle and bracteoles 32 outer sepal 33 middle sepal 34 inner sepal 35 stamen 36 ovary and style 37 capsule 38 seed 31 from Souvage 2412 (RAB) 32–36 from Souvage 2413 (RAB) 37–38 from Souvage 14933 (RAB) 39–47 *C. glaucorum* 39 leaves 40 bracteole 41 outer sepal 42 middle sepal 43 inner sepal 44 stamen 45 ovary and style 46 capsule 47 seed. From Souvage & Vindt 2412 (RAB).
the petiole, veins prominent below; petioles 0.5–1.4 cm. Flowers 1–2 in pedunculate, axillary cymes; peduncles 0.8–2.5 cm; bracteoles 2–4 mm, linear to filiform; pedicels 0.5–1.4 cm; outer sepals 7–10 × 5–8 mm, broadly ovate, rounded and mucronate to acute, somewhat convex, tomentose, greyish, inner sepals c. 7 × 5 mm. glabrous, membranous; corolla 2.6–3 cm long, deep pink, unlobed, midpetaline bands adpressed pilose, terminating in a tooth; filaments glandular below; ovary pilose (or fide Sa’ad (1967: 230) glabrous), style glabrous or thinly pilose, divided 7 mm above base, stigmas 3–3.5 mm long. Capsule and seeds not seen. [Sa’ad 1967: 227; Tohmé and Tohmé 2007: 215 (photo)]

Distribution. Almost restricted to Turkey: Turkey (Rix 322, Bornmüller 3176, Siehe 182, Sintenis 6078, Balls 516); Iraq? (Kotschy 73), Lebanon (fide Mouterde 1978: 37).

Notes. The small ovate-triangular leaves and the softly tomentose indumentum help to identify this species. It might be confused with some forms of C. stachydifolius but the sepals are ovate and rather larger.


Figure 5, t. 8–13

Type. TURKEY, Marash, Haussknecht s.n. (holotype G; isotypes JE, W!).

Description. Similar in overall morphology to Convolvulus galaticus but differing as follows: plant pilose with spreading hairs, leaves obscurely sinuate-margined but not crenate-lobed as commonly in C. galaticus, flowers mostly paired, the inflorescence commonly reflexed, sepals 7–9 × 3.5–5 mm, broadly elliptic, bicoloured, the apical part terminating in a distinct broad-based mucro; corolla white to pale pink, the ovary always hirsute, style pubescent below, divided 7–7.5 mm above base, stigmas 2–2.5 mm. Capsule pilose; seeds hirsute. [Sa’ad 1967: 230; Aykurt and Sümbül 2011c (photo, plate and full description)]

Distribution. Endemic to Turkey. Previously known only from the type collection but rediscovered in 2008 (Aykurt and Sümbül 2011c). It is clearly very rare.


Figure 5, t. 14–22.


Type. CYPRUS, Sintenis & Rigo 55 (holotype G; isotype W!).

Description. Annual herb, mostly branched at base, with decumbent or ascending stems to c. 30 cm, vegetative parts thinly pubescent. Leaves petiolate,
2–4(-5) × 1.5–3 cm, ovate or reniform, apex rounded, margin entire or undulate, base weakly auriculate, cordate and cuneate onto the petiole; petioles up to 10 cm on basal leaves but mostly 2–3 cm on cauline leaves. Flowers solitary, axillary, pedunculate, becoming congested upwards; bracts resembling small leaves, but sometimes deeply palemly lobed with acute lobes; peduncles 0.5–5 cm, elongating and reflexing in fruit; bracteoles 3–4 mm, filiform to linear-lanceolate; pedicels 0.3–1.5 cm; sepals 3–6 × 3–4 mm, broadly oblong-obovate, prominently mucronate, stiffly hirsute with spreading hairs; corolla 1.5–2(-2.8) cm, pink or pinkish purple, unlobed, midpetaline bands pilose; filaments glandular below; ovary glabrous; style glabrous, divided c. 4 mm above base, stigmas c. 1.5 mm. [Sa’ad 1967: 174; Feinbrun-Dothan 1978: plate 57; Tohmé and Tohmé 2007: 214 (photo); Meikle 1985: 1173]

**Distribution.** Eastern Mediterranean, apparently especially common in Cyprus: Cyprus (Davis 2979, 3033); Turkey; Syria (Hasbani 464, Barbey 612); Lebanon (Polunin 5208, Gombault 4497, 4499); Palestine/Israel (Davis 4214, 4500, Eig et al. 276).

**Notes.** The retuse, strongly apiculate sepals, reflexed fruiting peduncles and annual habit are distinctive.

**Species 19–21.**

*Convolvulus pitardii*, *C. glaouorum* and *C. vidalii* form a complex of species. *C. vidalii* is the most restricted in distribution and the best defined. *Convolvulus pitardii* and *C. glaouorum* are more widely distributed, their geographical patterning only partially defined with the former mostly in the Eastern Rif and Middle Atlas while the latter is mostly in the High Atlas. Most specimens are easily assigned to one or other species but further study is needed.


Figure 5, t. 31–38.

**Type.** MOROCCO, Oued Cherrat, C.-J. Pitard 2977 (holotype P00332177!).

**Description.** Perennial herb with stout somewhat woody rootstock from which arise various short decumbent, subglabrous, pubescent to pilose stems to 50 cm. Leaves petiolate, 0. 8–3.2 × 7.5–3.5 cm, ovate-deltoid or reniform, rounded to obtuse, margin undulate to coarsely serrate, base cordate, usually shortly and softly tomentose-sericeous but sometimes with longer hairs, occasionally subglabrous; petioles 0.5–0 7 cm, often flexuose. Flowers solitary, borne on axillary peduncles; peduncles 0–1 cm; bracteoles 2.5–7 mm, filiform; pedicels 1–8.5 cm, commonly flexuose and somewhat deflexed in fruit; calyx in flower clearly longer than broad, sepals 4.5–9 × 3–6 cm, lanceolate to linear-oblong, acute to apiculate forming a narrow calyx, the inner sepals broader; corolla 2.2–3(-4) cm long, pink with a darker centre, midpetaline bands sericeous near apex; filaments glandular below; ovary glabrous; style glabrous, divided c. 7 mm above base; stigmas 3–4 mm. Capsule glabrous; seeds finely tuberculate. [Sa’ad 1967: 239]
Notes. Distinguished from *C. vidalii* and *C. glaouorum* by the narrow calyx (lanceolate in outline) and the narrow sepals which are much longer than broad. This species is divided into two varieties:

**19a. Convolvulus pitardii var. pitardii**

**Distinguishing features.** Leaves glabrous above

**Distribution.** Morocco (Only known from the type).


Type. MOROCCO, Ain Leuh, Benoist 384 (holotype P00332176!).

**Type.** Based on *Convolvulus leucochnous* Benoist

**Distinguishing features.** Leaves sericeous. The long flexuose pedicels are also very distinct. Much more common than the type variety.

**Distribution.** Endemic to Morocco where it usually grows on schists: Central Rif (Carine et al. 322; Jury & Shakwa 20997, Font Quer 358, Bowring 10) and Zaïan, east of Middle Atlas (Lynes 153, Jabandiez 80b, Davis 557, Gattefossé s.n. [3/4/1936], Maire s.n. [18/4/1926], Sauvage 1359, 8097, 8410).


Figure 5, t. 39–47


Type. Based on *Convolvulus glaouorum* Braun-Blanquet & Maire


Type. MOROCCO, Azrou, no details of collector or collection given (holotype BP?).

**Type.** MOROCCO, Demnate, R. Maire s.n. (lectotype MPU 000022!, designated here; isolectotypes P!, AL?).

**Description.** Perennial herb with relatively slender rootstock (c. 3 mm wide) from which emerge various short decumbent or ascending stems 5–15 (-20) cm long, veg-
etative parts pubescent. Leaves petiolate, 2–4 × 1–3 cm, dimorphic, lower leaves ovate-deltoid, obtuse, margin undulate to dentate, base truncate to shallowly cordate and shortly cuneate on the petiole; upper leaves somewhat smaller, strongly dentate, apex acute; petioles 1–5 cm. Flowers solitary on axillary peduncles; peduncles 0.3–2.5 cm long, very variable in length; bracteoles 4–6 mm, filiform; pedicels 1–2.5 cm, commonly flexuose; calyx in flower about as long as broad, outer sepals 4.5–7 × 3.5–6 mm, oblong-ovate, mucronate, adpressed pubescent; inner sepals c. 7 × 5 mm, broadly obovate, mucronate, soon scarious; corolla 2.6–3.3 cm, white or pink, unlobed, mid-petaline band terminating in a point, nearly glabrous (slightly scabrous); filaments glandular below; ovary glabrous; style glabrous, divided 9 mm above base; stigmas 4 mm. Capsule glabrous; seeds finely tuberculate. [Sa’ad 1967: 231]

**Distribution.** Endemic to Morocco: High Atlas (Davis 54093, Davis & King 68145, 68533, Jahandiez 7, Whiting & Richmond 228, Weiller 270, Maire s.n. [8/4/1926], Podlech 45982, Guzmán et al. s.n. [23/3/1989]) with isolated stations at Fez (Trethewy 370) and Djebel Tazzeka (Jury et al. 16800). Usually on limestone.

**Notes.** Similar to *C. vidalii* and *C. pitardii*, differing from the former by presence of peduncles, the colouring of the corolla and larger sepals and from the latter by its dwarf habit and obovate sepals, the calyx only slightly longer than broad. The short, possibly ascending stems are characteristic. Whiting & Richmond 59 (BM) seems intermediate between this species and *C. pitardii* in indumentum and sepal form.

It appears that the sheet with the original collection in Maire’s herbarium was cut in two and part deposited at Montpelier. This part is selected as the lectotype. The other part of the sheet may be at AL. We have not been able to trace type material of *C. mesatlanticus* but the illustration provided by Andréanszky (1934: 115) appears to be of *C. glauourum* and this concurs with the opinion of Dobignard and Chatelain (2011: 338).


**Type.** MOROCCO, Vidal y López s.n. (holotype MA!; isotype BC).

**Description.** Perennial herb from a stout tap root with decumbent stems to 30 cm, vegetative parts pilose. Leaves petiolate, 0.7–2.8 × 0.5–3.3 cm, dimorphic, lower leaves ovate-deltoid, obtuse, margin crenate, base cordate to truncate, upper leaves deltoid, apex acute, margin incised-lobed, base cordate; petioles 1–3 cm, flexuose. Flowers solitary, borne on axillary pedicels; peduncles absent; bracteoles 2–4 mm, filiform; pedicels 3–35 mm, becoming strongly recurved in fruit; sepals 2.5–5.5 × 2.5–5.5, ovate to obovate, acute or obtuse and apiculate; corolla 1.7–3 cm long, purple with cream centre and (usually) dark purple marks around throat, mid-petaline bands pilose towards apex; filaments glandular below; ovary glabrous; style glabrous, divided 5–9 mm above base; stigmas c. 4 mm. Capsule glabrous; seeds finely tuberculate.
**Distribution.** Endemic to the Western Rif in Morocco (Carine et al. 239, Font Quer 318, Wall 22/5/1936).

**Notes.** Distinguished from the *C. pitardii* and *C. glauorum* by the complete absence of peduncles, the strongly recurved fruiting pedicels, the shorter sepals and smaller corolla, this is purple with a cream centre and with five distinct dark purple markings in the throat.

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**Figure 5, t. 23–30**

**Type.** Southern Europe, (lectotype LINN 218.26!, designated by Sa’ad 1967: 210).

**Description.** Trailing or twining perennial herb with slender creeping rootstock; stems terete, to 2 m long; vegetative parts thinly pilose to densely sericeous-tomentose. Leaves petiolate, strongly dimorphic; lower leaves 2–4 × 1–3 cm, ovate-deltoid, apex apiculate, acute or obtuse, margin irregularly crenate, base cordate and shortly cuneate; upper leaves slightly larger, to 6 × 6 cm, similar in outline but deeply sinuate-lobed to 3–5-partite with narrowly oblong, entire to coarsely dentate segments; petioles 1–5 cm long. Flowers axillary, pedunculate, solitary or in a dichasial cyme with up to 4 flowers; peduncles 3–10 cm; bracteoles 3–12 mm, filiform, linear to narrowly linear-lanceolate; pedicels 5–13 mm; outer sepals 5–9 × 4–6 mm, variable in shape, elliptic to obovate, acute to obtuse, glabrous to hirsute, margin often scarious, undulate, inner sepals slightly broader with broad scarious margins, often basally auriculate; corolla (1.6-)1.8–4.5 cm long (very variable in size), pink (rarely white), very weakly lobed, midpetaline bands darker, shortly pubescent; filaments glandular below; ovary glabrous; style glabrous, divided 5–10 mm above base; stigmas 2.5–5 mm, relatively stout. Capsule glabrous; seeds glabrous, obscurely tuberculate. [Sa’ad 1967: 210]

**Notes.** A very variable species in indumentum, sepal form and flower size, this reflected in the extensive synonymy below. Two subspecies, sometimes treated as separate species, can usually be distinguished although intermediates occur occasionally, for example *Fitz 74/1978* (W) from Tunisia, *Dubuis 8549* (BM) from Algeria, *Pampanini 3729* (FI), the type of var. *angustisectus* from Libya or Faure s.n. (MPU) the type of var. *dissectus*, from Algeria, all of which have the distinct linear leaf lobes of subsp. *tenuissimus* without the softly sericeous indumentum.

22a. *Convolvulus althaeoides* subsp. *althaeoides*


**Type.** FRANCE, Sète [Cette], collector and whereabouts unknown.

*Convolvulus bryonifolius* Sims, Bot. Mag. t. 943. 1806. (Sims 1806: t. 943).
Type. Cultivated at Brompton, t. 943 (Sims 1806) based on a cultivated plant of uncertain origin.


Type. ITALY, Capri and Ischia, Tenore s.n. (NAP).


Type. ITALY, Calabria (holotype G?).


Type. Based on *Convolvulus hirsutus* Tenore


Type. GREECE, between Koron and Modon, Chaubard s.n. (lectotype P00608773!, designated by Sa’ad 1967: 212).


(Choisy 1845: 409).

Type. Not specified.


(Choisy 1845: 409).

Type. Based on *Convolvulus hirsutus* Tenore


(Choisy 1845: 409).

Type. Not specified.


(Choisy 1845: 409).

Type. Image in Thesaurus botanicus, t. 57. (Trattinnick 1805-1819).


(Choisy 1845: 409).

Type. Based on *Convolvulus argyraeus* DC.


(Pampinini 1914: 15).

Type. LIBYA, Ras T ecut, Pampanini 3729 (holotype Fl).


Type. MOROCCO, Djebbel Amsitten, S de Mogador, Maire s.n. (holotype RAB 078144!).


Type. ALGERIA, Oran, Faure s.n. (holotype MPU 002967!).


Type. ALGERIA, Lamoricière, Faure s.n. (holotype MPU 002968!).

Type. LIBYA, Cyrenaica, Wadi Derna, *Maire & Weller 1117* (holotype MPU!).

**Distinguishing features.** Variably hirsute but hairs not appressed and sericeous. Leaves variously dissected but lobes not linear. [Feinbrun-Dothan 1978: plate 64; Tohmé and Tohmé 2007: 213 (photo); Silvestre 2012: 257; Siddiqi 1977: 9 (Figure 3); Strid and Strid 2009: 390–391 (plate); Pignatti 1982: 389; Boulos 2000: 331].


**22b.** *Convolvulus althaeoides* subsp. *tenuissimus* (Sm.) Batt., Fl. Algérie 592. 1890. (Battandier 1890: 592)


Type. A plant cultivated in the Chelsea Physic Garden, *Miller s.n.* (holotype BM001035799).

*Convolvulus sericeus* Forssk., Fl. Egypt-Arab. 204. 1775, nom. illeg., non *Convolvulus sericeus* L. (1767). (Forsskål 1775: 204).

Type. TURKEY, Sea of Marmora, *Forsskål* (syntypes C).


Type. GREECE, collector unknown (holotype OXF-SIB0463A!).


Type. Without locality, *Forsskål* s.n. (lectotype BM001014569!, designated here).


Type. Based on *Convolvulus elegantissimus* Mill.

**Type.** Based *Convolvulus tenuissimus* Sm.

**Distinguishing features.** Plant softly sericeous in all parts. Leaves finely dissected with narrow linear lobes. [Tohmé and Tohmé 2007: 215 (photo as *C. elegantissimus*);
Pignatti 1982: 389 (as *C. elegantissimus*); Polunin 1980 (Plate 35); Strid and Strid 2009: 392–393 (plate as *C. elegantissimus*).  

**Distribution.** Mostly East Mediterranean region with scattered records in the west: Turkey (*Davis* 41184, *Sintenis* 338); Lebanon (*Mouterde* 12135); Aegean Islands (*Platt* 86, *Rechinger* 3816); Greece (*Heldreich* 235); Albania (*Baldacci* 1892); Croatia (*Denis* 121); Hungary (*Degen* 2934); Rumania (*Degen* 90); Italy (*Fiori & Béguinot* s.n. [1924]); Malta (*Adler* s.n. [12/5/1994]); France (*Bruyas* 3345); Malta (*Davis* 50632); Algeria (*Gombault* s.n. [24/3/1935]).

**Notes.** The species as a whole is widely distributed around the Mediterranean extending to Madeira and the Canary Islands, where it may be introduced. Subsp. *tenuissimus* is the predominant subspecies in SE Europe extending from southern Austria and Hungary to Italy, Malta, Algeria, the Aegean Islands and Turkey, perhaps centred on the Adriatic. It should be noted that if this subspecies is recognised at specific level its correct name is *C. elegantissimus* Mill. subsp. *althaeoides* is the only subspecies in the west Mediterranean region and the predominant subspecies in Cyprus, the Levant and North Africa. It is naturalised in California (*Hickman* 1993: 521). Records from Eritrea (*Sebsebe* 1999: 78), where it is presumably a garden plant or garden escape, do not specify a subspecies.

This species is morphologically very similar to *C. capensis* from South Africa. Both species are extremely variable and some forms are not easily distinguished except on geographical grounds. Molecular studies, however, indicate they belong to different clades and *C. capensis* has distinctly shorter, thicker stigmas (*Williams et al.* 2014).

**Species 23–41. Southern African species**

This group is exceptionally complex and there are few clearly demarcated species. Although *C. sagittatus* has long been recognised as the centre of a complex of species, the difficulties in species delimitation extend to almost every species in the group apart from perhaps *C. argillicola* and *C. kilimandschari*. Apparent intermediates between species are quite frequently found and in the absence of any clear evidence for hybridisation are difficult to explain. Any attempt to unite two taxa joined by intermediates will tend to result in a series of species collapsing into a single amorphous unit. Attempts have been made here to pick out what seem to be the core taxa and indicate the existence of intermediates. No attempt has been made to describe as new the occasional single collections, which cannot easily be accommodated. *C. sagittatus*, *C. aschersonii*, *C. thomsonii*, *C. austroafricanus* and *C. farinosus* form an especially complex group of species, which extend from South Africa northwards to Nigeria, Algeria, Ethiopia and SW Arabia but molecular studies tend to support their recognition as separate species. The first two are very similar to the South American *C. demissus* and *C. bonariensis* respectively but molecular studies suggest they are not very closely related (*Williams et al.* 2014). The three species (*C. capensis*, *C. bidentatus* and *C. namaquensis*) share very short, somewhat stout stigmas, which set them apart from the other southern African species and are unusual in *Convolvulus* as a whole.

Figure 6, t. 1–6


Type. ETHIOPIA, Begemeder, Schimper 1465 (holotype B†; isotype K).


Type. Based on *Convolvulus schimperi* Engl.


Type. TANZANIA, Kilimanjaro, *H.H. Johnston* s.n. (holotype K).


Type. TANZANIA, Kilimanjaro, Kilema, *Volkens* 1559 (holotype B†; isotype BR).


Type. Based on *Convolvulus kilimandschari* Engl.


Type. Based on *Convolvulus kilimandschari* var. *glabratus* Hallier f.


**Description.** Vigorous twining herb with stems reaching 2 m, vegetative parts varying from densely hirsute to subglabrous. Leaves petiolate, 3–8.5 × 1.8–6 cm, ovate-deltoid, acute, margin entire or obscurely crenate, base cordate (rarely hastate); petioles 7–30 mm. Flowers in many-flowered, axillary, pedunculate, bracteate heads; peduncles 1–13 cm long; bracteoles 5–10 × 3–7.5 mm, ovate, acute, scarious, tardily caducous; pedicels very short, 2–4 mm long; outer sepals 9–13 × 5–8 mm, broadly ovate, acute to apiculate, villous, becoming scarious; corolla 2.5–3(-4) cm long, very wide at the mouth, white, purplish or pink with a dark centre, unlobed, midpetaline bands pubescent; ovary glabrous; style glabrous, divided c. 7 mm above base; stigmas 2–2.5 mm, linear, slightly shorter than the style arm. Capsule glabrous; seeds glabrous, the surface with wavy, white-topped ridges. [Verdcourt 1963: 38–39 (plate); Sebsebe 2006 182]

**Distribution.** Mountains of eastern Africa from 1800 to 3500 m: .Ethiopia (*Friis et al.* 7359, *de Wilde* 8973); Kenya (*Fries & Fries* 459, *Greenway & Kanuri* 13886, *Tweedie* 1738); Uganda (*Wesche* 797); Tanzania (*Verdcourt* 1553, *Richards* 24124).

**Notes.** A very distinctive afromontane species because of its many-flowered capitellate inflorescence but variable in indumentum, plants from Ethiopia commonly less hirsute and with slightly larger corollas than those from further south.
Figure 6. 1–6 *C. kilimandschari* 1 leaf 2 outer sepal 3 inner sepal 4 calyx 5 stamen 6 ovary and style. From Gilbert 1086 (K) 7–16 *C. thunbergii* 7 leaf 8 leaf 9 bracteoles 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen 14 ovary and style 15 capsule 16 seeds 7 & 10–14 from Schleieren 7092 (K) 8–9 & 15–16 from Macowan 586 (K) 17–22 *C. capensis* 17 leaf 18 leaf 19 outer sepal 20 inner sepal 21 stamen 22 ovary and style 17 from Drège s.n. (OXF) 18–22 from Bolus 9971 (K) 23–31 *C. dregeanus* 23 leaves 24 bracteoles 25 outer sepal 26 middle sepal 27 inner sepal 28 stamen 29 ovary and style 30 capsule 31 seeds. From Gemmell 7/11/1949 (K) 32–40 *C. argillicola* 32 leaf 33 bracteole 34 outer sepal 35 middle sepal 36 inner sepal 37 stamen 38 ovary and style 39 capsule 40 seed. From Seydel 4170 (K).
A foundation monograph of Convolvulus L. (Convolvulaceae)

   Figure 6, t. 17–22.

   Type. SOUTH AFRICA, Sonnerat s.n. (holotype P-Lam, not seen).

   Type. SOUTH AFRICA, sin col. (P [Herb. Lam.]).

   Type. Icon, t.198 in Hort. Schoenbr.

   Type. SOUTH AFRICA, Thunberg s.n. (various syntypes UPS).

   Type. SOUTH AFRICA, Western Cape, Namaqualand, Lilyfontein, Drège s.n. (holotype B†; isotypes K!, L, W!).


   Type. SOUTH AFRICA, Cape, Zeyher & Eckler 24 (syntype ?B†), Drege, ‘C. alcefolius’ a, b, (syntype ? B†).

   Type. Based on Convolvulus plicatus Desr.

   Type. SOUTH AFRICA, Cape, without collection data (holotype G, not seen).

   Description. Perennial herb, usually coarsely brown-pubescent on all vegetative parts, occasionally glabrescent or white-pubescent; stems to 1.5 m, climbing or prostrate, sometimes woody towards the base. Leaves petiolate, 1.5–5 × 1.5–4 cm, very variable in form but always palmately veined, oblong, ovate or reniform in outline, sometimes unlobed with coarsely crenate to laciniate margins, often deeply palmately lobed or palmatisect, base more or less hastate, apex acute or obtuse; petioles 0.4–1.5 cm. Flowers solitary or arranged in few-flowered cymes, peduncles 4–10 cm; pedicels 4–15 mm; bracteoles 4–7 mm, filiform to linear; outer sepals 8–13 × 5–8 mm, oblong-ovate, acute or acuminate, often scarious-margined; corolla 2–3.2 cm, white, unlobed, fimbriate, the midpetaline bands thinly pilose, terminating in a small tooth; ovary glabrous; style glabrous, divided 5–6 mm above base, stigmas 1.5–2 × 0.5–0.75 mm, very narrowly ellipsoid. Capsule glabrous; seeds glabrous, smooth except for the obscurely rugose angles. [Meeuse 1958: 692; Meeuse and Welman 2000: 40 (map)]
**Distribution.** South Africa: Eastern and Western Cape (Parker 4618, Bolus 5211, Thompson 768, Garside 1610, Acocks 14813, Galpin 10544).

**Notes.** Recognised by the large unlobed, often fimbriate, white corolla combined with palmately-veined leaves and very short, thick stigmas. Some specimens are almost indistinguishable from the Mediterranean *C. althaeoides*, except by the distinctive stigmas.

Plants from Namaqualand (northwestern Cape) have a shorter calyx (6–7 mm long) and smaller corolla (12–16 mm) and have been treated as a distinct species, *C. inconspicuus*. They resemble *C. multifidus* very closely but can be distinguished by the presence of a distinct peduncle. The more distinctly elongate, 2 mm long stigmas of the type suggest they might be hybrids: *C. capensis × multifidus*.


Type. SOUTH AFRICA, Thunberg s.n. (holotype UPS).


Type. Based on *Convolvulus bidentatus* Bernh. ex Krauss

**Type.** SOUTH AFRICA, Western Cape, George near Zivarte valley, Krauss s.n. (holotype B†; isotypes FI!, W!).

**Description.** Perennial herb, glabrous to thinly pubescent in all vegetative parts; rootstock thick; stems to 3 m, prostrate or climbing. Leaves petiolate, very narrowly hastate, the central lobe 2–6 × 0.1–0.6 cm, linear to oblong, auricles very small, 0.2–1.2 × 0.1–0.4 cm, usually bifid, apex acute, margin entire; petioles 0.3–1.4 cm. Flowers axillary, pedunculate, usually paired (rarely solitary), peduncles 3–8(-14) cm; bracteoles 3–4 mm, subulate to narrowly lanceolate; pedicels 2–11 mm; outer sepals (5-)6–9 × (4-)6–8 mm, obovate, the apex truncate or rounded and often mucronate, margins scarious; corolla (1.2-)1.5–2.5(-3) cm long, white or pinkish, shallowly lobed, the midpetaline bands thinly pubescent terminating in teeth; ovary glabrous; style glabrous, divided 15 mm above base; stigmas ellipsoid, c 1 × 0.75 mm. Capsule glabrous; seeds glabrous, rugose with pallid ridges. [Meeuse 1958: 685; Meeuse and Welman 2000: 39 (map)]

**Distribution.** South Africa: along the southern fringes of Western and Eastern Cape (Acocks 23072, Bolus 2405, Johnson 1105, Fourcade 2626, Long 883, Zeyher 239).

**Notes.** Recognised by the very narrow, hastate leaves combined with rounded, scarious-margined sepals, 2-flowered peduncles and relatively large corolla. The distinctive stigma suggests a close affinity with *C. capensis. Long* 822 from Port Elizabeth
has 3-flowered peduncles and stigmas 3 mm long and might be of hybrid origin but has
the distinctive scarious sepals of *C. bidentatus*.

Meeuse (1958: 685) selected *Thunberg* s.n. (UPS) as a neotype but this was unnec-
essary as there are isotypes of the Krauss collection in the Webb herbarium at FI and at W.

26. *Convolvulus namaquensis* (Schltr. ex A.Meeuse) J.R.I.Wood & R.W.Scotland,
stat. nov.
urn:lsid:ipni.org:names:77147669-1


**Type.** SOUTH AFRICA, Western Cape, *Schlechter* 11124 (holotype PRE!; isotypes
BM000930470!, K!, P!).

**Description.** Very similar to *C. bidentatus* differing in little more than the obo-
vote, pubescent sepals, 6–7 mm long, which are abruptly narrowed to an acute to
apiculate apex and are not scarious-marginated. The peduncles can be up to 5-flowered.
Leaves 1.4–4 × 0.8–1.5, narrowly ovate-deltoid to oblong in outline, hastate at base
but auricles simple, margin sinuate or coarsely crenate; corolla 1.7–2 cm long; ovary
conical, glabrous, style divided 5–6 mm above base; stigmas 1 mm, narrowly ellipsoid,
sometimes unequal in length as in the isotype at K.

**Distribution.** South Africa (Western Cape, especially in the Clanwilliam area) and
Namibia centred on Namaqualand (*Le Roux* 2836, *Hardy & Bayliss* 1073, *Hugo* 6993,

**Notes.** Molecular studies (Williams et al. 2014) suggest this species is distinct from
*C. sagittatus*. The shape of the stigmas suggests a relationship with *C. bidentatus* and *C.*
capensis, rather than *C. sagittatus*.

We have only cited the isotypes we have seen. The isotype at W appears to represent
*C. sagittatus* and it is possible that not all collections of *Schlechter* 11124 represent *C.*
.namaquensis and this may explain why Meeuse treated this as a variety of *C. sagittatus*.

27. *Convolvulus thunbergii* Roem. & Schult., Syst. Veg, ed. 15 bis [Roemer &

Figure 6, t. 7–16.


**Type.** SOUTH AFRICA, Mpumalanga, Barberton, *E.E.Galpin* 430 (BOL, GRA,
K!, PRE).

(Wright 1904: 77).
Type. SOUTH AFRICA, Mpumalanga, Barberton, E.E. Galpin 430 (holotype K!; isotypes BOL GRA, PRE).


Type. Based on Convolvulus transvaalensis Schltr.

Description. Perennial herb, thinly pubescent in all vegetative parts; rootstock thin, woody; stems to 70 cm, prostrate. Leaves petiolate, relatively small, lanceolate to ovate in outline, the central lobe 1–5 × 0.3–0.8, cm, oblong to lanceolate, dentate, pinnatisect to pinnatifid, characteristically cordate-deltoid, auricles prominent, usually bifurcate, 0.3–1.5 cm, usually dentate, apex acute or obtuse; petioles 3–12 mm. Flowers solitary (rarely paired), axillary, pedunculate, peduncles 0.8–3 cm; bracteoles 3–7 mm, subulate to linear; pedicels 3–12 mm; outer sepals 9–12 × 4–6 mm, ovate, acute to acuminate, inner sepals scarioius, pubescent only in central vertical lines; corolla 1.6–2.8 cm, white or pink, very shallowly lobed, the midpetaline bands pubescent, terminating in a tooth; ovary glabrous; style glabrous, divided c. 7 mm above base; stigmas 4 mm, linear. Capsule glabrous; seeds smooth. [Meeuse 1958: 690; Meeuse and Welman 2000: 47 (map and plate)]

Distribution. South Africa: Eastern Cape, KwaZulu-Natal, Free State, North West, Gauteng, Mpumalanga, Limpopo (Moss 7122, Bolus 6847, Cooper 790, Meeuse 9376, Schlechter 3479); Lesotho (Dieterlen 387).

Notes. Distinguished by its essentially pinnately-nerved central leaf lobe. It seems close to C. natalensis particularly as represented by Hoggarth in Wood 4179, Dietelen 38751, Galpin 430 & Williams 154, which Meeuse (1958: 689) treated as var. transvaalensis of C. natalensis and is also close to some forms of C. australianus differing in little more than the larger flowers. It has been much confused historically being also treated as a variety of C. capensis (Baker and Wright 1904).


Figure 6, t. 23–31


Type. SOUTH AFRICA, Zeyher 1220 (lectotype BM000930471!, designated here; isolecotypic P!).

Type. SOUTH AFRICA, Northern Cape, Drège 7828 (holotype G; isotypes BM!, L, P!).

Description. Completely glabrous perennial herb with decumbent to ascending stems to 30 cm long from a central taproot. Leaves shortly petiolate, 1–2 (-3) cm long, very variable in form on the same plant and between plants, sometimes
linear with a hastate base and minute auricles (Zeyher 1220), more commonly di-morphic, the basal leaves ovate, weakly cordate and apically obtuse with coarsely serrate margins, becoming pinnatifid upwards, the upper leaves 5-fid with a long, linear central lobe and shorter basal lobes (Drège 7828); petioles 1–5 mm (shorter in linear-leaved plants). Flowers solitary, pedunculate; peduncles 0.5–3 cm long, pedicels 1–5 mm, linear-lanceolate to spatulate; outer sepals 4–5.5(-7) × 2.5–3 mm, obovate, rounded, rounded and mucronate or fimbriate; corolla 1–1.4 (-2) cm, white to pale pink, midpetalline bands glabrous; ovary glabrous; style glabrous, divided 6–9 mm above base, stigmas 1.5 mm, slightly widened upwards. Capsule glabrous; seeds glabrous, rugose. [Meeuse 1958: 671; Meeuse and Welman 2000: 41 (map)]

Distribution. South Africa except KwaZulu-Natal (Gemmell 4976, Acocks 20833, Hutchinson 3100, Verdoorn 899), Lesotho (Christols n. [1907-8]).

Notes. Distinct for being completely glabrous with small, delicate leaves and short obovate, rounded to slightly fimbriate sepals.


Type. SOUTH AFRICA, Free State, Boedecker s.n. (lectotype GOET-002454, designated by Meeuse and Welman 2000: 40).

Description. Perennial herb with woody taproot from which spread numerous stems to 60 cm, plant covered in adpressed brown to silvery hairs. Leaves 1–2.5 × 0.5–2 cm, lanceolate to ovate in outline, variable in form from pinnatisect to palmately 5-lobed, often with the terminal lobe much longer and deeply toothed and the basal lobes bifid, base truncate to shallowly cordate; petioles 1–5 mm long. Flowers solitary, axillary, pedicellate but not pedunculate (rarely peduncle to 1mm); bracteoles 1–2 mm long, subulate; pedicels 2–6(-10) mm, outer sepals 4–5(-6) × 2–3 mm, ovaate to oblong-elliptic, acute; corolla 7–10 mm long, pink or white, shallowly lobed, midpetalline bands pubescent with brown hairs; ovary glabrous; style glabrous, divided 2.5 mm above base; stigmas 2.5 mm, slightly widened upwards. Capsule glabrous; seeds glabrous, smooth but muricate on angles. [Meeuse 1958: 674; Meeuse and Welman 2000: 40 (map)]


Notes. Distinguished by the solitary, pedicellate flowers and near absence of peduncles combined with the very small calyx, the sepals usually about 5 mm long and thiny covered in brownish hairs. The inflorescence is similar to that of C. ocellatus but in that species the calyx is >6 mm long and the whole plant is densely tomentose. It can be confused with C. multifidus but in C. multifidus the calyx is larger. It could also be confused with C. austroafricanus but that species usually has several flowers which are always borne on a peduncle.
There are specimens apparently intermediate with *C. austroafricanus* including *Moss 4718* from Belmont, *Gooseno 728* from Free State and *Eyres 1820* and *Jacobsen 1772* from Zimbabwe. These have short but very distinct peduncles 5–10 mm long which bear 1–2 flowers, similar in dimensions to *C. boedeckerianus*. Unlike *C. austroafricanus* these plants are not very hirsute. Given the increasing evidence for hybridisation within *Convolvulus* these specimens may represent plants of hybrid origin.


**Type.** SOUTH AFRICA, Eastern Cape, *Thunberg* s.n. (holotype UPS!).

**Description.** Perennial herb similar in facies to *C. boedeckerianus*, densely villous to tomentose in all vegetative parts; rootstock a thickened, woody taproot; stems 15–75 cm long, prostrate. Leaves 0.5–2.5 × 0.5–1 cm, palmately lobed with the central lobe pinnatisect, more or less ovate in outline with weakly cordate base; petioles 3–8 mm. Flowers solitary, axillary, pedunculate; peduncles 0–8 mm, pedicels 8–15 mm; bracts linear 2–7 × 0.5 mm; outer sepals 6.5–9 × 5–mm, broadly elliptic, acute, villous, somewhat glabrescent towards the margins; corolla 10–13 mm, pale pink or white, deeply lobed, midpetaline bands pubescent with brownish hairs; ovary glabrous; style glabrous; stigmas 3.5–4 mm, linear. Capsule glabrous; seeds glabrous, smooth except for muricate angles. [Meeuse 1958: 675; Meeuse and Welman 2000: 43 (map)]

**Distribution.** South Africa, almost endemic to the Cape (*Burchell 1839, Acocks 21861, Baur 1020*).

**Notes.** Distinguished from *C. boedeckerianus* by the larger calyx and (usually) pedunculate flowers.


**Type.** NAMIBIA, *Dinter* 1892 & 2153 (syntypes B†, SAM).

**Description.** Densely hispid-pilose perennial with prostrate/trailing stems from a central taproot to 70 cm; hairs rusty-brown in colour. Leaves petiolate, 1–3.5 (-5) × 0.5–2.5 cm, ovate in outline, deeply pinnatisect, abruptly narrowed and cuneate onto the petiole; petioles 1–8 mm. Flowers 1–2, axillary, subsessile; peduncles to c. 0.3 cm; pedicels 0; bracts filiform, 5–9 × 0.5 mm; outer sepals broadly ovate with a long caudate apex, c. 7–8 mm at anthesis, accrescent to 12–13 mm, becoming somewhat scarious, the margin crisped; corolla 10–12 mm long, deeply lobed for c. 4 mm, nearly concealed by calyx, white with pilose midpetaline bands; ovary glabrous, divided c. 4 mm above base; stigmas 2 mm, linear. Capsule glabrous; seeds glabrous, rugose. [Meeuse 1958: 670; Meeuse and Welman 2000: 37 (map)]

**Distribution.** Namibia (*Seydel 3695, 4170, Marxmuller 1032, Pearson 9562, Dinter 4284*). 1500–2000 m. *Acacia* bushland on sand; apparently rare.

**Notes.** Very distinct because of the subsessile flowers and accrescent calyx, which almost conceals the corolla.
Figure 7, t. 7–14

Type. SOUTH AFRICA, Northern Cape, Marloth 716 (holotype B†; isotype PRE).

(Meeuse 1958: 673).
Type. Based on *Convolvulus ornatus* Engl.

Type. NAMIBIA, Kraaifontein, Dinter 812 (holotype B†; isotypes SAM, PRE, not seen).

Type. Plate 4065 in Curtis, *Botanical Magazine* 70 (1844); epitype (designated here): SOUTH AFRICA, North West Province, Gauteng, Magaliesberg, Burke 119 ex Herb. Hooker (K!).

Description. Perennial herb with all vegetative parts tomentose with brown or grey hairs; rootstock stout, woody; stems 20–100 cm long, decumbent and trailing to erect, occasionally apparently rambling over shrubs, often woody towards the base. Leaves subsessile or shortly petiolate, 1–2.5 × 0.1–1.5 cm, narrowly oblong with or without basal auricles to palmately 5-fid (var. *ornatus*), the central lobe much longer than the bifid basal lobes, margin characteristically revolute, petioles 0.5–3 mm. Flowers almost always solitary; peduncles 0–5 mm long; pedicels 3–11 mm; bracts 1–5 mm, linear; outer sepals 6–8 × 3–4, oblong-lanceolate, abruptly contracted above middle and then narrowed to an obtuse to subacute apex; corolla 12–14 mm long, pink or white, distinctly lobed, midpetaline bands pubescent with brown hairs; ovary pilose or glabrous; style thinly pilose or glabrous, divided c. 5 mm above base; stigmas 3.5–4 mm, linear; Capsule pilose at the apex; seeds smooth. [Meeuse 1958: 673 p. p.; Meeuse and Welman 2000: 45 (map)]


Notes. Usually easily recognised by the densely tomentose indumentum combined with revolute leaf margins. The calyx and corolla are similar in size to that of *C. multifidus* but the sepals are abruptly contracted above the middle and then gradually narrowed to the apex.

Figure 7, t. 15–22

Type. ZIMBABWE, Wild 3926 (holotype K†; isotypes EA, SRGH).

Type. ZIMBABWE, Gweru, Rand 274 (holotype BM000930474!).
Figure 7. 1–6 C. farinosus 1 leaf 2 outer sepal 3 middle sepal 4 inner sepal 5 stamen 6 ovary and style. From Voeke 3803 (GOET) 7–14 C. ocellatus 7 leaf 8 outer sepal 9 middle sepal 10 inner sepal 11 stamen 12 ovary and style 13 bracteoles, calyx and capsule 14 seeds. From Adams 10/1920 (K) 15–22 C. randii 15 leaf 16 bracteoles 17 outer sepal 18 middle sepal 19 inner sepal 20 stamen 21 ovary and style 22 calyx and capsule. From Leach and Muller 11720 (K) 23–28 C. aschersonii 23 leaf 24 bracteoles showing flower buds 25 outer sepal 26 inner sepal 27 stamen 28 ovary and style. From Moss 6304 (BM) 29–35 C. natalensis 29 leaf 30 outer sepal 31 inner sepal 32 stamen 33 ovary and style 34 calyx and capsule 29 & 31–35 from Hilliard 5023 (K) 30 from Drège s.n. (OXF) 36–42 C. sagittatus 36 leaf 37 outer sepal 38 inner sepal 39 stamen 40 ovary and style 41 calyx and capsule 42 seeds. From Wood 3239 (BM) 43–51 C. austroafricanus 43 leaf 44 bracteole 45 outer sepal 46 middle sepal 47 inner sepal 48 stamen 49 ovary and style 50 calyx and capsule 51 seed. From Noorgrann 423 (K).
Description. Perennial herb, all vegetative parts covered in appressed sericeous hairs; rootstock woody, very stout, apparently horizontally spreading; stems erect or ascending, rarely rambling over shrubs, 20–80 cm high. Leaves shortly petiolate, 0.8–3 × 0.2–2 cm, oblong to obovate, apex acute to apiculate, margin entire to crenate, not revolute, base truncate to cordate, prominently veined especially on the lower surface; petioles 0.5–3 mm. Flowers solitary, axillary, pedunculate; peduncles (0.1-)0.3–2.5 cm; bracteoles 3–5 mm, linear; pedicels 2–10 mm; outer sepals 8–10 × 3–6 mm, broadly to narrowly ovate, tapered to an apiculate apex; corolla 16–20 mm long, white or pale pink, shallowly lobed, the midpetaline bands pubescent, terminating in teeth; ovary glabrous, finely acuminate; style glabrous, divided 5 mm above base, stigmas 5 mm, linear. Capsule glabrous seeds smooth.

Distribution. Endemic to Zimbabwe, growing in grassland on serpentine deposits, 1270–1700 m. (Brummitt & Drummond 15281, Drummond 6166, Wild 5594, Chase 7247).

Notes. Somewhat variable in habit but readily recognised by the broad oblong-ovate leaves, silvery sericeous indumentum, acute sepals and larger corollas. Walters 2433 could be interpreted as a hybrid with C. ocellatus – it is geographically and morphologically intermediate.

Figures 2a and 7, t. 43–51

Diagnosis. Affine C. farinosi L. et C. aschersonii Engler sed pilis asperis, longis instructis et lobis medianis foliorum inciso-dentatis distinctis.

Convolvulus aschersonii sensu Meeuse (1958: 677).

Type. ZIMBABWE, Salisbury [Harare], a weed, 29 June 1927, R.G. Young 18497 (holotype BM001035803!; isotype PRE).

Description. Perennial herb, all vegetative parts pubescent with somewhat asperous, sometimes rufous hairs; rootstock a woody taproot; stems prostrate or twining, up to 2 m long. Leaves petiolate, 3–6 × 0.5–2.5 cm, variable in shape, ovate-deltoid, auriculate, sometimes the auricles lobed, the central lobe commonly oblong, apex acute, the margins undulate, sinuate-dentate to pinnatisect, base hastate; petioles 3–30 mm. Flowers 1–6 together (very rarely all solitary on the same plant) in axillary pedunculate cymes; peduncles 10–35 mm; pedicels 2–15 mm, bracts 2.5–4 mm, linear; sepals very unequal, outer sepals 6–8 × 4–5 mm, ovate to elliptic, acute; inner sepals 4–6 × 3–4 mm, nearly glabrous, apiculate; corolla 9–12 mm long, white or pale pink, lobed, the midpetaline bands pubescent, terminating in prominent teeth; ovary glabrous; style glabrous, divided c. 3 mm above base, stigmas 2.5 mm, linear. Capsule glabrous; seeds glabrous, smooth. [Meeuse and Welman 2000: 38 (map), under Convolvulus aschersonii]

Distribution. South Africa (Codd 8732, Meeuse 2237, Hutchinson 2895, Codd 8732); Zimbabwe (Blenkison in Moss 14811, Peter 51118, Drummond 4904, Leach 8369); Zambia (Fanshawe 6566); Ethiopia (Mooney 5548). It is centred on Northern
South Africa-Zimbabwe and is absent north of southern Zambia apart from two collections from Ethiopia.

**Notes.** This species was treated as *C. aschersonii* by Meeuse (1958) and Meeuse and Welman (2000) but is very different from the type of that species. It is distinguished from all similar species by the spreading pubescent, slightly asperous indumentum of stem, leaves and flower parts, the pinnatisect leaves and (usually) the 4–6-flowered cymes. Towards the north of its range it tends to have fewer flowers and specimens intermediate with *C. thomsonii* and *C. aschersonii* are sometimes found. Although quite often united with *C. sagittatus* molecular studies (Williams et al. 2014) support the retention of *C. austroafricanus* as a distinct species.

*Convolvulus austroafricanus* is common in the area where Zimbabwe and South Africa meet and should be classified as Least Concen (LC) using IUCN (2012) guidelines. The epithet “*austroafricanus*” meaning southern Africa refers to its distribution.

A cultivated plant (*Meeuse 9237A*) looks very like a hybrid between *C. austroafricanus* and *C. farinosus*.


Figure 7, t. 23–28


Type. SOUTH AFRICA, Northern Cape, Drège 7829 (lectotype L, designated here; isolecotype P!).


Type. SOUTH AFRICA, Northern Cape, Drège 7829 (lectotype L, designated by Meeuse and Welman 2000: 46); isolecotype P!).


Type. *Bolus* 252 (K, lectotype, designated here).


Type. SOUTH AFRICA, Mpumalanga, Barberton, *Galpin* 1037 (isotypes K!).


Type. Based on *Convolvulus sagittatus* subvar. *linearifolius* Hallier f.


Type. Based on *Convolvulus ulosepalus* Hallier f.

Type. ETHIOPIA, *Schimper* 660 (holotype B†; isotypes BM001011617!, E005-7479!).
**Description.** Perennial herb, all vegetative parts similarly obscurely puberulent to pubescent; rootstock a woody taproot; stems prostrate or twining, up to 2 m long. Leaves petiolate, (0.5-) 2–10 × 0.2–4 cm, variable in shape, narrowly deltoid in outline, auriculate with the basal auricles simple or, more commonly bifurcate, the central lobe oblong to oblong-lanceolate, much longer than the auricles, apex acute to apiculate, margin entire to undulate, base commonly more or less truncate and briefly cuneate onto the petiole, leaves near base of stem often with a broader central lobe than those near apex; petioles 5–25 mm. Flowers (1-) 2–6 together (very rarely solitary) in compact axillary, pedunculate cymes; peduncles 8–35 mm; bracteoles 2–5 mm, linear or linear-lanceolate; pedicels 1–10 mm, outer sepals 5–6 (-7) × 2–3 mm, lanceolate to ovate, acute, usually pubescent, inner sepals up to 5 mm wide, suborbicular, apiculate, margins scarious, glabrous or pubescent on the midrib only; corolla 7–12 mm long, white or pink, lobed, the midpetaline bands pubescent, terminating in prominent teeth; ovary glabrous; style glabrous, divided 3–4 mm above the base; stigmas c. 3 mm. Capsule glabrous; seeds glabrous, smooth. [Collenette 1999: 232 (as Convolvulus sagittatus); Meeuse 1957: 678 as C. ulosepalus; Meuse and Welman 2000: 436. p. p.; Verdcourt 1963: 44 p. p.; Sebsebe 2006 185 as C. sagittatus var. aschersonii]

**Distribution.** South Africa (Baur 901, Bolus 252, Tyson 124, Moss 14129); Namibia (Merxmuller 813, Wanntorp 815); Lesotho (Dinter 144, Dieterlen 97); Botswana (de Winter 7403, Brown 7952); Mozambique (Macuica 1333); Madagascar (White s.n. [16/9/1929]), Baron 5213); Angola (Welwitsch 6204); Zimbabwe (Rand 510, Chubb 375); Zambia (Fanshawe 5519, Sanane 307); Malawi (Patel & Kwatha 2708); Democratic Republic of the Congo (Symoens 13595); Ruanda (Troupin 4802); Tanzania (Grimshaw 93463, Richards 26827); Kenya (Mearns 1157, Lugard 168); Uganda (Scott Ellior 1145); Somalia (Thulin 10918); Ethiopia (Schimper 1130, Hildebrandi 498, Scott 305, Bidgood et al. 4970, Cufodontis 47); Eritrea (Schweinfurth & Riva 1061, Schweinfurth 1739, Ryley 1116); Yemen (Spellenberg 5426); Saudi Arabia (Colinette 5367); Nigeria (Lely 362).

**Notes.** The type of C. aschersonii (Schimper 660) has leaves with a relatively broad central lobe 5–10 mm wide and this is matched in South African material (Dieterlen 97a has even wider leaves) but narrower lobes are much more common in southern Africa. Plants towards the northern end of the range have few-flowered cymes, quite frequently reduced to single flowers. They are often more strongly pubescent and with less pronounced, often simple basal auricles whereas bifurcate auricles are the norm further south. Examples of this northern form include Simwanda 108 from Zimbabwe, Robinson 8 from Zambia, Symoens 13595 from Congo, Eggeling 2593 from Uganda, Bally 5592 from Kenya, Newbould 774 from Somalia, Scott Jones 32 from Eritrea, Wood 3281 from Yemen and Colinette 5367 from Saudi Arabia.

Convolvulus aschersonii is most readily distinguished from C. austroafricanus by the leaf shape and the short pubescence. The central leaf lobe is entire and often very narrow, most notably in specimens from Namibia. Possible hybrids or intermediates with C. austroafricanus with strongly sinuate leaf lobes occur quite frequently in Transvaal but are hardly known elsewhere. (Hanekom 2528, Meeuse 9020, Frieburberg 3195, Wilms 983, Mogg 12299, Acocks 2169, Marais 36). From C. sagittatus and C. thomsonii...
it is distinguished by the usually 2–5-flowered peduncles, bifurcate auricles and corolla
less than twice as long as the calyx, rarely exceeding 12 mm in length. Intermediates
or possibly hybrids with *C. sagittatus* also occur in South Africa, (*Baur 350, Galpin
1037, Wilms 2158, Meuse 10253, Pillans 5605*), Zimbabwe (*Eyles 8473*) and Zambia
(*Best 107*). These have larger flowers than typical of *C. aschersonii* but the peduncles are
2-flowered and the leaves like those of *C. aschersonii*. These were, at least mostly, treated

    Figure 7, t. 1–6

Type. SOUTH AFRICA, Cape, *Thunberg* (holotype UPS, not seen).
Type. *Bourbon* ex Herb. Thouin (holotype C10009603!).
*Convolvulus micranthus* Willd. ex Spreng., Syst. Veg. 1: 601. 1824, nom. illeg., non
Type. Of unknown origin, sin col. (holotype B-W 03636-010).
Type. Based on *Convolvulus micranthus* Willd. ex Spreng.
Type. ETHIOPIA, *Quartin Dillon & Petit* (holotype P-04067180!).
ger 1892: 350).
Type. ETHIOPIA, Anedehr, *Schimper* 599 (holotype B†; isotype BM001035801!).
(Hallier 1898a: 534).
Type. Based on *Convolvulus penicillatus* A.Rich.
Type. MADAGASCAR, *Hilsenberg & Bojer* s.n. (lectotype BM-000930463!, des-
ignated here).
*Convolvulus sagittatus* var. *abyssinicus* (Hallier f.) Baker & Rendle, Fl. Trop. Africa (Ol-
Type. Based on *Convolvulus sagittatus* subvar. *abyssinicus* Hallier f.
Type. Cultivated plant, *Vocke* 3803 (holotype GOET!).

**Type.** Cultivated plant grown at Uppsala (lectotype LINN 218.6!, designated by

**Description.** Perennial herb, appressed pubescent to farinose in all vegetative
parts, especially the younger stems; rootstock not known; stems to c. 1 m, twining or
prostrate. Leaves petiolate, 3–9 × 2–6 cm, characteristically cordate-deltoid, auricles
usually acute, apex acute to acuminate, margin entire, undulate or serrate; petioles 1–4.5 cm. Flowers 1–6 in axillary pedunculate cymes, peduncles 1.5–5 cm; bracteoles 1–2 mm, subulate; pedicels 1–15 mm; outer sepals 6–8 × 3–5 mm, lanceolate, ovate or elliptic, acute the apex often slightly reflexed, pubescent, inner sepals suborbicular with scarious margins, glabrous; corolla 10–15 mm, white or pinkish, lobed, the mid-petaline bands pubescent; ovary glabrous; style glabrous; divided 4 mm above base, stigmas 1–1.5 mm, linear. Capsule glabrous; seeds glabrous, rugose. [Sa’ad 1967: 225; Meeuse 1958: 684 (map); Meeuse and Welman 2000: 42; Gonçalves 1987: 28–30 (plate); Verdcourt 1963: 41; Silvestre 2012: 257]

**Distribution.** South Africa (Salter 9401, Moss 14480, Schlechter 2132); Swaziland; Madagascar (Bosser 12002); Mozambique (Nuvunga & Boane 296, Junod 423); Zimbabwe (Chase 5314); Zambia (Hutchinson & Gillett 3387); Malawi (Paweek 13136); Congo (Cambridge Congo Exped. 18); Ruanda (Michel 4893); Tanzania (Bidgood et al. 548, Schlieben 881); Kenya (Fries & Fries 198); Uganda (Purseglove 3709); Ethiopia (Schimper 599); Eritrea (?), Yemen (Wood 2990, 3192).

**Notes.** Usually readily recognised by the triangular-ovate, shortly pubescent to farinose, very acute leaves and small, deeply lobed corolla. However, occasionally plants are seen in which the leaves are ovate or sinuately lobed to more or less palmatisect, particularly in South Africa (Meeuse 9035, Moss 9855) and these are best distinguished from *C. austroafricanus* by the appressed pubescent indumentum. Occasional specimens suggest possible hybridisation with *C. aschersonii*, such as Archbold 2546 from Tanzania or Pawek 11875 from Malawi. As the only real difference between the two species lies in the leaf shape any intermediate specimen could be the result of hybridisation.


Figure 7, t. 36–42


Type. Not found at P.


Types: ETHIOPIA, Tauta bei Magdala, Steudner 956 (syntype B†) and Talenta, Rohfis s.n (syntype B†); ETHIOPIA, Sennen, Schimper 165 (neotype W!, designated here; isoneotype K).


Type. ANGOLA, Cuenza, H.H.Johnson (holotype K!).


Type. ANGOLA, Huilla, Welwitsch 6131 (holotype BM001035800!; isotypes COI, G, K!, P!).
Type. No specimens cited; based on subvarieties.


Type. No specimens cited; based on subvarieties.

Type. Based on Convolvulus steudneri Engl., C. angolensis Baker and Ipomoea huillensis Baker.

Convolvulus sagittatus subvar. graminifolia Hallier f., Bull. Herb. Boissier 6: 534. 1898, as “Convolvulus sagittatus var. grandiflorus subvar. graminifolia” (Hallier 1898a: 534).
Type. SOUTH AFRICA, KwaZulu-Natal, Rehmann 7823 (holotype Z, not seen).

Type. SOUTH AFRICA, Rehman 3796 (lectotype Z!, designated by Meeuse 1957: 681).

Type. SOUTH AFRICA, Burke s.n. (lectotype K!, designated by Meeuse 1957: 681).

Type. SOUTH AFRICA, KwaZulu-Natal, Gerrard 1333 (lectotype K 000097310, portion at top of sheet, designated here).

Type. Based on Convolvulus sagittatus subvar. graminifolia Hallier f.

Type. SOUTH AFRICA, Transvaal, October (18)76, E. Holub 1948-1951 (lectotype K, designated here). This appears to be a single sheet, rather than four separate numbers.

Type. Based on Ipomoea huillensis Baker

Type. Based on Convolvulus sagittatus subvar. subcordata Hallier f.

Type. YEMEN, Von Wissmann 2097 (lectotype HBG!, designated here).

**Type.** Based on *Convolvulus phylosepalus* Hallier f.


**Type.** Based on *Convolvulus hirtellus* Hallier f.


**Type.** Based on *Convolvulus sagittatus* var. *grandiflorus* Hallier f.

**Type.** SOUTH AFRICA, Cape, Thunberg s.n. (lectotype UPS, sheet 1, designated by Meeuse 1958: 679).

**Description.** Very variable perennial herb, the vegetative parts usually thinly to densely pubescent, very rarely glabrous; stems decumbent, trailing, rambling or ascending usually < 60 cm long; rootstock a stout taproot. Leaves petiolate, sometimes dimorphic with ovate-deltoid (below) and narrowly lanceolate leaves on the same plant, 1–2.8 (-5.5) × (0.1-) 0.3–1.4 cm, ovate-deltoid to narrowly lanceolate, apex acute, margin entire (very rarely undulate), base sagittate or hastate, the basal auricles not bifid, varying greatly in width; petioles 2–4 (-7) mm. Flowers axillary, pedunculate, 1(-2); peduncles (3-) 6–33 mm; bracteoles 2–3 mm, linear to linear-lanceolate; pedicels 2–5 (-12) mm, outer sepals 5.5–8 × 4–5 mm, ovate, broadly oblong to obovate, acute to obtuse, the apex often somewhat bent outwards, glabrous or pubescent, inner sepals glabrous; corolla (1-) 1.2–1.7 cm. pink or white, shallowly lobed, midpetaline bands pubescent, terminating in a tooth; ovary glabrous, style glabrous, divided 3–4 mm above base; stigmas 2–4 mm, linear. Capsule glabrous; seeds glabrous, minutely rugose. [Meeuse 1958: 679 p. p.; Meeuse and Welman 2000: 46 p. p.; Sebsebe 2007: 184 as *Convolvulus steudneri*]


**Notes.** Distinguished from related species by the solitary pedunculate flowers, the corolla typically 1.2–1.7 cm long. The leaves are essentially ovate-deltoid, becoming linear in some cases, although often very narrowly so and the basal auricles are simple. The petioles are often very short.

The type of *C. sagittatus* has narrowly lanceolate leaves, whereas the type of *C. phylosepalus* has broadly ovate leaves with very short petioles and conspicuous broad sepals. However, as noted above, both leaf forms can occur on the same specimen.
Although our concept of *C. sagittatus* is narrower than that of Meeuse and Welman (2000) or of Verdcourt (1963), it still represents an aggregate, which certainly contains distinct varieties and possibly distinct species. All the four cited specimens from Angola have ovate, acute to acuminate outer sepals and could be recognised as *C. angolensis*. Plants from Ethiopia and SW Arabia were separated off by Wood (1997) as *C. thymoides* and by Sebsebe (2006) as *C. steudneri* and could be recognised under the latter name. They have broadly oblong, obtuse, pubescent outer sepals but they are scarcely distinct from some forms of *C. sagittatus* found in South Africa including the lectotype of *C. hirtellus*. The syntypes of *C. steudneri* in Berlin were destroyed. No isotype is known so we have designated Schimper 165 (W) as a neotype. This was identified as *C. steudneri* by Hallier in December 1892, comes from the correct part of Ethiopia and may well be distributed elsewhere, as are many of Schimper’s collections. Another distinct form with very narrow, hirsute leaves is represented by Eyles 8473 from Zimbabwe and Baum 180 from Botswana. Santos 554 from Angola has unusual oblong leaves. All these have relatively large solitary flowers and it seems best to retain them in *C. sagittatus* until more detailed study can clarify their status.


Type. Based on *Convolvulus thomsonii* Baker


Type. Based on *Convolvulus subvar. villosus* Hallier f.


Type. TANZANIA, Songea District, *Busse* 938 (holotype B†; isotype EA).


Type. TANZANIA, Matengo hills, *Zerny* 17 (holotype W†).


Type. TANZANIA, Matengo hills, *Zerny* 370 (holotype W†).

Type. TANZANIA, N. of Lake Nyasa, *Thomson* s.n. (holotype K†).

**Description.** Prostrate perennial herb, densely tomentose on all vegetative parts, often brownish when dry. Leaves petiolate, 1.2–5 × 0.5–2.5 cm, variable in shape, ovate, lanceolate-deltoid or, most commonly oblong, margin undulate to crenate, base hastate to sagittate; petioles 3–6 (-20) mm. Flowers solitary, axillary, pedunculate; peduncles solitary or, occasionally, paired, 1.5–4 cm, often arching; bracteoles 5–7
mm, linear; pedicels 3–8 (-15) mm; outer sepals 9–11 × 5 mm, ovate, acute to shortly acuminate, densely hairy; corolla (1.3-)1.5–1.8 cm long, white, unlobed, midpetaline bands pubescent, terminating in a tooth; ovary glabrous. Capsule glabrous; seeds glabrous, nearly smooth but somewhat rugose on the angles. [Verdcourt 1963: 42 (as Convolvulus zernyi)]

**Distribution.** Malawi (Synge WC 251, Pawek 13111, Richards 20646); Tanzania (Lovett et al. 2089, Mgaza 121). 1800–2100 m.

**Notes.** We have widened the concept of this species from that of Verdcourt (1963) to include plants with a somewhat smaller corolla and calyx, including the type of *C. thomsonii*, which is atypical in its relatively short calyx and corolla but is clearly an immature specimen of this taxon. This species appears to be frequent in the highlands of northern Malawi and southern Tanzania. It is very close to *C. sagittatus* but differs in the larger sepals, 9–11 mm in length and the tomentose indumentum, which dries brown. The rather long, often arching peduncles are also very characteristic. An unusual feature is the occasional presence of paired peduncles. It can be distinguished from *C. aschersonii* and *C. austroafricanus* by the larger solitary flowers as well as the tomentose indumentum. It is also close to *C. galpinii* differing principally in the longer, gradually narrowed sepals.

As with many other African species, intermediates with other species are found. These have the same indumentum, relatively large corollas and sepals of *Convolvulus thomsonii* but inflorescences of 2–3 flowers. Phillips 2738 and 3920 from northern Malawi and Richards 6071 from Zambia appear to be intermediate with *C. austroafricanus* or possibly *C. aschersonii*.


**Type.** SOUTH AFRICA, Eastern Cape, *E.E.Galpin* 2110 (holotype K!; isotypes BOL, GRA, PRE).

**Description.** Perennial herb, densely brownish or whitish villous in all vegetative parts; rootstock not known; stems to 60 cm, slender, twining or (?) prostrate. Leaves petiolate, 2–4 × 0.7–1.2 cm, deltoid with cordate, hastate or sagittate base, apex acute, margin undulate or crenate; petioles 4–7 (-12) mm. Flowers axillary, pedunculate, solitary or paired, peduncles 1.5–2 (-6) cm; bracteoles 6–7 mm, linear; pedicels 3–6 (-10) mm; outer sepals 8 × 4 mm, ovate, abruptly narrowed above the middle to an acuminate apex; petals 16–21 mm long, white, shallowly lobed, the midpetaline bands densely pilose, terminating in a tooth; ovary glabrous; style glabrous, divided 8–10 mm above the base, stigmas 2.5 mm linear. Capsule glabrous; seeds glabrous, obscurely rugose with pallid ridges, not puberulous as stated by Meeuse (1957: 687). [Meeuse and Welman 2000: 43 (map)]

**Distribution.** South Africa: Eastern Cape (*Phillipson 1541, Krook 841*).

**Notes.** Distinguished by the relatively slender, twining stems, dense indumentum, hastate or sagittate leaves and abruptly acuminate sepals.

Figure 7, t. 29–35


Type. SOUTH AFRICA, Cape, Drège s.n. (isotypes K!, L, OXF!, MO!).


Type. LESOTHO, Cooper 929 (lectotype K 000405826!, designated here).

**Description.** Perennial herb, densely hirsute with brownish hairs in all vegetative parts; rootstock woody; stems to c. 1 m, apparently trailing (rarely climbing), relatively stout. Leaves petiolate, 1–6 × 0.8–4 cm, ovate-deltoid, simple, apex acute, margin undulate to irregularly dentate, base cordate; petioles 5–10 (-15) mm. Flowers 1–5; peduncles 2–6.5 cm; pedicels 3–6 (-15) mm; bracteoles 6–12 × 1–2 mm, linear, narrowly lanceolate or narrowly oblanceolate; outer sepals 14–18 × 7–9 mm, broadly to narrowly ovate, obtuse or acute, margin undulate or crenate; corolla 15–30 mm, white or cream, shallowly lobed, the lobes broadly triangular, acute, c. 5 mm long, the mid-petaline bands densely pilose; ovary glabrous, acuminate; style glabrous, divided 5–8 mm above base, stigmas 6 mm, linear. Capsule glabrous; seeds tuberculate. [Meeuse 1957: 687; Meeuse and Welman 2000: 44 (map)]

**Distribution.** South Africa: centred on KwaZulu-Natal extending to Eastern Cape, Free State, Lesotho, Swaziland and Northern Province (Hilliard 5023, Sanderson 282, Codd 7655, Wood 3462, Rudatis 633, Strey 3460).

**Notes.** Distinguished by its tomentose, entire, ovate to oblong, cordate hirsute leaves. Plants described as var. *integrifolia* are somewhat similar to *C. galpinii* in leaf shape but 2-3 flowers are borne on each peduncle and the corolla is similar to *C. natalensis* in size.


**Description.** Perennial herb, shortly pilose with stiff spreading hairs in all vegetative parts; rootstock not known; stems to at least 80 cm, apparently trailing. Leaves petiolate, very narrowly hastate, the central lobe 2-5 × 0.2–0.4 cm, linear-lanceolate, basal auricles 3-4 mm long, bifid, apex acute to apiculate, margin entire; petioles 5–16 mm. Flowers axillary, pedunculate, 1 (–2), pedicules 3–5.5 cm; bracteoles 6–10 mm, linear; pedicels 3–8 mm, noticeably more densely hirsute than peduncles; outer sepals
14–18 × 8 mm, ovate, long acuminate, margin undulate, inner sepals distinctly shorter; corolla 25–30 mm, yellow-green, deeply lobed, the lobes triangular, acuminate, c. 10 mm long, the midpetaline bands densely pilose, terminating in the apex of the lobes; ovary glabrous, style glabrous, divided 6–10 mm above base, stigmas 3–5 mm.

**Distribution.** South Africa: KwaZulu-Natal (Wood 4071, 4382; Johnston 191, 778) and Eastern Cape (Bester 1479).

**Notes.** Included by Meeuse (1958) in *C. natalensis* but distinct in its leaves, profoundly lobed corolla and long acuminate sepals.

**Species 42–55. American species**

Apart from two anomalous species (*C. simulans* and *C. hasslerianus*) all species are perennial trailing or twining herbs with distinctly petiolate leaves, the lamina with a hastate, truncate or sagittate base. Dimorphic leaves are mainly features of *C. equitans* and *C. chilensis*. Only *C. hermanniae* subsp. *erosus* has a hirsute ovary and capsule. Taxonomy is based much on sepal and corolla size, number of flowers in each cyme and on indumentum. *C. hasslerianus* is the only American species with a woody xylopodium being adapted to the cerrado biome. It has erect stems and subsessile leaves, the lamina abruptly narrowed at the base.

The first two species treated here, *C. equitans* and *C. carrii* are clearly closely related and share several unusual even unique characters: auriculate sepals, styles pubescent below stigmas, persistent in fruit and somewhat exserted. Curiously these characters are present in some but not all specimens of both species. However, the presence or absence of these characters does not correlate well with other characters and shows no obvious geographical patterning. While *C. carrii* is easy to identify, it represents a very local population and it is not impossible that similar distinct local populations may be revealed elsewhere within the range of *C. equitans* following intensive field studies.

The taxonomy of the American species is difficult as can be appreciated by the synonymies listed under many species, the same infraspecific entity being placed variously under different species. However, we believe that O’Donell (1957, 1959) had correctly assigned most specimens to the correct species.


**Type.** MEXICO, León, Hartweg 98 (lectotype K-000613111!, portion placed diagonally across sheet ex Herb. Bentham with Bentham’s annotation, designated here; isolectotypes K ex Herb. Hooker K-000613113!, W!).

**Description.** Pubescent perennial herb from a stout tap root; stems decumbent or trailing to at least 1 m. Leaf blade very variable in size and form, 1.5–4 (–6.5) × 1–2.5 cm, most commonly with a narrow linear-ligulate central lobe much longer than the small lobed or bifurcate auricles, sometimes palmatisect, sometimes
broadly ovate-deltoid, auriculate, usually densely and finely pubescent, apex acute, base cordate, margin entire, undulate or (rarely) crenate-serrate; petioles 0.5–2.5 cm. Flowers 1–3 in pedunculate, axillary cymes; peduncles 1.5–9 cm; bracteoles 1.5–2.5 × 1 mm, linear-lanceolate; pedicels 2–9 (-17) mm; outer sepals 6–8(-12) mm, narrowly elliptic, truncate to auriculate at base, margin entire to crenate, apex truncate and mucronate to acute; corolla 1.4–1.8(-3.0) cm long, white, white with dark centre or pink, shallowly lobed; midpetaline bands pubescent, terminating in a mucro; filaments eglandular; ovary glabrous; style glabrous or pubescent just below the stigmas, somewhat persistent, divided 5–7 mm above base; stigmas 2 mm, weakly exserted. Capsule glabrous, seeds minutely rugose. [Turner 2009: 400 (maps); Carranza 2008: 8]

Notes. A very variable plant in many respects. However the vast majority of specimens have small leaves with a narrow linear-ligulate central lobe and short bifurcate or otherwise lobed auricles. In most plants the outer sepals are abruptly narrowed to auriculate at the base, but in many specimens including the type, they are gradually narrowed to the base. Plants are usually densely pubescent. The recognition of the following varieties only account for some of the great variation seen in this species.

42a. *Convolvulus equitans* var. *equitans*

Figure 8, t. 1–8

*Convolvulus incanus* auct. mult., non Vahl (1794).


Type. UNITED STATES OF AMERICA, Texas, no collection specified.

Distinguishing features. Flowers relatively small; sepals 6 – 8 mm long; corolla 1.4–1.8(2.3) cm long, usually pink.


Diagnosis. A var, typo floribus grandioribus, sepalis 11 – 12 mm longis, corolla 2.5–3 cm longa, plerumque alba, in centro atropurpurea.

*Convolvulus sagittifolius* Scheele (1849: 747), nom illeg., non *C. sagittifolius* Michx. (1803).

Type. Texas, “Neubraunfels”, *Lindheimer* s.n. (B†).

Type. UNITED STATES OF AMERICA, Texas, New Braunfels, *F. Lindheimer*, fasc. IV No. 469 (holotype K; isotypes BM, FHO, LE, P, W).
Figure 8. 1–8 *C. equitans* 1 leaves 2 bracteoles 3 outer sepal 4 inner sepal 5 stamen 6 ovary and style 7 capsule 8 seed 1–2 & 5–8 from Correll 27128 (TEX) 3–4 from Turner 21-787 (TEX) 9–16 *C. crenati-
folius* 9 (North American) leaves 10 bracteole 11 outer sepal 12 inner sepal 13 stamen 14 ovary and style 15 capsule 16 seed 9–14 from Runyon 2599 (TEX) 15–16 from Runyon 4479 (TEX) 17–24 *C. carrii* 17 leaf 18 bracteole 19 outer sepal 20 inner sepal 21 stamen 22 style 23 calyx 24 seed. From Correll & Correll 38844 (TEX) 25–31 *C. crenatifolius* subsp. *montevidensis* 25 leaves 26 bracteole 27 outer sepal 28 inner sepal 29 stamen 30 ovary and style 31 capsule. From Hawkes et al. 3263 (K) 32–39 *C. chilensis* 32 leaves 33 bracteole 34 calyx 35 outer sepal 36 middle sepal 37 inner sepal 38 stamen 39 ovary and style showing stigma variation. From Cuming s.n. (OXF) 40–46 *C. crenatifolius* subsp. *crenatifolius* 40 leaf 41 outer sepal 42 inner sepal 43 stamen 44 ovary and style 45 capsule 46 seed 40–44 from Buchtien 2450 (K) 45–46 from Wood 17714 (K).
**Distinguishing features.** Distinguished by it is larger flowers; sepals 11–12 mm long; corolla 2.5–3 cm long, usually white but often with a dark centre.


**Notes.** Intermediates with var. *equitans* occur and var. *lindheimeri* may have arisen as a result of hybridisation between *C. carrii* and *C. equitans* although it is not sympatric with *C. carrii*.

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**43. Convolvulus carrii** B.L.

**Type.** UNITED STATES OF AMERICA, Texas, *B.L. Turner & Jana Kos* 09-03 (holotype TEX; isotype OXF!).

**Description.** Trailing or twining herb with stems at least 60 cm long from a central rootstock, the vegetative parts densely pubescent to whitish-tomentellous. Leaves petiolate, 2–5 × 1.3–3 cm, ovate-deltoid to broadly oblong, obtuse or acute, margin undulate to incised-dentate, base shallowly cordate and cuneate onto the petiole, auricles simples or toothed, veins very prominent on lower surface; petioles 1–2.5 cm. Flowers 1(-2) borne on long axillary peduncles; peduncles 3–5 cm, often bent at apex; bracteoles 1–2 mm, minute, linear-lanceolate; pedicels 3–14 mm; sepals 9–12 × 5 mm, broadly oblong, apex rounded to emarginate and mucronate, base truncate to somewhat auriculate; corolla 2.5–3 cm long, white, usually with a maroon centre, unlobed, midpetaline bands pilose, terminating in a tooth; ovary glabrous; style divided c. 8–10 mm above base, glabrous or, just below the stigmas, pubescent; stigmas 2 mm, weakly exserted. Capsule glabrous; seeds glabrous, smooth, black. [Turner 2009: 398–9, figs 1–3]


**Notes.** A recently described species which requires further study. It may prove only to be an unusually distinct form of *C. equitans*.

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**Type.** CHILE, Chillán, *Née* s.n. (lectotype MA-475569!, sheet with corolla, designated here).

**Convolvulus canescens** Phil., *Linnaea* 33: 182. 1864. (Philippi 1864: 182).

**Type.** CHILE, San Felipe de Aconcagua, *Landbeck* s.n. (?SGO).
A foundation monograph of *Convolvulus* L. (Convolvulaceae)

*Convolvulus dissectus* var. *canescens* (Phil.) Reiche, Anales Univ. Chile 120: 828. 1907. (Reiche 1907: 828).

Type. Based on *Convolvulus canescens* Phil.

**Type.** Based on *Convolvulus dissectus* Cav.

**Description.** Thinnly to densely pubescent herb from a thick rootstock, sometimes sericeous on young parts, but more or less glabrescent; stems trailing (rarely twining), up to 2.5 m long. Leaves petiolate, 2–8 × 2–6 cm, very variable in form, usually linear or oblong with prominent elongate bifurcate basal auricles, but occasionally ovate-deltoid to suborbicular with rounded auricles, apex usually acute, margin entire or undulate, base cordate to truncate; petioles 0.5–3.5 cm. Flowers 1–2 (-3), axillary, pedunculate; peduncles 2–4 (-6.5) cm; bracteoles 2–4 mm, lanceolate; pedicels 5–10 mm; outer sepals 7–9 × 5–7 mm, elliptic, obtuse, mucronate; corolla 1.5–2.5 cm long, pink, very shallowly lobed with slightly fimbriate margins, midpetaline bands dark, pilose, terminating in a pilose mucro; ovary glabrous; style divided 6–10 mm above base, stigmas 1.5–3.5 mm, cylindrical to linear, unusually variable. Capsule glabrous; seeds rugose. [O'Donell 1957: 161–166 (Figure 6); Hoffmann 1998: 207]

**Distribution.** Endemic to central Chile from Antofagasta south to Santiago (Worth & Morrison 16236, Bridges s.n., Gardner & Knees 5652, 8467, DCI 1791). 0–1800 m.

**Notes.** This polymorphic species is usually easily distinguished from all other South American species by the leaves with bifurcate auricles combined with pink corollas usually around 2–2.5 cm long. However, some specimens from Coquimbo (*Simon* 312 (MIC, RSA), Wagenknecht 18445 (F)) have small, suborbicular sericeous leaves and merit further study. The type location is given as Chillán, but this is almost certainly an error as the plant has never subsequently been collected so far south (O'Donell 1957: 161).

45. *Convolvulus bonariensis* Cav., Icon. 5: 54, pl. 480(2). 1799. (Cavanilles 1799: 54).


Type. CHILE, Valparaiso, *Meyen* s.n. (holotype B?†).


Type. CHILE, Santiago, *Philippi* s.n. (whereabouts unknown).


Type. ARGENTINA, Cordoba, *Lorentz* 130 (lectotype GOET005724, designated by Staples et al. 2012: 676).


Type. CHILE, Santiago, Quinta Normal, *Philippi* s.n. (SGO, not seen).
Convolvulus dissectus var. diversifolius (Kunze ex Walp.) Reiche, Anal. Univ. Chile 120: 827. 1907. (Reiche 1907: 827).

**Type.** Based on Aniseia diversifolia Walpers

**Convolvulus dissectus var. diversifolius (Kunze ex Walp.) Reiche, Anal. Univ. Chile 120: 827. 1907. (Reiche 1907: 827).**

**Type.** Based on Aniseia diversifolia Walpers

**Type.** ARGENTINA, Pampas de Buenos Aires, Née s.n. (lectotype MA-475568!, sheet with location “pampas de Buenos Ayres” and determination by O’Donell, designated here).

**Description.** Finely adpressed-pubescent herb from a thick rootstock, sometimes sericeous on young parts; stems trailing, up to 2 m long, 1–3 mm in diameter. Leaves petiolate, 3–6 (-11) × 1.2–3 (-6) cm, very variable in shape but usually oblong-lanceolate or strap-shaped with pronounced (rarely bifurcate) auricles, occasionally ovate-deltoid, characteristically 5 times as long as broad, apex usually obtuse, mucronate, margin undulate to crenate or serrate, base hastate to cordate; petiole 5–40 mm. Flowers (1-) 2–5 in axillary, pedunculate cymes; peduncles 0.6–4 (-6) cm; bracteoles 2–4 mm, narrowly lanceolate; pedicels 3–12 mm; outer sepals 6–8 × 3–5 mm, elliptic, acute; corolla 1–1.5 cm long, pink, shallowly lobed, midpetaline bands pubescent terminating in teeth; ovary glabrous, style divided 3–6 mm above base; stigmas c. 1.5 mm, narrowly ellipsoid. Capsule glabrous; seeds smooth to indistinctly tuberculate. [O’Donell 1957: 159-160 (Figure 5); O’Donell 1959: 267–270 (Figure 44)]

**Distribution.** Argentina (Hieronymus 916, Grisebach 130, Pedersen 8251); Uruguay (King s.n.); Chile (Gay s.n., Phillipi s.n.). 0–1950 m. Records from Bolivia are errors.

**Notes.** The adpressed pubescent, lanceolate to strap-shaped leaves combined with the small corolla are characteristic. Flower size and usually leaf shape serve to distinguish it from C. chilensis, with which it sometimes grows in Chile. It is morphologically extraordinarily similar to C. aschersonii from South Africa which differs in its paler, more deeply lobed corollas and usually shorter sepals.


**Convolvulus andinus* Phil., Linnaea 33: 184. 1864. (Phillipi 1864: 184).

**Type.** CHILE, Santiago, *Philippi* s.n. (holotype *SGO*, not seen).

**Convolvulus ovatus Phil., Anal. Univ. Santiago 90: 221. 1895. (Phillipi 1895: 221).**

**Type.** CHILE, Maule, Rio Maule, *Philippi* s.n. (holotype *SGO*, not seen).

**Convolvulus demissus var. andinus* (Phil.) Reiche, Anal. Univ. Chile 120: 826 (Reiche 1907: 826).

**Type.** Based on *Convolvulus andinus* Phil.

**Convolvulus demissus var. ovatus* (Phil.) Reiche, Anal. Univ. Chile 120: 826 (Reiche 1907: 826).

**Type.** Based on *Convolvulus ovatus* Phil.

**Type.** CHILE, Coquimbo, *Gay* s.n. (holotype G; several isotypes P!).
Figure 9. 1–7 C. laciniatus 1 leaf 2 outer sepal 3 inner sepal 4 stamen 5 ovary and style 6 capsule with calyx and bracteoles 7 seeds. From Wood et al. 22627 (K) 8–15 C. hermanniae subsp. erosus 8 leaves 9 bracteoles 10 outer sepal 11 inner sepal 12 stamen 13 ovary and style 14 capsule, apically hirsute 15 seeds. From Buchten 15/11/1885 (OXF) 16–21 C. montanus 16 leaves 17 outer sepal 18 inner sepal 19 stamen 20 ovary and style 21 calyx and capsule. From Tutin 1008 (BM) 22–28 C. crispifolius 22 leaf 23 outer sepal 24 middle sepal 25 inner sepal 26 stamen 27 ovary and style 28 calyx and capsule. From Chinnock 2915 (AD) 29–36 C. microsepalus 29 leaf and bracteole (left) 30 outer sepal 31 middle sepal 32 inner sepal 33 stamen 34 ovary and style 35 calyx and capsule 36 seed. From Orchard 211 (AD) and Badman 32 (AD) 37–43 C. angustissimus 37 leaves showing three forms on same plant 38 outer sepal 39 inner sepal 40 stamen 41 ovary and style 42 calyx and capsule 43 seeds. From Spicer 31/1/1875 (OXF).
**Description.** Glabrous or puberulent herb from a deep rootstock. Stems 30(-50) cm long, numerous, trailing. Leaf blade 0.6–2 × 0.4–1.6 cm, ovate-deltoid; base truncate and briefly cuneate onto the petiole, auricles not well-developed; apex obtuse and mucronate or acute; margin entire; petiole 4–8 (-12) mm. Flowers solitary (rarely paired), axillary, pedunculate; peduncles 10–18 mm; bracteoles 2–6 mm, linear; pedicels 2–4 mm; outer sepals 7–10 × 5–7 mm, elliptic, obtuse; corolla (1-) 1.5 (-2) cm long, pink, shallowly lobed, midpetaline bands pilose, terminating in small teeth; ovary glabrous; style divided 4–5 mm above base, stigmas 2–3 mm. Capsule glabrous; seeds smooth but with slightly muricate angles. [O’Donell 1957: 165–167 (Figure 7); O’Donell 1959: 276]

**Distribution.** Central Chile (Morisson 16746, Cuming 214, Gardner et al. 52, UCEXC 43) and adjacent parts of Argentina (fide O’Donell 1959: 277). 1500–2700 m.

**Notes.** This is an Andean species variable in indumentum with a superficial resemblance to *C. arvensis* but with much larger sepals and ovate-deltoid leaves with poorly developed basal auricles. It is also very similar to some forms of the African *C. sagittatus.*


**Type.** ARGENTINA, Chaco, Schulz 3556 (holotype LIL!).

**Description.** Finely pubescent trailing or twining herb from a thick rootstock, stems up to 1 m long. Leaves petiolate, 1–5 × 0.5–2 cm, ovate-deltoid, auriculate, apex obtuse and mucronate, margin weakly crenate, base cordate; petioles 3–13 mm. Flowers 1–4 in axillary, pedunculate cymes; peduncles 1–3 (-8.5) cm; bracteoles 1.5–2.5 mm, narrowly ovate; pedicels 5–15 mm; outer sepals 4–6 × 4–5 mm, broadly elliptic to obovate, obtuse, inner sepals truncate; corolla 0.7–0.8 cm long, pale pink, shallowly lobed, midpetaline bands pilose in the upper half terminating in small teeth; ovary glabrous, acuminate; style glabrous, divided 3.5–4 mm above base; stigmas 1.5 mm. Capsule glabrous; seeds strongly tuberculate. [O’Donell 1959: 291]

**Distribution.** Endemic to Argentina: Corrientes and Chaco (Pedersen 4418).

**Notes.** A local endemic with a small corolla growing on sand deposits in river valleys.


Figure 9, t. 1–7


**Type.** URUGUAY, Commerson (holotype P, not found).

*Convolvulus lasianthus* Cav., Icon. 5: 53, t. 479(1). 1799. (Cavanilles 1799: 53).

**Type.** CHILE, Talcahuano, Née (lectotype, MA-475572!, sheet numbered “1365” with rootstock and two corollas, designated here).
Type. Brazil. Sello s.n. (lectotype P03560958, designated here).

Type. ARGENTINA, Tucuman, (GOET?).

Type. CHILE, Bucalemu and Cahuil, L. Sanfirgo (syntypes SGO, not seen).

**Type.** URUGUAY, Montevideo, Commerson s.n. (holotype P-Juss!).

**Description.** Very variable perennial herb with numerous, often branched, trailing stems from a stout central rootstock, most commonly glabrous, sometimes thinly pubescent and rarely white-tomentose. Leaves petiolate, 1–3(-5) × 1–3(-5) cm, very variable in form but always deeply divided, usually profoundly palmatisect or pinnaatisect with narrow laciniate segments, rarely with broader segments; apex obtuse or acute; margin undulate or entire; petioles 3–15 mm. Flowers 1–2(-3), axillary, pedunculate; peduncles 1–3(-5) cm; bracteoles 2–3.5 mm; pedicels 2–10 mm; outer sepals 6–9 × 5–6 mm, elliptic to obovate, margins scarious; corolla 1–2 cm long, white or white with purple centre, lobed with acute apices, exterior glabrous to thinly pilose in correlation with overall plant indumentum, midpetaline bands present or absent but if present dark violet, pilose; ovary glabrous; style glabrous, divided 5–11 mm above base; stigmas 1.5–2 mm. Capsule glabrous; seeds smooth, black. [O’Donell 1957: 169-172, Figure 9; O’Donell 1959: 281]

**Distribution.** Argentina (Tressens et al. 2282, Pastore 1262), Chile, Uruguay (Gibert 40); Brazil (fide O’Donell 1959: 284); Bolivia (Wood 22627, Bang 959, Fiebrig 2587). 0–3800 m.

**Notes.** An extremely variable species easily recognised by its deeply divided leaves and white flowers, which are occasionally with dark violet midpetaline bands. The following specimens are outstanding and could each constitute a distinct taxon, but which I hesitate to recognise in the absence of any matching material: Venturi 8624 (BM, K, MO) from Argentina, which has very large leaves 5 × 5 cm with broad segments, the peduncles up to 6 cm long bearing up to three flowers and is apparently similar to C. geranioides from Chile; Sandoval & Stark 1025 (K) from Chile, which has small pinnatisect, white-tomentose leaves. There are also densely pubescent specimens from Uruguay (Gay s.n., Seijo et al. 2381, for example) which may accord with var. hirsutus Desr. Corolla indumentum and colouring are also outstandingly variable, some corollas completely glabrous while in others the midpetaline bands are pubescent.

Two specimens from Bolivia (Wood et al. 21956 and Bastian 783, both LPB) have finely dissected leaves like C. laciniatus but a hairy apex to the ovary. They probably represent the hybrid between C. laciniatus and C. hermanniae subsp. erosus, certainly Wood 21956 was growing in the vicinity of both parents.

**Type.** PERU, Huara, *Dombey* (lectotype P-00608800!, sheet labelled “Perou Dombey”, designated here; isolectotypes P!, BM000953290!).

**Description.** Trailing or (less commonly) twining herb from a thickened woody rootstock c. 1 cm thick, all vegetative parts grey-tomentose. Stems up to 1 m long, apparently more slender in twining plants, numerous. Leaves petiolate, 2–6.5 × 0.5–3 cm, ovate to ovate-deltoid, the auricles not well-developed, apex acute to obtuse, margin undulate to irregularly dentate, base cordate; petioles 5–12 (-22) mm. Flowers 1–2 (-3), axillary, pedunculate; peduncles 1–3 (-6) cm, often shorter than the leaves; bracteoles 2–4 mm, linear-lanceolate; pedicels 5–12 mm; outer sepals 7–10 × 4–6 mm, (narrowly) elliptic, usually acute; corolla 1.4–1.8 cm long, white, shallowly lobed, midpetaline bands extended into mucros, tomentose; ovary conical, 1.5–2 mm, glabrous or apically pilose, style divided 5–7 mm above base, glabrous except immediately above ovary, stigmas 2.5–3 mm. Capsule glabrous or apically pilose; seeds smooth.

We recognise two subspecies based on ovary and capsule indumentum:

49a. *Convolvulus hermanniae* subsp. *hermanniae*


**Type.** PERU, *Dombey* s.n. (lectotype C!, sheet with Dombey’s name, designated here).

*Ipomoea hermanniae* (L’Hér.) G. Don, Gen Hist. 4: 276. 1838. (Don 1838: 276).

**Type.** Based on *Convolvulus hermanniae* L’Hér.

**Distinguishing features.** Ovary and capsule completely glabrous.

**Distribution.** The principal or only subspecies in Ecuador and Peru extending south into Bolivia: Ecuador (*Spruce 5810*); Peru (*Thomas 3/1, Mathews 377*); Bolivia (*Badcock 607, Beck et al. 31637*), northern Argentina (*Fortunato et al. 4648*), 2200–2880 m.

**Notes.** The name *C. incanus* was, and still is (Hyam 2011: 554), commonly misapplied to *C. equitans* from North America, although it is clearly indicated that the type was collected by Dombey; perhaps it was grown from seeds with the same origin as those from which the type of *C. hermanniae* was grown.
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Figure 9, t. 8–15

Type. URUGUAY, Montevideo, Commerson s.n. (holotype P-Juss!).

*Convolvulus crenatus* Vahl, Symb. Bot. 3: 31. 1794 , nom. illeg., non *Convolvulus cre- 

Type. BRAZIL, Thouin s.n. (?C. not seen).

Type. Based on *Convolvulus crenatus* Vahl

Type. CHILE, Santiago, Meyen s.n. (B†).

Type based on *Convolvulus costatus* Meyen

(Choisy 1845: 409).
Type. URUGUAY, Montevideo, Commerson s.n. (holotype P [Herb. Juss.]).

Type. URUGUAY, Montevideo, Sellow s.n. (not found).

Type. PARAGUAY, Valenzuela, Hassler 7103 (holotype G).

Type. Based on *Convolvulus mollis* var. *albidovillosus* Chodat & Hassl.

**Type.** Based on *Convolvulus erosus* Desr.


**Distribution.** The only subspecies present in the Southern Cone extending north to Bolivia and Brazil: Chile (Cuming 280, Buchtien s.n. [19/11/1895]); Bolivia (Wood 19217, Bang 990); Argentina (Seijo 1354, Venturi 5464); Uruguay (Gibert s.n.); Brazil (Glaziou 19668). 0–2800 m.

**Notes.** *Convolvulus hermanniae* is distinguished from *C. cre natifolius* by its few-flowered peduncles and dense white-tomentellous indumentum. From *C. bonariensis* it differs in its white-tomentellous leaves. Subsp. *erosus* is unique amongst American taxa because of its hirsute ovary and capsule. O’Donell 1957: 167–169 Figure 8; O’Donell 1959: 277.


*Description.* Herb apparently from a deep rootstock, glabrous or with a few scattered hairs on vegetative parts, stems trailing, 5–15 cm long. Leaves petiolate, 0.6–1.6 × 0.5–1.3 cm, ovate, apex more or less rounded, margin strongly crenate, base truncate; petioles 3–8 mm. Flowers 1(-2), axillary, pedunculate; peduncles 1.2–1.6 cm; bracteoles 2.5–4 mm, oblanceolate; pedicels 2–5 mm; outer sepals 6–8 × 4.5–6 mm, obovate-elliptic, concave, scarious, emarginate, inner sepals similar emarginated or mucronulate; corolla 1.2–1.5 cm long, white to pale pink with a dark centre, deeply lobed, midpetaline bands glabrous terminating in a small tooth; ovary glabrous, style divided 5–7 mm above base, stigmas c. 2 mm. Capsule glabrous; seeds smooth, glabrous. O’Donell 1959: 288–290 (Figure 47).


*Notes.* A distinctive nearly glabrous species with small ovate, basally truncate, crenate leaves.


*Type.* PERU, Chinchin, Dombey s.n. (holotype P-03537718!, possible isotype MA 814635!).

*Type.* Based on *Convolvulus incisus* Choisy.

*Description.* Perennial herb from a tap root, thinly pubescent on all vegetative parts. Stems 15–40 cm long, trailing. Leaf blade 1–2.3 × 0.6–1.2 cm, ovate-deltoid; base cordate and briefly cuneate onto the petiole, auricles prominent; apex shortly mucronate; margin incised-dentate; petiole 3–5 mm. Flowers solitary (rarely paired), axillary, pedunculate; peduncles 8–14 mm; bracteoles 1–2 mm, filiform; pedicels 3–5 mm; outer sepals 6–7 × 4 mm, ovate, obtuse; inner sepals 6–7 × 6–7 mm, suborbicular, rounded, slightly scarious; corolla 1.5–1.6 cm long, white, lobed, midpetaline bands pubescent, terminating in triangular teeth; ovary glabrous; style divided 4–5 mm above base, stigmas 2.5 mm. Capsule glabrous; seeds smooth, glabrous.

*Distribution.* Moquegua (*Dillon et al.* 3327) and Piura in Peru, 600–700 m.

*Notes.* A poorly-known species growing at low altitudes in Peru but easily recognised by its incised-dentate leaves. Morphologically it would appear to lie between *C. laciniatus* and *C. montanus.*

**Type.** PERU, Huanuco Ruiz & Pavón s.n. (lectotype MA-814634, designated here; isolectotypes MA 814632, 814633).

**Description.** Pubescent to densely hirsute herb; stems twining up to 3 m high. Leaves petiolate, 3–8 × 1–4 cm, ovate-deltoid, strongly auriculate, usually large, apex usually obtuse and mucronate, margin undulate to sinuate, base broadly cordate to hastate with midrib area cuneate onto petiole; petioles 7–15 mm. Flowers (1-) 3–7 in compact axillary, pedunculate umbellate cymes; peduncles 1.5–12 cm; bracteoles 2–12 mm, apparently accrescent after anthesis; outer sepals 6–6.5 × 3.5–5 cm, elliptic, obtuse or acute; corolla 1.1–1.5 cm long, white to pink, deeply lobed, midpetaline bands brownish, pilose, terminating in a mucro; ovary glabrous; style divided c. 7 mm above base; stigmas 3 mm, more or less included. Capsule glabrous; seeds smooth. [O’Donell 1959: 271 p. p., Carranza (2008: 4ff.)]

**Notes.** We recognise two subspecies, which are distinct through most of their range, but intergrade in parts of northern Argentina (*Morel* 5885 from Formosa, *Schwarz* 6391 from Misiones and *Risso* 30 from Santiago de Estero are examples) and in the São Paulo area of Brazil (*Hoehne* 265), mostly at altitudes of around 1000 m.

52a. *Convolvulus crenatifolius* subsp. *crenatifolius*

Figure 8, t. 40–46


**Distinguishing features.** Distinguished by the more numerous flowers (there are nearly always some cymes with >3 flowers), the relatively short pedicels, the cymes usually forming rather tight umbellate clusters, and the smaller, usually pinkish, lobed corolla.

**Distribution.** Amphitropical, Andes and southern Brazilian highlands in South America; United States of America and Mexico in North America: Ecuador (*Lodiro* 113/5); Peru (*Stafford* 1041, *Lechner* 2116); Bolivia (*Wood* 17714, *Bang* 1158); Argentina (*Meyer* 5018, *Villa* 543); Brazil (*Meireles et al.* 2783, *Tamandaré & Brade* 6987); United States: Texas (*Runyon* 2599, 4479, *Correll & Washausen* 27684); Mexico: Guadalupe (*Schmitz* 1098 (W), *Hidalgo*, *Rose et al.* 8946 (P, US). Approximately 1500–3000 m in South America but to near sea level in Texas.

**Notes.** In South America this species appears to be distinctly montane in distribution being limited to the Andes and the higher mountains of southeastern Brazil. Specimens from Andean Bolivia, Peru and Ecuador are very consistent in habit. Its status in North America is uncertain. The leaves are often more strictly triangular and more coarsely dentate than in South American plants but some specimens such as *Dusén* 7788 from Paraná,
Brazil are indistinguishable. It may be an introduction in North America like \textit{C. farinosus} – we have seen no specimens collected before the 20\textsuperscript{th} century – but equally it may be the result of long-term dispersal. Species of Convolvulaceae in various genera, such as \textit{Ipomoea amnicola} Morong and \textit{Evolvulus arizonicus} A.Gray show a disjunct amphitropical distribution between North and South America so a distribution of this kind is not improbable.

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Figure 8, t. 25–31

Type. URUGUAY, Montevideo, \textit{Sellow} s.n. (B\dagger); [URUGUAY], Montevideo, \textit{Sellow} 278 (neotype NY 00318926, designated here).

Type. Based on \textit{Convolvulus montevidensis} Spreng.

Type. Based on \textit{Convolvulus montevidensis} Spreng.

\textit{Convolvulus crenatifolius} var. \textit{megapotamicus} Meisn., Fl. Bras. (Martius) 7: 312. 1869.
(Meisner 1869: 312).
Type. specimen annotated \textit{Convolvulus megapotamicus} Spreng. (holotype B\dagger).

Type. Based on \textit{Convolvulus montevidensis} Spreng.

Type. ARGENTINA, \textit{Lorentz} \& \textit{Hieronymus} 1057, 945, \textit{Lorentz} 1538, \textit{Kuntze} s.n. Dec. 1891 (syntypes B, all\dagger)

Type. Based on \textit{Convolvulus ottonis} Choisy

\textbf{Type.} Based on \textit{Convolvulus montevidensis} Spreng.

\textbf{Distinguishing features.} Distinguished from subsp. \textit{crenatifolius} by the more slender stems (c. 1 mm diameter on flowering shoots), 1–3-flowered cymes, relatively long pedicels, so inflorescence appears rather lax, and the larger (1.5–2.5 cm long), almost unlobed cream corollas with stigmas very slender, often exserted. The reddish-brown, somewhat scarious, slightly larger (7–9 mm long) outer sepals are often distinctive too. O’Donell 1959: 271–276 p. p., figure 45 under \textit{C. crenatifolius}. 
**Distribution.** Northern Argentina (Renvoize 3072, Tweedie 379, Tressens et al. 2467, Hawkes et al. 3263); Paraguay (Pedersen 60, Jorgensen 4033, Lourteig 2061, Balansa 1066); Uruguay (St.-Hilaire 2384, 2430); Southern Brazil, particularly Rio Grande do Sul (Rambo 46807) and Parana (Kissmann 7788); Bolivia (Villarroel et al. 1466). 0–?1500 m (Upper limit uncertain). Apparently centred on Paraguay.

**Notes.** According to the image in Flora Brasiliensis, C. ottonis represents a plant with broadly elliptic sepals similar to the neotype of C. montevidensis. The neotype may or may not represent part of the original collection on which Sprengel’s description was based but was collected by Sellow at Montevideo and originates from the Berlin herbarium. It shows the large corolla and reddish brown sepals so characteristic of this subspecies which is common in parts of Paraguay, southern Brazil, northern Argentina and Uruguay.

There is at least one collection from Paraguay (Hansen 7679 [C, NY]) which shows evidence of introgression with C. hasslerianus. The calyx is that of C. crenatifolius subsp. montevidensis but the flowers are solitary and the leaves are very shortly petiolate with subentire margins.


**Type.** ARGENTINA, Corrientes, Ituzaingó, Meyer 5786 (holotype LIL!).

**Description.** Densely pubescent or tomentose trailing or twining herb from a thickened rootstock, stems to at least 1 m long, relatively stout. Leaves petiolate, 2–7(-10) × 0.7–2.8 cm, lanceolate-oblong with pronounced basal auricles, these sometimes lobed, apex acute and mucronate, margin entire to weakly undulate, base hastate; petioles 3–10(-15) mm. Flowers solitary (very rarely paired), axillary, pedunculate; peduncles 2–5 cm; bracteoles 2–5 mm, linear-lanceolate; pedicels 10–15 mm; outer sepals 10–13 × 5–6.5 mm, elliptic, obtuse; corolla 2.5–4 cm long, white with dark centre, shallowly lobed, midpetaline bands pilose, extended into teeth; ovary glabrous, style glabrous, divided c. 16 mm above base, stigmas 2–3 mm, cylindrical. Capsule glabrous; seeds smooth to finely tuberculate. [O’Donell 1959: 285–288 (Figure 46)]

**Distribution.** Argentina: Corrientes and Misiones (Pedersen 1912, Ferraro 3094); Brazil: Rio Grande do Sul (Lindeman et al. 8417, Ferreira 110). 0–500 m.

**Notes.** An apparently very distinctive local endemic characterised by its large, usually solitary flowers and densely hairy indumentum. However, a number of specimens indicate that it is more variable than O’Donell supposed. Ibarrola 1305 from Corrientes probably fits but the sepals are only 9 mm long and the corolla a mere 2.5 cm in length. Dusén 7310 and Smith & Kiela 7814 from southern Brazil appear to be intermediate with C. hasslerianus as the leaves are only very shortly petiolate.

**Type.** BRAZIL, Rio Grande do Sul, *P. P. A. Ferreira* 300 (holotype ICN; isotypes K!, SP).

**Description.** Prostrate perennial with woody base, the stems winged, twining at the apices. Leaves shortly petiolate, 2–6 × 0.2–0.4 cm, linear-oblong, base sagittate, apex acute, glabrous; petiole 2–6 mm. Flowers solitary; peduncles 25–60 mm, shortly winged; bracteoles 3–5 nn, lanceolate, deciduous; pedicels 8–12 mm; outer sepals 6–8 × 3–4 mm, obovate, truncate, mucronulate, glabrous or canescent, the margins ciliolate; inner sepals similar but with scarious margins; corolla 1.8–2.2 cm long, white, glabrous, midpetaline bands sericeous; ovary glabrous, subglobose; style divided 6–9 mm above base; stigmas 3–4 mm. Capsule glabrous, apiculate; seeds black, glabrous.

**Distribution.** Brazil (Rio Grande do Sul, Paraná).

**Notes.** Resembling *C. lilloi* and *C. hasslerianus* in the solitary flowers and shortly petiolate leaves but near glabrous, the leaves linear-oblong and the sepals much shorter.


**Type.** PARAGUAY, Carimbatay, *Hassler* 4541 (holotype G; isotype NY!).

**Type.** Based on *Breweria hassleriana* Chodat

**Description.** Usually erect but occasionally decumbent to ascending cerrado perennial with woody xylopodium, vegetative parts villous with long spreading cobwebby hairs; stems several, erect, herbaceous, 20–30(-50) cm high. Leaves sessile or very shortly petiolate, 1.5–4.5 × 0.8–1.5 cm, ovate to oblong-ovate; base rounded, truncate to subcordate or sagittate; apex acute or (above) apiculate; margin entire; petiole 0(-2) mm. Flowers solitary (rarely paired); peduncles 20–50 mm; bracteoles 3–5 × 0.5–1 mm, linear-lanceolate, finely acuminate; pedicels 5–10 mm; outer sepals 10–15 × 5–7 mm, ovate, acuminate; corolla 3.2–4 cm long, white, unlobed, midpetaline bands pink, long-pilose, terminating in a mucro; ovary glabrous; style glabrous, divided 8–12 mm above base, persistent in fruit; stigmas 3 mm. Capsule glabrous, unusually large, c. 1 cm diameter; seeds smooth. [O’Donell 1950: 430–431, f. 3]


**Notes.** Unique species because of its adaptation to the cerrado biome. The erect habit, xylopodium, woolly, often cobwebby indumentum, subsessile leaves and large corolla all render it distinct from other American species.
Species 56–69. Australasian species

Herbaceous trailing or twining species, relatively slender compared with species from other regions. Leaves petiolate, with the lamina narrowed to a sagitate or hastate base, commonly dimorphic or even trimorphic; basal leaves often simple, stem leaves often lobed with narrow segments. The ovary, style and capsule are always glabrous. Although Johnson (2001) describes all species as perennials, several appear at least sometimes to be annuals and we have seen specimens of *C. crispifolius*, *C. eyreanus* and *C. recurvatus*, which certainly appear to be annuals. All three are species with recurved fruiting peduncles, a character which is often associated with the annual habit in *Convolvulus*.

The taxonomy of Australasian species is difficult. Many species are superficially similar especially when young or showing only one leaf form, and the taxonomy is often based on the direction of the fruiting peduncle and seed sculpture so non-fruiting specimens and incomplete specimens can be impossible to name. In many herbaria, all species from this region were once filed under the name *C. erubescens* following Bentham (1869), but this is clearly a gross oversimplification. However, it seems probable that further intensive study is needed before species delimitation is entirely satisfactory—*C. angustissimus* and *C. clementii* in particular appear to embrace a variety of forms from which the more distinct entities have been separated off as separate species.

Australian species are recorded as adventives or naturalised in other countries including the British Isles (Sell and Murrell 2009) and New Zealand (Heenan et al. 2003), usually under the name *C. erubescens*. We have not seen any of these collections and it is not certain to which Australian species these records refer.


Figure 9, t. 29–36

**Type.** AUSTRALIA, South Australia, Orchard 2626 (holotype AD!; isotypes NCU, COLO).

**Description.** Perennial herb from a central taproot with trailing stems to 1 m, plant adpressed pubescent to glabrescent. Leaves petiolate, 1–2 × 0.4–05 cm, lanceolate-deltoid, acute, margin entire to slightly undulate, base shallowly cordate and auriculate, the auricles entire or bifid; petioles 3–8 mm long. Flowers solitary, pedunculate, axillary, becoming recurved in fruit; peduncles mostly 1–2 cm long; bracteoles filiform, 1–1.5 mm; pedicels 3–12 mm; outer sepals 2–3(–4) × 2–3 mm, obovate to broadly elliptic, rounded and minutely apiculate, scarious, glabrous or thinly appressed pubescent; inner sepals similar; corolla 5–7 mm long, white or pink, very shallowly lobed, midpetaline bands almost glabrous except for a few hairs at apex; ovary glabrous; style glabrous, divided c. 2 mm above base, stigmas c. 1.5–2 mm. Capsule
glabrous; seeds coarsely and irregularly tuberculate. [Johnson 1987: 410–411, figure 1; Johnson 2001: 10, figs 3–4, map 1].

**Distribution.** Australia: South Australia and adjacent New South Wales (Orchard 211, Badman 32, Copley 192; Vonow 584, Mueller 1852).

**Notes.** Very distinctive because of the tiny calyx, lanceolate-deltoid leaves with basal auricles and the distinctive seed ornamentation.


**Type.** AUSTRALIA, Queensland, *R.W. Johnson* 5300 (holotype BRI; isotypes CANB, K!, NE, NSW).

**Description.** Perennial herb with trailing or twining stems to at least 50 cm, plant thinly pubescent to glabrescent. Leaves petiolate, dimorphic; petioles 2–10 mm; lowermost leaves 2.5–4 × 0.6–1.6 cm, deltoid, obtuse and finely mucronate, entire, base truncate and briefly cuneate onto the petiole, auricles absent; middle leaves similar but base more or less cordate, auricles present, often bifid or tridentate, the central lobe longer and narrower; middle and upper leaves with a narrowly linear-lanceolate central lobe 3–6 × 0.1–0.6 cm, the basal auricles more or less reflexed so base sagittate, inconspicuous, bifid or trifid, 3–5 mm long, segments usually very narrow. Flowers solitary (very rarely paired), pedunculate, axillary; peduncles 1.2–3.5(-5.5) cm, recurved in fruit; bracteoles 1–2.5 mm, filiform; pedicels 4–12 mm; sepals 4–6 × 2.5–3 mm, ovate or elliptic, rounded and mucronate, scarious-margined, glabrous or pubescent on dorsal surface near apex; corolla 0.7–1.6 cm long, pink, shallowly lobed with triangular lobes, midpetaline bands pilose; ovary glabrous; style glabrous, divided 3–4 mm above base, stigmas 1.5–2 mm. Capsule glabrous; seeds with prominent wavy tubercles. [Johnson 2001: 12–14, figs3–4, map 2]

**Distribution.** Australia: Northern Territory, Queensland and New South Wales (Evans 3248, Must 1510, Johnson 2075, Hubbard 3171, McDonald 46, Clemens s.n. [9/1945], McBarron 14875, Melville 3425). Reported from New Zealand (Heenan et al. 2003) but possibly extinct.

**Notes.** Very immature plants could be confused with *C. arvensis* but the corolla is much smaller. More mature plants without lower leaves are similar morphologically to *C. remotus* but the fruiting peduncle is recurved. The strongly tuberculate seeds and the leaves with a very long narrow central lobe combined with the small bifid auricles are also rather distinct.


**Type.** WESTERN AUSTRALIA, Cape Riche, *Preiss* 1927 (holotype LD!).

**Type.** WESTERN AUSTRALIA, Maddington, Canning River, *Preiss* 1928 (holotype LD, not seen).

**Type.** AUSTRALIA, South Coast, Bay 10 (Port Lincoln) *R. Brown* 2766 (lectotype BM!, portion on left side of sheet, designated here; isotype K!, possible isotype MEL).

**Description.** Perennial herb with twining or (occasionally) trailing stems to at least 50 cm, plant adpressed pubescent to more or less strigose. Leaves petiolate, not strongly dimorphic, 2.1–7.5 × 1–1.5 cm, narrowly deltoid, basally truncate and shortly cuneate onto the petiole, the central lobe linear, oblong, lanceolate or oblanceolate, acute, entire, 2–6 mm wide, basal auricles always present, 2–10 mm long, usually simple, occasionally bifurcate or toothed; petioles 6–10 (-20) mm. Flowers solitary or paired (rarely 3), pedunculate, axillary; peduncles mostly 1–3.5 cm long, not recurved in fruit; bracteoles 1.5–2.5 mm long, filiform; pedicels 4–10 mm; sepals 4.5–6 × 3–4.5 mm, broadly elliptic to obovate, rounded and mucronate at apex, margin somewhat scarious, dorsal surface pubescent; corolla 1–1.8 cm long, pink, lobed with broadly triangular lobes, midpetaline bands pilose towards apex; ovary glabrous; style glabrous, divided 4–6 mm above base, stigmas c. 2 mm. Capsule glabrous; seeds nearly smooth with obscure tubercles. [Johnson 2001: 14–15, f. 3–4, map 3]

**Distribution.** Widespread in Australia, except the east coast, but most abundant in South Australia and Western Australia (*Chorney* 991, *Symon* 3578, *Aplin* 1792; *Lazarides & Palmer* 005; *Elkins & Sweedman* 20050042, *Rechinger* 58286).

**Notes.** The usually very obviously twining stems with adpressed indumentum and narrowly deltoid auriculate leaves and straight peduncles serve to distinguish this species. The seeds are only obscurely tuberculate unlike those of *C. graminetinus*.

Robert Brown did not cite either a precise location or specimen in the protologue so Johnson was wrong to cite the Port Lincoln collection as holotype as there is another syntype mounted on the same sheet from a different location. In order to avoid future uncertainty we are formally designating the Port Lincoln collection at BM as lectotype. There is an isolectotype at Kew.

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**Figure 9, t. 22–28**

**Type.** SOUTH AUSTRALIA, Cudnaka [Kanyaka], *Mueller* s.n. (holotype MEL; isotypes MEL, P!).

**Description.** Perennial herb with trailing stems to 1 m, vegetative parts covered in long, whitish appressed velvety hairs, densely so on young growth. Leaves dimorphic: leaves of non-flowering shoots long-petiolate, 1–2 × 0.6–1.5 cm, ovate-deltoid, rounded, margin serrate, base truncate (very rarely slightly auriculate) and shortly cuneate onto the petiole, petiole 1–2 cm; leaves of flowering shoots 1–1.5(-2.5) × 0.5–1.4 cm, ovate-deltoid in outline but deeply toothed and incised towards the base; petioles 0.2–0.8 cm. Flowers solitary, pedunculate, axillary; peduncles 0.3–0.8 (-1.2 ) cm,
becoming recurved in fruit; bracteoles linear c. 1 mm; pedicels 1–3 mm; outer sepals 4 × 3.5 mm, elliptic, apiculate, the point recurved, sericeous; inner sepals similar but with fewer hairs; corolla 5–6 mm long, white or pink, lobed with somewhat triangular lobes, midpetaline bands sericeous; ovary glabrous, style glabrous, divided 2–2.5 mm above base; stigmas c. 1.5 mm. Capsule glabrous; seeds slightly winged and with low irregular suinate ridges. [Johnson 2001: 15–19, f. 5–6, map 4]

**Distribution.** Australia: Southern South Australia and adjacent parts of Victoria and New South Wales (Alcock 652, Kuchel 1470, Chimnook 2915, Hill et al. 5426). Johnson (2001) cites Copley 571 but this looks like an error for *C. eyreanus* as the peduncles are 1.5–2 cm long and mostly bear two flowers while the leaves are not so strongly sericeous.

**Notes.** This species shares with *C. eyreanus* a dense indumentum of longish ap-pressed hairs. Fruiting specimens can be recognised by the short recurved peduncles bearing single flowers, small capsules (4–4.5 mm in diameter) and small seeds (< 3 mm long).


**Type.** AUSTRALIA, South Australia, Donner 3531 (holotype AD).

**Description.** Perennial herb similar in general habit and distinctive features to *Convolvulus crispifolius* but generally larger: leaves on flowering shoots 0.7–4 × 5–2.5 cm, the basal half very incised-lobed almost to the midrib; peduncles commonly 2-flowered, (1-)1.2–2.9(-5) cm, rather tardily reflexing; pedicels 5–8 mm; outer sepals 4.5–6 × 3–4 mm, obovate-elliptic; corolla 6–8 mm long; ovary, style and capsule gla-brous (or, fide Johnson, with a few hairs). Capsule 5–5.5 mm diameter, seeds 3.2–4.5 mm. [Johnson 2001: 19–20, f. 5–6, map 4]

**Distribution.** Australia: northeastern South Australia and adjacent Queensland (Whibley 3455, Fison 3330, Cornwall 109, O’Leary 4541, Weber 8851).


**Type.** AUSTRALIA, Queensland, Dividing Range, Jericho, *Domin* (holotype PR, not seen).

**Type.** AUSTRALIA, Western Australia, between Ashburton and Grey Rivers, *Clement* s.n. (holotype PR; isotype K!).

**Description.** Perennial herb from a taproot with trailing (sometimes twining) stems to at least 75 cm, vegetative parts pubescent with adpressed or spreading hairs. Leaves petiolate, very plastic in shape, more or less trimorphic; petioles 0.3–3 cm,
diminishing in length upwards; lowermost leaves 1–3 × 0.6–1.5 cm, deltoid, acute, margin undulate to crenate, base truncate and shortly cuneate onto the petiole; lower leaves sometimes distinct, 3–4 × 3–4 cm, deeply laciniate; middle leaves with elongate oblong undulate- or crenate-margined middle lobe, 2.5–3.5 × 0.4–0.8 cm and deeply lobed, more or less laciniate auricles; upper leaves with a very narrowly oblong central lobe 2–3.5 × 0.2–0.5 cm, two slightly shorter ascending lateral lobes and smaller bifurcate basal lobes. Flowers solitary or paired, pedunculate, axillary, not recurved in fruit; peduncles 0.6–3 cm; bracteoles 1–2 mm, filiform; pedicels 3–8 mm; sepals 4–5 × 2.5–4 mm, obovate or elliptic, acute or rounded, mucronate, pubescent; corolla 7–9 mm, white or pink, weakly lobed, midpetaline band pubescent; ovary and style glabrous; style divided 2–3 mm above base, stigmas c. 1.5 mm. Capsule glabrous, 4–6 mm in diameter; seeds winged, raised-tuberculate. [Johnson 2001: 35–37, f. 9–10, map 8]

**Distribution.** Generally distributed in Australia but most common in central-western areas (Hill 167, Macdonald 435, Newby 10756, Pedley 914, Jacobs 2106).

**Notes.** This species is extremly variable in leaf form and flowering specimens are indistinguishable from *C. recurvatus.*


**Type.** AUSTRALIA, New South Wales, Moore 5863 (holotype CANB; isotypes BRI, NSW).

**Description.** A local endemic close to *C. clementii* but differing in its robust prosstrate habit: stems stout almost to the apex, leaves up to 5 × 4 cm, capsules 6–7 mm wide, the seeds unwinged and rather large reaching 3.8 × 3.2 mm, more finely appressed tuberculate. The ripe capsules are suborbicular, 6–7 mm in diameter, conspicuously larger than in *C. clementii.* [Johnson 2001: 37–38, f. 9–10, map 5].

**Distribution.** Australia: New South Wales (Bates 56321).


**Type.** AUSTRALIA, South Australia, Copley 827 (holotype AD; isotype K!).

**Description.** Perennial herb with trailing stems to at least 50 cm, vegetative parts sparsely to roughly pubescent with adpressed or spreading hairs. Leaves dimorphic, petiolate; petioles 5–20 mm; leaves of non-flowering shoots 1–2.5 × 0.5–0.9 cm, oblong-subrectangular, truncate at apex and base, sometimes cordate and weakly auriculate, margins coarsely dentate; leaves of flowering shoots 1.2–3 × 0.5–1.6 cm, ovate or lanceolate in outline but deeply incised lobed, characteristically with the terminal lobe prominent, linear or narrowly oblong, acute to emarginate, the margin undulate to coarsely dentate, basal part deeply bi-quadrilobed. Flowers solitary (rarely paired), pedunculate, axillary; peduncles 0.8–2.2 cm, becoming recurved in fruit; bracteoles c. 1 mm, linear; pedicels 2–6 mm; sepals 3–5 × 3–3.5 mm, obovate
or elliptic, acute or rounded with a small recurved mucro; corolla 5–9 mm, white or pink, weakly lobed, midpetaline band pubescent; ovary and style glabrous; style divided 2 mm above base, stigmas 1–2 mm. Capsule glabrous, 4–4.5 mm in diameter; seeds obscurely winged and with irregular ridging. [Johnson 2001: 312–35, f. 9–10, map 5]

**Notes.** We recognise two subspecies:

63a. *Convolvulus recurvatus* subsp. *recurvatus*

**Distinguishing features.** Larger in all its parts, the sepals 4–5 mm and corolla 7–9 mm.


**Type.** AUSTRALIA, South Australia, *Wilson* 1692 (holotype AD; isotypes BRI, MEL).

**Distinguishing features.** A relatively distinctive subspecies because of the small corolla 5–7 mm in length and the very small calyx, the sepals 3–4 mm long. The leaves on the flowering stems are usually sparsely hairy and the central lobe is narrowly oblong with a distinctive emarginate apex.


**Notes.** *Convolvulus recurvatus* is very similar to *C. clementii* differing only in the recurved fruiting peduncles and the more strongly tuberculate seeds. Flowering specimens cannot be safely distinguished.


**Type.** AUSTRALIA, Victoria, *Beauglehole* 82670 (holotype MEL).

**Description.** Perennial herb with densely adpressed pubescent, trailing or twining stems, similar in facies to *Convolvulus recurvatus* with which it shares the distinctive recurved fruiting peduncle. It differs principally in the larger corolla, c. 0.9–1.2 cm long. The leaves are strongly dimorphic, the basal leaves triangular-ovate with undulate margin and poorly developed spreading, obtuse auricles. Flowers 1–2; corolla pink; seeds unwinged. [Johnson 2001: 22–23, f. 5–6, map 5]

**Notes.** This species occupies a situation somewhat intermediate both geographically and morphologically between *C. recurvatus* and *C. angustissimus* and might just be of hybrid origin.


**Type.** Plate in Bot. Mag. t.1007 (1807), lectotype, designated here; AUSTRALIA, plant from Hawkesbury River, New South Wales, collected by R. Brown on left side of sheet *Brown s.n.* [Bennett 2767] (epitype BM!, designated here).

**Description.** Perennial herb with trailing or twining stems reaching at least 50 cm, stems crisped-pubescent, stouter than in other Australian species, commonly exceeding 2 mm in width. Leaves petiolate, variable in size but not markedly dimorphic, 2.5–8 × 1–3.5 cm, deltoid, apex obtuse and mucronate, margin crenate or repand, base broadly cordate and cuneate onto the petiole with prominent auricles, these variable, simple, toothed or laciniately lobed; petioles 1.2–2.5 cm, diminishing in size upwards. Flowers 1–4, usually clearly cymosely arranged, axillary, pedunculate, not recurved in fruit; peduncles 1–2 per axil, 2–6 cm, usually straight; bracteoles 1–3 mm long, filiform; pedicels 8–25 mm, very variable in length and strikingly unequal in individual inflorescences, often sinuate; sepals 5.5–7 × 3.5–5 cm. narrowly elliptic, terminating in a recurved mucro; corolla 1.2–1.5 cm, pinkish, lobed with triangular lobes, midpetaline bans pubescent near apex; ovary glabrous; style glabrous, divided 3–7 mm above the base, stigma 2 mm. Capsule glabrous, seeds tuberculate, unwinged. [Johnson 2001: 20–22, f. 5–6, map 2]

**Distribution.** Australia: eastern coast of New South Wales and Queensland (*Beckler s.n.*, *McBarron 4110, Coveny 11781, Mosman 1854), apparently rather rare.

**Notes.** The most robust Australian species, the peduncles usually bearing several flowers and unusually sometimes with two peduncles per leaf axil. Most similar to *C. clementii* but leaves more obviously deltoid in form, the corolla larger and the seeds unwinged. *Johnson 3364* (P) from Northern Territory will key out here (unwinged fruit, paired 2-flowered cymes) but flowers and location fit *C. clementii*.

All Australian and New Zealand native species were once treated under this name following Bentham (1869).


Figure 9, t. 37–43

*Convolvulus geniculatus* Lehm., Index Seminarum (HBG) 1826: 17. 1826. (Lehmann 1826: 17).

**Type.** None cited.
Type. SOUTH AUSTRALIA, Kangaroo Island, coll. not known (holotype P).
Type. Based on Convolvulus angustissimus R.Br.
Type. WESTERN AUSTRALIA, York District, Preiss 1924 (holotype LD; isotypes MEL 689918, MEL689919).
Type. AUSTRALIA, Beljarup, Hay, Preiss 1925 (holotype LD!; isotypes MEL689916, MEL689917).
Type. AUSTRALIA, Victoria, Wawra 438. (holotype W!).
Type. AUSTRALIA, no type specified.
Type. Based on Convolvulus erubescens var. fililobus Wawra
Type. AUSTRALIA, Victoria, Forbes & Scarlett 1867 (holotype MEL; isotype BRI).
Type. AUSTRALIA, South Australia, Alcock 4733 (holotype AD; isotype SYD).

Type. AUSTRALIA, Tasmania, “Van Dieman’s Land near Risdon Cove” R. Brown s.n. [Bennett 2765] (lectotype BM!, portion on right side of sheet, designated here, isolecotype K!, also perhaps MEL).

Description. Perennial herb with trailing or twining stems, pubescent to subgla-brous to at least 40 cm but commonly short. Leaves extremely variable and often di/trimorphic on the same plant, petiolate, petioles 0.5–7 cm, diminishing in length upwards; lowermost leaves (if present) 1–2 × 0.3–1.5 cm, ovate-deltoid, obtuse, margin entire, undulate or sinuate-lobed especially towards the base, base cordate or truncate, the auricles poorly developed, entire to bi(tri)-f. lower stem leaves 2–3 (-6) × 1.3–5 cm, broadly or narrowly ovate-deltoid in outline, entire undulate or deeply sinuate lobed, the basal auricle prominent, lobed with a short ascending lobe; upper stem leaves usually finely lobed, the central lobe linear-oblong, mostly 2.5–4.5 × 0.1–0.3 cm, acute or apiculate; auricles usually with a prominent ascending lobe resembling the terminal lobe but half its length together with short bifid reflexed lobes. Flowers pedunculate, axillary, usually solitary; peduncles 0.5–5 cm long, becoming recurved in fruit; bracteoles
filiform, 1–2 mm long; pedicels 3–20 mm; sepals 4–7 × 2–2.5 mm, elliptic, rounded or acute, minutely mucronate, inner sepals slightly smaller; corolla 1.2–2 cm long, usually pink, weakly lobed, midpetaline bands pubescent only near apex; ovary glabrous; style glabrous, divided 3–10 mm above the base, stigmas 1–2 mm. Capsule glabrous; seeds 3–4 mm long, covered in low reticulate ridges. [Johnson 2001: 23 -32, f. 7–8, map 7]

**Distribution.** Principally southeastern Australia: Tasmania, Victoria, New South Wales, South Australia, Queensland, Western Australia (Milligan 90, Scarlett 83-395, Aston 2367, Hoogland 3078, Lea 1885, Coveny & Hind 11502, Jeanes 2084, Tilden 723, Coomber 2215, Gunn 721).

**Notes.** Johnson’s (2001) division of this species into four subspecies is not satisfactory. In the first place the type subspecies is a plant whose leaves have entirely linear segments quite unlike the subsp. *angustissimus* illustrated by Johnson (2001: 28). There are in fact quite a lot of specimens which accord well with Robert Brown’s type collection including Wawra 438, the type of var. *fililobus* and Morrison 1445, Robertson 221, Constable 56058 and Burns 7. The second difficulty with Johnson’s infraspecific classification is that the majority of specimens we have seen are not accommodated satisfactorily in any one or other of his subspecies. Specimens which accord with a particular subspecies can be recognised but a large residue which fit none remains. In this account, therefore, *C. angustissimus* is treated as a single variable species without recognised subspecies, usually easily identified by its relatively large corolla, 1.2–2 cm long. However, specimens from Western Australia and South Australia have smaller corollas and seem to intergrade with *C. remotus*. Examples of specimens showing this introgression include Lea 26/9/1885, Andrews 657, Black 12, Koch 5/1898.


**Type.** NEW ZEALAND, South Island, Cockayne s.n. (holotype WELT-4828).

**Description.** Greyish-pubescent creeping herb arising from underground rhizome; stems to 30 cm. Leaves petiolate, 1.5–3.6 × 0.2–0.8 cm, dimorphic and very variable, mostly deltoid or ovate, sometimes hastate and always with some leaves with an oblong or linear terminal lobe 1–5 cm long, combined with small basal auricles arising at right angles to the terminal lobe; petioles 1–5 cm. Flowers solitary, axillary, pedunculate; peduncles 2–6 cm long, 1-flowered, slender, pubescent; bracteoles 2–3 mm long, linear; pedicels 2–6 mm, pubescent; outer sepals 6–8 × 5–6 mm, broadly ovate, pubescent, larger than inner sepals; corolla 1.7–2 cm long, white, midpetaline bands pink; ovary glabrous; style glabrous, divided 6–7 mm above base. Capsule glabrous; seeds finely tuberculate. [Moore and Irwin 1978: 157]

**Distribution.** New Zealand: South Island (Travers 1864, Hombron 1841), 300–1600 m.

**Notes.** Similar to forms of the Australian *C. angustissimus* found in Tasmania and Victoria but corolla and sepals slightly longer.

**Type.** NEW ZEALAND, South Island, *A. W. Anderson* 15 Jan 1941 (holotype CHR 76122).

**Description.** Perennial herb from an underground rhizome, stems decumbent and trailing to ascending up to 20 cm long, thinly pubescent on vegetative parts. Leaves petiolate, 6.5–11.5 × 5–12.5 mm, deltoid, ovate or broadly oblong, always lacking basal auricles, retuse or obtuse at apex, margin undulate, base more or less truncate and shortly cuneate; petioles 1.5–2 cm. peduncles 1–3 cm, 1-flowered, very slender; bracteoles 1–3 mm, linear; pedicels 2–6 mm, pubescent; sepals 4 × 3.5–3.8 cm, obovate or broadly oblong, margin fimbriate and translucent, abaxially pubescent; corolla 18–19 mm, white or pink, unlobed, midpetaline bands pink, pubescent upwards; ovary glabrous; style glabrous, divided 5–8 mm above base, stigmas 1.5–2 mm, unequal. Capsule glabrous, seeds glabrous, covered in low ridges and tubercles.

**Distribution.** New Zealand: South Island (*Cockayne* 2370), 200–1000 m, always inland.


**Type.** Based on *Convolvulus verecundus* subsp. *waitaha* Sykes

**Description.** Similar in overall morphology to *C. verecundus* but a more vigorous plant with stems to 80 cm differing in being almost completely glabrous to thinly pubescent, the corolla smaller (8–13 mm long) with greenish, glabrous midpetaline bands, the undivided part of the style < 3 mm long and the seeds more prominently tubercled and ridged. The fruiting peduncles are recurved but no fruiting material of *C. verecundus* has been seen.

**Distribution.** New Zealand: North and South Islands (*Colenso* 131, *Melville* 5714, *Douglass* 65208, *Védel* 1847). Mostly coastal, 0–500 m in moister areas than other species.

Species 70–85. Old World species with petiolate leaves not markedly hastate or sagittate at base

This is a morphologically and geographically heterogeneous group formed from Clade B (Figure 1) which includes the spiny shrub *C. leiocalycinus*, the submaritime *C. persicus*, the lianas from Macaronesia and a number of mostly trailing undershrubs. The
only morphological character holding the group together, albeit weakly, is that the petiolate leaves show a tendency to be cuneate, rounded or truncate at the base, rather than hastate or sagittate. Species 75–81 form a relatively distinct subgroup which possesses a distinctly conical ovary and a robust, often liana-like habit. They are restricted to Madeira, the Canary Islands and Portugal.


Figure 10, t. 1–8

**Type.** IRAN, “In rupestris apricis. inter Abuschir et Schiras”, Kotschy 39 (lectotype G, designated by Sa’ad. 1967: 67); isolecotypes E!, GOET, K!, OXF!, P!, W!.

**Description.** Intricately branched spiny shrub reaching 1 m in height; branches woody, finely appressed sericeous, small stem spines present. Leaves shortly petiolate, 1–2.4 × 0.5–0.9 cm, variable in shape, oblong, lanceolate, ovate or suborbicular, acute, entire, base cuneate, truncate or auriculate, glabrous, pubescent or sericeous; petioles 2–4 mm. Flowers axillary, pedunculate, solitary; peduncle 1–10 mm, stout, woody; bracteoles minute, c. 1 mm, squamose, caducous or absent; pedicels 2–7 mm, compressed, finely pubescent, often not differentiated from peduncle; sepals lax, somewhat scarious, 4–7 × 2.5–5 mm, ovate or broadly elliptic to obovate, obtuse or acute, obviously veined or not, somewhat scarious, becoming more or less erect and adpressed to capsule in fruit or spreading or reflexed; corolla 2–3 cm long, white or pinkish, unlobed, midpetaline bands pilose near the tips only; filaments glandular below; ovary pubescent or glabrous; style glabrous, divided c. 10 mm above the base, stigmas c. 2 mm. Capsule glabrous; seeds glabrous, smooth. [Sa’ad 1967: 67; Austin and Ghazanfar 1979: 10; Petrov 1935: 133 (plate), Nowroozi 2002: 19 (plate), 100 (map); Breckle and Rafiqpoor 2010: 417 (photo)]

**Notes.** *Convolvulus leiocalycinus* is the only spiny species in Central Asia with leaves abruptly narrowed at the base into a distinct petiole. Another unusual feature is the lax sepals which are not appressed to the base of the corolla. It is a variable species in many details but always with a common facies. Variety *glaber* was described on the basis of its glabrous leaves, *C. olgae* on its sericeous leaves and *C. lycioides* on its oblong leaves but the species, in fact, shows a wide range of leaf shape and indumentum with no obvious geographical patterning. We recognise two varieties.

70a. *Convolvulus leiocalycinus* Boiss. var. *leiocalycinus*


**Type.** IRAN, “In collibus calcareis inter Abuschir et Schiras”, Kotschy 39 (holotype G; isotypes K!, OXF!, P!).

Figure 10. 1–8 C. leiocalycinus var. leiocalycinus 1 leaves 2 outer sepal 3 middle sepal 4 inner sepal 5 stamen 6 ovary and style 7 capsule 8 seed 1–2 from Kotschy 39 (W) 3–6 from Strauss s.n. (W) 7–8 from Bornmüller 3884 (B) 9–14 C. leiocalycinus var. retrosepalus 9 leaves 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen 14 ovary and style. From Lindberg 317 (W) 15–21 C. dryadum 15 leaf 16 bracteole 17 outer sepal 18 middle sepal 19 inner sepal 20 stamen 21 ovary and style. From Sennen & Mauricio 9471 (W) 22–30 C. persicus 22 leaves 23 bracteole 24 outer sepal 25 middle sepal 26 inner sepal 27 stamen 28 ovary and style 29 capsule 30 seed. 22 from Dubiansky s.n. (W) 23–28 from Aznavour s.n. (W) 29–30 from Szovitz s.n. (W) 31–36 C. maireanus 31 leaf 32 outer sepal 33 inner sepal 34 stamen 35 ovary and style with 3 stigmas 36 apex of style with 2 stigmas. From Pampanini 6206 (G) 37–45 C. lanjouwii 37 leaf 38 bracteole 39 outer sepal 40 middle sepal 41 inner sepal 42 stamen 43 ovary and style 44 capsule 45 seed. From Griffith 678 (K).
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**Type.** IRAN, Shiraz, *Aucher-Eloy* 4935 (holotype P).


**Type.** Based on *Convolvulus lycioides* Boiss.


**Type.** TAJIKISTAN, Mount Daschti Kasi, *Fedstchenko* 31/5/1869 (holotype LE!).


**Type.** TAJIKISTAN, Mount Karatau, *Zaprjagaev* 55 (location not certainly known ? TAK).


**Type.** PAKISTAN, Balochistan, *Sultan ul Abedin* 4893 (holotype KUH, not seen).

**Distinguishing features.** Characterised by the lanceolate to ovate or obovate outer sepals 4–7 × 2.5–5 mm wide, these patent or erect in fruit. Leaves and ovary glabrous or hirsute.

**Distribution.** Tajikistan (*Varvitseva* 209, *Botchantsev & Egorova* 690, *M.Popov* 932); Iran (*Bornmüller* 3884b, *Stapf* 2325, *Edmondson & Miller* 1547, *Davis & Bokhari* 56083); Afghanistan (*Rechinger* 33380, 3875); Pakistan (*Duthie* 18841, *Stocks* 870, *Lamond* 710); Oman (*McLeish* 3736).

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**Figure 10, t. 9–14**


**Type.** AFGHANISTAN, *Lindberg* 317 (holotype W!).

**Distinguishing features.** This differs from var. *leicalycinus* by the narrowly lanceolate, reflexed sepals, c. 7 × 1 mm, the veins usually conspicuous. The leaves and ovary are glabrous.


**Note.** Intermediates with var. *leicalycinus* occur quite frequently (*Grey-Wilson & Hewer* 534, *Podlech* 21729, *Rechinger* 33380, *Koie* 4414). These are similar to var. *retrosepalus* in their lack of hairs but the sepals are obovate and spreading.

**Figure 10, t. 15–21**

**Type.** ALGERIA, Djebel Babor, *Maire* s.n. (holotype AL?; isotypes MPU005286!, P00417695!, P00417696!).

**Description.** Perennial herb from a rhizomatous rootstock with branched trailing stems to at least 40 cm; stem and vegetative plants adpressed pubescent or (rarely) glabrous. Leaves petiolate, 2–5 × 1.5–3 cm, ovate-deltoid, apex obtuse, margin undulate to sinuate, base truncate to very shallowly cordate; petioles 0.3–0.8(-1.5) cm. Flowers solitary, axillary, pedunculate; peduncles 4–9 cm, often bent at apex; bracteoles 1–2 mm, filiform; pedicels 5–7 mm; outer sepals 9–10 × 4–5 mm, broadly elliptic, mucronate; inner sepals slightly larger c. 11 × 6 mm, somewhat scarious; corolla 2.5–3.1 (-4.5) cm long, white with dark centre, midpetaline bands pink, pubescent near the apex, unlobed but margin slightly undulate; filaments glandular; ovary glabrous, conical; style glabrous, divided c. 12–14 mm above base; stigmas 2–3 mm, stout. Capsule and seed not known. [Sa’ad 1967: 223]

**Distribution.** Djebel Tazekka and Rif Mountains of Morocco (*Sennen & Mauricio* 9471, *Davis* 54878, *Ait Lafkih et al.* 127) and Algeria.

**Notes.** Distinctive because of the long pedunculate, solitary flowers, triangular, basally more or less truncate leaves and very long style.

A distinctive variety was described from Djebel Tazekka, an isolated massif in Morocco, by Sauvage and Vindt (1954: 31) based on the glabrous or subglabrous leaves and large corolla up to 4.5 cm in length. This “var. *tazekkensis*” (based on *Guinet et al.* 68) was never validly published but merits further investigation.


**Figure 10, t. 22–30**

**Type.** TURKEY, Constantinople, *G. V. Aznavour* (neotype BM!, designated by Staples in Staples and Jarvis 2006: 1021); isoneotypes B, E!, P!).

**Description.** Perennial branched undershrub with woody rootstock and lower branches, the whole plant shortly tomentose; stems very stout, 3–5 mm thick. Leaves petiolate, coriaceous, 2–5 × 1–3.5 cm, elliptic, oblong-elliptic or obovate, apex obtuse to rounded, margin entire, base broadly cuneate to rounded, slightly asymmetric; petioles 0–6 cm. Flowers solitary, axillary, pedunculate, usually arising from the middle part of the stem; peduncles 0.8–3.3 cm; bracteoles 3–5 × 1–3 mm, ovate to oblong-elliptic, acute; pedicels 5–7 mm; sepals 12–15 × 7–9 mm, ovate, obtuse or acute; corolla 3–4.5 cm, white, unlobed, undulate, midpetaline bands pilose; filaments glandular below; ovary very narrow, thinly pilose at apex; style divided c. 18 mm above base; stigmas 2 mm, narrowly elliptic. Capsule glabrous, seeds tuberculate. [Sa’ad 1967: 163; Nowrooze 2002: 103 (map); Grigoriev 1953: 11 (plate)]
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**Distribution.** Coasts of the Black Sea: Georgia (Cosson 8 in Hohenacker), Turkey (Olivier & Brugiére s.n., Uslu 2141), Bulgaria (Bosseva et al. 88), Romania (Grintescu 1094b) and Caspian Sea: Russia [Dagestan] (Becker 1876), Azerbaijan (Lewandowsky 519, Kerimov 32), Iran (Aucher-Eloy 4940), Turkmenistan (Dubiansky s.n. [14/7/1932]). Coastal sand dunes.

**Notes.** A very distinct, apparently isolated species.


*Figure 10, t. 31–36*

**Type.** LIBYA, Cyrenaica, “Messe a ovesti di Cirene Sfonta–Ruheina, 8 Mag 1934,” Pampanini & Pichi-Sermolli 6207 (syntype FI)

**Description.** Perennial trailing, scrambling or twining herb with puberulent, sharply 4-angled to weakly winged stems of “a considerable height”, presumably 1–2 m. Leaves petiolate, somewhat dimorphic, 2.5–7 × 2–5.5 cm, younger leaves ovate, apex acute to obtuse, margin undulate to irregularly dentate with some large teeth, base cordate and briefly cuneate with a broad right-angled sinus, minutely adpressed pubescent; mature leaves more deltoid, deeply lobed with acute segments in the lower part, strongly auriculate; petioles 0.5–2 cm, puberulent. Flowers in a terminal cluster of up to 7 at the apex of a long axillary peduncle; peduncles 8–22 cm, pubescent; bracteoles filiform to linear, 4–8 mm, pubescent; pedicels 3–8 mm, pubescent; outer sepals 8–9 × 5–6 cm, broadly obovate-elliptic, mucronate, pubescent; inner sepals 4–5 cm wide, less hirsute and with scarious margins; corolla 2.8–4.5 cm, white with purplish throat, unlobed, basal tube narrow, midpetaline bands thinly adpressed pubescent; filaments glandular; ovary pilose; style divided c. 9 mm above base; stigmas 2 or 3, 2 mm long, rather stout. Capsule and seeds not seen. [Sa’ad 1967: 234]

**Distribution.** Libya: Cyrenaica (Sandwith 2625, Park 506, Pampanini & Pichi-Sermolli 6206).

**Notes.** A remarkable species with flowers clustered at the apex of a very long peduncle. The stigmas are short and stout and commonly 3 in number.


*Figure 10, t. 37–45*

**Type.** AFGHANISTAN, Griffith 678/K.D. 5872 (holotype K!; isotype P!).

**Description.** Trailing or scrambling herb, probably branched at base with stems to at least 40 cm, all vegetative parts densely pubescent to tomentose. Leaves petiolate, 2.2–3.5 × 0.7–1.5 cm, ovate-deltoid, apex acute, margin entire, base truncate; petioles 4–5 mm. Flowers up to 3 in pedunculate, axillary cymes, but often reduced to 1–2; peduncles 2.5–5 cm; bracteoles 2–3 mm, linear-lanceolate; pedicels 3–6 mm; outer
Figure 11. 1–7 C. massonii 1 leaf 2 outer sepal 3 middle sepal 4 inner sepal 5 stamen 6 ovary and style 7 capsule 1–4 & 6–7 from Mandon 180 (BM) 5 from Press & Short 446 (BM) 8–14 C. canariensis 8 leaves, adaxial (right) and abaxial surfaces (left) 9 bracteole 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen 14 ovary and style. From Bourgeau 1428 (C) 15–23 C. fruticulosus 15 leaves 16 bracteole 17 outer sepal 18 middle sepal 19 inner sepal 20 stamen 21 ovary and style 22 capsule 23 seed 15–21 from Bornmüller 2612 (W) 22–23 from Perraudière 1429 (C) 24–30 C. valentinus 24 outer sepal 25 middle sepal 26 inner sepal 27 stamen 28 ovary and style 29 capsule 30 seed 24–28 from Balansa 358 (W) 29–30 from Bourgeau 80 (GOET) 31–39 C. sabatius 31 leaves 32 bracteole 33 outer sepal 34 middle sepal 35 inner sepal 36 stamen 37 ovary and style 38 capsule 39 seed. From Jahandiez 308 (E) 40–48 C. supinus 40 leaf 41 bracteole 42 outer sepal 43 middle sepal 44 inner sepal 45 stamen 46 ovary and style 47 capsule 48 seed 40 from Raymond 13k (RAB) 41–46 from Letourneau 2 (C) 47–48 from Kralik 68 (C).
sepals 9–10 × 4–4.5 mm, broadly oblong-rectangular, obtuse to truncate and mucronate, inner sepals scarious-margined and subglabrous; corolla 2.5–2.7 cm, colour unknown, unlobed, midpetaline bands thin, pilose; filaments glandular near base; ovary glabrous; style glabrous; divided c. 6 mm above base, stigmas 2 mm, relatively stout. Capsule glabrous, seeds minutely hirsute.

**Distribution.** Afghanistan—only known from the type collected at “Seh Baba”.

**Notes.** This species and *C. rectangularis* have unique, distinct, broadly oblong-rectangular sepals.


**Type.** AFGHANISTAN, Volk 1018 (holotype W!).

**Description.** Perennial herb with woody rootstock from which arise many wiry, probably scrambling stems to at least 25 cm; stems striate, glabrescent. Leaves very shortly petiolate, 1–3.5 × 0.4–0.6 cm, lancolate-deltoid, acute, margin entire to sinuate-lobed, base truncate to auriculate, shortly crisped pubescent when young, glabrescent; petioles 1–3 mm. Flowers 1–3, borne on axillary peduncles; peduncles 1–1.5 cm; bracteoles 2.5 mm, filiform; pedicels 4–10 mm; outer sepals 9–10 × 6 mm, broadly oblong-rectangular, truncate and minutely mucronate, margin scarious, purplish, pubescent and with ciliate margins, inner sepals oblong, c. 4 mm wide; corolla 2.3–3.2 cm long, pinkish, midpetaline bands pubescent; filaments glandular below; ovary glabrous, style glabrous, divided c. 7 mm above base; stigmas not seen. Capsule glabrous; seeds wrinkled. [Sa’ad 1967: 104; Rechinger 1963: 17]

**Distribution.** Afghanistan (Rechinger 35902, 37103).

**Notes.** Although placed as distantly related in different sections by Sa’ad, *C. rectangularis* and *C. lanjowii* are quite close and might prove to be conspecific. The description above is based on the two widely distributed Rechinger collections cited above. These differ clearly in their sparse indumentum and in the sinuate-lobed narrower leaves with a rather rigid texture from *C. lanjowii*. However the type and Amsel s.n. (W) are much more hirsute and with unlobed leaves so approaching *C. lanjowii*. Further collections are needed to confirm whether two distinct species are really involved.


Figure 11, t. 1–7


**Type.** MADEIRA, Masson s.n. (probably BM000839753).

Type. MADEIRA, Masson s.n. (holotype BM000839753!).
Type. MADEIRA, Lowe (whereabouts uncertain).

Bucharea maderensis Raf., Fl. Tellur. 4: 84. 1838. (Rafinesque 1838: 84).
Type. Based on C. suffruticosus Dryand. ex W.T.Aiton.

Type. Based on Convolvulus massonii F. Diettr.

**Type.** Based on Convolvulus suffruticosus Dryand.

**Description.** Perennial undershrub with trailing or twining stems to 4 m, becoming woody below with age, the whole plant glabrous to thinly adpressed pilose on younger parts. Leaves petiolate, 4–11 × 1.5–6 cm, ovate, acute to shortly acuminate, entire, truncate to cordate at the base, more or less reticulate veined on abaxial surface, glabrous or nearly so; petioles 1.5–4 cm. Flowers 1–6, in very lax, pedunculate, axillary cymes; peduncles 3–6 cm; bracteoles 14 × 0.5–1 mm, filiform to linear; pedicels 15–30 mm; sepals 9–15 × 4–7 mm, obovate or oblanceolate, with a triangular apiculate apex; corolla 2–2.5 cm, white, unlobed, midpetaline bands pink, pilose; filaments glandular; ovary pubescent at apex, style pubescent, divided 4 mm above the base, stigmas 4 mm. Capsule large, acute c. 6 mm long, glabrous; seeds (immature), smooth, with pale reticulation. [Jardim and Francisco 2000: 134 (photo)]

**Distribution.** Endemic to Madeira (Mandon 180, Lowe 576, Press & Short 446), 400–1000 m.

**Notes.** Very similar to *C. canariensis* but distinguished by its nearly glabrous leaves.

Figure 11, t. 8–14


Convolvulus pannifolius Salisb., Parad. Lond. 1: t.20 (Salisbury 1805: t.20).
Type. Icon, in Parad. Lond. 1: t.20 drawn from a plant from Tenerife (Canary Islands).

Nemostima canariensis (L.) Raf., Fl. Tellur. 4: 82. 1838. (Rafinesque 1838: 82).
Type. Based on *Convolvulus canariensis* L.

Periphas pannifolius (Salisb.) Raf. Fl. Tellur. 4: 85. 1838. (Rafinesque 1838: 85).
Type. Based on *Convolvulus pannifolius* Salisb.

Convolvulus bourgaei Bolle, Bonplandia 9: 54. 1861. (Bolle 1861: 54).
Type. CANARY ISLANDS, Arafo, Tenerife, Bolle (whereabouts uncertain).
A foundation monograph of *Convolvulus* L. (Convolvulaceae)

**Type.** CANARY ISLANDS (lectotype LINN 218.17!, designated by Sa’ad 1967: 248).

**Description.** A liana or scrambling shrub to 10 m, old stems woody with brown bark, young stems villous. Leaves petiolate, 4–10 × 2–5 cm, ovate to oblong-ovate, acute, entire, cordate at base, densely villous, the veins prominent on the lower surface; petioles 1–1.5 cm. Flowers 3–7 in axillary, pedunculate cymes; peduncles c. 2.5–3.5 cm, bracteoles linear, acuminate; pedicels 5–18 mm; sepals 8 × 4 mm, elliptic-rhomboid, apiculate, pilose, the inner sepals with glabrous, membranous margins; corolla 1.8–2.2 cm long, pale blue with a white centre, unlobed, midpetaline bands pilose; filaments glandular; ovary sparsely pilose at apex; style glabrous, divided 3–4 mm above base; stigmas c. 4 mm. Capsule glabrous; seeds smooth, glabrous. [Sa’ad 1967: 117 p. p., Bramwell and Bramwell 2001: 264–265 (photo); Schönfelder and Schönfelder 1997: 174–175 (photo)]

**Distribution.** Endemic to the Canary Islands, but common in and around laurel forest, 400–1000 m. Gran Canaria, Tenerife, La Palma, La Gomera, El Hierro (Asplund 927, Murray s.n. [19/5/1892], Bourgeau 1428).


*Rhodorrhiza volubilis* (Brouss. ex Link) Bolle, Bonplandia 9: 54. 1861. (Bolle 1861: 54).

**Type.** Based on *Convolvulus volubilis* Brouss. ex Link


**Type.** CANARY ISLANDS, Tenerife, Buch 204 (holotype B†); Tenerife, Risco de Tagana, 27 Mar. 1855, Bourgeau 1427b (neotype P00434110!, designated here).

**Description.** A liana or scrambling shrub, the stems woody below, vegetative parts glabrous to thinly pilose. Leaves petiolate, 5–7 × 0.5–2.2 cm, linear-lanceolate, acute to obtuse, entire, base rounded, glabrescent to thinly pilose, veins prominent beneath; petioles 4–12 mm. Flowers 1–3 in pedunculate axillary cymes; peduncles 1–2.5 cm, slender; bracteoles 1–3 mm, filiform; pedicels 3–7 mm; outer sepals 6 × 3 mm, broadly oblong, slightly constricted below triangular, acute, with a greenish apical portion, inner sepals ovate, slightly smaller; corolla 2 cm, whitish with pink, pilose midpetaline bands, deeply lobed with lanceolate lobes; ovary glabrous; style glabrous, divided c. 3 mm above base, stigmas 6 mm. Capsule not seen.

**Distribution.** Endemic to the Canary Islands: Tenerife and La Gomera; 300–800 m (Bourgeau 1427, Carine & Santos Guerra 196c, Lowe s.n. [19/4/1861]).

**Type.** CANARY ISLANDS, *Lopezsocas* s.n. (probable holotype ORT-22418— but collection date does not correspond exactly).

**Description.** Similar to *C. volubilis* but leaves 3–9 × 3–4.2 cm, ovate-elliptic, obtuse, entire, base rounded to subcordate, dark green, glabrous. Flowers 1–6 in axillary pedunculate cymes; peduncles 1.5–3.5 cm, bracteoles 5–12 mm, filiform, somewhat caducous; pedicels 10–18 mm, sepals 9–12 mm, oblong-ovate with a distinct triangular apiculate apex, subglabrous; corolla 1.6–2 cm, pink, unlobed, midpetaline bands darker; ovary c. 3 mm long, conical, thinly pilose; style glabrous, divided c. 4 mm above base. Capsule and seeds not seen. [Bramwell and Bramwell 2001: 264–265 (photo)]

**Distribution.** Endemic to Lanzarote in the Canary Islands at 400–600 m (*Murray s.n. [16/5/1902], Stearn 1124—cultivated on Gran Canaria*).

80. *Convolvulus* sp. A

**Description.** Twining perennial of unknown size, stems pubescent. Leaves petiolate, 3.5–7 × 1.2–2 cm, narrowly ovate, apiculate, entire, base cordate, weakly auriculate, veins prominent beneath, both surfaces minutely tomentellous. Flowers 2–5 in axillary, pedunculate cymes; peduncles 1.5–2.5 cm; bracteoles 7–10 × 0.5–2 mm, shortly petiolate, oblong, acuminate; pedicels 6–18 mm; outer sepals 10–13 × 3–4.5, narrowly ovate, acuminate, tomentose, inner sepals 8–10 mm long, acute; corolla 2.2–2.4 cm long, lobed, midpetaline bands pilose; ovary c. 4 mm long, densely hirsute; style pilose, divided 3–4 mm above base. Capsule and seeds not seen.

**Distribution.** Only known from La Palma in the Canary Islands (*Bramwell & Humphries 3448*).

**Note.** This appears to be a distinct species but we hesitate to describe it given the complexity of the Canary species and the fact that it is only known from a single collection. Its sepals are distinctly longer than those of both *C. fruticulosus* and *C. canariensis* and the tomentellous leaves are different from all similar species except *C. fruticulosus* but in that species the leaves are oblong not ovate. Further collections are needed to elucidate its exact status.


**Type.** CANARY ISLANDS, a plant grown at Paris from seed sent by Collignon from the Canary Islands (holotype P [Herb. Lam.]!).

**Description.** Woody-based scrambling plant with long trailing stems to 1.5 m. Leaves shortly petiolate, 1–5 × 0.5–1.4(-2.5) cm, oblong, apiculate, entire, base sub-
cordate, weakly auriculate, thinly to densely tomentellous on both surfaces; petioles 2–4 mm. Flowers 1–3 in shortly pedunculate, axillary cymes the flowers and leaves crowded together; peduncles 0–10 mm; bracteoles, 5–6 mm, filiform, caducous; pedicels 5–12 mm; sepals 6–7 (-9) × 2.5–3 mm, pubescent, outer sepals broadly oblong-elliptic, obtuse to subacute, inner sepals oblong, acute to mucronate; corolla 1.5–1.7 cm long, pale blue, weakly lobed, midpetaline bands pilose; filaments glan-
dular, ovary 3.5 mm long, pilose at apex or glabrous; style glabrous except sometimes near the base, divided 3 mm above base; stigmas 3 mm. Capsule globose-conical, apiculate, c. 4–8 mm long, pilose apically or glabrous; seeds tuberculate, glabrous.

[Sa’ad 1967: 250, Bramwell and Bramwell 2001: 262–263 (photo); Schönfelder and Schönfelder 1997: 176–177 (photo)]

Notes. *Convolvulus fruticulosus* is a very variable species endemic to the Canary Islands, and populations appear to vary from island to island and from one part of an island to another part. Populations on the smaller islands are poorly known. Variation is mostly in indumentum, shape of the leaf base, development of the inflorescence and sepal shape. These differences do not correlate well with each other and the various names cited in the synonymy below seem to have been applied somewhat arbitrarily to one variant or another. As sepal shape is commonly of significance in taxon delimitation in *Convolvulus*, our infraspecific classification is based primarily on this character as was Sa’ad’s (1967: 251–252) but we disagree on the decisive sepal characters and on the interpretation or assignation of the various names. We recognise two subspecies:

81a. *Convolvulus fruticulosus subsp. fruticulosus*

Figure 11, t. 15–23.


Distinguishing features. Characterised by the obtuse to subacute outer sepals. Plants are almost always densely tomentellous and leaves usually subcordate.
Distribution. Endemic to the Canary Islands: Tenerife (Bornmüller 2612, Asplund 4680, Murray s.n. [4/5/1899], Acebes et al. s.n. [1/5 1976]), La Gomera (Carine & Santos Guerra 197, 198).

Notes. Plants referred to C. perraudieri differ from the the type of C. fruticulosus in having somewhat larger leaves, 3–5 × 0.6–1.4 cm, and cymose flowers with a distinct peduncle but, at least in the Santa Cruz area of Tenerife, occur very close to, if not together with smaller leaved plants, in which the peduncle is suppressed.


Type. CANARY ISLANDS, Gran Canaria, portion of sheet 132087 (Despréaux 1) consisting of two shoots covered by collector’s label from “Roches del Barranco de las flores G. C. May 1839” to which the label “TYPUS” is affixed (lectotype FI, designated here).


Type. Based on *Rhodorrhiza glandulosa* Webb


Type. Based on *Rhodorrhiza glandulosa* Webb

Type. Based on *Rhodorrhiza glandulosa* Webb

Distinguishing features. Best distinguished from subsp. *fruticulosus* by the narrowly ovate or oblong-ovate, acuminate (and apiculate) sepals. Additionally the leaves are rounded or truncate at the base and both leaves and sepals are commonly glabrous to thinly pubescent. The ovary and style vary from glabrous to hirsute.

Distribution. Endemic to the Canary Islands: Gran Canaria, La Palma, 500–1000 m.

Notes. Indumentum varies from nearly completely glabrous (*Carine & Durães* 163, 165, *Bramwell & Humphries* 3040, *Bramwell* 1177), to thinly pubescent with somewhat crisped hairs (Murray s.n. [9/5/1894]) and to densely tomentellous (*Lowe* s.n. [28/5/1875], Bramwell 1905).


Type. PORTUGAL, *Pinto da Silva*, Teles & Pina 9337 (holotype LISE 94263!).
Description. A scrambling or twining shrub, old stems woody, glabrescent, young stems pubescent. Leaves petiolate, 1–6 × 2.5–3.5 cm, elliptic or oblong-elliptic, retuse, entire, base rounded to subcordate, puberulent on the nerves beneath but soon glabrescent; petiole 1–2.5 cm. Flowers 3–6 in axillary, pedunculate cymes; peduncles 1–2 cm; bracteoles 5–9 × 1–2.5 mm, oblanceolate; pedicels 5–10 mm; sepals 6–9 × 3–3.5 mm, obovate to elliptic, mucronate, puberulent, inner sepals scarious, puberulent near base only; corolla 1.5–1.7 cm, white, sinuate, midpetaline bands tomentose; filaments glandular near base; ovary glabrous; style glabrous, divided c. 4 mm above base, stigmas c. 2 mm. Capsule and seeds unknown. [Silvestre 2012: 260]

Distribution. Portugal: Cabo Espichel. Rare, narrow endemic of dolomitic rock at 125 m.

Notes. Although seeds are clearly visible on the image of the type specimen no description has been provided.

This species is related to C. canariensis and its allies from the Canary Islands and Madeira. It differs from C. canariensis in its near glabrous leaves and from C. masonii in its shorter sepals, smaller corolla and glabrous ovary. It is similar to C. volubilis but the leaves are oblong-elliptic, not linear lanceolate.


Figure 11, t. 24–30

Convolvulus suffruticosus Desf., Fl. Atlant. 1: 175. 1798. (Desfontaines 1798: 175).

Type. ALGERIA, Desfontaines s.n. (holotype P).


Type. ALGERIA, Oran, Bou-Tlélis, Pomel s.n. (holotype AL, probably divided with MPU!; isotype P00434103).


Type. MOROCCO, Ain Tellout, Henry 6-462 (holotype MA!).


(Jahandiez and Maire 1934: 588).

Type. Based on Convolvulus suffruticosus Desf.

Type. SPAIN, Valencia, Alicante, Cavanilles s.n. (holotype MA 475578!).

Description. Perennial herb from a rhizomatous rootstock with decumbent stems to 40 cm long; vegetative parts appressed hairy to pilose, often with both types of hair on the same plant. Leaves shortly petiolate, 1.5–4 × 0.2–1(-2.3) cm, lanceolate, oblong or oblong-elliptic, often falcate, acute, entire, base truncate; petioles 1–6 mm. Flowers 1–2 in pedunculate axillary cymes; peduncles 1–4 cm; bracteoles 8–20 × 0.5–2 mm, linear or linear-lanceolate, pedicels 0–3 mm, very short; outer sepals 7–9 × 2.5–4 mm, oblong-ovate to ovate, acuminate, inner sepals oblong-elliptic, cuspidate with broad membranous mar-
gins; corolla 2–2.5 cm, blue, pale violet, weakly lobed, midpetaline bands darker on the exterior, adpressed-pilose; filaments glandular below; ovary conical, glabrous; style divided 4–6 mm above base, glabrous, stigmas 3.5–5 mm. Capsule glabrous; seeds glabrous, tubercled. [Sa’ad 1967: 206; Silvestre 2012: 262, 263 (plate); Carine and Robba 2010: 12]

**Distribution.** SE Spain (St. Lager s.n. [27/5/1890], Porta & Rigo 67, Ellman & Sandwith 1162); Mallorca; Morocco (Carine et al. 369, Font Quer 489, Calvo 2381); Algeria (Balansa 358, Bourgeau 80, Chevalier s.n.[17/4/1897]).

**Notes.** The unusually short pedicels and often falcate leaves serve to make this species distinct.


**Type.** ITALY, Liguria, Viviani s.n. (holotype GE; isotype G-DC).

**Description.** Rather variable perennial herb from a woody rootstock, the stems sometimes short and straight and sometimes with trailing, flexuose stems at least 40 cm long; vegetative parts varying from appressed puberulent to villous. Leaves petiolate, 0.5–3 × 0.3–2.2 cm, ovate to suborbicular, rounded to obtuse, entire, base truncate to subcordate and shortly cuneate onto the petiole; petioles 1–5 mm. Flowers 1–3 in shortly pedunculate axillary dichasial cymes; peduncles 0.5–3.5 cm, commonly flexuose and sometimes recurving in fruit; bracteoles 3–13 × 0.5–2.5 mm, linear to oblong-lanceolate; pedicels 3–12 mm; outer sepals 5–7 × 2–2.5 mm, oblong-lanceolate, acute; inner sepals broader (c. 3 mm wide), thinly pubescent except ciliate margins, membranous; corolla 1.6–2 cm long, blue or violet, unlobed, midpetaline bands pilose; filaments glandular below; ovary glabrous; style glabrous, divided c. 4 mm above ovary, stigmas 3 mm. Capsule glabrous; seeds glabrous, tuberculate. [Sa’ad 1967: 196; Carine and Robba 2010: 17; Pignatti 1982: 388]

**Notes.** Carine and Robba (2010) circumscribed two subspecies as indicated below. There is much variation in leaf size, especially in North African material. The two subspecies are distinguished by sepal characters but are perhaps most easily recognised because of their geographical disjunction.

84a. *Convolvulus sabatius* subsp. *sabatius*


**Type.** Based on *Convolvulus sabatius* Viv.


**Type.** “Georgia, Mount Swant”, Hohenacker s.n. (holotype W!).

**Distinguishing features.** Sepals pubescent with appressed hairs, the margins glabrous.

**Distribution.** Italy: Liguria (Bicknell 3346, Joad 1882).
**Notes.** The type of *C. georgicus* is a small scrap with a single flower and the appearance of *C. sabatius*. Examination of the sepals confirms not only that they are the same shape as those of subsp. *sabatius* but also have its distinct indumentum with a band of appressed hairs along the centre leaving the margin glabrous. The collection might have been of a cultivated plant but was more probably mislabelled in the herbarium. *Convolvulus sabatius* should not be included in the list of species occurring in Georgia.


Figure 11, t. 31–39

Type. ALGERIA, Constantine, Séjourné s.n. (holotype G, not seen).

Type. MOROCCO, Ait Mesan, *J. Ball* s.n. (holotype P!).

Type. Based on *Convolvulus mauritanicus* Boiss.

Distinguishing features. Distinguished by the prominent spreading hairs on the calyx and often also on the stem and leaves.

Distribution. Morocco (Balls 2934, Lindberg 3902, Gattefossé 3/8/1935), Algeria (Cosson 9/6/1875). Reaches at least 2300 m in Morocco (Jury 17634). It is also widely cultivated and reported to have escaped in Sicily.

Notes. The flexuose peduncles, prominent bracteoles, essentially broadly oblong leaves and violet flowers make *C. sabatius* a relatively distinct species.


Figure 11, t. 40–48

Type. ALGERIA, Oran, *Bourgeau* 60 (lectotype P00417713!, designated by Sa’ad 1967: 202); isolectotypes C, E!, GOET, K!, P!, W!).

Description. Perennial herb from a deep, somewhat woody rootstock, usually branched at base with trailing herbaceous stems to c. 40 cm long, vegetative parts all (thinly to) densely lanate. Leaves shortly petiolate, 0.6–1.6 × 0.3–0.8 cm, oblong to oblong-elliptic or oblong-ovate, obtuse, acute or shortly mucronate, entire, abruptly narrowed to a truncate or cordate base; petioles 0–1 mm. Flowers 1–3 in shortly pedunculate axillary dichasial cymes, the inflorescence as a whole appearing racemose; peduncles 0.5–3 cm; bracteoles 5–9 × 0.5–1 mm, linear; pedicels 0–3(-8) mm, outer sepals 8–11 × 3 mm.
**Figure 12.** 1–10 *C. humilis* (a–e) leaves 2 flower 3 bracteole 4 outer sepal 5 middle sepal 6 inner sepal 7 stamen 8 ovary and style 9 capsule 10 seed 1 from *Bicknell* s.n. (W) 2 from *Faure* s.n. (CAIM) 3–8 from *Choulette* 164 (W) 9–10 from *Huet du Pavillon* s.n. (G) 11–20 *C. gharbensis* 11 leaves 12 bract 13 bracteole 14 outer sepal 15 middle sepal 16 inner sepal 17 stamen 18 ovary and style 19 capsule 20 seed 11–18 from *Samuelsson* 7188 (B) 19–20 from *Pitard* s.n. (E) 21–30 *C. meonanthus* 21 leaf 22 bract 23 bracteole 24 outer sepal 25 middle sepal 26 inner sepal 27 stamen 28 ovary and style 29 capsule 30 seed 21–28 from *Ferreira* 1955 (W) 29–30 from *Henriques* s.n. (W) 31–39 *C. pentapetaloides* 31 leaves 32 bracteole 33 outer sepal 34 middle sepal 35 inner sepal 36 stamen 37 ovary and style 38 capsule 39 seed 31 from *Silva et al.* 1890 (G) 32–37 from *Davis* 2506 (E) 38–39 from *Huter et al.* 341 (G) 40–48 *C. tricolor* subsp. *tricolor* 40 leaves 41 bracteole 42 outer sepal 43 middle sepal 44 inner sepal 45 stamen 46 ovary and style 47 capsule 48 seed 40–46 from *Ross* 168 (L) 47–48 from *Faure* s.n. (U) 49–56 *C. simulans* 49 portion of stem with leaves 50 leaf 51 outer sepal 52 inner sepal 53 stamen 54 ovary and style 55 capsule 56 seed 49–54 from *Twisselmann* 10597 (BM) 55–56 from *Boyd & Ross* 6405 (BM).
oblung-elliptic, acute; inner sepals ovate, c. 4 mm wide, membranous; corolla 1.8–2.8 cm long, yellow or creamy-yellow, unlobed, midpetaline bands pilose; filaments glandular below; ovary glabrous or with a few hairs; style glabrous, divided 6–10 mm above ovary, stigmas 3–4 mm. Capsule glabrous or with a few hairs; seeds glabrous, tuberculate. [Sa’ad 1967: 202; Siddiqi 1977: 15 (Figure 6); Carine and Robba 2010: 14]

Notes. There is much variation in indumentum and two varieties can be recognised:

85a. *Convolvulus supinus* var. *supinus*

Type. ALGERIA, El Abiad Sidi Cheiikh, *Pomel* s.n. (holotype AL; isotype MPU!).

Type. ALGERIA, Metilili, *Pomel* s.n. (holotype AL; isotypes MPU004908!, P00417716!).

Type. MOROCCO. Tazouggest, *Maire & Wilczek* s.n. (holotype MPU003306!; isotype MPU003307!).

Type. MOROCCO, Beni-Ouziem oasis, *Maire & Wilczek* s.n. (holotype MPU003305!; isotype P00417712).

Type. Based on *Convolvulus brevipes* Pomel

Distinguishing features. Leaves thinly to densely lanate.


Type. MOROCCO, Zeluan, *Pau* s.n. (holotype MA).

Type. *Ducellier* s.n. (holotype MPU!; isotype P00434104).

**Type.** Based on *Convolvulus suffruticosus* var. *sulfureus* Batt.


**Type.** MOROCCO, Tazzouget, Maire & Wilczek s.n. (?AL, P00434107!, MPU!, RAB013775).


**Type.** MOROCCO, Oued Zerzef, NE of Erfoud, Maire & Wilczek s.n. (AL?, P00434101!, MPU003308!, RAB 013774!).


**Type.** MOROCCO, Grand Atlas, Nain 10 (lectotype MPU003679!, designated by Sa’ad 1967: 208; isolectotypes P00434105!, P00434102).

**Type.** Based on *Convolvulus valentinus* var. *melliflorus*.

**Distinguishing features.** Leaves glabrous or glabrescent on the upper surface.


**Note.** Distinctive because of its lanate indumentum, small, very shortly petiolate leaves and usually elongate, raceme-like inflorescence with yellow corollas and short pedicels, the bracteoles immediately below the sepals.

**Species 86–92.** Annuals with blue or bluish flowers

A relatively well-defined group of annual species essentially Mediterranean in their distribution except *Convolvulus simulans*, which grows in California. Molecular studies (Williams et al. 2014) confirm this species is in the same clade as its European relatives. Apart from its isolation this species is also remarkable for having the smallest corolla in *Convolvulus*. In all species in this group with pedunculate flowers, the peduncle becomes recurved in fruit.


**Figure 12, t. 11–20**

**Type.** MOROCCO, *Picard* 1806 (lectotype AL (possibly transferred to MPU006495), designated by Sa’ad 1967: 181; isolectotypes, K!, MPU!, P00417698!, P00417699!, P00417700!).
**Description.** Annual herb, commonly much branched at the base, reaching c. 35 cm, stems thinly pubescent. Leaves 2–8 × 1–2.5 cm, obovate-spathulate, obtuse to acute, entire, base attenuate or, above, abruptly cuneate, clearly sessile, glabrous or with a few marginal cilia. Flowers several in a sessile terminal head; bracts 1.5–2.3 × 0.8–1.5 cm, ovate, acute, rounded at the base, thinly pilose with long white hairs, green with a palid area near the base; peduncles absent; bracteoles 12–15 × 1–3 mm, oblong, very variable in size, pilose with long white hairs; pedicels absent; outer sepals 9–10 × 2 mm, oblong, acute, densely pilose with white hairs; inner sepals similar but narrowly lanceolate; corolla 1.5–2.5 cm long, blue, unlobed, midpetaline bands pilose, terminating in a small tooth; filaments with sessile glands; ovary glabrous; style glabrous, divided c. 7 mm above base, stigmas 5 mm. Capsule glabrous, much exceeding calyx; seeds tuberculate.

**Distribution.** Endemic to Morocco (Sauvage 8000, Davis 54326, Mathez et al. 2426, Lewalle 12771).


**Type.** ITALY, Sicily (lectotype LINN 218.40!, designated by Verdcourt 1963: 41).

**Description.** Annual herb, commonly branched at base with prostrate to erect stems to 40 cm long, thinly pilose with brownish hairs on vegetative parts. Leaves petiolate, 1–5 × 0.4–2 cm, ovate-deltoid, acute, base cuneate to abruptly truncate, margin entire; petioles 2–5 (-11) mm. Flowers 1–3 (-4); peduncles 0.6–2.5 cm, bracteoles 2–11 × 1 mm, filiform, linear or linear-lanceolate; pedicels 0–10 mm, becoming recurved in fruit; outer sepals 5–6 × 1.5–3 mm, lanceolate, ovate to subrhomboid, acute; corolla 5–7 mm long, white or lilac, deeply lobed for c. 2 mm, midpetaline bands glabrous; filaments glandular below; ovary glabrous; style glabrous, divided c. 2 mm above base, stigmas 2 mm. Capsule glabrous; seeds glabrous, tuberculate. [Sa’ad 1967: 197; Feinbrun-Dothan 1978 plate 62]; Collenette 1999: 232 (photo); Silvestre 2012: 259, 261 (plate); Pignatti 1982: 388; Tohmé and Tohmé 2007: 216; Strid and Strid 2009: 394–395 (plate)]

**Notes.** We recognise two subspecies, which intergrade occasionally (e.g. Ascherson 1054 from the Libyan desert in Egypt, Finlay s.n. from Madeira).

87a. *Convolvulus siculus* subsp. *siculus*

Figure 13, t. 1–8


**Type.** t. 48 (p. 89) in Boccone, Icones & descriptions rariorum plantarum Sicilia.


**Type.** Based on *Convolvulus siculus* L.
Figure 13. 1–8. C. siculus subsp. siculus 1 leaf 2 bracteole 3 outer sepal 4 inner sepal 5 stamen 6 ovary and style 7 capsule 8 seed. From Sharobiem & Shalaby 942 (CAIM) 9–17 C. virgatus var. virgatus 9 leaves 10 bracteole 11 outer sepal 12 middle sepal 13 inner sepal 14 stamen 15 ovary and style 16 capsule 17 seed 9–10 & 16–17 from Rechinger 3988 (W) 11–15 from Aucher-Eloy 4955 (W) 18–25 C. rhyniospermus 18 leaf 19 bracteole 20 outer sepal 21 middle sepal 22 inner sepal 23 stamen 24 ovary and style 25 seed. From Kotschy 235 (W) 26–34 C. hystrix subsp. hystrix 26 habit showing spines and flower position 27 leaf 28 bracteole 29 outer sepal 30 inner sepal 31 stamen 32 ovary and style 33 capsule 34 seed. From Sa’aid 1444 (CAIM) 35–43 C. glomeratus 35 leaf 36 bracteole showing variation in shape 37 outer sepal 38 middle sepal 39 inner sepal 40 stamen 41 ovary and style 42 capsule 43 seed. 35 from Schimper 784 (W) 36–41 from Täckholm et al. 786 (CAI) 42–43 from Täckholm et al. 944 (CAI).
Type. Specimen ex Herb. Martius (M).

Type. ALGERIA, Garrouban (holotype AL).

Convolvulus siculus var. flexuosus (Pomel) Batt., Fl. Algérie 2: 546. 1890. (Battandier 1890: 546).
Type. Based on Convolvulus flexuosus Pomel

Distinguishing features. Bracteoles narrowly lanceolate, but variable in size: 15 × 3.5 mm in the Linnean type but usually much smaller to 4 × 1 mm; pedicels very short (0–1 mm) so bracteoles adjacent to sepals.

Distribution. European Mediterranean, main Mediterranean islands and Western Middle East from Turkey south to Egypt, Jordan and northern Saudi Arabia: Portugal; Spain (Jerónimo 8285); Southern France (Billot 3435); Balearic Islands (Bowden & Sims 6810); Corsica (Burdon s.n. [21/5/1913]); Sardinia (Müller s.n.); Sicily (Rigo 136); Malta (Kramer & Westra 4211); Greece (Stamatiadou 14643); Aegean Islands (Davis 1594); Cyprus (Merton 2581); Turkey (Davis 41234, 41825); Palestine/Israel (Davis 8561, 41234, Meyer & Dinsmore 7468); Jordan (Western 44); Saudi Arabia (Collenette 8527); Egypt (Simpson 527); Libya (Davis 49978, 50180, Vaccari 163); Tunisia (Fay 945); Algeria (Balansa 359); Morocco (Faure s.n. [23/4/1929]); Madeira (Mandon 1866); Canary Islands (Bourgeau 887, Sprague & Hutchinson 391, Murray s.n. [16/5/1902]).


Convolvulus pseudosiculus Cav., Descr. Pl. 97. 1801. (Cavanilles 1801: 97).
Type. Cultivated plant (holotype MA 222471!).

Type. Cultivated plant of uncertain origin (lectotype B-W03724010, designated here).

Type. ETHIOPIA, Schimper 73 (holotype B†; isotype P).

Type. ALGERIA, Mers-el-Kebir, Pomel s.n. (holotype AL, not seen).

Type. Based on Evolvulus agrestis Schweinf.

**Type.** Based on *Evolvulus agrestis* Schweinf.

**Distinguishing features.** Bracteoles filiform, pedicels 5–10 mm long so bracteoles distant from sepals. [Verdcourt 1963: 41].

**Distribution.** Principally in NW Africa and the southern Red Sea area: Canary Islands (Bourgeau 458, Aedo et al. 12447); Spain (Bourgeau 1295); Portugal (?); Sardinia (fide Stace 1972); Morocco (Trethewy 109, Jury et al. 14203, Jahandiez 222); Algeria (Romieux s.n. [29/4/1883]); Sudan (Schweinfurth 2192); Ethiopia (Schimper 362, 1294); Eritrea (Ryding 1411, Pappi 1757); Somalia (Thulin & Gifri 8711); Socotra (Popov SO/331); Yemen (Wood Y/72/177); Saudi Arabia (Collenette 488). Rare and scattered elsewhere: Tanzania (Peter 43022); Kenya (Kokwaro 2840); Oman: Dhofar (Miller & Nyberg 9133, Mandaville 7359); India (Beddome 5618 (BM), from Secunderabad).

**Notes.** As a species *C. siculus* is distinctive because of its petiolate, basally truncate leaves and blue flowers.

Some publications (e.g. Dobignard and Chatelain 2011) treat subsp. *elongatus* and subsp. *agrestis* as separate taxa but there seems to be no reason for this.

*Convolvulus elongatus* is illegitimate as Willdenow cited the earlier *C. pseudosiculus* in synonymy. The change of type face in Battandier (1890: 595) indicates *C. elongatus* is being treated as a subspecific name of *C. siculus* following an earlier explanation (Battandier 1890: 4).


**Type.** LIBYA, Maire 1114 (holotype MPU004048!).

**Distinguishing features.** This hybrid differs from *C. siculus* in its oblong-spathulate leaves attenuate at the base and from *C. humilis* by the upper leaves lanceolate, narrowed, not rounded at the apex.

**Distribution.** Found once in Libya (Cyrenaica).

**Notes.** This taxon represents *C. siculus × humilis*.


Figure 12, t. 31–39


**Type.** None specified.

Type. Based on Convolvulus pentapetaloides L.

Type. Without locality, Latourette s.n. (lectotype LINN 218.41!, designated by Sa’ad 1967: 207).

Description. Annual herb with slender rootstock, often branched at base; stems adpressed pubescent. Lower leaves 3.5–6 × 0.7–1.2 cm; spatulate with an attenuate, pseudopetiolar base, apex obtuse, margin entire, nearly glabrous but more or less ciliate on the margins; upper stem leaves and bracts clasping, 2–4 (-6) × 0.4–0.8 cm, lanceolate (to oblanceolate). Flowers solitary, pedunculate, axillary; peduncles 5–18 mm, pubescent, becoming recurved in fruit; bracteoles 1–3 mm, filiform to narrowly lanceolate; pedicels 3–8 mm, pubescent; sepals somewhat scarious, 5 × 2.5 mm, ovate, acute and mucronate, glabrous apart from long basal trichomes; corolla 0.7–0.9 mm long, blue, shallowly lobed, midpetaline bands pubescent with brown hairs; filaments sparsely glandular below; ovary glabrous or with a few very long trichomes; style glabrous, divided 3–4 mm above the base, stigmas c. 2 mm. Capsule glabrous, strongly exerted from the sepals; seeds covered in pointed tubercles. [Sa’ad 1967: 188; Feinbrun-Dothan 1978 (plate 60); Tohmé and Tohmé 2007: 215 (photo); Pignatti 1982: 388; Silvestre 2012: 269; Strid and Strid 2009: 396–397 (plate)]

Distribution. Circum-mediterranean, east to Iraq: Portugal (Daveau 2428); Spain; Balearic Islands (White s.n. [4/3/1903]); Italy (Bicknell & Pollini 632); Sardinia; Sicily (Todaro 923); Malta (Duthie s.n. [23/3/1874]); Greece (Guiol s.n. [7/1930]); Cyprus (Meikle 2006, Sintenis & Rigo 60); Turkey (Siehe 103); Lebanon (Gombault 4504); Syria (Haradjian 4344); Palestine/Israel (Davis 4486); Jordan (Trought s.n. [21/4/1953]); Iraq (Al-Rawi 8853); Libya (Sandwith 2314, Archibald 968); Russia: Caucasus/Balkaria (Czermak s.n.).

Notes. Similar morphologically to C. siculus but distinguished by its sessile leaves.


Figure 12, t. 21–30


Type. Based on Convolvulus meonanthus Hoffmanns. & Link

Type. PORTUGAL, Coimbra, Brotero s.n. (LISU).

Description. Annual herb, commonly branched at the base, reaching c. 40 cm, stems and leaves with long, stiff spreading hairs. Basal leaves 2.5–4.5 × 0.7–1 cm, obovate-spathulate, obtuse, entire, base attenuate into a pseudopetiolo, stem leaves 1.5–5.5 × 0.2–1(-1.8) cm, oblong or lanceolate, sessile. Flowers solitary, axillary, pedunculate; bracts lanceolate, acute; peduncles 1.5–5 cm, slender, flexuose, becoming
recurred in fruit; bracteoles 0.5 mm, triangular, acute; pedicels 2–4 mm, not well
differentiated from the peduncles; sepals 5–6 × 2–2.5 mm, ovate, acute to apiculate,
margin, scarious, ciliate or glabrous, sepals otherwise more or less glabrous; corolla
1.5–2.4 cm long, tricoloured blue, white and yellow, weakly 5-angled with apices
of lobes pointed, midpetaline bands adpressed pilose; ovary glabrous; style glabrous,
divided c. 5 mm above base, stigmas 2.5–3 mm. Capsule glabrous, much exceeding
calyx; seeds tuberculate. [Sa’ad 1967: 185; Pignatti 1982: 388; Silvestre 2012: 268,
271 (plate)]

**Distribution.** West Mediterranean region, perhaps only in Europe: Algeria (?);
Morocco (?); Portugal (Brummitt & Ernst 5985); Spain (Boissier & Reuter 1841, Toda-
ro 922); Italy (Woolley-Dod 1756).

**Notes.** Somewhat resembling *C. pentapetaloides* but corolla much larger.


Figure 12, t. 40–48

**Type.** Herb. Clifford 68, Convolvulus 12, sheet A, (lectotype BM-000558104, design-
nated by Sa’ad 1967: 204).

**Description.** Annual herb, commonly branched at the base, reaching c. 40 cm, stems
and leaves with long, stiff spreading hairs mixed with short, appressed hairs. Lower leaves
2.5–4.5 × 0.7–1.4 cm, obovate-spathulate, obtuse or emarginate, entire, base tapering,
stem leaves 1.5–4 (–5) × 0.2–1(–1.8) cm, oblong, obovate or oblanceolate, sessile. Flowers
solitary, axillary, pedunculate; bracts lanceolate, acute, resembling upper leaves; peduncles
1–4 cm, slender, flexuose, becoming recurved in fruit; bracteoles 2–3 mm, filiform, acute;
pedicels 3–7 mm, not well differentiated from the peduncles; sepals 5.5–7 × 2.5–3 mm,
broadly oblong to pandurate, scarious-margined, pilose, clearly differentiated into two
parts, the upper green, acute to apiculate, the lower part colourless; corolla 2–3 (–3.5) cm
long, tricoloured blue, white and yellow, weakly 5-angled with apices of lobes pointed,
midpetaline bands adpressed pilose; filaments glandular below, ovary pilose; style gla-
brous, divided c. 5–6 mm above base, stigmas 5–6 mm. Capsule pilose, much exceeding
calyx; seeds tuberculate. [Sa’ad 1967: 204; Feinbrun-Dothan 1978 (plate 63); Pignatti
1982: 388; Tohmé and Tohmé 2007: 217 (photo); Silvestre 2012: 270, 271 (plate)]

**Notes.** We recognise two subspecies whose ranges overlap in North Africa:

90a. *Convolvulus tricolor* subsp. *tricolor*.


**Type.** An unspecified cultivated plant.

*Convolvulus tricolor* var. *pseudotricolor* Bertol., Fl. Ital. 2; 450. 1835. (Bertoloni 1835: 450).

**Type.** ITALY, Genoa, *Sturla* (GE†).

Type. Plate in Reichenbach (1858: t.137, I, II, 1-10).


Type. MOROCCO, Casablanca, *Gentil* s.n. (holotype MPU007512).


Type. ALGERIA, between Madaurum and Mount Ouenza, Mdaourouch, *Maire* s.n. (syntype MPU010254) and Guelma, *Battandier* s.n. (syntype).


Type. Based on *Convolvulus tricolor* var. *hortensis* Batt.


Type. TUNISIA, Tunis, *Battandier* s.n. (lectotype MPU001918, designated here).


Type. Based on *Convolvulus maroccanus* Batt.

**Distinguishing features.** The upper, green part of the sepals is acute and shorter than the lower colourless part.

**Distribution.** Mostly western Mediterranean: Spain (*Boissier* 1837); Portugal (*Atchley* 454); France (*Meebold* 1928); Italy (*Joad* 1882); Greece (*Turner* 43); Morocco (*Davis* 417, *Jury et al.* 19326); Algeria (*Faure* s.n. [3/5/1931]). Cultivated and adventive in Turkey, Crete, Lebanon, the Middle East, Pakistan and doubtless elsewhere.


Type. None specified.


Type. ALGERIA, between Affreville and Miliana, *Maire* s.n. (holotype AL?; isotype MPU003792!).


**Distinguishing features.** The upper green part of the sepals is acuminate and longer than the lower colourless part.

**Distribution.** Central Mediterranean: Malta; Sicily; Morocco (*Pitard* 1802); Algeria (*Choulette* 163, *Faure* s.n. [7/6/1929]); Tunisia (*Rico* 1888, *Pitard* s.n. [3/1909]).
Notes. Todaro never provided a description for *C. cupanianus* and the epithet was first validated at varietal level by Battandier and Trabut (1905) with a brief (and misleading) description in a key. This validation was overlooked by Sa‘ad (1967).


*Convolvulus undulatus* Cav., Icon. 3: 39, t. 277. 1794. (Cavanilles 1794: 39).

Type. Plant of unknown origin ex Herb. Cavanilles (lectotype MA 94198!, sheet with original label, designated here).


Type. Cultivated plant (holotype BREM).


Type. NORTH AFRICA, between Algiers and Tripoli (P, not seen).


Type. Cultivated plant (HBG, not seen).

Type. Plant of unknown origin, cultivated in Vienna by Jacquin (not found at W).

Description. Annual herb, commonly branched at the base with decumbent or ascending stems 5–25 cm long, vegetative parts glabrescent or shortly pubescent. Leaves 0.5–5 × 0.3–1.5 cm, oblanceolate to rounded, margin entire, basal leaves gradually narrowed into a long petiole-like base up to 2 cm in length (so appearing spatulate), stem leaves abruptly narrowed at base, sessile and sometimes clasping and auriculate. Flowers solitary, subsessile in the axils of the upper leaves, becoming crowded towards the apex; peduncles and pedicels not clearly differentiated, 0–1 mm long; bracteoles filiform, minute; sepals 2.5–3.5 × 1.5–3 mm, narrowly elliptic to obovate, acute to rounded, thinly pilose; corolla 1–1.1 cm long, blue with a pale tube, distinctly lobed with triangular lobes, midpetaline bands pubescent, darkish; ovary long-pilose, style divided 1–1.5 mm above base, glabrous, stigmas 2 mm. Capsule pilose with stiff coarse hairs; seeds strongly tuberculate. [Sa‘ad 1967: 183; Feinbrun-Dothan 1978 (plate 59); Silvestre 2012: 272; Pignatti 1982: 388; Strid and Strid 2009: 398–399 (plate)]

Distribution. Nearly circum-mediterranean but apparently absent from France, Turkey and the Balkans: Spain (*Rivas* s.n. [31/4/1946]); Portugal; Italy (*Todaro* 920); Sicily (*Todaro*); Morocco (*Jahandiez* 244, *Hooker* s.n. [5/1871]); Algeria (*Balansa* 357, *Cosson* s.n. [22/5/1852]); Libya (*Pampanini & Pichi-Sermolli* 6263); Palestine (*Dinsmore* 3721); Jordan (*Abu Laila et al.* 2005JOR-10-1); Syria: Jebel Druze (*Gombault* 5961); Cyprus (*Syngrestides* 1195).

Notes. Similar morphologically to *C. pentapetaloides* but flowers sessile or nearly so.

Figure 12, t. 49–56


**Type.** MEXICO, Baja California near Tia Juana [Tijuana], *M.E. Jones* 3720 (holotype GH; isotypes K, NY),

**Type.** Based on *Breweria minima* A.Gray

**Description.** Annual with adventitious root; stems 5–25 cm long from central root-stock, decumbent, indumentum of scattered long hairs mixed with some shorter pubescence. Leaves 1–5 × 0.2–0.6 cm, oblong-oblancoate; apex rounded; base attenuate, petiole-like, margin entire. Flowers solitary, axillary; peduncles 0.8–1.6 cm, often becoming recurved in fruit; bracteoles 3–6 (-9) × 1–2 mm, oblancoate; pedicels 1–3 mm; outer sepals 5 × 1 mm, lanclote-oblong, acute to apiculate, differing from the obovate inner sepals; corolla 5–6 mm long, deeply lobed, pale blue with white midpetaline bands radiating from the centre; midpetaline bands glabrous, terminating in a mucro; filaments eglandular; ovary glabrous; style glabrous, divided 1–1.5 mm above base, stigmas 1 mm. Capsule glabrous; seeds tuberculate.


**Notes.** Although separated geographically from related species, *C. simulans* is very close to *C. pentapetaloides* and its allies morphologically and this is confirmed by our molecular studies which show they all belong to a single clade (Williams et al. 2014).

**Species 93–107. Red Sea group**

Vegetatively extremely variable including annual and perennial herbs, spiny and unarmed undershrubs and some species with fastigiate branching. The outstanding feature of many (but not all) species lies in the structure of the stigmas. In many species in this clade (Clade A in Figure 1) the stigmas are widened upwards and oblong-elliptic in shape. In the three species formerly placed in *Seddera* (*C. kossmatii*, *C. socotranus*, *C. semhaensis*), the stigma is not co-extensive with the style arm, its lower part being differentiated from the stigma proper. Another unusual feature lies in the flower colour. Most species in this group are blue-flowered as in the annual species 84–90 and the clade appears to be centred geographically on the Red Sea region.

Figure 13, t. 18–25.


Type. ERITREA, *Terracciano* 148 (holotype FT).


Type. INDIA, *Blatter* 3515 (lectotype BLATT!, designated by Bhandari 1964: 327).


Type. Based on *Convolvulus densiflorus* Blatt. & Hallb.


Type. SAUDI ARABIA, Jiddah, *Kruijt* 191 (holotype L).

**Type.** SUDAN, Kordofan [Kurdufan], *Kotschy* 235 (holotype G; isotypes BM001050391!, K!, OXF!, P!).

**Description.** Annual herb, often branched at base, pubescent in all vegetative parts, stems prostrate to ascending, up to 60 cm long. Leaves shortly petiolate, 0.5–4.5 × 0.1–1.3 cm. ovate, lanceolate, elliptic or oblanceolate, obtuse or acute, margin entire, base cuneate, rarely truncate; petioles 2 mm long. Flowers 3–6 in subsessile, axillary, bracteate heads; peduncles 0–0.5(-3) cm long; bracteoles 4–8 × 2–3 mm, lanceolate or ovate; outer sepals 4–7 × 0.5–1.5 mm, lanceolate, acute, densely villous; corolla 4–5 mm long, white or pale pink, deeply lobed, the lobes longer than broad, 2–2.5 mm long, more or less hidden by calyx hairs, midpetaline bands glabrous, ovary glabrous; style glabrous, divided 2–2.5 mm above base, stigmas c. 1.5 mm long; capsule glabrous, seeds tuberculate or (var. *laevis* Sa’ad) smooth. [Sa’ad 1967: 194; Collenette 1999: 231 (photo); Thulin 2006: 235; Austin and Ghazanfur 1979: 27, 25 (plate)]

**Distribution.** A Saharo-Sindian species, unexpectedly absent from southern Arabia and the Gulf region: India (*Aggarwal* s.n. [12/1/1955]); Pakistan (*Stocks* 474, *Jafri* 816); Saudi Arabia (*Collenette* 4734, *Trott* 1338); Egypt (*Khattab* 6346); Sudan (*MacDougal & Sykes* 36); Chad (*Gaston* 568); Ethiopia: Bale/Barrei (*Rippstein* 1236); Eritrea (*Popov* 1396); Djibouti (*Collenette* 8679, *Audru* 7117); Somalia (*Bally* 10218, *Thulin* et al. 9233); Yemen, Hadramaut (*Monod* 16530, 17334); Socotra (*Popov* SO/98).

**Notes.** The glabrous midpetaline bands of this, the previous and the following species are unusual.

*Convolvulus blatteri* was distinguished by its very small pale pink corolla, precisely the distinguishing character for *C. rhyniospermus* and images of the type kindly sent by the Blatter herbarium (BLATT) do not suggest any other differences. According to Bhandari his *C. rhyniospermus* has pedunculate brownish-villous heads with a corolla 16 mm. This fits *C. glomeratus*, known from Sind adjacent to the Jodhpur region and it seems likely that *C. blatteri* was described as a consequence of confusion with *C.*
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Figure 14. 1–7 *C. oppositifolius* 1 leaf 2 outer sepal 3 inner sepal 4 stamen 5 ovary and stigma 6 capsule 7 seeds. From *Popov* 68/46 (BM) 8–12 *C. jefferyi* 8 leaf 9 outer sepal 10 inner sepal 11 stamen 12 ovary and style. From *Greenway* 10454 (K) 13–20 *C. scopulatus* 13 leaf 14 outer sepal 15 middle sepal 16 inner sepal 17 stamen 18 ovary and style 19 calyx when fruiting 20 seeds. From *Miller et al.* 8142 (E) 21–28 *C. sericophyllus* 21 habit showing inflorescence 22 basal leaf 23 bract 24 calyx 25 outer sepal 26 inner sepal 27 stamen 29 ovary and style. From *Waring* 57 (BM) 29–36 *C. stenocladius* 29 habit showing inflorescence and bracteole 30 leaf 31 outer sepal 32 inner sepal 33 stamen 34 ovary and style 35 capsule 36 seed. From *Thulin* 6589 (K) 37–43 *C. socotranus* 37 leaf 38 bract 39 outer sepal 40 inner sepal 41 stamen 42 ovary and style with bracteole 43 calyx and capsule 44 seed. From *Balfour et al.* 73 (OXF).
glomeratus, which was treated under the name *C. auricomus* by Bhandari. *Convolvulus hamphilahensis* was distinguished by the corolla being shallowly lobed with lobes broader than long, 0.5–1 mm in length but this does not justify specific or subspecific rank in the absence of other distinguishing morphological or ecological features.


**Type.** SOMALIA, Recoil 73 (holotype P).

**Description.** Annual or briefly perennial herb with a small tap root, similar to *Convolvulus rhyniospermus*; stems usually numerous, decumbent or ascending from the base to 40 cm, but usually much less; vegetative parts pubescent. Leaves subsessile, 0.5–6 × 0.2–1.8 cm, oblong or, less commonly, oblanceolate or elliptic, obtuse and sometimes mucronulate, entire, cuneate at the base into an indistinct petiole. Flowers many, in subsessile, bracteate heads forming an elongate leafy inflorescence; peduncles 0–0.4 mm; bracteoles 4–9 × 1–3 mm, linear, oblong-elliptic or lanceolate, acute, ciliate especially in the lower half; sepals 5–7 × 0.5–2.5 mm, ovate, acute, pilose and strongly ciliate, the outer sepals c. 1 mm wider than the inner ones; corolla blue, 7–12 mm long, shallowly lobed, midpetaline bands with a few inconspicuous hairs; ovary glabrous, style glabrous, divided 2.5 mm above base, stigmas linear, 2–3 mm, slightly widened towards apex and sometimes unequal. Capsule glabrous, seeds papillate. [Verdcourt 1963: 40 (as *Convolvulus rhyniospermus*); Verdcourt 1982: 461; Sebsebe 2006 181]

**Notes.** This species is quite variable, approaching *Convolvulus jefferyi* and *C. stenoclados* (see discussion under both species) at one extreme and *C. rhyniospermus* at the other. Specimens without corollas cannot be safely separated from *C. rhyniospermus*. Following Verdcourt (1982), we recognise two infraspecific taxa, their extremes being very different in appearance:

94a. *Convolvulus capituliferus* subsp. *capituliferus*


**Type.** SOMALIA, Las Khoreh, Hildebrandt 865b (holotype B†).

*Convolvulus capituliferus* var. *suberectus* Franchet, Sert Somal. 41. 1882. (Franchet 1882: 41).

**Type.** SOMALIA, without precise location, Franchet s.n. (holotype P00434258†).


**Type.** SOMALIA, foot of Golis Range, Edith Cole s.n. (holotype K).

**Distinguishing features** The type variety has small leaves and bracts 0.5–1.5 cm long, equaling or only slightly exceeding the flower heads. The corollas are only 7–8 mm long.
**Distribution.** Apparently restricted to Somalia and Djibouti, where it is the common variety (*Thulin et al. 9233, Glover & Gilliland 705, Hemming 1848, Colleenette 146*). Records from Ethiopia require confirmation.


**Type.** KENYA, Kirrika 140 (K).

*Type.* Based on *Convolvulus capituliferus* var. *foliaceus* Verdc.

**Distinguishing features.** Leaves and bracts 3–6 cm long giving the inflorescence a leafy appearance. Corolla 9–12 mm long.

**Distribution.** This seems to be the only subspecies in Kenya (*Gillett 21325, Padwa 194*) and Ethiopia (*Ellis 232, de Wilde 5909*) but also occurs in Somalia (*Hemming & Deshmukh Jess 298*).

**Notes.** Distinguished from *C. rhyniospermus* by the larger, easily visible, shallowly lobed, blue corolla. Thulin (2006: 235) treated this species as a synonym of *C. rhyniospermus* but Verdcourt (1982: 459) drew attention to the distinctive characters of the two species.


**Figure 14, t. 8–12**

**Type.** KENYA, Jeffery 749 (holotype EA; isotype K).

**Description.** Perennial herb with prostrate or twining stems to 50 cm, vegetative parts adpressed pilose, when young with silvery hairs. Leaves shortly petiolate, 1.5–4 × 0.35–1(-2) cm, oblong, ovate or elliptic, apex rounded to acute, base cuneate to subhastate, margin entire; petioles 1–4 mm long. Flowers 2–5 in pedunculate, bracteate heads; peduncles 1–4.5 cm; bracteoles 6–14 × 2–8 mm, lanceolate or oblong; outer sepals 5–9 × 1–4 mm, elliptic to obovate, villous; corolla 8–10 mm long, blue, unlobed, midpetaline bands pubescent; ovary glabrous; style glabrous, divided 5 mm above base, stigmas 3–3.5 mm long, linear. Capsule glabrous; seeds glabrous, tuberculate. [Verdcourt 1963: 40]


**Notes.** This species is not so distinct from *C. capituliferus* differing principally in its perennial habit and long-pedunculate heads. Three collections (*Tanner 2338, Hicks 808, Kokwaro 15114*) are intermediate having subsessile inflorescences combined with a clearly perennial habit. The first is from Mlangoni in Tanga Province in Tanzania while the last two are from the Tsavo National Park area (3° 17’S, 38° 32’ E), all in
the interior behind coastal *C. jefferyi* but some distance from any known station for *C. capituliferus*, which grows in northern Kenya.


Figure 14: , t. 29–36

**Type.** SOMALIA, *Puccioni & Stefanini* 414 & 584 (syntypes FT).

**Description.** Perennial herb with prostrate stems to 50 cm, vegetative parts appressed pilose. Leaves shortly petiolate, 0.7–3 × 0.1–0.3 cm, linear to narrowly oblong, acute, base cuneate, margin entire; petioles 0.5–1.5 mm long. Flowers 1 (= 2) in pedunculate, axillary, bracteolate heads; peduncles 12–30 mm long, often flexuose or reflexed; bracteoles 4–7 × 1.25–1.5 mm, linear to lanceolate, appressed to sepals; pedicels absent; outer sepals 5–8 × 2–3 mm, lanceolate to ovate; corolla 12 mm long, blue, unlobed, midpetaline bands pubescent; ovary glabrous; style glabrous, divided c. 2 mm above base, stigmas 2.5 mm, linear. Capsule glabrous; seeds glabrous, sinuate-ridged. [Thulin 2006: 237]

**Distribution.** Somalia (*Thulin & Dahir* 6589; *Gillett et al.* 22497; *Drake-Brockman* 972).

**Notes.** Easily recognised by its flexuose peduncles, one-flowered heads and bracteoles appressed to the sepals.

Two specimens (*Lavranos & Carter* 23310, *Gillett & Becket* 206) from north of Mogadishu in Somalia have the appearance of hybrids or intermediates between *C. stenocladus* and *C. capituliferus*. The heads are few-flowered (mostly 2–3-flowered), sessile towards the apex but pedunculate below.


**Type.** ETHIOPIA, *Gilbert & Sebsebe* D. 8640 (holotype ETH; isotype K).

**Description.** Perennial herb with numerous prostrate stems to 50 cm from a central woody rootstock, vegetative parts finely adpressed pubescent. Leaves shortly petiolate, 1–3.7 × 0.1–0.5 cm, linear to narrowly oblong, apex acute, margin entire, base narrowly cuneate; petioles 1–2 mm. Flowers 1–3, subsessile in shortly pedunculate, axillary, bracteate heads; peduncles 2–5 mm long; bracteoles 7–11 × 1–2 mm, narrowly oblong, glabrous; pedicels 0–1.5 mm; outer sepals 8–10 × 1.5–2 mm, narrowly elliptic, acute; corolla 8–10 mm long, blue with a whitish centre, unlobed, weakly crenate, midpetaline bands thinly pilose; ovary and style glabrous, style divided 4–5 mm above base, stigmas 2 mm, linear. Capsule glabrous; seeds glabrous, tuberculate. [Sebsebe 2006: 181 (plate)]

**Distribution.** Endemic to Ethiopia (*Sebsebe* 2486); only known from Bidre in Bale floristic region.

**Notes.** Perhaps most similar to *C. jefferyi* but the base distinctly woody, the leaves linear-oblong and the flowers few, in numerous shortly pedunculate heads.

**Type.** ETHIOPIA, Sidamo et al. 8236 (holotype ETH; isotype K!).

**Description.** Perennial herb with prostrate stems to 40 cm, vegetative parts covered in adpressed silvery hairs. Leaves shortly petiolate, 1–2.5 × 0.3–0.6 cm, linear-oblong, acute, margin entire, base more or less truncate; petioles 1–1.5 mm. Flowers 1–2, subsessile in shortly pedunculate, axillary bracteolate heads; peduncles 0–2.5(–5) mm, bracteoles 6–9 × 1.5–2 mm, lanceolate; outer sepals 8–9 × 2.5–4 mm, ovate, shortly acuminate; corolla 9–12 mm, blue, very shallowly lobed, midpetaline bands pilose; ovary glabrous, style glabrous, divided c. 3 mm above base; stigmas c. 2 mm, linear. Capsule glabrous; seeds glabrous, tuberculate. [Sebsebe 2006: 182 (plate)]

**Distribution.** Ethiopia (Bidgood et al. 4980, Gilbert & Sebsebe 8661).

**Notes.** Similar to *C. bidrensis* but differing in the indumentum, cuneate leaf bases and peduncles 2–5 mm long.


**Type.** SOMALIA, Hildebrandt 1312 (holotype B†).

**Description.** Perennial herb with prostrate or twining stems to 50 cm long, vegetative parts densely sericeous becoming golden-brown when old. Leaves shortly petiolate, 0.6–2 × 0.6–2 cm, suborbicular, apex rounded or, rarely, emarginate or obtuse, base cordate, margin entire; petioles 1–6 mm long. Flowers 2–5 in shortly pedunculate, bracteate heads; peduncles 0.4–1.5 cm; bracteoles 7–10 × 5–7 mm, oblong-elliptic to ovate; outer sepals 5–7 × 2–3 mm, oblong to obovate, villous; corolla 9–11 mm long, blue, unlobed, midpetaline bands pilose; ovary glabrous; style glabrous, divided 3 mm above base; stigmas 1.75–2 mm, narrowly cylindrical and thicker than style. Capsule glabrous; seeds glabrous, tuberculate. [Thulin 2006: 235]

**Distribution.** Endemic to Somalia (Thulin & Warfa 4533, 5907; Friis et al. 5024; Revoil s.n. [6/1883], Tardelli & Bavazzano 502). On coastal sand dunes.

**Notes.** Thulin (2006: 235) suggests that this species is scarcely different from *C. jefferyi* and his description of *C. subspathulatus* in *Flora of Somalia* seems to anticipate uniting the two species. However the suborbicular leaf shape and sericeous indumentum serve to distinguish the two species easily.

100. *Convolvulus virgatus* Boiss., Diagn. Pl. Orient. 7:24. 1846. (Boissier 1846: 24). Figure 13, t. 9–17

**Type.** IRAN, Aucher-Eloy 4955 (holotype G; isotypes K!, P!, W!).

**Description.** Undershrub forming a small bush up to 40 cm high and 60 cm wide; stems from a deep woody taproot, many, ascending, rigid, green, glabrous, sometimes spinescent at the tips, weakly divaricate. Leaves sessile, 1.7–2.5 × 0.2–0.4
cm, lanceolate or linear-lanceolate, glabrous, acute or acuminate, margin entire, base truncate to obscurely auriculate. Inflorescence of few-flowered, axillary, pedunculate, hirsute heads; peduncles 1.5–4.5(-8) cm, rigid, woody; bracteoles 5–12 × 1–2 mm, very variable in size, linear or lanceolate, acute; pedicels 1–2 mm, often bent at a sharp angle to the peduncle; sepals 8–9 × 2–2.5 mm, ovate, acuminate, villous; corolla 1.3–2.1 cm, usually white, sometimes pinkish, shallowly lobed, the mid-petaline bands ending in teeth, pubescent, sometimes darker pink; ovary glabrous; style glabrous, divided c. 5.5 mm above the base, stigmas 1–1.25 mm, elliptic. Capsule glabrous; 1–2-seeded; seeds tuberculate, glabrous. [Sa’ad 1967: 86; Austin and Ghazanfar 1979: 16; Jongbloed 2003: 316 (photo); Pickering and Patzelt 2008: 169 (photo)]

Notes. We recognise two varieties:

100a. Convolvulus virgatus var. virgatus

Distinguishing features. Plant lax in habit, the branches neither very numerous nor markedly spinescent; leaves all or mostly > 2 cm long; corolla > 1.5 cm long.

Distribution. Locally frequent in desert in southern Gulf region: U.A.E. (Ghazanfar 4318, Western 23; York 80; Müller-Hohenstein 86077); Oman (Radcliffe-Smith 3615); Iran (Grey-Wilson & Hewer 261; Léonard 5876, Rechinger 3460); Pakistan (Pierce s.n., Lamond 219).


Type. OMAN, Muscat, Aucher-Eloy 4938 (holotype G; isotypes BM 000049109, P, W).

Type. Based on Convolvulus mascatensis Boiss.

Distinguishing features. Differs from the type in being very compact with short, intricately branched, spinescent shoots, relatively short, broad leaves, small heads and short corollas. Possibly an adaptation to extreme arid conditions.

Distribution. Oman (Gallagher 7758, 7965, McLeish 1848, Whitcombe 340 and Miller 6539).

Notes. Convolvulus virgatus is sometimes confused with C. glomeratus but the branches are rigid and woody and the leaves linear-oblong, glabrous.


Figure 13, t. 35–43
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**Type.** SAUDI ARABIA, Jiddah, *Schimper 784* (lectotype G-DC, designated by Sa’ad 1967: 182); isolecotypes GOET, OXF!, P!, W!.

**Description.** Perennial herb with prostrate, ascending or twining stems to 1 m, rootstock thick and somewhat woody, pubescent on vegetative parts; stems sometimes slightly woody. Leaves shortly petiolate, 1–4.5 × 0.5–1.5 cm, lanceolate or ovate, acute, base truncate to cordate, margin entire; petioles 0–5 mm long. Flowers 4–10 in axillary, pedunculate, villous, bracteate heads formed of compact scorpioid cymes; peduncles 1–4 (-7) cm long, straight or recurved; bracteoles 8–12 (-28) × 2.5–5 (-9) mm, ovate, acuminate, villous; outer sepals 8–12 × 3.5–4.5 mm, ovate, long-acuminate, broader than the inner sepals; corolla 8–12 mm long, white to pale blue, undulate, midpetaline bands pilose; ovary glabrous; style glabrous, divided c. 4 mm above base, stigmas ellipsoid, 1.5–2 mm. Capsule glabrous, seeds glabrous, tuberculate. [Feinbrun-Dothan 1978: plate 58; Nowroozi 2002: 79 (plate), 105 (map); Collenette 1999: 229 (photo); Austin and Ghazanfur 1979: 24, 25 (plate); Jongbloed 2003: 312 (plate)]

**Notes.** We recognise two varieties:

101a. *Convolvulus glomeratus* var. *glomeratus*.


**Type.** ETHIOPIA, *Quartin-Dillon* s.n. (holotype P; isotype BM000930475!).

*Convolvulus glomeratus* var. *volubilis* C.B.Clarke, Fl. Brit India (J.D. Hooker) 4: 249. 1884. (Clarke 1884: 249)

**Type.** PAKISTAN, Sind, *Dalzell 53* (lectotype K!, designated here).

*Convolvulus faurotii* Franch., J. Bot. (Morot) 1: 121. 1887 (Franchet 1887: 121)

**Type.** DJIBOUTI, Tadjourah, *Faurot* (holotype P, not seen).


**Type.** Various syntypes (from an annotation on *Schimper* 784).


**Type.** PALESTINE/ISRAEL, Engedi, *Dinsmore* and Usdum to Engedi, *Post herbarium* (syntypes BEI).


**Type.** IRAN, Bandar Abbas, *Parsa 568* (holotype K!).


**Type.** Based on *Ipomoea auricoma* A.Rich.


**Type.** Based on *Convolvulus glomeratus* var. *volubilis* C.B.Clarke
Type. EGYPT, Wadi Ise, Sa’ad 1398 (holotype CAIM, not seen).
Type. INDIA, Rajasthan, Jodhpur, Bhandari 363 (holotype JAC; isotype CAL).

Distinguishing features. Corolla 8–12 mm long; sepals usually < 10 m long; peduncles usually straight.

Distribution. A characteristic Saharo-Sindian species: Niger (Newby 62); Nigeria (Sharland 1679); Egypt (Khattab 6478, Danin s.n. [14/12/1968]); Sudan (Schweinfurth 2167); Eritrea: Doomairah Island (Courbon 385); Ethiopia (Friis et al. 10733); Djibouti (Aubert de la Rue s.n. [3/1938]); Somalia (Newbould 995); Socotra (Smith & Lavranos 724, Schweinfurth 387); Kenya (Luke 5447); Saudi Arabia (Zohrab 268); Yemen (Miller & Long 3316, Deflers 715, Smith & Lavranos 58); Oman (Radcliffe-Smith 5161); U.A.E (Heller 293); Palestine/Israel (Meyers & Dinsmore 1189, Davis 3806); Jordan (Abu Laila 38-2); Iran; Pakistan (Stocks 376, Lamond 792, Rechinger 28606); India (Santapau 16602, Shetty 2317).

urn:lsid:ipni.org:names:77147666-1

Diagnosis. A subsp. typo corolla 15–20 mm longa (non < 12 mm longa) et usque 2.5 cm diametro dignoscenda.

Type. OMAN, Dhofar, Cliff near Dalkut, McLeish 2813 (holotype E00132890!).

Distinguishing features. The key feature of this variety is the very large corolla 1.5–2 cm long when dry and up to 2.5 cm in diameter when living. The leaves are always relatively large, up to 4 × 2.5 cm, the peduncles long and commonly gently curved, reaching 7 cm in length, and the sepals may reach 12 mm. However, all characters apart from the corolla size can be matched in other populations of Convolvulus glomeratus and as the corolla size is hardly constant, varietal status seems appropriate.

Distribution. Oman (Dhofar): McLeish 697, 2248, 2415, 2661, 2814; Ash 126; Collenette 8347; Miller 2262, 2331, 2356; Miller & Whitcombe 2082.

Notes. There has been some uncertainty about the correct name for this species. Convolvulus glomeratus Thunb. is a nomen nudum so the combination C. auricomus is unnecessary. C. arabicus Hochst. & Steud. also appears to be a nomen nudum, so C. glomeratus remains the accepted name. Convolvulus zargarianus is a synonym of C. glomeratus. Although Sa’ad describes the ovary as velutinous and the style as hairy and shows this in her illustration, this is an error.
Figure 14, t. 1–7

**Type.** OMAN, Gallagher 6763/2 (holotype E00285430!).

**Description.** Low undershrub from a woody base reaching c. 30 cm; stems densely tomentellous with white, spreading hairs, becoming stiff and rather woody when old and said to form a candelabra-shaped plant. Leaves alternate below but mostly opposite upwards, subsessile, 5–13 × 2–5 mm, elliptic or oblong-elliptic, apex acute to rounded, margin entire, base cuneate to truncate, glandular and hirsute with short spreading hairs on both surfaces; petioles 0–1 mm. Flowers 1–2 in small sessile, axillary clusters near the branch tips; peduncles and pedicels absent or nearly so; bracteoles 6 × 2 mm, oblong, acute; outer sepals 7–8 × 1.8–2 mm, lanceolate, acute, green near apex but membranous below, sericeous; inner sepals narrower (1.5–1.8 mm wide) with membranous margin; corolla 11–13 mm long, pinkish or “pale blue”, midpetaline bands villous; ovary glabrous; style glabrous, divided c. 6 mm above base, stigmas short, clavate. Capsule glabrous, seeds minutely rugulose.

**Distribution.** Endemic to Oman (Miller 6492; Miller & Nyberg 9462, McLeish 3263; Hughes & Gallagher 7895/15, Popov 68/35, 68/46).

**Notes.** Very distinct because of the short clavate stigmas and small, tomentose leaves arranged oppositely towards the branch tips. Some plants have very reduced leaves giving the plant a somewhat different facies (e.g., Popov 68/23, BM) and have been confused with *C. hystrix*.

Figure 14: 13–20

**Type.** SOMALIA, Glover & Gilliland 686 (holotype K!; isotypes BM!, FHO!).

**Description.** Slender virgate unarmed shrub of fastigiate habit to 1 m high; young stems glabrous to thinly adpressed pubescent, bluish-grey, rigid and woody when mature. Leaves sessile, usually erect, 1.5–4 × 0.5 mm, linear to narrowly elliptic, acute, glabrous or minutely pubescent. Flowers 1–5 (- 8) in subaxillary, bracteate, silky villous heads; peduncles 0.5–3 mm long, bracteoles 3–7 × 1–2 mm, linear-lanceolate, acute, villous; outer sepals 7–9 × 1–1.5 mm, lanceolate to oblong-lanceolate, acuminate, villous, inner sepals 5–7 mm; corolla 10–12 mm long, pale blue, unlobed, midpetaline bands pilose; ovary glabrous; stigma narrowly elliptic. Capsule glabrous; seeds 1, glabrous, smooth. [Thulin 2006: 235]

**Distribution.** Northern Somalia (Gillett & Watson 23869); Yemen: Hadramaut (Raub & Lavranos 13262, Thulin et al. 8067, 8207, Miller et al. 8142). Coastal desert.

**Notes.** The type collection virtually lacks leaves. The Somalia plants and *Miller et al.* 8142 from Yemen have glabrous stems whereas the stems are thinly adpressed-pubescent in the other Yemen collections.

**Type.** Based on *Convolvulus spinosus* Forssk., non *Convolvulus spinosus* Burm.f.

**Description.** Subshrub, much branched with entangled spinescent branchlets to 1 (-2) m, vegetative parts glabrous, sericeous, pubescent or densely pilose. Leaves subsessile, 4–10 (-15) × 1–3 (-5) mm, narrowly oblanceolate, elliptic or ovate, acute, base broadly cuneate, truncate to auriculate, margin entire. Flowers 1–6 in subsessile, elliptic to suborbicular axillary clusters; peduncles absent; bracteoles 3–7 × 2–5 mm, narrowly elliptic to obovate; pedicels 0–1 mm; outer sepals 7–9 × 6–8 mm, broadly ovate or elliptic, acuminate, wider than inner ones; corolla 0.8–1.4 cm long, pale to dark violet, weakly lobed, midpetaline bands pubescent, brown; ovary glabrous; style glabrous, divided 6–7 mm above base, arms unequal c. 1–1.5 mm, stigmas short and narrowly elliptic, c. 1 mm. Capsule glabrous; seeds glabrous.

**Notes.** Within Arabia and along the Red Sea this species is reasonably constant although there is variation in whether hairs are appressed or spreading and in the number of flowers in each head, but much of this variation seems random geographically. In Somalia variation is much greater and three subspecies are here recognised:

104a. *Convolvulus hystrix* subsp. *hystrix*

Figure 13, t. 26–34


Type. YEMEN, Bait al Faqih, Forsskål (holotype C, isotype BM000049217).


Type. EGYPT, Red Sea, Delile s.n. (holotype MPU; isotype P!).


Type. OMAN, Dhofar, Miller & Nyburg 9288 (holotype E; isotype K!).

**Distinguishing features.** Plant spiny with numerous short spine-like lateral branchlets arising on the main spinescent branches. Stems and leaves pubescent to pilose. Flowers in clusters of up to 6 forming a suborbicular head; bracteoles obovate, about as broad as long, corolla 1.2–1.4 cm long. Sa’ad 1967: 75; Collenette 1999: 229 (photo); Boulos 2000: 331.

**Distribution.** Red Sea coastal regions of Egypt (Boulos & Tackholm s.n. [12/3/1965]), Sinai (Danin s.n. [27/3/1971]), Sudan (Scheuwingbruch 2151), Eritrea (Bally 6913), Djibouti, Somalia (Gillett 4735, Collenette 38), Saudi Arabia (Kercher 44, Zohrab 5) and Yemen (Wood Y/75/2); also in the Hadramaut region of Yemen (Woodford 31, Thulin et al. 9559) and the Dhofar region of Oman (Miller & Whitcomb 2050, Miller & Nyberg 9288).

**Note.** The type of subsp. *dhofaricus* (Miller & Nyberg 9288) is an exceptionally villous specimen but there exist many intermediate specimens with more typical *C.*
hystrix and we do not think this taxon merits recognition. There are also plants with strikingly sericeous stems and leaves in Dhofar (Miller 6326a).


Type. ETHIOPIA, Ogaden, *Riva* 297 (holotype FT!).

**Type.** Based on *Convolvulus ruspolii* Dammer ex Hall f.

**Distinguishing features** Similar to subsp. *hystrix* in armature but the spine-like side branches rather slender. Stems glabrous to shortly pubescent. Leaves 5–11 × 1–2 mm, oblong or lanceolate to elliptic, glabrous to puberulent or sericeous. Flowers usually solitary, sometimes in pairs forming a narrowly oblong-lanceolate head twice as long as broad; bracteoles 3–3.5 × 1–1.5 mm, oblong, oblanceolate or obovate, longer than broad; corolla 0.8–1 cm long. [Sebsebe 2006: 182]

**Distribution.** Ogaden region of Ethiopia (Hemming 1530) and Somalia (Popov 1008; Glover & Gilliland 636; Thulin & Warfa 5562; Bally 10164).

**Notes.** Some specimens from Somalia (Gillett, Hemming & Watson 21885, Bally & Melville 16271, Thulin & Warfa 5562, Kasmi et al. 850) have ellipsoid flower clusters with 2–4 flowers and are intermediate with subsp. *hystrix* and suggestive of hybrid origin.


Type. SOMALIA, Nogol, *Puccioni & Stefanini* 942 (holotype FT!).

**Type.** Based on *Convolvulus hystrix* forma *inermis* Chiov.

**Distinguishing features** Plant virtually unarmed, the side branches long, relatively slender, spinescent when old, short lateral branchlets absent or, when present, neither rigid nor spine-like. Indumentum and flower heads similar to subsp. *hystrix*.

**Distribution.** Bari and Nogol regions of NE Somalia (Hansen & Heemstra 6297, Becket 687, Nugent 33, Hemming 1866).

**Notes.** Occasional specimens intermediate with subspecies *hystrix* are known from the same region (Lavrasos & Carter 24645, Bally & Melville 15450).

Two other specimens from NE Somalia (Beckett 42, Thulin *et al.* 9488) are close to both *Convolvulus hystrix* subsp. *inermis* and *C. scopulatus*. They are similar in habit to both species but the stems and leaves are sericeous, the leaves oblong-lanceolate and
the bracteoles similar to the leaves but acuminate to a fine point. They may represent an undescribed species or a form of *C. hystrix* or *C. scopulatus*.


_Type._ *SOCOTRA, Balfour et al. 73* (lectotype K, designated by Sebsebe Demissew in Sebsebe et al. 2009: 230); _isolectotypes_ BM, E, OXF).

**Type.** Based on *Breweria fastigiata* Balf.f.

**Description.** Fastigiate undershrub reaching 60 cm in height but more in width, silvery-sericeous when young with most hairs appressed but some spreading, glabrescent and becoming brown when old; branches rigid but not spinescent. Leaves sessile, 2–6 × 0.5–1 (-2) mm, linear-lanceolate, acute, entire, cuneate at the base, sericeous. Flowers solitary, axillary, sessile; bracts resembling small leaves; bracteoles 1.5 × 0.5 mm, ovate, acute; sepals 5–7 × 2–3 mm, ovate to elliptic, concave, the apex acute, bent outwards, pubescent; corolla 5.5–7 mm long, white, midpetaline bands pilose; filaments glandular below; ovary glabrous; style glabrous, divided 3–4 mm above base, arms somewhat unequal 0.5–1 mm long, stigmas 0.5 mm, obovoid. Capsule 1-seeded, glabrous, seeds smooth, glabrous.

**Distribution.** Endemic to Socotra (*Thulin & Gifri 8954, Popov 50/111, Smith & Lavranos 101*).


_Type._ Based on *Breweria spinosa* Vierh.

**Type.** Based on *Breweria spinosa* Vierh.

**Description.** Undershrub to 60 cm, branches fastigiate, sharply spinescent, sericeous when young but later glabrescent. Leaves subsessile, 4–12 × 1–1.5 mm, acute, entire, cuneate at the base, silvery pubescent. Flowers solitary, axillary, subsessile; peduncles
absent; bracteoles 2–3 × 0.5 mm, oblong, acute; pedicels c. 1 mm; outer sepals 6 × 3 mm, ovate to elliptic, acute, pubescent on the margins; inner sepals c. 4 mm wide, subrhom-loyd with hyaline margins; corolla 10–11 mm long, white, midpetaline bands pubescent; filaments glandular basally; ovary glabrous, style glabrous, divided c. 8 mm above base; style arms 0 and 0.5 mm, unequal, stigmas subglobose. Capsule and seeds not known.

**Distribution.** Endemic to Abd al Kuri Island in the Socotra group (*Smith & Lavranos* 645, *Miller* 11444).


**Type.** *SOCOTRA*, Semha Island, *Miller* 11461A (holotype E, not seen).

**Description.** Grey undershrub to 50 cm, branches straight and rigid, densely grey canescent when young, becoming more sparsely hirsute with age and reddish-brown in colour. Leaves shortly petiolate, 2.5–8 × 0.5–1.5 mm, narrowly lanceolate, cuneate at base, densely grey-sericeous; petioles 0.5–1 mm. Flowers solitary, axillary, subsessile; peduncle absent; bracteoles 4–5 × 1.5 mm, narrowly oblong-elliptic, densely pilose; pedicels 0.5 mm; outer sepals 6–6.5 × 1.5 mm, oblong, acuminate; inner sepals shorter, scarious; corolla 7–8.5 mm long, white faintly flushed pink, midpetaline bands long-sericeous to base; filaments glandular at base; ovary pilose; style divided 4 mm above base, stigmas 0.75 mm, obovoid. Capsule pilose at apex; seeds glabrous.

**Distribution.** Endemic to Semha Island in the Socotra islands of Yemen.

**Notes.** *Miller* 12511, the only specimen we have seen of this species, has a glabrous ovary and style. The sepals are shorter and narrower than in *C. kossmatii* but the differences are not very great. These two species are very close and may prove to be conspecific.

Species 108–131. Mostly Middle Eastern species with a fastigiate habit

All species in this group (Clade I of Figure 1) belong to the second major clade within *Convolvulus*, in which the leaves are not distinctly petiolate. Most are more or less fastigiate in form with stiff woody branches, which are not spiny in character (although *C. erinaceus* is sometimes interpreted as spiny) but there are important exceptions. *C. verdcourtianus* (not sampled) and *C. trabutianus* are spiny undershrubs while *C. rottlerianus*, *C. prostratus*, *C. pilosellifolius*, *C. grantii* and, often, *C. sarmentosus* are herbaceous. *Convolvulus rottlerianus* is unique in being annual.

**Type.** SOMALIA, Bally & Melville 15583 (holotype K).

**Description.** Spiny undershrub, appressed pubescent/strigose in its vegetative parts, branches spinescent; sterile spines also present. Leaves sessile, 10–35 × 1–2.5 mm, linear to narrowly lanceolate, obtuse, cuneate at the base. Flowers borne on usually paired spinescent side branches 1.5–3 cm long, the individual flowers solitary or paired arising in the axils of minute bracteoles; bracteoles 0.5 × 0.3 mm, oblong, caducous; pedicels 1–2 mm long; outer sepals 3–4.5 × 1.5–2 mm, oblong to lanceolate, apex obtuse and apiculate; corolla 8–11 mm long, white, sometimes flushed pink or pale blue, very shallowly lobed, midpetaline bands pubescent; ovary glabrous; style glabrous, divided 1.5–3.5 mm above base; stigmas 3.5–4.5 mm, linear. Capsule glabrous; seeds shortly pubescent, smooth.

**Distribution.** Endemic to northern Somalia (Becket 736).

**Notes.** Superficially rather similar to *C. hystrix* but distinguished by the tiny bracteoles, cuneate-based leaves and pubescent seeds. Perhaps more significant are the long, linear stigmas, which contrast strongly with the short, narrowly elliptic stigmas of *C. hystrix*.


Figure 15, t. 1–7


**Type.** MOROCCO, Ifni, Caballero s.n. (lectotype MA, designated by Sa’ad 1967: 71).

**Type.** ALGERIA, Oran, Diels s.n. (holotype B†).

**Description.** Intricate, nearly leafless, spiny undershrub to 50 cm, stems and branches spinescent, branches arising at right angles, stems and vegetative parts glabrous to strongly adpressed pubescent. Leaves alternate on younger shoots but commonly clustered on very short thick brachyblasts on older shoots, sessile, 0.4–2.2 × 0.1–0.4 cm, oblanceolate, obtuse, entire, attenuate at the base. Flowers solitary (very rarely paired), axillary but sometimes appearing to be in clusters on brachyblasts from which the leaves have fallen; peduncles 0–6 mm, woody, persistent and spinescent; bracteoles c. 1 mm long, scale-like; pedicels 1–3.5 mm, commonly recurved; calyx somewhat globose, sepals similar, 4–5 × 2.5–3 mm, elliptic, rounded and minutely mucronulate, pubescent; corolla 1.4–1.6 cm, white, very shallowly lobed, midpetaline bands pilose, pink; ovary very sparsely pilose; style sparsely pilose below, divided 5 mm above base, stigmas 4–6 mm, somewhat unequal. Capsule and seeds not seen. [Sa’ad 1967: 71 p. p.]
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Figure 15. 1–7 *C. trabutianus* 1 leaf 2 bracteole 3 outer sepal 4 middle sepal 5 inner sepal 6 stamen 7 ovary and style. From Raymond 32 (RAB) 8–16 *C. rottleri*an us subsp. *rottleri*an us 8 leaf 9 bracteole 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen 14 ovary and style 15 capsule 16 seed. From Wight s.n. (OXF) 17–25 *C. pilosellifolius* 17 leaves 18 bracteole 19 outer sepal 20 middle sepal 21 inner sepal 22 stamen 23 capsule 24 seed 17 from Bornmüller 1530 (STU) 18–23 from Bornmüller 1531 (W) 24–25 from Sintenis 516 (B) 26–34 *C. prostratus* 26 leaves 27 bracteole 28 outer sepal 29 middle sepal 30 inner sepal 31 stamen 32 capsule 33 seed 26–32 from Sieber s.n. (L) 33–34 from Letourneaux 280 (W) 35–43 *C. chondrilloides* 35 leaves 36 bract 37 outer sepal 38 middle sepal 39 inner sepal 40 stamen 41 ovary and style 42 capsule 43 seed 35–41 from Bornmüller 7640 (W) 42–43 from Schmid 6469 (W) 44–51 *C. sarmentosus* 44 leaf 45 bract 46 outer sepal 47 inner sepal 48 stamen 49 ovary and style 50 capsule 51 seeds. From Miller et al. 10221 (K).
Distribution. Restricted to the Maghreb of northwestern Africa: Mauritania (Chevalier s.n., Monod 19597); Morocco (Lewalle 9758, Jury et al. 14457, 19615, 20738, Jehandiez 156, Davis 48684, Allorge s.n. [17/4/1913], Podlech 49240); Algeria (Humbert s.n. [4/1924]).

Notes, A rather variable plant, sometimes glabrous, sometimes densely adpressed pubescent so approaching *C. caput-medusae* in this respect; flowers can be solitary and pedunculate (e.g. Davis 48684), when the spine-like peduncles persist, but may also develop in apparent pedicellate clusters on virgate brachyblasts. These differences merit further study.

Sa’ad (1967) treated *C. trabutianus* under *C. caput-medusae* (it is *C. trabutianus* that is illustrated under the name *C. caput-medusae*) but the two plants are distinct. *C. caput-medusae* is always white-sericeous, only the branches are spinescent, the flowers are more or less sessile and only 8–10 mm long, amongst many differences.


Type. INDIA, Rottler s.n. in Wallich 6669 (lectotype G-DC!, designated here; isolecotype K-W!).

Description. Annual herb from a thin tap root, commonly branched at base with erect or ascending stems, 10–45 cm high, vegetative parts adpressed pilose, occasionally with some stiff spreading hairs. Leaves mostly on lower part of stem, sessile, 1.5–3.5 (-7.5) × 0.2–0.6 (-1) cm, lanceolate, oblong or narrowly oblong-lanceolate, mucronate, entire, gradually narrowed to a pseudopetiolate base. Flowers 1–3 in axillary pedunculate cymes; peduncles 1–5 cm, ascending; bracteoles 2–5 × 0.5 mm, fiiform to linear-lanceolate; pedicels 2–5 mm; outer sepals 4–6 × 2–2.5 mm, ovate to elliptic, acuminate and mucronate, glabrous or adpressed pilose; inner sepals slightly smaller, glabrous; corolla 0.7–1.2 cm long, pink, distinctly lobed, midpetaline bands pilose; ovary glabrous; style glabrous, divided 2–4 mm above base, stigmas 3 mm long. Capsule glabrous; seeds pubescent with patches of adpressed hairs.

Notes. We recognise two subspecies:

110a. *Convolvulus rottlerianus* subsp. *rottlerianus*

Figure 15, t. 8–16


Type. Ethiopia, Gilbert et al. 8290 (holotype ETH; isotype K!).

Distinguishing features. Outer sepals adpressed pilose. [Austin and Ghazanfar 1979: 27, 25 (plate)]

Distribution. India, (Rottler s.n. [18/11/1795], Perroet 888, Wight 2234, 2293, Talbot 2177, Deane 107, Beddome 5608/9), Pakistan, Ethiopia (Corrá 8, Friis et al. 3688).
Notes. *Convolvulus rottleri*

鞍us has only recently been found in Ethiopia and is unknown in Iran and Arabia. Ethiopian material was described as a separate species, *C. gilbertii*, probably because the possibility of the occurrence of an Indian species was not considered. No difference between specimens from the two areas can be discerned. Little is known about the habitat of this subspecies in India but it is found in drier areas. In Ethiopia it is a rare plant of Acacia bushland.


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Type. PAKISTAN, Balochistan, Stocks s.n. (K!).


Type. Based on *Convolvulus tenellus* Stocks


Type. Based on *Convolvulus tenellus* Stocks

Distinguishing features. Outer sepals glabrous.


111. *Convolvulus prostratus* Forssk., Fl. Agypt.-Arab. 203. 1775. (Forsslåk 1775: 203). Figure 15, t. 26–34.


Type. INDIA, Heyne s.n. (B†).


Type. Based on *Ipomoea microphylla* Roth ex Schult.


Type. EGYPT, Sieber s.n. (holotype LE; isotypes E!, K!, L).

*Evolvulus pilosus* Roxb., Fl. Ind. (Carey & Wallich ed.) 2: 106. 1832. (Roxburgh 1832: 106).

Type. INDIA, plant cultivated in Calcutta Botanic Garden (whereabouts unknown).


Type. INDIA, “montes Hindostania meridionalis 1825”, *Wallich* 1316 (lectotype G 00135972!, sheet annotated “Convolvulus pluricaulis Ch.”, designated here).
Type. IRAN, Makran, *Aucher-Eloy* 4953 (holotype G; isotypes K!, BM!).

Type. PAKISTAN, Sind, *Stocks* (holotype ?G, possible isotypes K!).

Type. Based on *Convolvulus scindicus* Boiss.

Type. Based on *Convolvulus scindicus* Boiss.

Type. INDIA, Falconer s.n. (lectotype K, sheet labelled “Evolvulus alsinoides var. and annotated *Convolvulus pluricaulis var. macra*” in Clarke’s handwriting, designated here).

Type. SAUDI ARABIA, Jeddah, *Schimper* 783 (syntypes BM 000049019!, GOET, HAL, HBG, K!, L, OXF!, P!, STU, W!).

Type. Central Sahara (ALGERIA?), *Mauod* 312 (holotype AL?; isotype P00417710!).

Type. Western Sahara, *Lutherear* s.n. (holotype ?AL; isotypes MPU006233!, P00434263!).

Type. Based on *Convolvulus heterotrichus* Maire

Type. EGYPT, *Abdallah* s.n. (holotype U; isotypes CAI, CAIM, K!, WAG).

Type. EGYPT, *Abdallah* 1646 (holotype U; isotype CAIM, WAG).

**Convolvulus microphyllus var. macra** (C.B.Clarke) S.K.Sharma & Tiagi, Fl. N. E. Rajasthan 262 (Sharma and Tiagi 1979: 262).
Type. Based on *Convolvulus pluricaulis var. macra* C.B.Clarke

Type. Based on *Convolvulus deserti* Hochst. & Steud.
**Type.** YEMEN, Mor, Forrskål s.n. (lectotype C, designated by Sa’ad 1967: 192).

**Description.** Very variable perennial herb with ascending or prostrate stems up to 70 cm long, vegetative parts thinly to densely pubescent or villous, stems often somewhat rigid and woody when old. Leaves subsessile, 0.8–3 × 0.2–0.6 cm, oblong, linear, lanceolate, narrowly lanceolate or oblanceolate, acute or obtuse, margin entire, cuneate, the lowermost tapered at the base. Flowers 1–3 (-11) in sessile or pedunculate bracteate clusters, these occasionally rather lax with individual flowers clearly separate; bracts leaf-like, exceeding, equalling or shorter than the flowers; peduncles 0–5 (-10) cm long; bracteoles 3–7 × 1–2 mm, filiform, linear to lanceolate or narrowly oblong, sometimes caducous; pedicels 0–3 (-6) mm long; outer sepals 4–8 × 1.5–6 mm, lanceolate to ovate, acuminate, green in the upper half, paler in the lower half; inner sepals caudate; corolla (6-)10–15 mm long, white or pale pink, unlobed, midpetaline bands pilose; ovary glabrous; style glabrous, divided 3–4 mm above the base, stigmas c. 4 mm. Capsule glabrous, seeds smooth, pubescent. [Sa’ad 1967: 192; Nowroozi 2002: 105 (map); Collenette 1999: 230 photo]; Austin and Ghazanfar 1979: 23, 21 (plate); Jongbloed 2003: 314 (photo)]

**Distribution.** A characteristic Saharo-Sindian species, apparently absent from Palestine/Israel, Syria, most of Iraq and countries north of Iran: Cape Verde Islands (Lobin 1986: 155); Senegal (Raynall 5778); Mauritania (Monod 18317, Adam 19415-2); Niger (Popov 41, Monod 13855); Chad; Algeria (Monod 312); Sudan (Kotschy 354, Schweinfurth 2149); Libya (fide Greuter et al. 1986); Egypt (Letourneaux 2802, Schweinfurth 138); Djibouti (Mosnier 718); Somalia (Thulin & Warfa 5800); Saudi Arabia (Trott 1458, Zohrab 107, Collenette 2418, 7887); Qatar (Mandaville 4109); Oman (Lawton 2052, Mandaville 7329); UAE (Borosova et al. 107); Yemen (Deflers 34, Lunt 158); Iraq (Rechinger 9353); Iran (Furlonge 15, Aucier-Eloy 1234); Afghanistan (Griffith 681); Pakistan (Lace 3397, Popov 63/413); India (Popov 63/380).

**Notes.** Convolvulus prostratus is easily confused with *C. pilosellifolius* particularly in the Arabian peninsular. It is best distinguished by the lanceolate to ovate outer sepals which taper to an acuminate apex. In contrast, in *C. pilosellifolius* the outer sepals are oblong-oblanceolate, widest above the middle, and merely acute. Records of *C. pilosellifolius* from Yemen and much of the Persian/Arabian Gulf are probably errors for *C. prostratus*.

**Convolvulus prostratus** is a polymorphic species and the extremes can look very different. Variation is particularly complex in the Arabian peninsula. At least some of the variation is explained by response to rainfall (Wood 1997: 233–234) but some of it is geographically related. The following are among the more distinct forms but it should be emphasised that all kinds of intermediates occur.

In the types of *C. prostratus* and *C. microphyllus* the flower clusters are compact, 1–3-flowered, subsessile or at most shortly pedunculate. The flower clusters appear...
lanceolate in form and relatively small. This is the common form in Africa, where other forms are rare or absent. Similar forms occur across Arabia to India.

In India, Pakistan and Afghanistan plants similar to (i) occur commonly but a second form corresponding to the type of *C. pluricaulis* is also frequent. This differs in the presence of prominent, narrowly oblong to oblongate bracts reaching to the apex of the stem thus resembling a perennial form of *C. rottleriannus*. These forms are virtually restricted to the Indian subcontinent but occur very rarely elsewhere, such as *Heudelot* 403 from Senegal. Examples include *Haines* 3412, *Thomson* 72, *Clarke* 28110 and *Mooney* 2025 from India, *Duthie* 7177, *Stewart* 7037, *Drummond* 14701 and *Popov* 63/413 from Pakistan and *Griffith* 681 from Afghanistan.

In Arabia and rather rarely elsewhere there occur plants which accord with the types of *C. austroaegyptiacus* and *C. cancerianus*. These are usually vigorous plants with stout, somewhat woody stems, the hairs spreading on the leaves and stems and the inflorescence rather lax so individual flowers are visible as in *C. pilosellifolius*. In some examples the flowers are very numerous, up to at least 10. Examples include *Collenette* 909 and *Chaudhary* 6696 from Saudi Arabia, *Willcox* 216, *Lumley* 50 and *Borosova et al.* 138 from U.A.E., *Lawton* 2390 from Oman and *Wood* 3427 and *Thulin et al.* 8303 from Yemen. These forms are rare elsewhere but occur in Egypt and Iran (*Wright & Bent* 503-103).

Occasional plants with spinescent branches occur. These appear to be restricted to Arabia and include *Boulos* 10931 from Qatar and *Collenette* 4143 from Saudi Arabia.

Plants with very woody stems which could be treated as shrubs occur occasionally, particularly in Oman. Good examples are *Miller & Whitcombe* 2031 & 2049 from Oman, but *Collenette* 9077 & 9150 from Saudi Arabia and *York & El-Keblawy* 55 from UAE are also distinctly woody.

Dwarf forms with very small leaves occur on Bahrain (*Naguib* 72, *Fernandez* 373, *Good* 196, *Cornes* 304) and Farasan Island in the Red Sea (*Collenette* 8993). These may be the result of arid conditions or salt spray and may constitute an ecotype similar to var. *pumilus* of *C. oleifolius*.

There is much variation in the number of flowers in each cluster but occasional plants occur where the flowers are solitary. Examples include *Schweinfurth* 2150 from Egypt, *Trott* 225 from Saudi Arabia and *Borosova* 107 from U.A.E.

No attempt has been made here to give formal names to any of this variation but it is very clear that the *C. prostratus* complex merits much more detailed study.


**Type.** “Levant”, *Vaillant & Tournefort* (holotype P-Juss!).

**Description.** Perennial herb with a woody taproot, stems decumbent or ascending to 70 cm, plant usually thinly adpressed pubescent but sometimes villous. Lower leaves with petioles to 5 cm, narrowly oblanceolate, obtuse, stem leaves sessile, 1.5–9 × 2–1.5 cm, linear, lanceolate or oblong, acute, margin entire or wavy, attenuate at base.
Flowers pedunculate, sometimes solitary but mostly clearly separated and arranged in somewhat congested, pedunculate monochasial or diachasial cymes; peduncles (1-) 3–5 (-10) cm. much exceeding the subtending bracts; bracteoles 3–6 × 1–2 mm, linear or narrowly oblong; pedicels 1.5–6 mm; sepals with green herbaceous acute, upper part, outer sepals 5–8 × 3–5 mm, oblong-ob lanceolate, acute, inner sepals ovate, caudate, corolla 10–15 mm, pink or white, unlobed (or, rarely, divided to base), midpetaline bands pubescent; ovary and style glabrous; style divided 3–4 mm above base, stigmas c. 4 mm; capsule glabrous, seeds smooth, shortly pubescent. [Feinbrun-Dothan 1978: plate 61; Nowroozi 2002: 79 (plate), 105 (map); Jongbloed 2003: 313 (photo); Col lenette 1999: 230 (photo); Austin and Ghazanfar 1979: 22]

**Notes.** We recognise two varieties of this species:

112a. *Convolvulus piloselloides* var. *piloselloides*  
Figure 15, t. 17–25


  Type. UZBEKISTAN, Bukhara, **Lehmann** s.n. (holotype LE!; isotype P!).

  Type. IRAN, Bushehr, **Haussknecht** s.n. (holotype G; isotypes BM001014570!, P03551021!, W!).

  Type. Based on **Haussknecht** s.n.

  Type. IRAN, Bandar Abbas, **Bornmüller** 468 (holotype B†; isotype K!).

  Type. TURKEY, Gazıntep, **Haussknecht** s.n. (holotype P).

  Type. IRAN, Sistan Depression, **de Marco** 75044 (holotype URT!).

  Type. SAUDI ARABIA, Jiddah, **Collenette** 6961 (holotype RIY; isotypes E!, K!).

**Distinguishing features.** Leaves lanceolate or oblong, at least 2 cm wide. Inflorescence usually of several flowers.

**Distribution.** Middle East and Central Asia but apparently absent from the Indian subcontinent and Africa, apart from Egypt and Libya; in Arabia rare and absent from
the south: Libya (Guichard Lib/356); Egypt (Simpson 6073); Jordan (Townsend 65/389, Trought 21/5/1952); Palestine/Israel (Meyers & Dinsmore 3632); Syria (Haradjian 3433); Turkey; Iraq (Barklay et al. 5055, Guest 2475, Rustam 3492); Kuwait (Boulos 16221, Rawi et al. 10774); U.A.E. (Western 551); Saudi Arabia (Collenette 2521, 4443); Iran (Haussknecht s.n. [5/1867], Rechinger 4118, Davis & Bokhari 56081); Azerbaijan (Grossheim & Schiskin 315); Uzbekistan (Androssow s.n. [27/6/1901], Vvedensky 443 in Herb. Fl. As. Med); Turkmenistan (Litwinow 1644, Nevski 300), Kirgizstan (Lazkov s.n.); Tajikistan (Korshinsky 3299); Kazakhstan (Litvinov s.n. [23/5/1899]); Afghanistan (Griffith 680, Koie 2884); Pakistan: Balochistan (Ghafoor & Goodman 5076).

Notes. Convolvulus chaudharyi is a form with the corolla lobes divided nearly to the base.


Type. IRAN, Bushehr, Koie 268 (holotype B).

Distinguishing features. This is a delicate form with linear-lanceolate leaves to 2 cm wide and mostly solitary flowers.

Distribution. The occasional specimen of this variety occurs throughout most of the range of Convolvulus pilosellifolius but especially around the Arabian/Persian Gulf, such as Good 193 from Bahrain.

Notes. Convolvulus pilosellifolius can be confused with Convolvulus cantabrica, especially forms of that species previously assigned to Convolvulus linearis, but differs in the shorter corolla (to 15 mm) and glabrous ovary and capsule.


Figure 15, t. 35–43

Type. IRAN, Aucher-Eloy 4941 (lectotype G, designated by Sa’ad 1967: 87); isolecrototypes P!, W!).

Description. Erect perennial undershrub with a woody base and glabrous, herba-
aceous branches to at least 1 m, nearly leafless above. Leaves sessile, somewhat dimor-
phic, basal leaves 2–3.5 × 0.5–1 cm, spatulate to oblanceolate with a long petiole-like
base; stem leaves 2.5–3 × 0.2–2 cm, linear to lanceolate, acute, entire, base cuneate.
Flowers in a large, nearly leafless, branched terminal inflorescence composed of axil-
ary cymes of 1–6-flowered cymes, the flowers irregularly grouped; ultimate branches
rather slender, not rigid; bracts 7 × 1 mm, linear, bracteoles minute; pedicels 0–10
mm, densely pubescent; sepals 2–4 × 1.5–4 mm, ovate to suborbicular, mucronulate,
pubescent, the inner sepals broader, scarious; corolla 1.3 cm long, white, midpetaline
bands pilose; ovary pilose; style glabrous, divided c. 3 mm above base; stigmas 3 mm.
Capsule pubescent at apex, 1-seeded; seeds glabrous, black, smooth. Sa’ad 1967: 87; Nowroozi 2002: 55 (plate), 102 (map).

**Notes.** We recognise two varieties of which only var. *chondrilloides* is common:

113a. *Convolvulus chondrilloides* var. *chondrilloides*


Type. IRAQ, Baghdad, *Aucher-Eloy* 1410 (holotype G-DC).


Type. IRAN, Karaj, *Gauba* 1624 (holotype B†).

**Distinguishing features.** Sepals pubescent.


Type. IRAN, Tehran, *Koelz* 16059 (holotype W†).

**Distinguishing features.** Distinguished by the glabrous sepals

**Distribution.** Apparently very rare and reported only from Iran.


Figure 14, t. 21–28


Type. SOMALIA, *Hildebrandt* 885 (holotype B†; isotype BM†).


Type. SOMALIA, *Revoil* s.n. (P, not seen)

Type. YEMEN, Aden, *Hooker & Thomson* s.n. (holotype K†).

**Description.** Slender, erect branched shrub 0.5–3 m high, vegetative parts characteristically sericeous to strigose. Leaves subsessile, 4–13(-40) × 1–5 (-10) mm, filiform, oblong to obovate, acute. Inflorescence with the appearance of long narrow branched racemes; flowers in dichasial cymes commonly reduced to clusters of 1 –2(-3), arising from the axils of linear bracts; peduncles 0–3.5 cm long; bracteoles linear 1–5 mm
long; pedicels 2–3 mm long; outer sepals 2.5–3.5 × 1.5–2 mm, ovate, acute, glabrous to sericeous; corolla 6–10 mm long, white, weakly lobed, midpetaline bands strigose, red; ovary glabrous, style glabrous, divided 3 mm above base, stigmas 1 mm. Capsule glabrous; seeds pubescent. [Thulin 2006: 233]

**Distribution.** Yemen: south (Schweinfurth 99, Deflers 32); Somalia: north (Gillett 4490, Revoil 75).

**Notes.** Specimens collected after good rainfall have a rather different morphology with well-developed, obovate lower leaves, Waring 57 being a good example.


**Type.** SOCOTRA, Abd al Kuri Island, Ogilvie-Grant exp. 13, 45, 46 & 50 (syntypes E!, LIV).

**Description.** Herb with thickened woody taproot and a basal rosette; stems ascending to c. 30 cm, vegetative parts sericeous and with some spreading hairs. Leaves petiolate, dimorphic; rosette leaves 3.5–4.5 × 0.7–1.4 cm. obovate to oblanceolate-spathulate, obtuse to acute, margin entire to undulate, base attenuate onto the petiole; stem leaves 0.3–1.5(-3) × 0.2–1 cm, acute, oblanceolate, oblong or elliptic, margin deeply sinuate, base attenuate; petioles 2–5 mm long. Flowers solitary, pedunculate; peduncles c. 3 mm long; bracteoles 2 × 0.75 mm, linear; pedicels c. 3.5 mm long; outer sepals 4–4.5 × 2–2.5 cm, ovate, acute or shortly acuminate; corolla 10–12 mm long, white or pinkish, lobed with broadly triangular lobes, midpetaline bands pilose; ovary glabrous; style glabrous, divided c. 2.5–3 mm above base; stigmas 4 mm long. Capsule glabrous; seeds glabrous. [Miller and Morris 2004: 517]

**Distribution.** Endemic to Abd al Kuri Island in the Socotra archipelago (Paulay 1899, Smith & Lavranos 660; Miller et al. 19032).

**Notes.** Very distinct because of the rosette habit and small, sinuately-lobed stem leaves. The corolla is slightly larger than in *C. sarmentosus* and *C. hildebrandtii*. It is the most herbaceous of the three species.

Miller and Morris (2004: 517) suggest that this species is an annual but this seems to be an error.


**Type.** SOCOTRA, Balfour et al. 302 (holotype K!; isotype OXF!).

**Description.** Perennial herb with numerous decumbent stems to 30 cm long, vegetative parts densely greyish strigose-pubescent when young but indumentum much sparser on older parts. Leaves forming a somewhat persistent basal rosette, sessile, 0.8–2.5 × 0.2–0.8 cm, obovate to oblanceolate, apex obtuse, margin entire, at base attenuate into a pseudopetiole, densely silvery strigose; stem leaves narrower upwards
and merging with bracts, thinly strigose. Inflorescence a raceme-like thyrsus formed of single-flowered cymes; peduncles 2–10(-16) mm long; bracteoles 1–3 mm long, filiform to narrowly elliptic; pedicels 3–5 mm long; outer sepals 2.5–4 × 1.5–2 mm, ovate, acute, green with scarious margin; corolla (7-)9–11 mm long, white, unlobed, midpetaline bands strigose; ovary glabrous; style white, glabrous, divided c. 2 mm above base, stigmas 2.5 mm, red. [Miller and Morris 2004: 517]

**Distribution.** Yemen: Socotra ([Miller et al.](10221, 10191, 19107) and Hadramaut ([Thulin & Gifri](8652); [Thulin et al.](8196)).

**Notes.** The sericeous basal leaves separate *C. sarmentosus* from *C. hildebrandtii* and the entire leaf margin from *C. grantii*. Mature specimens without basal parts can be confused with *C. hildebrandtii* but the stems are herbaceous and “leafy,” the bracts oblance-oblanceolate, rather than linear.


**Type.** SOCOTRA, Balfour et al. 238 (lectotype K!, designated here).

**Type.** SOMALIA, Wodderi, Hildebrandt 884 (holotype B†; isotype BM001050393!).

**Description.** Perennial herb, base woody, stems erect, to 70 cm, more or less herbaceous to somewhat woody and fastigiate, pilose below with hairs up to 3 mm long, becoming strigose upwards, glabrescent when old and woody. Leaves crowded towards the base of the stem, diminishing in size upwards, 1–4 × 0.2–0.4 cm, oblanceolate, acute, gradually narrowed into a long petiole-like base, long-pilose, often absent; stem leaves 1–2.8 × 0.1–0.2 cm, diminishing in size upwards, all linear to very narrowly linear-oblanceolate, apparently caducous. Inflorescence a large, lax terminal thyrsus up to 30 cm long, formed of dichasial cymes bearing up to 3 flowers each but commonly reduced to single flowers; bracts on main axis 5–7 mm, linear; peduncles 0.6–6 cm long, becoming shorter on the secondary and tertiary flowers, often single-flowered; bracteoles 1 mm, linear; pedicels 2–4 mm long; outer sepals 2.5–3.5 × 1.5 mm, ovate, acuminate, somewhat scarious but with green midrib, inner sepals narrower, strigose; corolla 8–8.5 mm long, white, weakly lobed, midpetaline bands strigose; ovary 2 mm long, glabrous ([Hildebrandt](884, Balfour et al. 116 or thinly pilose ([Miller et al.](19120); style glabrous, divided c. 2 mm above base; stigmas c. 3 mm. Capsule glabrous or with a few apical hairs; seeds glabrous to pubescent. [Miller and Morris 2004: 517; Thulin 2006: 234]

**Distribution.** Somalia (type only); Socotra ([Balfour et al.](116, Gwynne 19, Thulin & Gifri 8814 & 8516, Miller et al. 10181 & 19120).

**Notes.** The capsule is only 2.5 mm wide, not 5 mm as described by Thulin (2006).

We agree with Vierhapper (1907) and Miller and Morris (2004) in uniting *C. filipes* with *C. hildebrandtii* rather than with Thulin (2006) who kept the two species separate. The striking differences between specimens in stem, leaf, ovary and seed indumentum do not correlate well each other or with geographical distribution.
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Figures 2b and 16, t. 37–40

**Diagnosis.** Sepalis ovatis acuminatis 2.5–4 mm longis *C. sermentosum* et *C. hildebrandtii* tangit sed ramis lignosis, sepalis pubescentibus pilis patentibus, affine *C. leptocladus* Boissier sed sepalis ovatis dignoscenda.

**Type.** OMAN, Breik Qotait, Mussandan Peninsula, 30 March 1980, *R. Whitcombe* 807 (holotype E00507115!).

**Description.** Small unarmed undershrub c. 15 cm high, stems rigid, minutely adpressed pubescent. Leaves almost completely absent, probably lanceolate, certainly acute, entire, thinly pubescent. Inflorescence elongate, formed of pedunculate dichasial cymes arising in the axils of bracts at right angles to the stem; bracts 2–10 × 0.5–2 mm, linear to narrowly oblong, acute, entire, cuneate at base, thinly appressed pubescent; peduncles 1.5–3 cm long, straight, rigid, appressed pubescent; bracteoles 1–2 × 0.5 mm, linear, pubescent; pedicels c. 5–15 mm; flowers almost always solitary; sepals 3.5–4 × 1.5 mm, ovate, acuminate, pubescent with spreading hairs, inner sepals similar but somewhat scarious-margined; corolla c. 10 mm long, of unknown colour and shape, midpetaline bands pubescent; filaments c. 1 mm; anthers c. 1.5 mm; ovary c. 1.25 mm, acuminate, glabrous; style glabrous, divided c. 2 mm above base, stigmas c. 2 mm.

**Distribution.** Known only from the type collection made on the Musandam Peninsula in Oman.

**Notes.** This species is very similar morphogically to *C. leptocladus* and is similarly near-ly aphyllous but differs in the ovate-acuminate sepals which are pubescent with spreading hairs. It is more obviously woody than *C. hildebrandtii* with stouter peduncles, recalling those of *C. eremophilus*, and the inflorescence is of well-developed dichasial cymes. The sepals are similar in shape to those of *C. hildebrandtii* but slightly larger. There is abundant spreading pubescence on all parts of the inflorescence, not just on the sepals.

This species is only known from a single collection. It may be rare and threatened or simply overlooked but for the time being should be classified as Data Deficient (DD) within IUCN (2012) guidelines. The epithet “peninsularis” refers to the Mussandan Peninsula in Oman where the type collection was made. No information is known about its precise habitat.

Figure 16, t. 31–36

**Type.** IRAN, *Aucher-Eloy* 4942 (holotype G; isotypes K!, LE!, P!, W!).

**Description.** Much-branched fastigiate undershrub to c. 40 cm, the branches usually arising at right angles to the main stem, adpressed pubescent, hairs resembling
Figure 16. 1–7 C. erinaceus 1 leaf 2 bracteole 3 outer sepal 4 stamen 5 ovary and style 6 capsule 7 seed from Granitov 442 (C) 8–16 C. eremophilus 8 leaves 9 bracteole 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen 14 ovary and style 15 capsule 16 seed. From Rechinger 1313 (W) 17–23 C. koieanus 17 leaves 18 bracteole 19 outer sepal 20 middle sepal 21 inner sepal 22 stamen 23 ovary and style. From Køie 684 (B) 24–30 C. lindbergii 24 leaf 25 bracteole 26 outer sepal 27 middle sepal 28 inner sepal 29 stamen 30 ovary and style. From Lindberg 409 (W) 31–36 C. leptocladus 31 leaves 32 bract 33 outer sepal 34 inner sepal 35 stamen 36 ovary and style 31–32 from Rechinger 3389 (W) 33–36 from Scharif 832E (W) 37–40 C. peninsularis 37 portion of inflorescence 38 bract 39 outer sepal 40 inner sepal. From Whitcombe 807 (E).
cystoliths. Leaves commonly absent, sessile, 1.5–2.5 cm, linear to linear oblanceolate, acute, entire, attenuate at base, subglabrous or with few adpressed hairs. Flowers 2–3 in very lax axillary dichasial cymes borne on rigid branches, somewhat spinescent after flowers have fallen; peduncles 1.5–2 cm; bracteoles 1 mm, oblong-elliptic, minute; pedicels 2–8 mm, very fine; sepals 3–4 × 2 mm, obovate, shortly mucronate, uniformly pale green, adpressed pubescent, inner sepals slightly longer and broader; corolla 11–14 mm long, white, weakly lobed, midpetaline bands pilose; ovary glabrous; style glabrous, divided c. 3 mm above base, stigmas 4 mm. Capsule glabrous; seeds brown, glabrous, smooth. [Sa’ad 1967: 99; Nowroozi 2002: 45 (plate), 102 (map)]

**Distribution.** Endemic to southern Iran (Léonard 5921, Grey-Wilson & Hewer 127, Rechinger et al. 3389, Scharif’832E, Fasy 337, Foroughi 10671)

**Notes.** The very short pubescent sepals are a good character as are the very slender peduncles arising at or near 90°. There seems to be some variation in inflorescence branching, sometimes clearly dichasial (Grey-Wilson & Hewer 127), sometimes almost racemose (Léonard 5921). The following species (species 120–126) form a complex of mostly ill-defined taxa. Although frequently misidentified, *C. erinaceus* is the best defined, usually easily identified by its distinctive morphology, small deeply lobed corolla and short rounded sepals. *Convolvulus hamadae* has the same appressed sericeous indumentum but with acute sepals and a larger unlobed corolla. The others have varyingly pubescent to tomentose stems and differ in details of bract shape, ovary indumentum, sepal form and habit. Further collection and study may demonstrate several to be conspecific or hybrids.


*(Eichwald 1831:11).*

Figure 16, t. 1–7


**Type.** SAUDI ARABIA, Collenette 6385 (holotype E00699569!; isotype K!).

**Type.** AZERBAIJAN (?), “Caspian Sea”, Eichwald 474 (lectotype LE!, sheet labelled 474 and with Sa’ad’s annotation, designated here; isolectotypes HAL ?, LE!).

**Description.** Much-branched undershrub with somewhat zigzag, rigid branches forming an intricate ball-like plant to 1(-3) m in height, the lower part sometimes with a distinct trunk up to 1.5 cm in diameter; young stems sericeous, branching at 80–90°. Basal leaves 10–30 × 1 mm, stem leaves usually few, sessile, 6–7 (-20) × 0.5–1 mm, linear, pubescent. Flowers usually solitary (rarely paired) borne on thin, rigid peduncles 4–15 (-20) mm long; bracteoles 1 mm, triangular, scale-like, puberulent; pedicels 1–5 mm, puberulent, often recurved; outer sepals 3–4 × 2.5 mm, elliptic-obovate, round-
ed to emarginate, sericeous-pubescent; inner sepals narrower, 1–1.5 mm wide; corolla 0.6–0.9 cm long, deeply lobed to about quarter of its length, white or pink, midpetaline bands narrowly triangular, pubescent, terminating in a point; ovary sericeous; style glabrous, very short, divided c. 2 mm above base, stigmas c. 1.5 mm; capsule pubescent or glabrous, 1-seeded; seeds pubescent. [Sa’d 1967: 95 p. p. excl. Convolvulus hamadae and C. erinaceus var. kermanensis; Petrov 1935: 137 (plate); Nowroozi 2002: 32 (plate), 101 (map); Collenette 1999: 228 as C. excelsus (photo); Grigoriev 1953: 11 (plate)]

**Distribution.** Russia: Dagestan (Teimurov s.n. [20/6/2011]), “Siberia” (Turczaninov); Azerbaijan (Shipechinsky s.n. [14/7/1925]); Uzbekistan (Neustreva-Knorrning 3769, Rodin & Arkadyev s.n. [8/5/1948]); Turkmenistan (Androsov s.n. [10/7/1932], Babrov 535, Granitov in Herb. Fl. As. Med.442; Kirgizstan (Minkwitz 376); Tadjistan (Nikitin 2780); Kazakhstan (Dubrayansky 852, 856, Afanasiev 3767, Berg s.n. [28/6/1900], Spiridonow s.n. [1914], Rodin et al. 468); Northern Iran (Reino Alava & Iranshahr 23405, Furse 7614); Afghanistan (Aitchison 701, Koie 2225, Neubauer 4206), Pakistan (?), Saudi Arabia (Collenette 6385). A plant of sandy and stony desert.

**Notes.** Distinguished by the sericeous stem, short obtuse sepals, small, lobed corolla and tendency to have short rigid peduncles giving the plant a characteristic intricate habit.

The recently described *C. excelsus* from Saudi Arabia is distinguished principally by its tall habit and disjunct distribution. However neither its height nor its disjunction is as distinctive as Mill (2013) suggests, there being records from scattered locations in many countries (see above) and images and descriptions of specimens at least 1 m high.


**Type.** KAZAKHSTAN, Kara-tau, Popov 5/6/1926 (holotype TAK; isotypes B, BM!, E!, K!, LE!, P!, W!).

**Type.** Based on *Convolvulus subsericeus* subsp. *hamadae* Vved.

**Description.** Erect undershrub, intricately branched from the base to at least 40 cm; stems, thinly sericeous. Leaves 1–5 × 0.2 cm, linear-oblong, acute, base tapering into a long pseudopetiole, thinly adpressed pubescent and appearing greenish. Flowers 1 (-2) at the apex of rigid, straight, relatively slender woody peduncles 0.8–1.5 cm long; bracteoles minute, linear, c. 1 mm, pedicels 0.5–1 mm, bent at 90° to peduncle; sepals (3-) 4 (-5) × 1.5 mm, narrowly oblong, acute, densely pubescent; corolla (8-)10 mm, white, unlobed, broadly infundibuliform, midpetaline bands pilose, terminating in a tooth; ovary pilose. Capsule pilose, seeds pubescent.

**Distribution.** Kazakhstan (Drobov s.n. [3/8/1996], Krasheninnikov 158); Kyrgyzstan (Knorrning 115, Drobov 246); Uzbekistan (Tishchenko 98, Muravliansky 1932, Knorrning 60); Tajikistan (Nikitin 167, s.n. [19/6/1936], Knorrning 129); Turkmenistan
(Litvinow 1647, Sintenis 1285); Afghanistan (Aitchison 731); Iran (Pabot DK 518). Most common in Uzbekistan.

**Notes.** The indumentum and corolla size suggests this lies between *C. erinaceus* and *C. subsericeus* or more probably *C. eremophilus*, given the distribution of the three species. It has a laxer, less rigid appearance than *C. erinaceus* with branches less divaricate, the corolla is longer and unlobed and the sepals are acute, not obtuse. From *C. subsericeus* it is distinguished by the shorter, pungent branches, flowers generally solitary and a little smaller, the sepals acute, not acuminate. From *C. eremophilus* it is distinguished by the sparse, adpressed indumentum of the stems and shorter corolla. A few specimens are completely glabrous, such as *Botchantzev* 468 from Uzbekistan, but seem to fit here best.

Sa’ad treated this species as a synonym of *C. erinaceus* but the sepals and corolla are quite different.


**Type.** Based on *Convolvulus subsericeus* Schrenk


**Type.** “TURKESTAN”, various collections cited (LE).

**Type.** KAZAKHSTAN, Balkash, *Schrenk* s.n. (lectotype LE!, sheet annotated “Typus” by Grigoriev, designated here; isolecotypes BM001035795!, K!, LE!, OXF!, W!).

**Description.** Branched (often divaricately) undershrub to at least 50 cm, stems sericeous to adpressed puberulent, somewhat zigzag, branches arising at an acute angle. Basal leaves unknown, stem leaves sessile, 1–3 × 0.1–0.3 cm, linear-lanceolate, acute, entire, base cuneate, sericeous, Flowers up to 3 in pedunculate, cymes but commonly reduced to solitary flowers; peduncles 2.5–6 cm, characteristically long and slender, often bent at transition to pedicel; bracteoles 2 × 0.5 cm, deltoid-lanceolate, caducous; pedicels very short, 1–2 mm; sepals 5–7 × 2 mm, narrowly ovate, shortly acuminate, pubescent; corolla 1.1–1.5 cm, white, shallowly lobed, the midpetaline bands, pilose, terminating in teeth; ovary pilose; style glabrous, divided c. 5 mm above base, stigmas 2 mm. capsule pilose at apex; seeds pubescent.

**Distribution.** Kazakhstan (Karolin & Kiriloff 1720, Sokolov s.n. [11/6/1908], Schipczinsky 305, Dubiansky & Basilevskaja s.n. [9/8/1927], Chaffanjon 660). Apparently rare and limited to sandy desert in the area around Lake Balkash.

**Notes.** *Convolvulus subsericeus* is sometimes confused with *C. divaricatus* from which it is distinguished by the subsericeous stems, the narrow, linear-lanceolate stem leaves and the long slender branches branches arising at an acute angle.

Figure 17, t. 1–7


**Type.** AFGHANISTAN, Kandahar, *Podlech* 30744 (holotype M; isotype W!).


**Type.** UZBEKISTAN, Kzyl-Kum, *Afanassiev* 238 (holotype LE!; isotypes LE!).

**Type.** UZBEKISTAN, Chiwa (Khiva), *Koralkov* s.n. (holotype LE!).

**Description.** Perennial undershrub from a woody rootstock forming a small bush; stems numerous to 50 cm, rigid and woody below, herbaceous above, slightly divaricate, densely grey-pilose. Basal leaves not seen; stem leaves sessile, 0.3–1.5 × 0.3–1.5 cm, very variable in size from plant to plant, oblanceolate, lanceolate, ovate or suborbicular, acute, entire to somewhat undulate, basally cuneate to rounded, pilose. Flowers 1–3 (- 5) in axillary dichasial cymes but often solitary; peduncle 0.5–6 cm, somewhat terete to rigid; bracteoles 3 mm, filiform; pedicels 2–10 mm; outer sepals 5–6 × 2.5 mm, lanceolate, ovate or elliptic, acuminate or caudate, densely lanate; inner sepals broader (c. 3 mm), glabrous; corolla 1.1–1.3 (-1.5) cm long, cream or pinkish, unlobed, midpetaline bands darker, pilose, terminating in a tooth; ovary glabrous or with a few apical hairs; style glabrous, divided c. 2 mm above base, stigmas c. 2 mm; capsule glabrous, 1-seeded (?always); seeds hisrute. [Sa’ad 1967: 89]


**Notes.** Distinctive because of the pilose indumentum with spreading hairs combined with the lanceolate to ovate stem leaves but very close to *C. subsericeus* and *C. eremophilus*. From the latter it is best distinguish by the less rigid, less flexuouse branches arising at around 60° from the stem as well as the broader leaves.

Specimens intermediate between *C. divaricatus* and *C. eremophilus* exist (Grigor'ev 1953: 19) and have been called *C. michelsonii* (V. Petrov) V. Petrov ex Grigor'ev (1953: 19) or *C. korolkowii* var. *michelsonii* V.Petrov (1935:136), the type being *Michelson* s.n. [29/5/1914] (holotype LE) from the Kyzyl-Kum desert in Uzbekistan. However, their status is uncertain and they may be hybrids. Examples include *Litwinow* 873a (LE) from Turkmenistan.


**Type.** TAJIKISTAN, Kinzikaeva, Soskov & Possadskaja s.n. [29/8/1960] (holotype LE!; isotype LE!).
Figure 17. 1–7 C. divaricatus 1 leaves 2 bracteole 3 outer sepal 4 middle sepal 5 inner sepal 6 stamen 7 ovary and style. From Drabov 287 (B) 8–14 C. gracillimus 8 flowering branch 9 leaf 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen 14 ovary and style. From Rechinger 16080 (W) 15–20 C. sarothrocladus 15 leaves 16 outer sepal 17 middle sepal 18 inner sepal 19 stamen 20 ovary and style 15 from sin coll. (JE) 16–20 from Haussknecht s.n. (W) 21–26 C. pseudocantabrica subsp. askabadensis 21 leaves 22 outer sepal 23 middle sepal 24 inner sepal 25 stamen 26 ovary and style. From Gauba 1623 (B) 27–33 C. ammannii 27 leaf 28 outer sepal 29 inner sepal 30 stamen 31 ovary and style 32 sepal and capsule 33 seeds. From Hsia 20/7/1931(K) 34–37 C. xanthopotamicus 34 shoot showing woody stem and branching 35 leaf 36 outer sepal 37 inner sepal. From Purdom s.n. (K).
Description. Small grey-pilose undershrub similar in general facies to *Convolvulus divaricatus* but stems more rigidly erect and only reaching 30 cm, leaves 1–3 × 0.2–0.5 cm, linear to linear-oblanceolate. Flowers subsessile or shortly pedunculate with peduncles to 1.2 cm, bracteoles persistent, pedicels very short, < 1 mm, sepals c. 6 mm long, narrowly ovate, acuminate, corolla somewhat larger, 1.2–1.6 mm long. Ovary, style and capsule all pilose. Also close to *C. subsericeus* but much more hirsute.

Distribution. Tajikistan, Tujun-tau, apparently only known from the type.

Notes. This species needs revision. It may or may not prove to be distinct from *C. divaricatus*. It should be noted that some details in the protologue are incorrect, particularly as to the size and shape of the leaves.


Figure 16, t. 8–16


Type. AZERBAIJAN, between Baku and Sallian, near Eszek Caravanserai, C.A. Meyer s.n. (LE, not seen).


Type. UZBEKISTAN, Chiwa (Khiva), *Korolkow* s.n. (holotype LE!).


Type. TURKMENISTAN, 5/1886, *O. Kuntze* s.n. (holotype LE!).


Type. Based on *Convolvulus dorycnium* var. *turcomanicus* Kuntze


Type. IRAN, Kerman, *Bornmüller* 3886 (holotype B; isotypes K!, P!, W!).


Type. IRAN, Kerman, *Bornmüller* 3886 (holotype K; isotypes B, P!, W!).


Type. Based on *Convolvulus spinosus* var. *kermanensis* Bornm.


Type. AFGHANISTAN, Ghorat, *Podlech* 21799 (holotype M!).

Type. IRAN, Kashan, *Bubse* 1463 (holotype G; isotypes K!, P!).

Description. Undershrub from a thickened woody rootstock to 60 cm with rigid (but not spiny) branches spreading widely at almost a right angle and forming an en-
twined mass; stems and leaves pubescent with spreading hairs. Leaves sessile, 0.5–5.5 × 0.1–0.9 cm, linear to oblong, acute, margin entire to undulate, pubescent, merging upwards into the bracts. Flowers pedunculate, solitary or in 2–3-flowered cymes; bracts 3–20 × 0.5–2.5 mm, suborbicular to broadly ovate; peduncles 0.8–5.5 cm, straight, rigid, usually arising at 90° to the stem; bracteoles 2–3 mm, filiform; pedicels 0–1 mm, often at an angle from the peduncle; outer sepals 4–5 × 2 mm, ovate, acute with mucronate apex, pilose, pubescent or, rarely, glabrous on the abaxial surface, sometimes glabrescent in fruit; inner sepals similar but less hairy and commonly convex; corolla 1.1–1.8 cm, white or purplish-flushed, somewhat undulate but not lobed, midpetaline bands pubescent; ovary glabrous to hirsute, style glabrous; style divided 5–6 mm above base; capsule glabrous or with a few apical hairs, seeds hirsute. [Petrov 1935: 138 (plate under Convolvulus turcomanicus); Sa’ad 1967: 94; Nowroozi 2002: 43 (plate), 101 (map); Breckle and Rafiqpoor 2010: 415 (photo as C. korolkowii)]

**Distribution.** Turkmenistan (Litwinov 1641, 1654; Sintensis 330, 487, Smirnova 13436, Androsov & Bubyir s.n. [4/6/1912]); Uzbekistan (Rodin & Arkadyev 243); Kazakhstan (Kudishchov s.n. [14/7/1928], Rodin et al. 476, Popetsky s.n. [26/3/1932]), Azerbaijan, Afghanistan (Hedge & Wendelbo 3569, 3839, 8407, Neubauer 4253, Rechinger 34194); Iran (Schmidt 6091, 6275, Bunge s.n. [8/1/1858], Renz & Iranshahr s.n. [8/7/1974], Rechinger 1285, 1313, 46317, 51477, 53682, 55800, 57447). In sandy deserts; abundant in Turkmenistan and parts of northern Iran and Afghanistan.

**Notes.** We are proposing a broad concept of this ill-defined species. It is characterised by the presence of spreading hairs at least on the lower part of the stem, acute to mucronate sepals and straight rigid peduncles arising at 80–90° to the branch. The types of *C. eremophilus*, *C. korolkowii* and *C. turcomanicus* have a glabrous ovary while that of *C. longipedunculatus* is hirsute. However this is hardly discrete as specimens with ovaries having a few hairs (*Hedge & Wendelbo* 3569, *Rechinger* 46317, 51447, *Schmidt* 6275) occur as well as plants with a densely hairy ovary (*Rechinger* 55800, Neubauer 4253, *Schmidt* 6091). Sa’ad separated what she considered *C. eremophilus* (*Aellen & Scharif* 5318E, Moussouri & Tehrani 30693E mostly from Kashan) from *C. korolkowii* by its suborbicular, not linear bracts. This is a difficult character as bracts are often not present and in any case there are specimens whose bracts are elongate in form, such as *Hedge & Wendelbo* 3839 identified as *C. eremophilus* by Sa’ad. *C. turcomanicus* was separated by its glabrous apiculate sepals. Apiculate sepals are common even on specimens with pubescent sepals while glabrous and pubescent sepals are sometimes found on the same plant. It seems glabrescence is common as the plant ages. There is also considerable variation in corolla size but most corollas are about 12–15 mm long. Despite these differences all specimens have a common facies and the different variations do not correlate well with each other or show any very distinct geographical patterning. Many specimens are in any case difficult to evaluate as bracts, corollas and capsules are often wanting.

Figure 16, t. 24–30

**Type.** AFGHANISTAN, Lindberg 409 (holotype W!).

**Description.** Much-branched undershrub to 30 cm, stem and all vegetative parts grey-sericeous, branches rigid and with few leaves, ascending at about 60°. Leaves sessile, 6–20 × 1–5 mm, linear to narrowly oblong, obtuse, entire, narrowed at both ends. Flowers 1–3, arising in the axils of small bracts on a rigid peduncle; bracts 2 × 1 mm, triangular; peduncles 0.8–2.5 cm; bracteoles c. 1 mm; pedicels 0–1.5 mm, sepals 3–3.5 × 2 mm, oblong-elliptic, densely sericeous, outer rounded, inner mucronulate; corolla 0.9–1 cm long, white, midpetaline bands sericeous, weakly lobed; ovary globose, pubescent (or glabrous in *Rechinger* 35336), style glabrous, divided c. 4 mm above base, stigmas 1.5 mm. Capsule and seeds unknown.


**Notes.** This poorly known species is characterised by the grey sericeous stems and leaves, small sericeous mucronulate calyx and short corolla. It may be only a form of *C. eremophilus*.


Figure 17, t. 15–20

**Type.** IRAQ, between Kirkuk and Sulaymaniyyah, *Hauussknecht* 653 (lectotype G, designated by Sa’ad 1967: 105).

**Description.** Undershrub with fastigiate branches to 40 cm, stems appressed pubescent. Leaves sessile, the basal leaves 2.5–6 × 0.5–3 cm, oblanceolate, acute to obtuse, attenuate at the base, appressed pubescent; stem leaves linear 1.5–3.5 × 0.2–0.4 cm. Flowers axillary, solitary or paired forming a lax, sparsely branched inflorescence, which is commonly dichasial in structure apically; peduncles 0.5–2 cm long, slender, bracteoles minute; pedicels 2–6 mm; sepals 6–7 × 3–4 mm, elliptic to obovate, mucronate, the margins scarious, the inner sepals narrower; corolla 12 mm long, white, midpetaline bands pubescent; ovary comose; style pilose, divided 4 mm above base, stigmas 1–2 mm. Capsule not seen. [Sa’ad 1967: 105]

**Distribution.** Iraq (*Helbaek* 1726, *Hauussknecht* s.n. [6/1867]); Iran (*Koele* 15840).

**Notes.** This species is distinguished by the relatively large, glabrous sepals and narrow, sparingly branched inflorescence which is clearly cymose in structure apically. It seems close to *C. pseudocantabrica* subsp. *askabadensis* but the ovary is hirsute and the corolla smaller.

**Type.** IRAN, Kermanshah, Mozaffarian 79475 (holotype TARI).

**Description.** Perennial undershrub with woody taproot, from which arise many sericeous stems to 50 cm. Basal leaves unknown; stem leaves sessile, 20–40 cm long, linear-filiform. Flowers 3–5 in axillary and terminal dichasial cymes; bracteoles linear, acute; sepals 8 mm long (fide description) or 4–4.5 mm (fide illustration), ovate, mucronate, glabrous; corolla c. 1.8 cm long, white, midpetaline bands pubescent; ovary glabrous; style glabrous, much longer than stigmas (fide illustration). Capsule glabrous, 1-seeded.

**Distribution.** Iran; Iraq (Rawi 5720).

**Notes.** We have not seen the type material. Rawi 5720 is annotated in the Kew herbarium as “*C. leptocladus* subsp. *glabrisepalus* Kandemir” and seems to fit perfectly with *C. kurdistanicus* as long as the sepals of *C. kurdistanicus* are the more probable 4.5 mm long (as illustrated), rather than 8 mm long as described. *C. kurdistanicus* is also extremely close to *C. koieanus* differing only in the glabrous ovary. As *C. kurdistanicus* and *C. koieanus* grow in neighbouring provinces of Iran, it seems quite possible that they will prove to be conspecific.


**Figure 16, t. 17–23**

**Type.** IRAN, Luristan, Chah-Bazan, Köie 1301 (lectotype C, designated by Sa’ad 1967: 97; isolecotype B).

**Description.** Undershrub with woody taproot, from which arise many rigid branched stems to c 40 cm, stems minutely adpressed pilose, the hairs resembling cystoliths. Leaves sessile, 10–30 × 0.5 mm, filiform, acute, adpressed pubescent. Flowers 1–3 in long-pedunculate, axillary and terminal dichasial cymes; peduncles up to 20 cm long, straight, slender and not very rigid; bracteoles 1–2 × 0.25 mm, filiform; sepals 5–6 × 4 mm, obovate-elliptic, apiculate, glabrous; corolla 1.4–1.5, colour unknown, midpetaline bands pubescent; ovary comose; style divided 2 mm above base; stigmas 3 mm. Capsule and seeds not known. [Sa’ad 1967: 97, Nowroozi 2002: 53 (plate), 102 (map)]

**Distribution.** Iran (Köie 1302, 684).

**Notes.** Appears to be close to *C. leptocladus* but is distinguished by its filiform leaves, pubescent ovary and longer, oblong sepals.


**Figure 17, t. 8–14**
Type. IRAN, Tehran, Koelz 16080 (holotype W; isotypes E!, US).

Description. Slender, sericeous, rigid undershrub of grey appearance to c. 30 cm with numerous erect stems and very rigid branches arising at c. 60°. Leaves sessile, 0.8–2.8 × 0.2–0.3 cm, linear to oblanceolate, acute, entire, decurrent at the base. Inflorescence of solitary pedunculate flowers, becoming somewhat dichasial cymose apically; bracts oblong, caducous; peduncles 5–20 mm, slender; bracteoles minute, scale-like; pedicels 3–7 mm, curved; sepals 2 × 2 mm, suborbicular to broadly elliptic, obtuse, the outer ones pubescent, the inner glabrous, membranous, mucronate; corolla 0.6 cm long, white, midpetaline bands pilose; ovary pilose, style pilose, divided 1 mm above base, stigmas 2 mm. Capsule and seeds not seen. [Sa’ad 1967: 109; Rechinger 1963: 25 (plate)]

Distribution. Iran. Only known from the type collection.

Notes. The tiny sepals and corolla and the very rigid grey stems are characteristic.


Type. KAZAKHSTAN, Koksu River, Schrenk s.n. (lectotype LE!, sheet with single rootstock, designated here).

Description. Perennial undershrub with tough woody rootstock from which arise several erect, woody, branched fastigiate stems to 50 cm; stems adpressed pubescent. Basal leaves sessile, 2–4 × 0.2–0.5 cm, oblong, acute, entire, attenuate to somewhat abruptly narrowed at the base, glabrous to thinly adpressed pubescent on the veins and lower surface; stem leaves similar but linear, diminishing in size upwards. Inflorescence terminal and paniculate-like, formed of terminal dichasial cymes and solitary flowers at the apex of lateral branches; bracteoles 2–5 mm, filiform; pedicels 1–10 mm; sepals 5–7 × 2 mm, oblong to obovate, acute to mucronate, glabrous, the inner sepals larger, c. 3 mm wide, obovate, with a clearly demarcated wing-like margin; corolla 1.8–2.2 cm, pink, undulate, midpetaline bands pilose, terminating in a broad tooth; ovary glabrous, style glabrous, divided c. 4 mm above base, stigmas 3 mm. Capsule glabrous, 1-seeded, seeds pubescent (fide Sa’ad). Sa’ad 1967: 100; Austin and Ghazanfar 1979: 14.

Notes. Two well-defined subspecies can be recognised:

131a. *Convolvulus pseudocantabrica subsp. pseudocantabrica*


Type. KAZAKHSTAN, Mount Tarbagatay, Karelin & Kiriloff 329 (holotype MW; isotypes BM!, K!, LE!, OXF!, P!, W!).

Type. Based on *Convolvulus dianthoides* Kar. & Kir.  

Type. Based on *Convolvulus dianthoides* Kar. & Kir.

**Distinguishing features.** Characterised by the shorter sepals, c. 5 mm long, which are obovate and abruptly mucronate.

**Distribution.** China (fide Fang and Staples 1997: 290); Afghanistan (Rechinger 16476, 31103, Grey-Wilson & Hewer 1217, Aitchison 847, Volk 169); Pakistan (Siddiqui & Rahman 26848); Kyrgyzstan (Nikitin s.n. [7/7/1967], Drobov 2779, Fedorov & Ilina 305); Tajikistan (Kamelin s.n. [24/7/1962], Bormmüller 518B, Kinzikeyeva 1066); Kazakhstan (Goloskokov 4836, Vassinger 20); Uzbekistan (Minkwitz 1289, Borodin & Kallistow 78).


Figure 17, t. 21–26


Type. TURKMENISTAN, Sintenis 1892 (holotype B†; isotypes BM!, E!, JE, K!, L, LE!, P!, STU).

Type. Based on *Convolvulus askabadensis* Bornm. & Sint.

**Distinguishing features.** Characterised by having oblong, acuminate sepals, c. 7 mm in length. Petrov 1935: 140 (plate); Nowroozi 2002: 51 (plate as *Convolvulus pseudocantabrica*), 102 (map)

**Distribution.** Apparently restricted to Iran and Turkmenistan: Northern Iran (Rechinger 1744, 53148, 55562, Schmid 6120, Wendelbo & Foroughi 12677, Sharif 39, Hewer 3823, Furse 2901), Turkmenistan (Meyer 642, Lipsky s.n. [25/5/1912], Litwinow 1646, Sintenis 798).

**Notes.** Sa’ad (1967) erroneously considered *C. askabadensis*, rather than *C. dianthoides*, to be conspecific with *C. pseudocantabrica*, being possibly confused by Vvedensky’s description of a superfluous subsp. *dianthoides*. Both Petrov (1935) and Grigoriev (1953) treated these two taxa correctly.

Species 132–171. Old World undershrubs with sericeous leaves

A relatively distinct group of shrubs or undershrubs or, if herbaceous, woody at base, never twining or trailing, the leaves always lacking a distinct petiole. All species are hirsute and usually sericeous, often cushion-forming and/or with spinescent branch-
es. The ovary is hirsute except in *Convolvulus lanuginosus* and *C. carduchorum*. This group is widely distributed from the Canary Islands through the Mediterranean region and Central Asia to China and Siberia. It is particularly characteristic of Central Asia where many species are armed. Hybridisation has been demonstrated more frequently amongst species of this group than in any other group and it is suspected that *C. suendermannii* and *C. sericocephalus* are also of hybrid origin.


**Type.** RUSSIA, Siberia, *Patrin* (holotype P [Herb. Lam.]).

**Description.** Grey-sericeous perennial herb with thick woody taproot; stems short, decumbent or weakly ascending, more or less herbaceous, to 12 (–22) cm long. Leaves sessile, 0.7–3 × 0.15–0.5 mm, linear or linear-oblanceolate, obtuse, tapering at the base. Flowers pedunculate from the axils of leaf-like bracts or, rarely, terminal only; peduncles 0.4–2.2 cm, 1-flowered; bracteoles, 4–13 × 0.5 mm, linear; pedicels 1–6 mm, often bent or curved; outer sepals 4.5–6 × 2–2.5 mm, ovate, abruptly narrowed and drawn out to an obtuse apex, the inner sepals much broader, c. 7 × 4 mm; corolla 0.8–1.3 cm long, white or very pale pink, very obscurely lobed, midpetaline bands pilose, terminating in a blunt tooth; ovary and style pilose; style divided c. 3 mm above base, stigmas c. 3 mm long. Capsule pilose at apex only; seeds smooth, pubescent. Figure 17: 27–33.


Figures 2c and 17, t. 34–37.

**Diagnosis.** Maxime affine *C. ammannii* Desr. sed floribus terminalibus solitariis vel in cymis terminalibus dispositis, sepalis corollaque longioribus, caule lignosa distincta.

**Type.** CHINA, Shensi, Hancheng Sian, 1914, *W. Purdom* s.n. (holotype K001067037!; isotypes K!).

**Description.** Much branched perennial undershrub with erect stems to c. 20 cm; old stems woody and rigid, weakly divaricate, up to 10 mm thick, new growth herbaceous grey-sericeous. Leaves sessile, 4–40 × 0.5 mm, linear, acute, grey-sericeous. Flowers terminal, solitary or in small dichasial cymes, the branches appressed pilose, up to 6 mm long; bracts and bracteoles not clearly differentiated, 1–10 × 0.5 mm, linear; peduncles not differentiated from the stem; pedicels 1–3 mm; outer se-
pals 6–7 × 2.5–3.5 mm, elliptic to obovate, caudate, densely pilose; inner sepals 5 × 3–4 mm, ovate, caudate, convex, somewhat scarious, thinly pilose; corolla 1.5–2 cm, unlobed, midpetaline bands pilose; filaments 4 mm long, glabrous, anthers 2 mm, sagittate; ovary 2 mm long, conical, comose, style pilose below, divided 3–7 mm above base, persistent; stigmas 1.75 mm; capsule 2 × 3.5 mm, pubescent, capped by the persistent style; seeds 1.5 × 1 mm, conical with a rounded base, pubescent, blackish-brown.

**Distribution.** China: Shanxi, Hanchengsian; Henan, Loyan, Shan Xian, Sanmenxia Gorge, on left bank of Yellow River (M.P. Petrov s.n. [27/5/1957]).

**Notes.** Similar to *C. ammannii* but flowers all terminal, the stem somewhat woody and slightly divaricate, the sepals and corolla both significantly longer and leaves strictly linear.

This species is only known from two collections from the Hwang Ho (Yellow River) region of north China. The Petrov collection at LE has entirely solitary terminal flowers, while in the Purdom collection (K) some branches terminate in solitary flowers while in others the flowers are arranged in terminal dichasial cymes.

This species may be rare and threatened or simply overlooked but for the time being should be classified as Data Deficient (DD) within IUCN (2012) guidelines. The epithet “*xanthopotamicus*” refers to the Yellow River or Hwang Ho to whose valley system it is restricted.


**Type.** KYRGYZSTAN, Jalalabad, Pimenov et al. s.n. [9/6/1996] (holotype LE!).

**Description.** Low undershrub with thick woody rootstock from which arise various short stiff stems to c. 20 cm, stems densely pilose, dead branches persistent and spinescent. Leaves sessile, 12–20 × 1–1.5 mm, linear-oblongolate, obtuse, flat, silvery sericeous. Flowers subsessile from the uppermost leaf axils, 1–4 together forming a subterminal cluster; peduncles absent; bracteoles 1–3 mm, linear; pedicels 0–2 mm, pilose; sepals 6–7 × 2.5, elliptic or obovate, narrowed to an apiculate apex, densely pilose; corolla 1.7–2 cm, pink, obscurely lobed, the lobes pubescent, midpetaline bands densely sericeous; ovary and style pilose. Capsule and seeds not seen.

**Distribution.** Kyrgyzstan (Ajdarova & Gorbunova s.n. [2/7/1964]).


**Type.** “near Tashkent”, Krause s.n. (syntypes LE!, 2 sheets).

**Description.** Densely grey canescent undershrub with thick woody base, up to 1.5 cm in diameter, from which arise numerous, erect, straight, rigid but not spinescent woody stems to 40 cm, these near leafless upwards and somewhat scape-like.
Leaves mostly on lower part of stem, numerous, sessile, 5–25 × 0.5 mm, linear to very narrowly linear-oblanceolate, obtuse. Flowers subsessile, 1–5 grouped at the apex of the stem, sometimes with a single flower on the stem below the apical cluster; bracts and peduncles absent; bracteoles 1–2 mm, linear-lanceolate, obtuse; pedicels 1–2 mm; sepals 4–6 × 2.5–3 mm, broadly ovate to suborbiculate, shortly apiculate, margins scarious, densely silky-pubescent; corolla 1.3–1.5 cm long, white, unlobed but with pilose border, midpetaline bands densely pilose, terminating in teeth; ovary densely pilose; style pilose, divided c. 8 mm above base; stigmas 3 mm. Capsule pilose apically. [Petrov 1935: 139 (plate)]

**Distribution.** Endemic to Kyrgyzstan (Knorring & Minkwitz s.n. [24/7/1924], Gudenov s.n. [19/8/1958], Botchantsov 78, Kamelin et al. 9090, Lazkov s.n. [4/5/2005]).

**Notes.** Very distinct because of the dense grey-canescence indumentum, the plentiful linear leaves and the long, scape-like stem with subsessile flowers at or near the apex. The cited type locality is thought to be an error as this species has never subsequently been found near Tashkent (Uzbekistan).


**Figure 18, t. 10–15**

**Type.** MONGOLIA, Tzagan-Balgassu, *Turczaninow* s.n. (holotype KW!).

**Description.** Low grey-sericeous undershrub with woody rootstock, often more or less cushion-forming; branches short, woody, spinescent when old. Leaves sessile, 1–2.8 × 0.1–0.3 cm, linear to narrowly linear-oblanceolate, obtuse, entire, tapering at the base. Flowers in clusters of 1–4 in the axils of the leaves towards the tips of the branches; peduncles absent; bracteoles c. 2 mm long, filiform or linear; pedicels 1–2 mm; outer sepals 4–6 × 3.5 mm, obovate, rounded to truncate and slightly fimbriate, pilose abaxially; inner sepals broader, 4–4.5 mm wide, glabrous to thinly pilose; corolla 1.5–2.5 cm long, pink, unlobed, midpetaline bands pubescent; ovary pilose; style thinly pilose, divided c. 4.5 mm above base, stigmas c. 3 mm. Capsule pubescent; seeds glabrous. [Sa’ad 1967: 77]


**Notes.** *Convolvulus tragacanthoides* has the appearance of a spiny *C. ammannii*, with which it is sometimes confused, but flowers sessile and clustered.

137. *Convolvulus spinifer* Popov, Trudy Turkestansk. Gosud. Univ. 4: 56, pl. between 64–65. 1922. (Popov 1922: 56.).

**Figure 18, t. 16–20**

**Type.** KAZAKHSTAN, *Popov* 546 (holotype LE!).
Figure 18. 1–9 *C. fruticosus* 1 shoot showing bract (leaf) and flower 2 bracteole 3 outer sepals (two forms) 4 middle sepal 5 inner sepal 6 stamen 7 ovary and style 8 capsule 9 seed 1 from Borissova 3768a (C) 2–7 from Paulson 303 (C) 8–9 from Rechinger 5502 (W) 10–15 *C. tragacanthoides* 10 shoot showing spines 11 leaf 12 outer sepal 13 inner sepal 14 stamen 15 ovary and style. From Cowdry 1382 (K) 16–20 *C. spinifer* 16 bract (leaf) 17 outer sepal 18 middle sepal 19 inner sepal 20 ovary and style. From Regel s.n. (W) 21–26 *C. gortschakovii* 21 leaf 22 outer sepal 23 middle sepal 24 inner sepal 25 stamen 26 ovary and style. From Karelin & Kirilloff 326 (K) 27–33 *C. spinosus* 27, 28 leaves 29 outer sepal 30 middle sepal 31 inner sepal 32 stamen 33 ovary and style. From Griffith 5857 (GOET) 34–41 *C. argyracanthus* 34, 35 leaves 36 bracteole 37 outer sepal 38 middle sepal 39 inner sepal 40 stamen 41 ovary and style 34–36 From Rechinger et al. 3228 (W) 37–41 from Rechinger et al. 3234 (W).
A foundation monograph of Convolvulus L. (Convolvulaceae)

Description. Sometimes treated as a synonym of Convolvulus tragacanthoides, this species appears to be distinct. It is less obviously a cushion plant having stems to at least 30 cm in height, but commonly 5–10 cm, the branches all spinescent even when young; leaves linear to oblanceolate, 0.2–0.6 cm wide; flowers subsessile in clusters of 1–5 at the apex of the stem, often with a solitary pedunculate flower borne on a rigid, woody peduncle below the apical cluster; peduncles on axillary flowers 4–13 mm; pedicels 0.5–2 mm; sepals concave, all dorsally pubescent, 5–6 mm long, acute to acuminate. [Petrov 1935: 134 (plate)]

Distribution. China: Kashgar (Popov 241, 614); Kazakhstan (Goloskokov s.n. [29/6/1971], Divnogorski s.n. [24/5/1907], Shishkin s.n. [17/7/1935], Ptaschicki 632, 642); Kyrgyzstan (Abolin 712, Dessiatoff 1864); sin loc. (Chaffanjon 158).

Notes. Convolvulus spinifer appears to be somewhat intermediate between C. krauseanus and C. tragacanthoides.

138. Convolvulus fruticosus Pall., Reise Russ. Reich. 2: 734. 1773. (Pallas 1773: 734). Figure 18, t. 1–9


Type. RUSSIA, Siberia, Irtib River, Patrin s.n. (holotype P).


Type. TAJIKISTAN (?). Tjuk-Karagan, Eichwald s.n. (whereabouts unknown).


Type. IRAN, Shiraz, Aucher-Eloy 4937 (holotype P).

Type. RUSSIA, Irtysh, Pallas s.n. (lectotype BM 0010145880, designated here, isolecotypes BM 0010145879, BM 0010145881, BM 0010145882, LE!, W!).

Description. Intricately branched spiny shrub to 50 cm, stems adpressed pubescent. Leaves sessile, 1–3.5 × 0.3–0.6 cm, oblong to narrowly oblong-elliptic, acute, margin entire, base cuneate, adpressed-pubescent to sericeous; cauline spines abundant on young shoots. Flowers borne on short spinescent axillary peduncles, usually solitary, sometimes up to 3 in a diachasial cyme; peduncles 12 mm, spine-like; bracteoles 9–11 × 1–2 mm, linear to linear-elliptic; pedicels 2 mm, recurved; sepals very lax, outer sepals 10–11 × 3–6 mm, elliptic or rhomboid, acule to mucronate, densely pubescent; inner sepals much shorter, 7–8 mm long; corolla 2.3–2.5 cm long, pink, somewhat undulate, midpetaline bands darker pink, adpressed pilose; ovary and style pilose; style divided 7 mm above the base, stigmas 3 mm long. Capsule pilose; seeds puberulous. [Sa’ad 1967: 66: Austin and Ghazanfar 1979: 13; Nowroozi 2002: 29 (plate), 100 (map)]
**Distribution.** China (fide Fang and Staples 1997: 290); Mongolia (Grabov 5514, Przewalski 48); Russia: Siberia; Kazakhstan (Schiskin s.n. [10/7/1937], Ianatov & Kuznezov s.n. [13/6/1956], Pobjarkov 417, Spiridonov s.n. [1914]); Kyrgyzstan (Dessiatoff 1759); Uzbekistan (Kamelin et al. 589); Tadjikistan (Botchantsev 237, Browicz 76); Turkmenistan (Bozissova 3768b, Rodin et al. 205); Afghanistan (Aitchison 418; Koie 4413); Iran (Schmidt 6150; Merton 3943, Andersen & Jensen 2100, Rechinger 5502).


Figure 18: t. 21–26


Type. KAZAKHSTAN/RUSSIA, Songaria, *Karelin & Kirilov* 326 (syntypes LE!, W!).

Type. KYRGYZSTAN, Schrenk, s.n. (holotype LE!; isotypes BM001046244!, OXF!, W!).

**Description.** Low spiny undershrub, often cushion-like, 10–20(-30) cm high, stems divaricate, branches arising at right angles, grey-sericeous when young, persistent and woody-spinescent when old; cauline spines also present. Leaves sessile, 1–2.5 × 0.2–0.5 cm, oblanceolate, acute, entire, tapering to a long petiole-like base. Flowers solitary, axillary, pedunculate; peduncles 5–7 mm, woody, straight, spinescent; bracteoles 6–12 × 1–2 mm, foliose, linear to linear-oblong; pedicels 1–2 mm; outer sepals 7–11 × 7–11 mm, orbicular, apex rounded and apiculate, base cordate, glabrous, papery in texture; inner sepals 5–7 × 4–5 mm, ovate, acuminate; corolla 1.8–2.2 cm long, pink, undulate but not lobed, midpetaline bands brownish-pilose terminating in a small tooth; ovary pubescent; style divided 7 mm above base, pubescent below; stigmas 3 mm. Capsule apically pubescent; seeds not seen.

Similar in inflorescence, habit and overall morphology to *C. fruticosus* but distinctive because of the glabrous orbicular cordate papery outer sepals, which are much larger than the ovate, acuminate inner sepals.

**Distribution.** Kyrgyzstan (Karelin & Kirilov 326); Kazakhstan (Saposchnikov 1914, Mishenkova 331); Tadjikistan; Russia: Altai (Ladrigin 445), Mongolia (Cheney 65, Potanin s.n. [13/8/1879]), China (fide Fang and Staples 1997: 289).

**Notes.** There are a number of specimens in which the sepals are pilose but similar in shape to those of *C. gortschakovii*. These include Kosinsky 889 from Kazakhstan (Semipalatinsk) and Przewalski s.n. [25/5/1879], Kalinin s.n. [17/8/1949] and Klemenz 178 from Mongolia (all at LE). Without further evidence it is impossible to decide whether these are hybrids or some other kind of intermediate with *C. fruticosus*. 

Figure 18, t. 27–33


**Type.** IRAN, *Aucher-Eloy* 4933 (holotype P!).


**Type.** AFGHANISTAN, *Griffith* 5857 (holotype W!; isotypes C, GOET, K!).

**Type.** IRAN, *Garzin* s.n. (holotype G).

**Description.** Intricately branched spiny undershrub to 60 cm, stems finely adpressed pubescent, branches spinescent and with some stem spines near branch tips formed from old peduncles. Leaves sessile, 0.5–1.2 × 0.3–0.4 cm, oblong to oblongate, obtuse, margin entire, base attenuate, adpressed-pubescent. Flowers axillary, usually solitary, sometimes up to 3 in a diachasial cyme; peduncles 4–8 mm, woody, spinescent, bent at apex; bracteoles 1–1.5 mm, scale-like; pedicels c. 1 mm; outer sepals 3 × 2 mm, oblong to elliptic, obtuse and mucronate, convex, pubescent with spreading hairs; inner sepals 4.5–5 × 3 mm, pubescent with spreading hairs; corolla 1.3–1.6 cm long, white, midpetaline bands adpressed pilose; ovary pubescent; style pubescent, divided c. 4 mm above base, stigmas 3 mm; capsule comose; seeds smooth, glabrous. [Sa’ad 1967: 70; Austin and Ghazanfar 1979: 12; Nowroozi 2002: 27 (plate), 100 (map)]

**Distribution.** Iran (*Parris 75.477, Faroughi 10731, Ruenemark et al. 22367, Aucher-Eloy 1279*); Afghanistan (*Breckle 1074*); Pakistan: Balochistan (*Lamond 1224, Ghafoor & Goodman 4994, Rechinger 28121, 29401*). Most common in Balochistan.

**Notes.** The inner sepals are noticeably longer than the outer sepals.


Figure 18, t. 34–41

**Type.** IRAN, *K.H. Rechinger et al.* 3228 (holotype W!; isotypes E!, G, K!).

**Description.** Grey spiny undershrub to 60 cm, stems grey-sericeous, spinescent, lateral spines formed from dead peduncles present near branch tips. Leaves sessile, 1–1.7 × 0.3–0.6 cm, obtuse, margin entire, base attenuate, grey-sericeous. Flowers solitary (or, fide Sa’ad (1967), 2–3 in axillary diachasia), axillary, pedunculate; bracts leaf-like; peduncles 3–4 mm, woody; bracteoles c. 1.5 mm, linear, obtuse; pedicels 1.2 mm long, bent at an angle to the peduncle; sepals all similar, 3–6 × 2–4 mm, obovate, mucronulate, abruptly narrowed at base, adpressed-pilose; corolla 1.6–2.2 cm, white with slight bluish flush, weakly lobed, midpetaline bands pilose; ovary pilose, style pubescent, divided c. 7 mm above base, stigmas 3 mm; capsule and seed not known. [Sa’ad 1967: 63; Rechinger 1963: f. 2]
Distribution. Iran: Kerman, Fars (Davis & Bokhari 56223, Grey-Wilson & Hewer 301, Popov 51/75, Foroughi 10731).

Notes. Resembles C. spinosus but most easily distinguished by the obovate leaves and all five sepals equal in size and shape.


Figure 19, t. 16–23

Type. IRAN, Shiraz, Kotschy 352 (lectotype G, designated by Sa’ad 1967: 62; isolectotypes BM000047962, C, E!, FI, GOET, HAL, JE, K!, OXF!, P!, W!).

Description. Intricately branched spiny undershrub, 10–60 cm high, stems woody, weakly divaricate and spreading at a wide angle, grey-sericeous, spine-tipped and with numerous short lateral spines on older shoots formed from old peduncles. Leaves sessile, 0.5–1.5 × 0.2–0.4 cm, oblong-elliptic, oblanceolate or oblong-lanceolate, obtuse, margin entire, attenuate at the base, grey-sericeous. Inflorescence of few-flowered terminal clusters, sometimes also with solitary flowers in the leaf axils below; peduncles 3–8 mm, rigid, spinescent, sericeous; bracteoles 4–6 × 0.5–1.5 mm, linear, acute; pedicels 1–3 mm, villous, sometimes recurved; outer sepals 7–10 × 2–3 mm, ovate, abruptly narrowed into an acuminate and mucronate apex, densely pilose with long, pinkish hairs, inner sepals narrower and with scarious margins; corolla 1.5–2.6 cm, pink or white, very shallowly lobed, the midpetaline bands with long hairs; ovary and style pilose; style divided 6–7 mm above base, the stigmas relatively short, c. 2 mm long; capsule pilose at apex, one-seeded; seeds puberulous. [Sa’ad 1967: 62; Rechinger 1963: 8; Nowroozi 2002: 22, 25 (plate), 100 (map); Austin and Ghazanfar 1979: 10; Jongbloed 2003: 309 (photo)]

Distribution. Pakistan (fide Austin and Ghazanfar 1979); Iran (Parris 75.260; Léonard 5877, Rechinger 3226, Remaudière 1959, Soltani 6397B, Alava & Bokhari 10755, Wendelbo & Foroughi 15771), U.A.E., Oman (Radcliffe-Smith 4110, Mandaville 6784).

Notes. The spiny sericeous habit, spinescent peduncles and sepals with very long hairs make this distinct from all but *C. iranicus*. However both corolla and sepal length is quite variable.


Figures 2d and 19, t. 24–31

Diagnosis. *Convolvulus acanthocladi* Boiss. & Kotschy similis sed sepalis parvioribus, 4–4.5 (non 7–10) mm longis, tenuiter pilosis, floribus solitariis, corolla valde breviore (1.5–1.7 cm non usque 2.5 cm) longa, ramis brunneolis, pubescentibus pilis disperses, adpressis, non albo-canescensibus.
Figure 19. 1–8 *C. turrillianus* 1 leaf 2 bract 3 bracteole 4 outer sepal 5 middle sepal 6 inner sepal 7 stamen 8 ovary and style. From *Mirzagen* 830E (B) 9–15 *C. urosepalus* 9 leaf 10 bracteole 11 outer sepal 12 middle sepal 13 inner sepal 14 stamen 15 ovary and style. From *Koelz* 18056 (W) 16–23 *C. acanthocladus* 16 leaf 17 bracteole 18 outer sepal 19 middle sepal 20 inner sepal 21 stamen 22 ovary and style 23 capsule 16–22 from *Stapf* 362 (W) 23 from *Stapf* 361 (K) 24–31 *C. iranicus* 24 leaf 25 bract 26 outer sepal 27 middle sepal 28 inner sepal 29 stamen 30 ovary and style 31 capsule. From *Alava & Bokhari* 10629 (E) 32–40 *C. cantabrica* 32 leaves 33 bracteole 34 outer sepal 35 middle sepal 36 inner sepal 37 stamen 38 ovary and style 39 capsule 40 seed. From *Haussknecht* s.n. (JE) 41–47 *C. aucheri* 41 habit 42 bract 43 outer sepal 44 middle sepal 45 inner sepal 46 stamen 47 ovary and style. From *sin coll. 1944* (W).
Type. IRAN, Fars province, 20 km from Shiraz along road to Bushehr, 26 Jun 1972, Reino Alava & M.H. Bokhari 10629 (holotype W!; isotypes E00456799!, TUR, not seen).

Description. Much branched, spiny woody undershrub forming a compact intricate bushlet c. 20–25 cm high, young stems pale brown with appressed hairs. Branch tips spinescent, lateral spines present, formed from old fertile and (towards the branch tips) sterile peduncles. Leaves sessile, 7–10 × 3–4 mm, oblanceolate to obovate, obtuse, entire, attenuate at the base, appressed pubescent with whitish hairs. Flowers solitary, axillary; bracts resembling reduced leaves, 2–3 × 1.5–2 mm, oblong-elliptic, obtuse; peduncles 12–14 mm, straight, rigid, spinescent, arising at 90° from the branch, appressed pubescent; bracteoles c. 0.25 mm, minute, filiform; pedicels 1–1.5 mm, often bent at 90° to the peduncle, distinctly more densely pubescent with spreading hairs that the peduncle; outer sepals 4–4.5 × 3 mm, elliptic-rhomboid, acute to shortly acuminate, thinly pilose, often (?) always purplish, inner sepals c. 4 × 1.5 mm, colourless, very thinly pilose; corolla 1.5–1.7 cm, base somewhat inflated, colour unknown, midpetaline bands densely pilose; filaments glabrous, anthers 1.25 mm, ovary subglobose, c. 1 mm, thinly pilose; style 5 mm long, pilose, stigmas 2 mm, slightly widened apically. Capsule and seeds unknown.

Distribution. Only known from the type.

Notes. Most similar to *C. acanthocladus* but indumentum much less dense, the stem brown and thinly adpressed-pubescent rather than grey-sericeous, the corolla and sepals much shorter, the sepals more or less rhomboid being widest in the middle and gradually narrowed to the apex. The flowers appear always to be solitary.

This species is only known from a single collection. It may be rare and threatened or simply overlooked but for the time being should be classified as Data Deficient (DD) within IUCN (2012) guidelines. Nothing is known of its habitat except that it grows on a hillside. The epithet “iranicus” refers to Iran, to which this species is endemic.

Figure 19, t. 9–15

Type. IRAN, de la Escalera s.n. (holotype MA-94152!).

Description. Similar to *C. acanthocladus*. Stems erect, straight and spreading at a very acute angle to the main axis, grey-sericeous and pilose with spreading hairs, branches spine-tipped but lateral spines lacking. Leaves linear, 5–15 × 1–2 mm. Flowers solitary or paired in the uppermost leaf axils, sessile, characteristically overtopped by the spinescent branches; sepals 12–13 mm long, similar in shape to those of *C. acanthocladus* but more abruptly caudate with a pronounced apical mucro and distinctly longer; corolla c. 2.5 cm long, white but pinkish in bud. [Rechinger 1961: 22; 1963: 25; Nowroozi 2002: 25 (plate), 100 (map)]

Distribution. Endemic to Iran (Kölz 18056).
Figure 19, t. 1–8

**Type.** IRAN, Karevandar, *Parsa* 566 (holotype K).

**Description.** Small undershrub to c. 25 cm, stems and branches sericeous, spinescent, sterile cauline spines present, few. Leaves sessile, 1.5–3 × 0.5 cm, obovate or elliptic, obtuse, entire, the base attenuate to a petiole-like base, densely sericeous. Flowers in compact capitulate cymes, terminal on naked peduncle-like branches; bracts ovate, acuminate, densely pilose; bracteoles c. 8 × 2 mm, linear-lanceolate, finely acuminate, densely pilose; pedicels absent; sepals 8–9 × 1.5–2.5 mm, lanceolate, acuminate, pilose; corolla c. 1.8 mm long, cream, midpetaline bands pilose; ovary pilose; style pubescent, divided c. 5 mm above base, stigmas c. 3 mm. Capsule not seen.

[Sa’ad 1967: 85; Nowroozi 2002: 37 (plate), 101 (map), Rechinger 1963: Figure 3]

**Distribution.** Endemic to southeastern Iran (*Popov 51/157, Rechinger 55064, Mirzayan 830E, Assadi in Rechinger 54802, Runemark et al. 22616*).

**Notes.** Superficially similar to *C. oxysepalus* but the stem and leaves greyish-sericeous with adpressed hairs, the plant more obviously spiny with short-lateral spinescent branchlets in addition to the spinescent main shoots; the ovary is densely pilose and the style thinly pubescent, the stigmas only 3 mm long.

Figure 19, t. 32–40


**Type.** “In Europa Australi & Africa” (lectotype LINN No. 218.49!, designated by Sa’ad 1967: 124).


**Type.** Cultivated plant from Chelsea Physic Garden (holotype BM001035797!).

*Convolvulus cantabrica* var. *terestris* (L.) L., Mant. Pl. 2: 236. 1771. (Linnaeus 1771: 236).

**Type.** Based on *Convolvulus terestris* L.


**Type.** specimen in Herb. Tournefort (P, not seen).

*Convolvulus terminalis* Salisb., Prodr. Strip. Chap. Allerton 125. 1796, illegitimate superfluous name or possibly a variant of *Convolvulus cantabrica* L. (Salisbury 1796: 125).

**Type.** No type cited.

*Nemostima cantabrica* (L.) Raf., Fl. Tellur. 4: 82. 1838. (Rafinesque 1838: 82).

**Type.** Based on *Convolvulus cantabrica* L.

*Convolvulus dorycnioides* De Not., Repert. Fl. Ligust. 283. 1844. (De Notaris 1844: 283).

**Type.** ITALY, Liguria, *Traverso* s.n. (whereabouts uncertain).


**Type.** TURKEY, near Bouloukli, *Balansa* 698 (holotype G).

Type. Gandoger (LY, not seen).


Type. Gandoger (LY, not seen).


Type. Gandoger (LY, not seen).


Type. LEBANON, Mount Cassius (whereabouts unknown, probably BEI).


Type. IRAN, Sultanabad, _Strauss_ s.n. (holotype B†).


Type. RUSSIA, ”Abkasia”, _W. Steup_ (holotype LE†).

**Type.** “In Italia, Sicilia, Narbona, Verona” (lectotype LINN No. 218.48!, designated by Sa’ad 1967: 124).

**Description.** Undershrub with stout woody base and erect or ascending stems to 50 cm; stems commonly branched in the lower half; all vegetative parts pilose to pubescent. Leaves sessile, the basal and lowermost leaves 4–8 × 0.5–2 cm, obovate-spathulate with a long attenuate petiole-like base; cauline leaves 2–5 × 0.2–0.8(-1.5) cm, linear, linear-oblong, lanceolate or oblanceolate, acute, entire, cuneate at the base. Flowers in long-pedunculate axillary and terminal diachasial cymes, these sometimes congested and subcapitate, often forming a large lax, panicle-like inflorescence or, sometimes, appearing in the form of a lax raceme; bracts leaf-like, linear to oblong, diminishing in size upwards; peduncles 1–9 cm long; bracteoles 5–7 mm, linear, pedicels 0–10 mm; outer sepals 7–8 × 4–5 mm, lanceolate, acuminate to caudate, densely pilose, the lower half colourless, the apical portion green, the inner sepals slightly broader, ovate; corolla 1.7–2.5 cm long, pink, unlobed, midpetaline bands pilose, darker; ovary pilose, style pilose, divided c. 4 mm above base, stigmas 3 mm. Capsule pilose, seeds puberulent. [Sa’ad 1967: 121; Tohmé and Tohmé 2007: 214 (photo); Silvestre 2012: 265; Pignatti 1982: 387]

**Distribution.** Mediterranean region east to Afghanistan: Morocco (_Hooker_ s.n. [5/1871]); Algeria (_Tiarét_ s.n. [4/1858]); Tunisia (_Fay_ 1150); Spain (_Canto et al._ s.n. [20/5/1982]); Balearic Islands; France (_Hepper_ 9491, _Jolinon_ 607, _Schulz_ 173); Corsica (_Chevalier_ s.n. [21/6/1889]); Sardinia; Sicily (_Todaro_ 627); Italy (_Pamannini_ s.n. [26/6/1912]); Croatia; Greece (_Stainton_ 7759); Albania (_Alston & Sandwith_ 1450); Slovakia (_Weber_ s.n. [5/1935]); Hungary (_Kovács_ 978); Romania (_Wisniewski_ 2038); Bulgaria (_Schneider_ 989); Bosnia and Herzegovina (_Callier_ 112); Ukraine; Russia (_Karpov_ s.n. [6/1998], _Marcovicz_ 3766); Turkey (_Dudley_ 34927, _Leblebici et al._ s.n. [5/6/1972], _Sintenis_ 318, _Duzenli_ 681); Lebanon (_Maitland_ 433); Syria (_Haradjian_ 3494); Palestine (_Meyers_ 3345); Iran (_Furse & Synge_ 275, _Gauba_ 81); Azerbaijan (_Klochkova_ 386); Afghanistan (_Hewer_ 1237); Armenia (_Campbell_ 165); Georgia (_Davis_ 33807).

**Notes.** This species can look very similar to forms of _C. pilosellifolius_ but differs in the larger corolla and pilose ovary and capsule.

Figure 19, t. 41–47

**Type.** TURKEY, (Gazi)antap, *Aucher-Eloy* 1405 (lectotype G-DC, designated by Sa’ad 1967: 108); isolecotypes K!, OXF!, P!.

**Description.** Similar to *C. cantabrica* in general appearance and most characteristics but differing in the always densely spreading pilose indumentum, the always oblong leaves 1.5–5 × 0.5–1 cm, flowers in loose terminal cymes, usually solitary at the apex of the cyme branches. The sepals are green in the apical part but whish in the basal part and the corolla is white or pale pink with prominent pink midpetaline bands. [Sa’ad 1967: 108]

**Distribution.** Apparently endemic to Turkey, being found principally around Gaziantap (*Balls* 1184, *Albury et al.* 1055). Records from Syria require confirmation.

**Notes.** Sa’ad’s (1967) placement of this species with *C. turcomanicus* and *C. gracilimus* is misleading as bracts and bracteoles are present and the species is clearly very close to *C. cantabrica* in floral details.


Figure 20, t. 15–22


**Type.** IRAN, Mount Kuh-i-Besri, Sultanabad, *Strauss* s.n. (holotype B).

**Type.** IRAN, *Kotschy* 379 (holotype G; isotypes BM, C, E, GOET, FI, OXF, P, W).

**Description.** Woody based perennial with deep taproot, usually branched at base with several ascending stems in a loose tuft to c. 35 cm in height, stems and all vegetative parts obscurely to densely appressed pubescent. Leaves sessile, 3 × 0.2–0.3 cm, linear, acute, entire, attenuate at base. Inflorescence of terminal heads, occasionally with a few flowers in the uppermost leaf axil; bracts 6–9 × 1.5–2 mm, lanceolate; peduncles and pedicels absent; bracteoles 7 × 1 mm, linear, acute, often overtopping the head; outer sepals 8–9 × 2.5 mm, ovate, abruptly narrowed around the middle with a long acuminate apex, villous; inner sepals similar but with glabrous margins; corolla 1.7–2.5 cm long, cream, midpetaline bands pilose; ovary pilose; style pilose, divided 7 mm above the base, stigmas 4 mm. Capsule pilose. [Sa’ad 1967: 119]

**Distribution.** Endemic to Iran (*Schmidt* 5474, *Grant* 17704, *Stapf* 375).

**Notes.** Distinguished from other species with a capitate inflorescence by its narrow, linear leaves and adpressed stem indumentum. The sepals are shorter than in *C. commutatus*. 
Figure 20. 1–7 C. sericocephalus 1 leaf 2 bract 3 outer sepal 4 middle sepal 5 inner sepal 6 stamen 7 ovary and style. From Yanata & Dayeb s.n. (LE) 8–14 C. calvertii 8 leaf 9 bracteole 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen 14 ovary and style. From Calvert & Zohrab s.n. (E) 15–22 C. schirazianus 15 bracteole 16 outer sepal 17 middle sepal 18 inner sepal 19 stamen 20 ovary and style 21 capsule 22 seed. From Kotschy 379 (W) 23–33 C. holosericeus 23 leaf 24 bracteole 25 outer sepal 26 middle sepal 27 inner sepal 28 exterior of corolla showing midpetaline bands 29 interior of corolla showing stamens 30 stamen 31 ovary and style 32 capsule 33 seed 23–31 from Sintenis 4082 (JE) 32–33 from Sintenis 4082b (GOET) 34–42 C. lineatus 34 leaf 35 bracteole 36 outer sepal 37 middle sepal 38 inner sepal 39 stamen 40 ovary and style 41 capsule 42 seed 34–40 from Spencer 17/4/1893 (G) 41–42 from Roux 8/7/1860 (G) 43–51 C. oleifolius 43 leaves 44 bracteole 45 outer sepal 46 middle sepal 47 inner sepal 48 stamen 49 ovary and style 50 capsule 51 seed 39–49 from Rechinger 7819b (W) 50–51 from Tunta 901 (W).


**Type.** AZERBAIJAN, *Aucher-Eloy* 4947 (holotype G; isotypes BM001046241!, OXF!, P!, W!).

**Type.** IRAQ, Mosul, *Aucher-Eloy* 1411 (holotype G; isotypes BM001046242!, OXF!, P!).

**Description.** Woody based perennial with thick woody taproot, usually branched at base, sometimes more or less cushion-forming, with several erect stems in a loose tuft to c. 40 cm in height, stems and all vegetative parts densely appressed pilose. Basal leaves 3–5 × 0.4–0.8 cm, oblanceolate to spatulate, acute, entire, attenuate at base; stem leaves sessile, 1.5–4.5 × 0.2–0.8 cm, oblong-lanceolate, acute, entire, base cuneate to attenuate. Inflorescence mostly of sessile terminal heads but sometimes with 1–2 flowers in the axils of the upper leaves; heads with 1–5 flowers; bracts 10–22 × 1.5–3 mm; peduncle absent; bracteoles 4–6 × 1 mm, linear, pedicels 0–3(-9) mm; outer sepals 11–13 × 3–4 mm, broadly lanceolate, abruptly narrowed to a long attenuate apex, pilose; inner sepals ovate but slightly shorter, c. 10 mm long; corolla 2–2.8 cm long, pale pink or white, unlobed, midpetaline bands adpressed pilose, pink; ovary pilose, style pilose, divided 6–8 mm above base, stigmas 3 mm; capsule pilose, 1-seeded (fide Sa’ad 1967), seeds puberulous. [Sa’ad 1967: 116; Rechinger 1963: 14]


**Notes.** The short-pedicellate flowers which give the inflorescence a looser appearance than in related species are noteworthy. The appressed indumentum especially on the stem serves to separate this species from *C. calvertii*.


**Type.** IRAN, Ilam, Mozaffarian 88391 (holotype TARI).

**Description.** Very similar to *C. commutatus* differing in the indumentum of long spreading hairs and the inflorescence with rather loose heads, arising at both the apex of the stem and in the upper 3 leaf axils.

**Distribution.** Endemic to Iran and only known from the type collection.

**Notes.** *Convolvulus elymaiticus* appears to lie between *C. commutatus* and *C. calvertii*. The lax inflorescence, white corolla and geographical distribution suggest an affinity with *C. commutatus* while the corolla size (2 cm long) places it in intermediate position. The spreading hairs on the stem, however suggest a closer affinity with *C. calvertii* and the presence of individual flowers in the uppermost leaf axils, which also occurs occasionally
in *C. calvertii*, confirms this. Without seeing material it is impossible to be certain whether this is a good species or not but it seems likely to be a form of the variable *C. calvertii*.


**Type.** TURKEY, *Calvert & Zohrab* 1282 (holotype G; isotypes E!, OXF!).

**Description.** Variable woody based perennial with thick woody taproot, sometimes cushion-forming, with several ascending stems in a loose tuft to c. 20 cm in height, stems and all vegetative parts with long spreading hairs. Basal leaves 4–8 × 0.3–0.8 cm, oblong or oblanceolate, acute, entire, narrowed to a long petiole-like base; stem leaves sessile, 3–5 × 0.6–0.9 cm, oblong-elliptic, acute, entire, cuneate at the base. Flowers in many-flowered terminal heads, occasionally also 1–2 flowers in the axil of the uppermost leaf; bracts 1.3–3 × 0.1–0.6 cm, linear-oblong or lanceolate, acute, pilose; bracteoles 11–16 × 0.5–1 mm, linear, pilose; pedicels 0–3 mm; outer sepals 6–10 × 1.5–2 mm, lanceolate, long acuminate, pilose; inner sepals abruptly narrowed around the middle with a caudate apex; corolla 1.5–2 cm, white or pink, not lobed, midpetaline bands pilose, darker; ovary pilose; style pilose, divided c. 3 mm above base, stigmas 3–5 mm. Capsule pilose; seeds pubescent. [Sa’ad 1967: 114]

**Notes.** We recognise two subspecies:

**151a. Convolvulus calvertii** subsp. *calvertii*

Figure 20, t. 8–14


**Type.** CRIMEA, near Karassubasar and Sympheropolin (whereabouts unknown).


**Type.** CRIMEA, *Callier* 155 (lectotype K! ex Herb Churchill, designated here; isolecototypes E!, HBG, JE, K!, OXF!, P!, STU, W!, reported from LE but not seen there).


**Type.** Based on *Convolvulus calvertii* var. *tauricus* Bornm.


**Type.** Based on *Convolvulus calvertii* var. *tauricus* Bornm.
Type. Based on Convolvulus saxatilis M.Bieb.

Type. CRIMEA, Rehmann 663 (holotype location uncertain, probably LE; isotype P).

Type. Based on Convolvulus bracteosus Juz.

**Distinguishing features.** Stems and leaves with prominent spreading hairs as well as appressed sericeous hairs. Leaves oblong or oblanceolate, 5–10 times longer than broad.

**Distribution.** Turkey (Balls 1542, Stainton & Henderson 5372, Watson 2935); Crimea (Busch s.n. [6/6/1905], Callier 4563); Iran (Furse 7519, Rechinger 4765); Turkmenistan (Polyakova 226, Gubanov 399, Federov s.n. [3/6/1917]).

**Notes.** Bornmüller (1906) did not mention any specific type specimen for his var. tauricus but made reference to collections from Crimea by Marschal von Bieberstein and Callier. Juzepczuk (1950) mentioned no type but the only collection cited was Callier 155 “pro (maxima?) parte”. Sa’ad (1967) cited the same collection from LE as holotype without qualification and without seeing the specimen. Smolyaninonova (1981) proposed a lectotype from the location “in collibus cretaceis ad Barultsscha prope Karasabazar” but without collector or number. In order to end the uncertainty we have designated Callier 155 collected at “Kreideberge in Karakusch bei Karasubazar” at Kew as the duplicate at Berlin is presumed destroyed and we were unable to find a specimen at LE. This material is widely distributed and all specimens we have seen represent the same species.

Convolvulus bracteosus is a form of C. calvertii with narrowly oblong-elliptic bracts 5–8 mm wide, these exceeding the head. The basal leaves are oblanceolate. Juzepczuk & Kurgianov 1580 (LE) is a good example of this form. The exact identity of C. saxatilis is uncertain but it is probably C. calvertii subsp. calvertii.

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151b. Convolvulus calvertii subsp. ruprechtii (Boiss.) J.R.I.Wood & R.W.Scotland, stat. nov.
urn:lsid:ipni.org:names:77147678-1

Type. RUSSIA, Daghestan, Ruprecht s.n. (lectotype G 00330221!, specimen from “Daghestania prope Kutuschi,” designated here; isolectotypes G!, LE).

**Type.** Based on Convolvulus ruprechtii Boiss.
Distinguishing features. Leaves and stem silvery with appressed sericeous hairs; spreading hairs absent or almost so. Leaves broadly oblong to obovate, up to three times as long as broad. Petrov 1935: 144 (plate).

Distribution. Crimea (Vasak s.n. [29/7/1977]); Russia: Dagestan (Tsvelev et al. 1020, 2850, 3164, Alexeenko 952, 9355, Grossheim s.n. [25/6/1915]); Armenia (Fayvush et al. 04-0424); Azerbaijan (Grossheim et al. s.n. [10/6/1947]); Iran (Miller et al. s.n. [17/5/2005]). Principally in the eastern Caucasus around 1500 m.

Notes. Convolvulus calvertii is recognised by the near sessile flowers with bracts often overtopping the heads are distinctive. It is easily confused with C. commutatus and C. schirazianus but is distinguished by the distinct spreading hairs on the stem. C. lanuginosus differs in the pilose ovary and C. sericocephalus in the sparse indumentum of the inflorescence so the sepals are easily visible.


Figure 20, t. 1–7

Type. CRIMEA, Yanata & Doych 27/5/1913 (lectotype LE, designated here).

Description. Perennial herb with leaves arranged in a basal rosette, from which arise erect stems 30–40 cm high; stems adpressed pilose. Leaves sessile, mostly basal, 2–5 × 0.3–0.5 cm, linear to oblanceolate, acute, tapered at the base to a pseudo-petiole, adpressed pilose to subsericeous. Flowers congested at the top of the stem forming a headlike inflorescence with a single head arising from the uppermost leaf axil; bracts resembling linear-lanceolate reduced leaves, erect, slightly exceeding the inflorescence; peduncles of lateral capitula 2–22 mm, bracteoles filiform, pedicels 0–3 mm, sepals 14–15 × 5–6 mm, obovate, strongly cuspidate, adpressed pubescent and with a few spreading hairs, the inner sepals smaller; corolla 1.8–2 cm long, pink, midpetaline bands pilose; ovary hirsute; style pilose, divided 5 mm above the base; stigmas 4 mm. Capsule not seen.

Distribution. Crimea (Lindemann s.n.).

Notes. This species appears to be almost certainly the hybrid between C. holosericeus and C. calvertii, resembling the former in habit, leaf shape and indumentum but the latter in the presence of some spreading hairs on the sepals and the less saccate calyx. Unlike C. calvertii the sparse indumentum makes the sepals clearly visible.

Juzepczuk (1950) did not indicate type specimens for C. sericocephalus and a lectotype was incorrectly proposed by Smolyaninonova (1981) with the location as “Zapadnya storona Fyodosiskovo shosse” but without specimen citation. This appears to refer to Yanata & Doych s.n. [27/5/1913], designated as lectotype above and, incidentally, the only specimen of this taxon seen by Sa’ad. Sa’ad’s citation of Juzepczuk s.n. as the type is an inexplicable error as Juzepczuk does not cite any of his own collections.
Figure 20, t. 23–33

**Type.** CRIMEA, Marschall von Bieberstein s.n. (holotype LE!; isotype BM!).

**Description.** Undershrub with a thick woody taproot from which arise numerous short prostrate to weakly ascending stems to 30 cm forming a mat, vegetative parts all grey-sericeous. Leaves sessile, 2–4.5 × 0.2–0.6 cm, linear, oblong or oblanceolate, acute, entire, base long-attenuate. Flowers in terminal cymose clusters, usually with single flowers or few-flowered, diachasia, subsessile or borne on peduncles up to 1.7 cm long from the axils of the uppermost leaves; bracts resembling the leaves but smaller, linear- oblong; bracteoles 3–6 × 0.5 mm, linear; pedicels 1–4 mm; outer sepals 10–15 × 5–12 mm, ovate to suborbicular, acuminate, gibbous with broad membranous wing-like margins; inner sepals slightly smaller; corolla 2–2.7 cm long, pale yellow or cream; unlobed but slightly undulate, midpetaline bands adpressed pilose; ovary pubescent, style pubescent, divided c. 7–8 mm above ovary, stigmas 5 mm. Capsule pubescent, seeds puberulent. [Sa’ad 1967: 132; Parris 1978: 207]

**Notes.** We recognise two subspecies based on sepal size, although intermediates are not uncommon.

153a. *Convolvulus holosericeus* subsp. *holosericeus*

**Distinguishing features.** Sepals relatively small and narrow, 7–10 × 5–10 mm.

**Distribution.** Croatia (?); Greece; Bulgaria; Macedonia (*Soska* s.n. [15/6/1922]); Crimea (*Busch* s.n. [6/6/1905]); Russia: Daghestan (*Woronov* 385); Turkey (*Dönmez* 2507, *Davis & Coode* 36630, *Siebe* 622, *Balls* 1432, *Bourgeau* 241); Syria (*Haussknecht* 1865).


**Type.** TURKEY, Harput, *Sintenis* 427 (lectotype LD, designated by Parris 1978: 208); isolectotypes B, E!, HBG, JE, P!, W!).

**Distinguishing features.** Sepals large, suborbicular 11–17 × 11–13 mm, the type being an extreme example of the subspecies.

**Distribution.** Turkey (*Siebe* 622, *Davis & Hedge* 29166); Iraq (*Omar et al.* 49666, *Aucher Eloy* 1409). It appears to be the only subspecies present in Iraq.

**Notes.** The gibbous sepals are very distinctive in this species. *Convolvulus holosericeus* var. *macrocalycinus* was originally lectotypified by Sa’ad (1967: 133) but as she used the erroneous name “macrosepalus”, valid lectotypification dates from the *Flora of Turkey* (Parris 1978).


**Type.** SPAIN, Sierra Nevada, *Boissier* s.n. (holotype G; isotypes C, E!, G, GOET, HAL, JE, K!, L, W!).

**Description.** Cushion-forming undershrub, stems short, spreading, the bases covered in leaf remains; vegetative parts silvery-sericeous. Leaves sessile, 0.3–2 × 0.2–0.6 cm, obovate to oblanceolate, obtuse or acute, entire, cuneate to a broad base, the venation very prominent, especially below. Flowers usually solitary, terminal or axillary; peduncle 1–3 mm long; bracteoles 4–8 × 0.5–1 mm, linear; pedicels 1–3 mm; sepals 7–10 × 2–3 mm, oblong-lanceolate with caudate apex, base membranous, apex pilose, inner sepals oblong-ovate with membranous margins; corolla 1.7–2.1 cm long, pink, weakly lobed, midpetaline bands darker, pilose; ovary sericeous; style sericeous, divided 3–4 mm above the ovary, stigmas c. 4 mm. Capsule hirsute; seeds glabrous, smooth. [Sa’ad 1967: 138; Silvestre 2012: 264, 263 (plate)]

**Notes.** Divisible into two, geographical disjunct but morphologically similar subspecies:

154a. *Convolvulus boissieri* subsp. *boissieri*

**Figure 21, t. 42–49**

**Distinguishing features.** Leaves obovate or oblanceolate, the hairs weakly appressed to somewhat spreading and rather similar to the indumentum of the calyx.

**Distribution.** Spain (*Porta & Rigo* 546, *Bourgeau* 784). In the southern Sierra Nevada region.


**Figure 21, t. 40–41**


**Type.** TURKEY, Caria, *Pinard* s.n. (lectotype G, designated by Sa’ad 1967: 140; isolectotypes K!, OXF!, W!).


**Type.** TURKEY, Eastern Anatolia, *Donietti* s.n. (holotype GOET).


**Type.** Greece, *Orphanides* 2532 (holotype G; isotype K!).
Type. Based on Convolvulus parnassicus Boiss. & Orph.

Type. Based on Convolvulus parnassicus Boiss. & Orph.

Type. TURKEY, between Beyshir and Konya, Dudley 35857 (holotype E00285412; isotype K!).

Type. Based on Convolvulus compactus Boiss.,

Distinguishing features. Leaves obovate to narrowly linear-oblanceolate, hairs strongly appressed, sometimes sericeous and clearly differentiated from the spreading hairs of the calyx. [Sa’ad 1967: 140; Polunin 1980 (Plate 35)]

Distribution. Balkan peninsular and Turkey: Croatia (Botteri s.n.); Albania (Alston & Sandwith 2154); Montenegro; Macedonia (?); Bulgaria (?); Greece (Rechinger 9545, Guicciardi 2963); Turkey (Balansa 1168, Dudley 37177, Davis 21878, Post 528).

Notes. Subsp. compactus is very variable in leaf shape, plants with almost linear leaves from Turkey such as Balls 1366 fit the type of C. konyacus, but this only seems to be one extreme in the range of variation.


Type. TURKEY, Aykurt & Kemaloğlu 2172 (holotype AKDU, not seen).

Distinguishing features. This apparently sterile hybrid differs from Convolvulus holosericeus in the absence of pouched sepals and differs from C. boissieri subsp. compactus in the adpressed sericeous indumentum and in the stigma that is distinctly shorter than (rather than about equalling) the style.

Distribution. Reported from a single locality in central Anatolia.

Notes. This taxon represents C. holosericeus subsp. holosericeus × C. boissieri subsp. compactus.


Type. TURKEY, Aykurt & Kemaloğlu 1495 (holotype AKDU, not seen).

Distinguishing features. It resembles C. boissieri subsp. compactus in its cushion-forming habit but differs in its adpressed sericeous outer sepals and stems up to 20 cm high.

Distribution. This hybrid is reported from a single locality in south central Anatolia.
Notes. This taxon represents *C. holosericeus* subsp. *macrocalycinus* × *C. boissieri* subsp. *compactus*.


**Type.** TURKEY, Aykurt & Kemaloğlu 1006 (holotype AKDU, not seen).

**Distinguishing features.** Resembles *C. boissieri* subsp. *compactus* in its cushion-forming habit but differs in its pedicellate flowers and distinct stems 3–10 cm high.

**Distribution.** Reported from a single locality in SW Anatolia.

**Notes.** This taxon represents *C. boissieri* subsp. *compactus* × *C. oleifolius* var. *angustifolius* (as var. *deserti*).


**Type.** Based on *Convolvulus suendermannii* Bornm.

**Type.** Plant from Bulgaria, Ali Botush Mountain, cultivated in Berlin, Sündermann s.n. (holotype B!).

**Distinguishing features.** Intermediate between *Convolvulus boissieri* and *C. lineatus*. Stems short, ascending; leaves sessile, obovate to oblanceolate, acute, cuneate to a broad base.

**Distribution.** Endemic to the area of Ali Botush Mountain, Bulgaria

**Notes.** *Convolvulus suendermannii* is an interesting plant. We agree with Sa’ad (1967) that it has the appearance of *C. lineatus* but Bornmüller’s comment that it lies in “apparent midposition” between *C. lineatus* and *C. compactus* is readily understandable because of its dwarf habit so it is not difficult to see why Kuzmanov (1982) treated it as subsp. *suendermannii* of *C. boissieri*. It might well represent the hybrid *C. lineatus* × *C. boissieri* subsp. *compactus*. What adds to the interest is the type locality, which is precisely the same place where Stoïanov 868 was collected. This is the plant whose identity troubled Turrill and Stace (1971: 57). If this is indeed a hybrid or intermediate in some way between *C. lineatus* and *C. boissieri* subsp. *compactus* rather than a geographically anomalous population of *C. boissieri* subsp. *boissieri*, the geographical difficulties in Stace’s infraspecific classification of *C. boissieri* disappear. Some support for this view is provided by the presence of a distinct peduncle-like stem in the part of *Stoïanov* 868 preserved in the envelope of the specimen at Kew. While the leaves are clearly those of *C. boissieri* the inflorescence is thus atypical of that species and similar to that of the type of *C. suendermannii*. Another specimen
(Velčev et al. 711 (W, E) from nearby Slavjanka appears to be the same taxon. Careful field observation is necessary to confirm whether or not C. suendermannii is a hybrid. [Strid 1991: 18–20].


Figure 20, t. 34–42

Convolvulus spicifolius Desr. in Lamarck. Encycl. 3: 549. 1792. (Desrousseaux 1792: 549).
Type. Plant cultivated in Jarden du Roi (P [Herb. Lam.]).
Type. FRANCE, Avignon, Requien s.n. (holotype P, not seen).
Type. No type cited, presumably France, with reference to “Gérard, Fl. Gallo-Prov. 317, n.3”.
Convolvulus besseri Spreng., Syst. Veg. 1: 610. 1824. (Sprengel 1824: 610).
Type. UKRAINE, Pedolia, Besser s.n. (B†).
Type. ARMENIA, Yerevan, Koch s.n. (B†).
Type. MOROCCO, Oudjda, Jahandiez s.n. (holotype MPU009741!).
Type. MOROCCO, Grand Atlas, Maire & Weller 628 (holotype AL, not seen; isotype MPU004309!).
Type. RUSSIA, northern Caucasus (Balkaria), Galushko 12/7/1963 (holotype cited from but not received at LE, whereabouts unknown).

Type. Without locality, Löfling 163 (lectotype LINN No. 218.43!, designated by Sa’ad 1967: 128).

Description. Perennial herb, often mat-forming, from a thick, branched underground rhizome; stems ascending to 30 cm, vegetative parts densely but minutely puberulent to shiny white-sericeous. Basal leaves 4.5–8 × 0.8–1.8 cm, oblong to oblanceolate, acute, entire, attenuate at base into a long pseudopetiole; stem leaves distinctly sessile, 1.5–5 × 0.2–0.7 cm, narrowly linear-oblanceolate, acute. Flowers in terminal diachasial cymes and axillary cymes of 1–5 flowers; bracts and bracteoles not clearly differentiated,
3–25 × 1–3 mm, linear to oblanceolate, acute, very variable in size; pedicels 3–4 mm; sepals of two parts—pale base and acute, commonly reflexed, green apex; outer sepals 6–10 × 2 mm, oblong-lanceolate; inner sepals 6–8 × 3 mm, broadly ovate, margins scarious; corolla 1.8–2.5 cm long, pink with white centre and paler midpetaline bands, shallowly lobed, midpetaline bands appressed pilose; ovary conical, sericeous, style pilose, divided 7–10 mm above base, stigmas 5–7 mm; capsule pubescent; seeds shortly pubescent.


**Distribution.** Around the Mediterranean and Black Seas and through Iran and central Asia to western China (Xinjiang) and Siberia (Altai): Portugal; Spain (Ellman & Hubbard 282, Lewalle 9116); France (André 21/6/1855); Italy (Davis & Sutton 65425); Sicily (Alexander 1845); Morocco (Carine et al. 367); Algeria (Alston & Simpson 37688, Faure 25/5/1916); Tunisia (Davis & Lamond 56988); Malta (Duthie 4/11/1874); Libya; Egypt (Ehrenberg s.n.); Lebanon (Gombault 4482); Syria (Delessert 1965); Turkey (Davis 46875, Watson 272, Callier 672); Cyprus; Greece: Karpathos (Gathorne-Hardy 416); Dodecanese (Raus 9902); Ukraine (Shiraevsky 16/7/1903, Callier 672), Armenia (Gabriilian 5/6/1975); Georgia (Hohenacker 6/1831, Kozlowsky 12/6/1924); Azerbaijan (Aucher-Eloy 4946); Russia: Kuban (Busch et al. 367), Altai (Shishkin et al. 17/6/1931); Iran (Rechinger 4314, Edmondson 1282); Afghanistan (Grey-Wilson & Hewer 1197); Pakistan (Lace 3716); Kyrgyzstan (Borosova 27); Turkmenistan (Litwinov 1655); Kazakhstan (Androsov 3770a); Tajikistan (Nikitin & Soksov 430); Uzbekistan (Bukintisch 71); China (Roborowski 146); Mongolia/Songaria (Potanin 1876).

**Notes.** Although we have not seen the type of *C. thegemensis* we are confident in treating it as a synonym of *C. lineatus* as the diagnosis does not distinguish it from *C. lineatus* in any way.

Apart from *C. arvensis*, *C. lineatus* is the most widely distributed species of *Convolvulus*. Preliminary molecular studies suggest that this species is polyphyletic with significant genetic variation but until now no significant morphological variation has been discerned so it is here treated as a single species.


**Type.** Based on *Convolvulus × cyrius* Boiss.

**Type.** CYPRUS, Lania, Kotschy 627 (holotype G; isotype W!)

**Distinguishing features.** Similar to *C. lineatus* but with somewhat longer stems, linear-lanceolate leaves < 5 mm wide and the flowers clustered at the apex of the stem.

[Meikle 1985: 1171]

**Distribution.** Endemic to Cyprus: Cape Gata (Meikle 2908, Davis 3573K).
Notes. This taxon represents *C. lineatus × oleifolius*. *Convolvulus × cyprius* is reported to be one of a series of interconnecting plants between *C. lineatus* and *C. oleifolius* in the type locality (Meikle 1985: 1171).


Figure 20, t. 43–51

Type. “Levant”, plant cultivated in Paris (holotype P [Herb. Lam.]).

Description. 60 cm, the old growth woody, young shoots herbaceous, flower-bearing; vegetative parts grey-sericeous. Leaves sessile, (1-)2.5–6 × (0.1-) 0.4–0.8 cm, linear, obleng or oblanceolate, obtuse to acute, entire, the base long-attenuate. Flowers in terminal diachasial clusters, sometimes with single flowers or few-flowered, diachasia borne on peduncles up to 3 cm long from the axils of the uppermost leaves; bracts resembling the leaves but smaller, always linear-oblong; bracteoles 8–10 × 1–1.5 mm, linear; pedicels 0–10 mm; outer sepals 6–9 × 2.5–5 mm, ovate, shortly acuminate to an obtuse apex, villous; inner sepals broader with scarious margins; corolla 2–2.5 cm long, pink, very shallowly lobed, the midpetaline bands appressed pilose, brown, terminating in a tooth; ovary pilose, style pilose, divided c. 3 mm above base, the stigmas 5 mm. Capsule pilose; seeds, densely pubescent. [Sa’ad 1967: 131; Meikle 1985: 1167, 1169 (plate); Pignatti 1982: 387; Strid and Strid 2009: 402–403 (plate)]

Notes. *Convolvulus oleifolius* is a variable species and we recognise three varieties:

157a. *Convolvulus oleifolius* var. *oleifolius*

*Convolvulus oleifolius* var.β Desr. in Lamarck, Encycl. 3: 552. 1792. (Desrousseaux 1792: 552).

Type. without data (P-JU).

*Convolvulus linearis* Curtis, Bot. Mag. t.289. 1795, nom. illeg., non *C. linearis* Lam. (1779). (Curtis 1795: t. 289)

Type. Icon. t. 289 in Curtis, Bot.Mag. (1795).


Type. PALESTINE/ISRAEL, Eig et al. s.n., four syntypes given.


Type. GREECE, Crete, Kissamos, Grabusa Dimitraki Island, Rechinger 12165 (holotype W).


Type. Based on *Convolvulus oleifolius* var. *scopulorum* Rech.f.
**Distinguishing features.** Very variable in habit but commonly ascending with stems > 10 cm in length and branches herbaceous. Leaves very variable but usually 2.5–6 × 0.4–0.8 cm.

**Distribution.** Eastern Mediterranean: Malta (Wright s.n.); Greece (Aucher-Eloy 1388, Townsend 71/158); Crete (Rechinger 12165); Cyprus (Merton 530, Davis 3286K); Aegean Islands (Boratyńska et al. 88); Turkey (Dudley 35421); Libya (Pampanini & Pichi-Sermolli 6220, Guichard Lib/558); Egypt (Wanntorp & Sjödin 2390); Palestine/Israel (Grierson 4/1970).


**Type.** LIBYA, Cyrenaica, Pampanini s.n. (holotype FI).

**Distinguishing features.** Distinguished by its prostrate, pulvinate habit – it does not normally exceed 10 cm in height. The leaves are oblong-elliptic, small, 1–2 × 0.4–0.6 cm.

**Distribution.** Appears to be a maritime ecotype and is reported from Libya and Cyprus (Seligman s.n. in Casey 1656, Kennedy 1783).


**Type.** LIBYA, Cyrenaica, Pampanini s.n. (holotype FI!).

**Distinguishing features.** Distinguished by its rigid, more or less fastigiate habit, the branches all woody. Leaves are linear, 1–1.5 × 0.2 cm and mostly absent below. The hairs on the bracteoles and calyx are shorter than in the type.

**Distribution.** Reported from Libya, Cyprus and Turkey (Syngressides 381, Seligman s.n. in Casey 1657).


**Type.** GREECE, Crete, Ierápetra. *Greuter 7802* (holotype Hb. Greuter (B or PAL?); isotypes E00288017!, G, LD, W!).

**Distinguishing features.** Undershrub clearly related to *C. oleifolius* and distinguished by its unusual habit. It is a pendulous plant, strongly acrotonous in its branching with the leaves in fasciculate bunches. No floral differences from *C. oleifolius* are known.

**Description.** Endemic to Crete.
Notes. It is impossible to confirm whether this is a distinct relict species or some peculiar adaptation of *C. oleifolius* to the cliff habitat. Its population is apparently restricted to a small number of plants on one or two limestone cliffs.


Figure 21, t. 11–17


Type. Based on *Convolvulus mazicum* Emb. & Maire


Type. Based on *Convolvulus mazicum* Emb. & Maire

Type. MOROCCO, Middle Atlas, J. Guebber-Rahal, *Emberger* s.n. (syntypes RAB078146!, P00417706!, MPU 006033, MPU006032, ?AL).

Description. A small cushion plant, 7–13 cm in diameter with a stout woody taproot, stem sericeous. Leaves sessile, 2–3 × 0.2–0.4 cm, linear to linear-oblan-ceolate, acute, entire, base attenuate, grey sericeous-pubescent on the lower surface and margins of upper surface, glabrous on central area. Flowers solitary or paired, sessile or on very short terminal peduncles up to 10 mm long; bracteoles linear, 3 × 0.5 mm, pedicels 2 mm; outer sepals 5–6 × 2 mm, lanceolate, obtuse, pilose; inner sepals ovate, c. 4 mm wide, membranous, abruptly narrowed to a green, pilose mucro; corolla 1.6–1.7 cm long, white, lobed with red, pubescent, midpetaline bands terminating in a broadly triangular lobe; ovary conical, pilose at apex; style pilose, divided c. 4 mm above base, stigmas 3 mm. Capsule and seeds not seen. [Sa’ad 1967: 146]


Notes. Dwarf plants of *C. lineatus* are similar but have longer sepals and corollas and the upper surface of the leaves are uniformly sericeous.


Figure 21, t. 26–32


Type. TURKEY, Eskisehir, *Scheibe* 1075 (holotype B!).
Figure 21. 1–10 *C. libanoticus* 1 habit 2 leaves 3 bracteole 4 outer sepals 5 middle sepal 6 inner sepal 7 stamen 8 ovary and style 9 capsule 10 seed 1–8 from Zerny s.n. (W) 9–10 from Kotschy 54 (W) 11–17 *C. mazicum* 11 leaves 12 bracteole 13 outer sepal 14 middle sepal 15 inner sepal 16 stamen 17 ovary and style. From Sauvage 13602 (RAB) 18–25 *C. cataonicus* 18 leaves 19 outer sepal 20 middle sepal 21 inner sepal 22 stamen 23 ovary and style 24 capsule 25 seed. From Haussknecht s.n. (W) 26–32 *C. phrygius* 26 leaves 27 bracteole 28 outer sepal 29 middle sepal 30 inner sepal 31 stamen 32 ovary and style. From Scheibe 1075 (B) 33–39 *C. carduchorum* 33 leaves 34 bracteole 35 outer sepal 36 middle sepal 37 inner sepal 38 stamen 39 ovary and style. From Handel-Mazzetti 2572 (W) 40–41 *Convolvulus boissieri* subsp. *compactus* 40 leaves 41 bracteole. From Kotschy 139 (W) 42–49 *C. boissieri* subsp. *boissieri* 42 leaf 43 outer sepal 44 middle sepal 45 inner sepal 46 stamen 47 ovary and style 48 capsule, 49 seed 42–47 from Bourgeau 784 (G) 48–49 from Hackel 8 (W).
Type. TURKEY, Eski-Scheher, Warburg & Endlich 515 (holotype B!).

Description. Compact cushion-forming undershrub with thick woody taproot, branched at base with short woody prostrate to ascending branches to c. 15 cm, young stems sericeous. Leaves sessile, 1.2–2 × 0.3–0.4 cm, linear-ob lanceolate, acute, attenuate at the base, sericeous and with some spreading hairs. Flowers solitary, axillary, shortly pedunculate but becoming crowded, sessile and subcapitate towards the branch tips; peduncles 0–5 mm, pilose; bracts leaf-like; bracteoles similar but shorter; sepals 8–11 × 3 mm, oblong, acute to apiculate, concave, adpressed pilose, not bicoloured; corolla 1.7–2.3 cm long, white with distinct pink, pubescent midpetaline bands, unlobed; ovary pilose; style glabrous, divided c. 4 mm above base; stigmas 4 mm. Capsule and seeds unknown.

Distribution. Endemic to Turkey (Rechinger 61014, Fitz & Spitzenberger 721, Sorger s.n. [28/5/1964]).

Notes. Could be confused with C. boissieri subsp. compactus but the 1-nerved, near linear leaves are distinct.

Although Parris (1978: 209) treated C. phrygius and C. pulvinatus as distinct species, they were collected at the same place and the distinctions in measurements are minor. The corollas are similar in size and the sepals are only about 2 mm different in length. There is no good reason to treat them as separate species.


Figure 21, t. 1–10


Type. GREECE, Keyllenes, Heldreich s.n. [21/6/1848] (B†; neotype Heldreich 961 (B, designated by Sa’ad 1967: 143); isoneotypes C, CAIM, E, G, K, JE, HAL, OXF, P, STU, W).


Type. Based on Convolvulus radicosus Heldr. & Sart.

Type. LEBANON, Boissier s.n. (lectotype G, designated by Sa’ad 1967: 143).

Description. Cushion plant with branched woody rootstock, herbaceous flowering stems to 5 cm, vegetative parts adpressed-pilose to subglabrous. Leaves sessile, 1–2.5(-6) × 0.2–0.4 cm, linear to oblanceolate, obtuse to acute, entire, base attenuate; glabrous or very sparsely hairy on the upper surface. Flowers in small terminal diachasial cymes of up to 5 flowers with solitary axillary flowers or axillary cymes; bracts leaf-like; peduncles 0–3 cm; bracteoles 3 × 0.5 mm; sepals 5–8 × 1.5–2 mm, oblong-ovate, scarious with distinct, acute, green triangular apex, inner sepals scarious; corolla 1.2–1.5 cm, white or pink, unlobed, midpetaline bands pilose, terminating in a tooth; ovary pilose; style pubescent, divided c. 2 mm above the base; stigmas c. 4 mm.
Capsule pubescent, seeds puberulent. [Sa’ad 1967: 143; Tohmé and Tohmé 2007: 215 (photo); Strid 1991: 17–18]

**Distribution.** Lebanon (Bornmüller 1107, Gombault 4483), Syria (Kotschy 54); Turkey (Davis 13514); Greece (Stamatiadou 6559); Crete (?). Disjunct on mountains 1600–2700 m.


Figure 22, t. 39–47


Type. TURKEY, between Ankara and Tkat, Acher-Eloy 4939 (holotype G).

**Type.** TURKEY, Donietti s.n. (holotype GOET).

**Description.** Perennial cushion-forming plant with woody taproot and short spreading woody branches, the herbaceous parts densely covered with weakly appressed to spreading, stiff hairs. Leaves sessile, dimorphic, small obovate-spathulate leaves 3–5 mm long with a broad base mixed with linear to oblanceolate, acute entire leaves, 1–2 × 0.2–0.5 cm, with an attenuate base. Flowers terminal, solitary (?always), sessile; bracteoles 5–7 mm, linear; outer sepals 3 × 1.5 mm, obovate, cuspidate, whitish, pilose; inner sepals 3 × 2 mm, broadly obovate, cuspidate, corolla pink, 2–2.2 cm, unlobed, midpetaline bands pilose; stamens very unequal; ovary pilose, style thinly pilose, divided c. 3 mm above base; stigmas 6–10 mm long; capsule pilose; seeds puberulent. [Sa’ad 1967: 138]

**Distribution.** Endemic to Turkey (Stainton & Henderson 5100, Davis 21910, Kotschy 179, Manissadjian 137).

**Notes.** A very distinctive species on account of its indumentum, dimorphic leaves, tiny calyx, pink corolla and unusually long stigmas.


Figure 21, t. 18–25


Type. TURKEY, Stainon & Henderson 5471 (holotype E00285414!; isotype K!).


Type. TURKEY, Kastamonu, Davis 21640 (holotype K!; isotype E!).

**Type.** TURKEY, Beryt Dagh, Haussknecht s.n. (holotype G; isotype W!).

**Description.** Woody based perennial, branched at base with a thick, woody tap root, somewhat cushion-forming with short spreading woody branches and ascen-
ing herbaceous stems to c. 20 cm, adpressed pilose with some spreading hairs. Leaves mostly basal, sometimes folded, sessile, 1–6 × 0.2–0.3 cm, linear or linear–oblanceolate, acute, entire with long tapering base; lower surface and margins pilose, upper surface glabrous except at margins. Flowers in few-flowered terminal heads, occasionally also with solitary sessile or very shortly pedunculate heads from the axils of the uppermost leaves; bracts 10–20 × 1–2 cm, linear, acute; peduncles 0–2 cm; bracteoles 3–6 mm, linear; pedicels 0–1 mm; sepals 6–10 × 2 mm, ovate, the scarious base abruptly narrowed to a green caudate apex 2–3 mm long, shortly pilose; inner sepals with broad, scarious, glabrous margins; corolla 1.5–2 cm long, white, unlobed, midpetaline bands pilose, terminating in a tooth; ovary pubescent; style divided c. 4 mm above base, stigmas 3 mm. Capsule pilose; seeds not seen. [Sa’ad 1967: 139; Parris 1978: 211]

**Distribution.** A rare species of central and eastern Turkey (Buchner 16/8/1982).

**Notes.** Similar to *C. calvertii* but distinguished by the calyx bicoloured, the apical part green.


Figure 21, t. 33–39


*Type.* TURKEY, Tunceli, pass between Pülmüür and Mutu, Huber-Morath 15657 (BASBG?, not seen, photo E!).


*Type.* TURKEY, Davis & Polunin 23382 (holotype E00285413!; isotypes BM001014567!, K!).

**Distinguishing features.** Woody based perennial similar to *C. cataonicus* but leaves, bracts and sepals adpressed pilose to subglabrous, sepals gradually acuminate and ovary and style glabrous or very thinly pilose. [Parris 1978: 211]

**Distribution.** Endemic to Turkey and apparently rare.

**Notes.** This species may prove only to be a variety or subspecies of *C. cataonicus*. It is readily distinguished by the near absence of hairs on the leaves, sepals and ovary, but at least one intermediate is known. *Brant & Strangeways* 1840 combines absence of hairs with a sepal shape similar to that of *C. cataonicus*. 

Figure 22, t. 48–55


Type. SPAIN, Montserrat, Salvador & de Jussieu (not found at P).

*Convolvulus capitatus* Cav., Icon. 2: 72. 1793, nom. illeg., non *Convolvulus capitatus Desr.* (1789). (Cavanilles 1793: 72).

Type. SPAIN, (“in monte Bañeres” (syntype MA 93917), “in montibus Monduber” (syntype MA 93915), “prope Gilet” (syntype MA 93916).


Type. SPAIN, M. Barnadez s.n. (holotype C!).


Type. Based on *Convolvulus capitatus* Cav.


Type. Based on *Convolvulus saxatilis* var. *sericeus* Boiss.


Type. SPAIN, not specified.


Type. Based on *Convolvulus saxatilis* var. *villosus* Boiss.


Type. Based on *Convolvulus saxatilis* var. *sericeus* Boiss.

Type. Without locality (lectotype P [Herb. Lam.], designated by Sa’ad 1967: 118).

Description. Woody based perennial, branched at base with erect stems to 40 cm; vegetative parts appressed pilose to villous with spreading hairs. Basal leaves 1.5–6 × 1–4 cm. oblanceolate with a long attenuate base; stem leaves sessile, 2.5–5 × 0.1–0.3 cm. linear or oblong, acute or obtuse, entire, somewhat narrowed at the base. Flowers in many-flowered terminal heads; bracts 7–22 × 2–6 mm. oblong-elliptic or ovate, acute; bracteoles 7–8 × 0.5 mm. linear; sepals 8–9 × 2.5–3 mm. narrowly ovate and abruptly narrowed into a long fine point, margin somewhat scarious; corolla 1.5–2. 8 cm long, white or pink with darker midpetaline bands, weakly lobed with broadly triangular lobes; midpetaline bands dark, pilose; ovary glabrous; style glabrous, divided c. 4 mm above base; stigmas c. 4 mm. Capsule gla-
brous, seeds smooth, pubescent. [Sa’ad 1967: 117; Silvestre 2012: 267; Polunin and Smythies 1973 (plate 38)]

**Distribution.** France (Billot 3157, Roux 1877); Spain (Jerónimo 4946, Miles at al. 311, 506, Bourgeau 332, 1297); Morocco (?).

**Notes.** A somewhat variable plant, the type adpressed pubescent, but villous plants with spreading indumentum, e.g. Font-Quer & Rothmaler 12/1935 and Simpson 51450 are frequent. Some specimens are much reduced and cushion-like, mostly from mountains in Spain (Bourgeau 334, Lofthouse s.n. [21/6/1926]).


Figure 22, t. 28–38

*Convolvulus argenteus* Desr., *Encycl.* [Lamarck et al.] 3: 552, 1789. *(Desrousseaux 1789: 552)*

**Type.** Cultivated specimen (P [Herb. Lam.]) said (erroneously) to be of Cretan origin.

**Type.** Plate “*Convolvulus Creticus rectus s. Dorycnium quorum Ponae*” in Morrison (1680: 11, sect. 1, plate 3, f.1), lectotype, designated by Sa’ad 1967: 126).

**Description.** Perennial undershrub to c. 30 cm, the flowering shoots herbaceous with all vegetative parts densely grey-sericeous. Leaves sessile, 2–3.5(-5) × 0.3–0.8(-1.2) cm, oblong to oblanceolate, acute or obtuse, entire, attenuate at base. Flowers in a dense terminal cymose cluster, sometimes with one or two flowers in the axils of bracts immediately below the cluster, borne on peduncles 1–2(-4) cm long; bracts as for leaves but smaller; bracteoles 9–14 × 1 mm, linear, acuminate and apiculate; pedicels 0–3 mm; sepals 7–9 × 2–3 mm, oblong-oblancoate, acute, densely pilose, the inner sepals broader (c. 3.5 mm) with scarious margins; corolla 2–7 cm, white, unlobed, the midpetaline bands densely pilose; ovary pilose; style glabrous or pilose at base, divided c. 3 mm above the base; stigmas 5 mm. Capsule pilose; seeds pubescent. [Sa’ad 1967: 126; Pignatti 1982: 387]

**Notes.** We recognise two varieties:

#### 166a. *Convolvulus cneorum* var. *cneorum*

*Convolvulus argenteus* Salisb., *Prodr. Stirp.* Chap. Allerton 125. 1796, illegitimate superfluous name for *Convolvulus cneorum* L. *(Salisbury 1796: 125).*

**Type.** Based on *Convolvulus cneorum* L.

**Distinguishing features.** Plants representative of the type subspecies have linear-oblong leaves and are apparently restricted to Sicily.

**Distribution.** Endemic to Sicily (*Todaro s.n., Heldreich s.n. [15/5/1840]).


**Type.** Based on *Convolvulus cneorum* var. *latifolius* Rchb.

**Distinguishing features.** Distinguished by the oblanceolate leaves.

**Distribution.** Much the most common variety: Croatia (Pichler s.n. [4/6/1868], Berger 12/5/1910); Albania (fide Greuter et al. 1983: 4); Italy (Bornmüller 48, Guadagno s.n. [10/6/1907]); Sicily (Prior s.n. [4/1845], Gabriel s.n. [19/4/1874], Bieringer 99); Tunisia (fide Pottier-Alapette 1981: 716).

**Notes.** Var. *latifolius* is not separated from var. *cneorum* geographically and does not merit the subspecific status given it by Sa’ad (1967: 127).


**Type.** “Oriente,” Hasselquist s.n. (lectotype LINN 218.50, designated by Sa’ad 1967: 90).

**Description.** Erect, perennial, much-branched undershrub from a woody rootstock to 1 m, the branches rigid and woody, adpressed pubescent. Leaves sessile, 1.5–6 × 0.2–2 cm, narrowly oblanceolate, acute, entire, attenuate at base, villose, the stem leaves smaller than those at the base. Flowers in a large, nearly leafless, branched terminal inflorescence composed of axillary cymes of 1–3(-7)-flowered diachasial cymes, the flowers appearing solitary; branches stout and woody; bracteoles 2–3 mm, linear; pedicels 0–4 mm; sepals 2.5–5 × 2–5 mm, very variable in form, oblong-elliptic to obovate, acuminate to emarginate and mucronate, adpressed pubescent, the inner sepals broader than the outer sepals; corolla 1.2–1.7 cm, pink (very rarely pure white), the midpetaline bands pilose; ovary glabrous, style glabrous, divided c. 5 mm above base, often persistent in fruit, stigmas c. 3 mm; capsule glabrous, seeds subglobose, puberulent. [Sa’ad 1967: 90; Meikle 1985: 1166; Siddiqi 1977: 13 (Figure 5); Strid and Strid 2010: 2–3 (plate)]

**Notes.** We recognise three subspecies but intermediates are quite frequently found: *Reino Alava* 6986 from Turkey, for example, is intermediate between subsp. *dorycnium* and subsp. *oxysepalus*.

167a. *Convolvulus dorycnium* subsp. *dorycnium*

Figure 22, t. 16–22

**Distinguishing features.** Branches rigid, woody; stem leaves few; sepals broadly obovate, truncate and mucronate.
Distribution. Tunisia (Cosson et al. s.n. [10/6/1883]); Greece (Aitchley 257, Halaczky s.n. [5/7/1888], Strid 31888); Crete (Verdcourt 4153); Cyprus (Economides 1188); Turkey (Balls & Gourlay 1194); Aegean Islands (Rechinger 707), Lebanon (Breidy & Khairellal 626), Syria (Kotschy 375), Palestine (Dinsmore 10187), Jordan (Dinsmore 12187); Egypt (?).


Figure 22, t. 23–27

Type. PALESTINE/ISRAEL, Tiberias, Boissier s.n. (lectotype G, designated by Sa‘ad 1967: 9); isolectotypes K!, P!).

Type. Based on Convolvulus dorycnium var. oxysepalus Boiss.

Distinguishing features. Branches rigid, woody; sepals oblong-elliptic to lanceolate, acuminate. [Nowroozi 2002: 102 (map); Tohmé and Tohmé 2007: 214 (photo)]

Distribution. Syria (Haradjian 630, Ehrenberg 133, Haussknecht s.n. [15/6/1865]); Palestine/Israel (Aucher-Eloy 1397); Iran (Kotschy 436, Hewer 3997, Bornmüller 3883, Bokhari & Edmondson 2087); Afghanistan (Gibbons 457). This subspecies has a more eastern distribution than subsp. dorycnium.


Type. KAZAKHSTAN, Regel 270 (lectotype LE!, designated by Sa‘ad 1967: 94; isolectotypes E!, K!, LE!).

Type. Based on Convolvulus subhirsutus Regel & Schmalh.

Distinguishing features. Stems leafy and more or less herbaceous; sepals narrowly oblong-obovate, more or less abruptly narrowed to a mucronate apex. Nowroozi 2002: 49 (plate), 102 (map); Breckle and Rafiqpoor 2010: 415 (photo).

Distribution. Apparently abundant in Central Asia: Northeastern Iran (Merton 3955, Andersen & Petersen 308, Sabeti 977); Afghanistan (Grey-Wilson & Hewer 848, Podlech 10760, Hedge & Wendelbo 3618); Uzbekistan (Vassilejeva & Vasilchenko 4837, Sintenis 384, Bornmüller 73); Turkmenistan (Capus 954, Djilenko 723); Kirgizstan (Popov 288, Bobrov 110); Kazakhstan (Minkwitz s.n. [23/6/1914], Fedshenko s.n. [8/8/1902]); Tajikistan (Linczevski & Masslennikova 737, Ovchinnikov 394).

**Type.** Western Tian Shan, *Popov* in Fl. As. Med. Fasc. 12, 288 (holotype TAK; isotypes E!, G, K!, LE!, P!, W!).

**Distinguishing features.** As rightly noted by Popov and Vvedensky (1927: 31) *Convolvulus tschimganicus* is intermediate morphologically between *C. pilosellifolius* and *C. dorycnium* subsp. *subhirsutus* differing from the former by the distant flowers borne on nearly straight branches and the sepals 5–6 mm long, oblong-obovate, mucronate, not distinctly bicoloured and the larger corolla 1.6–1.8 cm long. It is distinguished from the latter by its more slender, less rigid habit, spreading indumentum and the stems unbranched except near the apex so creating a less divaricate inflorescence.

**Distribution.** Endemic to Uzbekistan (*Korovin* s.n. [11/7/1928], *Khokhryekov* s.n. [8/8/1960]). Apparently rare.

**Notes.** The status of this species is unclear and it may be of hybrid origin.


**Type.** CANARY ISLANDS, Fuerteventura, *Lowe* s.n. (holotype BM000056985!; isotype K!).

**Description.** Hummock-forming undershrub 10 to 30 cm high, spreading horizontally to c. 60 cm; stems white-sericeous, stiff, spinescent when old. Leaves mostly alternate but sometimes clustered in short brachyblasts, sessile, 0.4–1.5 × 1.5–2.5 cm, oblanceolate to spathulate, acute, entire, cuneate at base, grey-sericeous with short, appressed scaly hairs. Flowers more or less sessile, axillary, 1 (-2) together; bracts similar to leaves but smaller, 5–6 × 1.5 mm; pedicels c. 1 mm, bracteoles 1.5 × 0.5 mm, oblong, acute; sepals all similar, 3–4 × 1.5–2 mm, broadly oblong-obovate, acute to mucronate, pubescent; corolla 8–10 mm long, white or pale pink, unlobed, midpetaline bands adpressed pilose, reddish; ovary with a bright orange disc, pilose; style pilose, divided c. 2.5 mm above base; stigmas 2.5 mm. Capsule reddish, densely pilose with the style persistent; seeds not seen. [Sa’ad 1967: 71 p.p.]


Figure 22, t. 1–7

*Breweria scoparia* (L.f.) Lindl., Fl. Med. 400. 1838. (Lindley 1838: 400).

**Type.** Based on *Convolvulus scoparius* L.f.
Rhodoxylon scoparium (L.f.) Raf., Fl. Tellur. 4: 80. 1838. (Rafinesque 1838: 80).

Type. Based on Convolvulus scoparius L.f.


Type. Based on Convolvulus scoparius L.f.

Convolvulus benehoavensis Bolle, Bonplandia 9: 54. 1861. (Bolle 1861: 54).

Type. CANARY ISLANDS, Palma, Bolle s.n. (?B†), ex descr.

Description. A branched unarmed undershrub to 2 m, vegetative parts glabrous or sparsely adpressed pilose. Leaves sessile, caducous, 0.5–4.5 × 0.1 mm, filiform, acute, entire. Flowers (1-) 5–6 in pedunculate, terminal and axillary cymes; peduncles 2–7 (-11) mm, pubescent; bracteoles 2–3 × 1 mm, lanceolate, acuminate, base clasping, appressed to the calyx, pubescent; pedicels 3–7 mm, stout, pubescent; outer sepals 4–6 × 2–2.5 mm, broadly oblong, mucronate; inner sepals obovate, abruptly narrowed to a mucronate apex; corolla 1–1.2 cm long, white or pinkish, deeply lobed, midpetaline bands pilose; ovary pilose; style pilose, divided 3–4 mm above base, stigmas c. 3 mm. Capsule not seen but presumably pilose. [Sa’ad 1967: 106; Bramwell 2001: 262–263 (photo); Schönfelder and Schönfelder 1997: 174–175 (photo)]

Distribution. Endemic to the Canary Islands: Tenerife, Gran Canaria, La Gomera, La Palma (?), El Hierro (Bourgeau 1427, Bramwell 1427, Murray s.n. [11/6/1899]).


Type. CANARY ISLANDS, Despréaux s.n. (holotype FI-Webb!).


Type. Based on Rhodorrhiza virgata Webb & Berthel.


Type. Based on Rhodorrhiza virgata Webb & Berthel.

Type. Based on Rhodorrhiza virgata Webb & Berthel.

Distinguishing features. The hybrid Convolvulus scoparius × floridus has leaves that are 1.12–4.86 mm wide, so intermediate in width between the parents. The inflorescence is generally compound unlike the simple inflorescences of C. scoparius but less branched than that of C. floridus.

Distribution. La Gomera and Tenerife in the Canary Islands (Bourgeau 890, Hernández & Pérez s.n. [16/4/1976], Carine & Santos Guerra 202).

Notes. This taxon represents C. scoparius × C. floridus.
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Figure 22, t. 8–15


Type. Based on *Convolvulus floridus* L.f.


Type. Based on *Convolvulus floridus* L.f.


Type. CANARY ISLANDS, Punta de Tenerife, *Hillebert* s.n.


Type. Based on *Convolvulus floridus* var. *densiflorus* Christ


Type. CANARY ISLANDS, various syntypes cited.


Type. Based on *Rhodorhiza florida* var. *angustifolia* Pit.

**Type.** CANARY ISLANDS, *Masson* s.n. (lectotype BM000829857!, designated by Sa’ad 1967: 110).

**Description.** A branched unarmed shrub up to 4 m in height, vegetative parts shortly adpressed pubescent, somewhat glabresent on older parts. Leaves sessile, 2–14 × 0.5–2.6 cm, narrowly to broadly oblong, dark green, acute to obtuse, entire, base attenuate. Inflorescence branches from the upper leaf axils forming a terminal, panicule-like inflorescence of branched cymes with primary branches to 7 cm long, the axes densely pubescent; bracteoles 1 × 0.5 mm, scale-like, caducous, pedicels 2–15 mm; outer sepals 4 × 2 mm, broadly lanceolate, apiculate, the margin ciliolate; inner sepals 4 × 4 mm, mucronate, elliptic or suborbicular, membranous; corolla 1.1–1.5 cm long, white, unlobed, mid-petaline bands pilose; anthers exerted; ovary pilose; style pilose, divided c. 3 mm above base; stigmas c. 3 mm. Capsule acute, pilose, 1-seeded; seeds minutely hirsute. [Sa’ad 1967: 110; Bramwell and Bramwell 2001: 262 (photo); Schönfelder and Schönfelder 1997: 174–175 (photo)]

**Distribution.** Endemic to the Canary Islands: Gran Canaria, Tenerife, La Palma, La Gomera, Lanzarote, Fuerteventura (*Bourgeau* 1426, *Asplund* 721, *Murray* s.n. [30/4/1894]).

**Notes.** A very distinctive species because of its shrubby habit and white flowers in a terminal paniculate inflorescence.
Species 172–190. Mostly villous undershrubs with flowers in capitulae

All species are perennial undershrubs, usually with leaves densely villous and lacking distinct petioles. Most are unarmmed. The flowers are arranged in sessile or pedunculate capitulae. They are plants mostly of the Middle East from Egypt and Saudi Arabia east to Pakistan, but not in the republics of former Soviet Central Asia.

The first two species, *C. oxyphyllus* and *C. hamrinensis* are anomalous in having spinescent branches and few-flowered capitula and form a difficult complex. As defined here, they are mostly easy to separate morphologically and geographically, their range only overlapping in Iraq. However, there are atypical specimens which do not fit comfortably in either species and the problem is intensified by what may be extreme adaptation to drought and desert conditions resulting in densely spiny, almost aphyllous specimens. Our molecular studies (Williams et al. 2014) suggest further study using extensive sampling might unravel this complex.


**Type.** IRAN, *Aucher-Eloy* 4950 (holotype G; isotypes BM!, K!, P!).

**Description.** A very variable undershrub 25–50 cm high from a woody rootstock, with woody, branches which are usually spinescent, vegetative parts usually densely white-tomentellous to villous but indumentum sometimes very short; side branches long and slender, reaching 30 cm or short, stout and spinescent. Basal leaves sessile 0.7–2.5 (-4.5) × 0.3–0.7, oblong-lanceolate, apex acute and mucronate, margin entire, narrowed to a petiole-like base, both surfaces tomentose to tomentellous, but the adaxial surface often greener; stem leaves and bracts smaller than the lower leaves, commonly ovate, acute to apiculate. Flowers 1–several in numerous subsessile villous axillary capitula (very rarely helicoid cymose in form), forming an elongate spicate inflorescence; peduncles absent, bracteoles 3.5–8 × 1.5–3 mm, lanceolate to oblong, acute; outer sepals 5–8 × 2–3.5, narrowly elliptic to oblong-obovate, acute, villous; inner sepals slightly narrower; corolla 1–1.4 cm, white or pink, weakly lobed, midpetaline bands pilose; ovary and style pilose; style divided c 5 mm above base, the stigmas 2.5 mm long. Capsule not known. [Sa’ad 1967: 76; Collenette 1999: 230; Rechinger 1961: 22 ff.; Nowroozi 2002: 34 (plate), 101 (map); Daoud and Al-Rawi 1985 (Plate 214)]

**Notes.** We recognise two subspecies:


Figure 25, t. 28–35

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**Type. IRAQ, Diyala River, near Mandali, Rechinger 9639 (holotype W!).**


Type. Based on *Convolvulus oxyphyllus* subsp. *cateniflorus* Rech.f.

**Distinguishing features.** The type subspecies is characterised by the sessile, sometimes clasping, very acute, sometimes apiculate stem leaves and bracts, long slender inflorescence branches with flowers usually 2-3 together, the sepals acute and the corolla 8–13 mm long. Spinescent side branches are few or absent.

**Distribution.** Iraq (Wheeler-Haines 1127, Rawi 21548; Guest et al. 14347, Guest 4016, 4020, Rechinger 8072, 9658, Barklay 2430, Uvarov s.n. [26/5/1932], Hazim 30665, Katib & Tikriti 29735); Iran (Haussknecht s.n. [6/1868]; Olivier & Brugièrè s.n.); Kuwait (Dickson 243). Mainly in Iraq.

**Notes.** Rawi & Alizzi 34452 is atypical because of short side branchlets, these and the main branches terminating in slender sharp spines. It is suggested that *C. cateniflorus* differs from typical *C. oxyphyllus* in the shorter, less spinescent, more densely tomentose stems and solitary flowers (Rechinger 1964: 483) but all kinds of intermediates can be found.


**Type.** IRAQ, between Ramadi and Rutbah, Rechinger 9886 (holotype W!; isotype E!).

**Distinguishing features.** Lateral branches numerous, short (2–4 cm), rigid, stout, strongly spinescent. Leaves somewhat caducous. Flowers several together, the inflorescence often elongating at maturity, reaching 3 cm in length

**Distribution.** Iraq (Rechinger 8190, 9571, Barklay & Abbas-al-Ani 3606, Alizzi & Omar 35230); Iran (Bokhari et al. 14790). Less common than the type variety.

**Notes.** The type of this subspecies is immature and almost flowerless. It could easily be interpreted as a form of *C. hamrinensis* with apiculate leaves. We have based our interpretation of this subspecies on Guest, Rawi & Rechinger 16058, apparently the same collection as Rechinger 8190).


**Figure 25, t. 36–42**


Type. SAUDI ARABIA, Collenette 2836 (holotype E!; isotype K!).


Type. SAUDI ARABIA, Collenette 2210 (holotype E!; isotype K!).
**Type.** IRAQ, Rechinger 8083 (holotype W!; isotype E00699568!).

**Description.** Undershrub with spinescent branches forming a low bush to 60 cm high and up to 1 m wide; young branchlets white-tomentellous, side branches rather short, c. 5 cm long, sometimes spine-like. Basal leaves 0.5–3 × 0.3–0.6, oblanceolate, obtuse, margin undulate, base attenuate into a long petiole-like base, densely puberulent on both surfaces, paler beneath; stem leaves and bracts 3 × 2 mm, oblong to oblanceolate, obtuse to subacute, cuneate at base. Flowers 1 (-2), sessile in the axils of bracts; bracteoles 2 × 0.5 mm, linear-oblong, pedicels 0–1 mm; sepals 5–6 × 2–3 mm, oblong to oblanceolate, obtuse, densely pilose; corolla 0.6–1 cm long, white, slightly lobed, midpetaline bands pilose; ovary hirsute, style glabrous, divided c. 4 mm above base, stigmas 4 mm. Capsule not seen.

**Distribution.** Locally abundant principally in sandy desert: Syria (?); Iraq (Guest et al. 16151B, Mohallal 19504, both sterile); Saudi Arabia: Jouf, Hail, Riyadh to Eastern Province. Mandaville 199, 217, 2271, 2328, 2465, 2485, 3124, 3208; Popov 69/224, 72/57: Chaudhary 3467; Wood 71/269; Philby s.n. [15/8/1931]; Vesev-Fitzgerald 15888; Hillcoat 364; Dickson 1074; Collenette 97, 1851, 5332, 7214, 7879, 7883, 7886. The type is from east of Baghdad but the numerous records from Saudi Arabia seem indistinguishable.

**Notes.** Arabian specimens of this species have been misidentified as *C. lanatus*. The type of *C. infantispinosus* (Collenette 2210) has more delicate spines but seems to be only a form of *C. hamrinensis*.

This species possibly intergrades with *C. oxyphyllus* but is nearly always easily identified. The plant has a characteristic appearance with short rigid spine-like side branches to the stiff woody spinescent main stem. Leaves and bracts are typically obtuse, the lower leaves petiolate. Flowers are solitary (rarely paired) axillary, usually much exceeding the rather inconspicuous bracts. At one extreme a few specimens (Collenette 5351, Rechinger 9886, Chaudhary 3467, Omar et al. 43961) have acute leaves and bracts, clearly approaching *C. oxyphyllus*. At the other extreme, specimens with obtuse, undulate leaves and bracts are found (Collenette 1851, 5332, 7874, Mandaville 7850). Collenette 1851 is especially close to the type of *C. hamrinensis*.
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**Type.** IRAN, Shiraz, *Kotschy* 357 (holotype G; isotypes BM 001014562!, C, E!, GOET, HAL, JE, L, OXF!, P!, W!).

**Description.** Weakly cushion-forming plant with a woody rootstock, from which arise ascending stems to 45 cm, vegetative parts pilose with somewhat stiff spreading hairs. Basal leaves 3–8 × 0.5–0.9 cm, oblong-oblanceolate, acute, entire, base long-attenuate and petiole-like up to 4 cm in length; stem leaves 2–5 × 0.5–1 cm, oblan- cecolate to oblong, acute, entire, base cuneate to attenuate. Flowers in sessile (above) or shortly pedunculate (below) 2–3-flowered axillary heads; bracts usually < 3 cm long, lanceolate (if longer, than narrowly lanceolate); peduncles 0–1.5 cm; bracteoles 9–11 × 1 mm, linear-oblong, acute, densely pilose; pedicels absent; outer sepals 9–11 × 2–2.5 mm, lanceolate, acuminate, densely pilose; inner sepals 8–9 × 1 mm, linear-lanceolate; corolla 2–2.5 cm long, pink, shallowly lobed, midpetaline bands darker, adpressed pilose; ovary glabrous; style glabrous, divided 3 mm above base, stigmas 4.5–5 mm; capsule glabrous; seeds glabrous. [Sa’ad 1967: 162; Austin and Ghazanfar 1979: 19]

**Distribution.** Pakistan; southern Iran ([Davis & Bokhari](#); [Macmillan](#); [Koelz](#); [Stutz](#); [Stapf](#)); Iraq ([Thamer](#)).

**Notes.** This species has been confused with *C. prostratus*, but is distinguished by its much larger corolla, monocoloured sepals and more developed cushion-like base. It has also been confused with *C. pyrrotrichus* but is distinguished by the narrower, lanceolate bracts < 3 × 1 cm.


Figure 24, t. 38–44


Type. Based on *Convolvulus pyrrotrichus* Boiss.


Type. Various syntypes.

**Type.** AFGHANISTAN, *Griffith* 5859 (holotype G; isotypes K!, P!).

**Description.** Vigorous perennial with stout, woody rootstock and stem base, to 50 cm high, the whole plant densely covered in long, soft white hairs. Basal leaves 3–13 × 0.6–2.5 cm, oblong-lanceolate, acute at both ends and with a long winged petiolate base; stem leaves sessile, 3–12 × 0.3–3.8 cm, elliptic or oblong-elliptic, acute, entire, broadly to narrowly cuneate at base, diminishing in size upwards, veins prominent. Inflorescence of sessile (above) or shortly pedunculate (below) capitula or scorpoid cymes arising from the upper part of the stem; bracts mostly 3–4 cm × 1.2–2 cm,
ovate; peduncles 0–3 cm, bracteoles 12–23 × 1.5–3 mm, linear-lanceolate, acuminate; pedicels 0–1 mm; outer sepals 10–14 × 3.5 mm, ovate, acuminate, covered with an indumentum of short dense hairs mixed with longer spreading hairs; inner sepals convex, glabrous; corolla 2–2.2 cm. white, weakly lobed, midpetaline bands pilose; ovary and style glabrous, style divided c. 2.5 mm above base, stigmas c.2.5 mm; capsule glabrous, seeds pubescent. [Sa’ad 1967: 164; Austin and Ghazanfar 1979: 20, 21(plate); Breckle and Rafiqpoor 2010: 417 (photo)]

**Distribution.** Afghanistan (Grey-Wilson & Hewer 1025, 1073; Hedge & Wendelbo 4283, 5107; Lamond 1902, 2534; Rechinger 16974, 32408); Pakistan (Lowndes 688).


Type. EGYPT, Sinai, *Forsskål* 456 (syntypes BM!, C).


Type. EGYPT, El Salhiya, *Delile* s.n. (holotype MPU).

**Type.** Based on *Convolvulus cneorum* Forssk.

**Description.** Undershrub from a woody base to 35 cm, the lower branches woody and spinescent, younger branches herbaceous; vegetative parts softly white-tomentose with spreading hairs. Leaves sessile, 1–3 × 0.3–0.5 cm, oblanceolate below, oblong above, acute, margin entire, base cuneate. Flowers in subsessile heads along the upper part of the stem; bracts oblong-elliptic to ovate; peduncles 0–5 mm; bracteoles 10 × 5 mm, ovate; pedicels absent; outer sepals 10 × 4 mm ovate, acute; inner sepals 7 × 2 mm, lanceolate, much narrower than outer sepals; corolla 1.8–2.3 cm, pale pink or white, somewhat undulate, midpetaline bands pilose; ovary and style glabrous; style divided 5 mm above base, the stigmas 4 mm. Capsule glabrous; seeds smooth, glabrous (fide Feinbrun-Dothan 1978: 37). [Sa’ad 1967: 80; Parris 1978: 203 p.p.; Boulos 2000: 331; Strid and Strid 2010: 4–5 (plate)].

**Distribution.** Lower Egypt and Sinai (Schweinfurth 2148, 1246; Keller 32; Boulos et al. 20333, 20349; Danin S-1990, Davis 10540, Schimper 727); Palestine/Israel: Negev (Zohary 7325); Turkey (Palmer T/60). The occurrence of this species in Turkey is correct, although unexpected, but records from other countries including Arabia are probably errors.

**Notes.** Replaces *C. secundus* in Egypt and Sinai. Differs principally in habit, forming a compact spiny bushlet, the lower branches and side shoots woody and spinescent. The sepals and bracteoles are more densely villous with the flower heads almost contiguous.

Figure 25, t. 8–14


Type. Palestine/Israel, *Sieber* s.n. (?B†).


Type. No type cited.


Type. No type cited.

**Type.** “Levant”, *sin coll.* (holotype P [Herb.Lam.]!).

**Description.** Perennial herb from a woody base, stems prostrate, reaching 50 cm, the whole plant densely villous. Leaves sessile, 2–4 × 0.4–1.3 cm, oblanceolate or oblong, becoming elliptic upwards, obtuse, margin entire, lower leaves attenuate at base, upper leaves and bracts cuneate, veins prominent, internodes short so leaves and flower heads more crowded than in related species. Inflorescence characteristically narrow, flowers 1–5 in subsessile, congested head-like scorpioid cymes; peduncle 0–1.5 cm; bracteoles 8–11 × 3–5 mm, lanceolate to ovate, acute; pedicels absent; outer sepals 12–15 × 3–4 mm, oblong, acuminate, flat; middle sepal asymmetric; inner sepals slightly shorter and narrower; corolla 2–2.8 cm long, usually creamy with a yellowish centre, weakly lobed, midpetaline bands long-sericeous; ovary and style glabrous, style divided 6 mm above base, stigmas 3mm; capsule glabrous, 1-seeded (fide Sa’ad 1967); seeds glabrous. [Sa’ad 1967: 168; Tohmé and Tohmé 2007: 216 (photo)]

**Distribution.** Turkey (*Uslu* 1363, 2671); Syria (*Aucher-Eloy* 1398); Lebanon (*Gombault* 693, *Blanche* 1457); Palestine/Israel (*Eig & Grizzi* 369, *Bornmüller* 1108, 1109; *Meyers & Dinsmore* 272; *Davis* 4424, 4672). On coastal sand. Records from Egypt are probably errors.

**Notes.** Unlike *C. lanatus* this species appears to have long trailing stems, which may become somewhat woody when old, but it lacks the spinescent basal branches of *C. lanatus*. The sepals are also more shortly villous so the heads are more or less separate. It differs from *C. schimperi* in the subsessile heads and leaves not undulate-marginated and from *C. spicatus* in the subsessile heads although short peduncles are clearly present in some specimens such as *Melville* 70/31 and *Samuelson* 527 (both K).

Species 178–181 are extremely similar and may prove to be conspecific. *Convolvulus cephalodus* differs in the hirsute ovary, but other distinctions are essentially minor differences of leaf shape. Clearly further collections are needed but not even the ovary indumentum is very convincing in the absence of other distinguishing characters.
Figure 23. 1–8 C. cephalopodus subsp. bushiricus 1–2 leaves 3 bracteole 4 outer sepal 5 middle sepal 6 inner sepal 7 stamen 8 ovary and style 1–2 from Rechinger 8803 (W) 3–8 from Køie 272 (B) 9–15 C. cephalopodus subsp. cephalopodus 9 leaves 10 bract 11 bracteole 12 outer sepal 13 inner sepal 14 stamen 15 ovary and style 9–10 from Rechinger 3448a (W) 11–15 from Rechinger 3448b (W) 16–23 C. cephalophorus 16 leaf 17 bracts 18 bracteole 19 outer sepal 20 middle sepal 21 inner sepal 22 stamen 23 ovary and style 16 from Kotschy 138 (W) 17–23 from Stutz 906 (W) 24–33 C. euphraticus 24 leaf 25 bract 26 bracteole 27 outer sepal 28 middle sepal 29 inner sepal 30 stamen 31 ovary and style 32 capsule 33 seed. From Rechinger 9959 (W) 34–43 C. asyrensis 34 leaf 35 bract 36 bracteole 37 outer sepal 38 middle sepal 39 inner sepal 40 stamen 41 ovary 42 capsule 43 seeds. From sin coll. 102.148 (W) 44–49 C. stapfii 44 leaves 45 bracteole 46 outer sepal 47 middle sepal 48 inner sepal 49 ovary and style 44–48 from Stapf 374 (W), 49 from Stapf 1062 (K).

Figure 24, t. 7–13

**Type.** EGYPT, Sinai, Wadi Feiran, *March* s.n. (lectotype GOET, designated by Sa’ad 1967: 169).

**Description.** Villous perennial to 40 cm. Leaves sessile, 1.3–7 × 0.4–1.2 cm, oblong to oblanceolate, acute, margin entire, attenuate at the base, softly white-villous. Flowers in dense axillary heads; peduncles 1.5–3.5 cm, exceeding bracts; bracteoles 6–15 × 1–2 mm, linear-lanceolate, acuminate, densely villous; outer sepals 7–10 × 2–3 mm, lanceolate, acuminate, inner sepals narrower, 1–2 mm wide; corolla 2–2.5 cm, unlobed, midpetaline bands pubescent, terminating in a tooth; ovary and style glabrous; style divided c. 3 mm above base, the stigmas 5 mm, longer than the united part of the style. [Sa’ad 1967: 169; Boulos 2000: 247]


**Notes.** Differs from the two previous species in the pedunculate heads but superficially identical to *C. cephalopodus* subsp. *bushiricus*, from which it is distinguished by the glabrous ovary. Very similar to *C. schimperi* differing in the ascending habit and in the leaves which are not undulate.

The lectotype is a meagre specimen and all the other cited specimens represent more complete material.


Figure 24, t. 1–6

**Type.** JORDAN, *Robertson* 120 (holotype K!).

**Description.** Similar to the previous species. Perennial to 40 cm; stems slightly zigzag. Leaves sessile, 1.3–4 × 0.3–0.4 cm, oblong, acute (not spinescent as stated by Sa’ad), margin entire, shortly tomentose. Flowers in dense axillary heads, becoming scorioid at maturity; peduncles 1.5–3 cm, exceeding bracts; bracteoles 6–7 × 3.5–4 mm, ovate, caudate (not spinescent), densely villous; outer sepals 7 × 3 mm, elliptic, shortly acuminate or caudate, inner sepals oblong, c. 1 mm wide; corolla 2–2.5 cm, unlobed, midpetaline bands pubescent, terminating in a tooth; ovary and style glabrous; style divided c. 2 mm above base, the stigmas 5–6 mm long.

**Distribution.** Endemic to Jordan where it is known from one unlocalised record.

**Notes.** The most distinct species in this complex because of the narrowly oblong, shortly tomentose leaves combined with the pointed bracteoles and sepals but only known from the type.
Figure 24. 1–6 C. jordanensis 1 Leaf 2 bracteole 3 outer sepal 4 inner sepal 5 stamen 6 ovary and style. From Robertson 120 (K) 7–13 C. spicatus 7 leaves 8 bracteole 9 outer sepal 10 middle sepal 11 inner sepal 12 stamen 13 ovary and style 7 from Drar 162 (CAIM) 8–13 from March s.n. (GOET) 14–19 C. schimperi 14 leaves 15 bracteole 16 outer sepal 17 inner sepal 18 stamen 19 ovary and style. From Bornmüller 10896 (B) 20–27 C. kotschyanus 20 leaf 21 bracteole 22 outer sepal 23 inner sepal 24 stamen 25 ovary and style 26 capsule 27 seed. From Bent & Wright 503-103 (W) 28–37 C. reticulatus subsp. reticulatus 28 habit 29 leaves 30 bracteole 31 outer sepal 32 middle sepal 33 inner sepal 34 stamen 35 ovary and style 36 capsule 37 seed 28–29 & 36–37 from Handel Mazzetti 2975 (W) 30–35 from Davis 22109 (E) 38–44 C. pyrotrichus 38 leaves 39 bracteole 40 outer sepal 41 middle sepal 42 inner sepal 43 stamen 44 ovary and style. From Gilli 3087 (W).
Figure 25. 1–7 *C. lanatus* 1 leaves 2 bracteole 3 outer sepal 4 inner sepal 5 stamen 6 ovary and style 7 seed. From *Khattam & Scharobeim* 2923 (CAIM) 8–14 *C. secundus* 8 leaves 9 bracteole 10 outer sepal 11 middle sepal 12 inner sepal 13 stamen; ovary and style 8 from *Eig & Grizl* (CAIM) 9–14 from Täckholm s.n. (CAI) 15–20 *C. ulicinus* 15 leaves 16 bracteole 17 outer sepal 18 inner sepal 19 stamen 20 ovary and style. From *Aucher-Eloy* 3936 (W) 21–27 *C. oxysepalus* 21 leaves 22 bract 23 outer sepal 24 middle sepal 25 inner sepal 26 stamen 27 ovary and style. From *Rechinger* 3211 (E) 28–35 *C. oxyphyllus* subsp. *oxyphyllus* 28 leaves 29 bract 30 bracteole 31 outer sepal 32 middle sepal 33 inner sepal 34 stamen 35 ovary and style. From *Rechinger* 9639 (W) 36–42 *C. hamrinensis* 36 leaves 37 bracteole 38 outer sepal. From *Rechinger* 8083 (W).

Figure 24, t. 14–19

**Type.** EGYPT, Sinai, *Schimper* s.n. (holotype G; isotypes BM!, K!, P!).

**Description.** Perennial herb from a stout woody rootstock to 50 cm in height, all parts covered in long spreading hairs, which are rust-coloured when dry. Basal leaves petiolate, 1.5–6.5 × 0.5–1 cm, obovate or oblanceolate, obtuse, margin strongly undulate, with long petiole-like base; stem leaves sessile, shorter (< 2.5 cm long), linear-oblanceolate. Flowers in pedunculate heads with up to 5 flowers; bracts 1–1.5 × 0.5–0.7 cm, oblong-elliptic; peduncles 0–11 mm long, about equalling the subtending bract; bracteoles 12 × 2 mm, linear-oblanceolate; pedicels absent; outer sepals 10–11 × 2–3 mm, lanceolate, acute, villous; inner sepals narrower and shorter, c. 8–9 × 1 mm; corolla 2.2–2.5 cm, colour unknown, wavy at the apex, scarcely lobed, midpetaline bands pilose; ovary and style glabrous divided c. 5 mm above base, stigmas c. 5 mm. Capsule not seen. [Sa’ad 1967: 167; Boulos 2000: 247]

**Distribution.** Endemic to Sinai in Egypt (*Holland* s.n., *MacDonald* s.n., *Hart* s.n. [1883/4]). Apparently a rare species. Records from Arabia are errors.

**Notes.** Distinguished from *C. spicatus* and *C. jordanensis* by the strongly undulate leaves. It is very similar to some forms of *C. cephalopodus* but distinguished by the glabrous ovary. It appears to be prostrate like *C. secundus*, but is distinguished by the shortly pedunculate heads as well as the distinctive leaves.


**Type.** IRAN, Makran, *Aucher-Eloy* 4949 (holotype G; isotypes BM000049216!, K!, OXF!, W!).

**Description.** Perennial herb from a woody taproot, from which arise ascending stems 30–35 cm high. Branches stout; whole plant densely pubescent with grey hairs. Leaves sessile, 1.5–4 × 0.4–1 cm, oblong-oblanceolate, obtuse, margin crisped-undulate, attenuate to a long petiole-like base, sometimes the abaxial surface notably paler. Inflorescence of axillary, pedunculate heads, which are occasionally elongated into more or less scorpionoid cymes; peduncles 1.2–1.5 cm; bracteoles 8 × 5 mm, ovate-elliptic, acute or shortly acuminate; outer sepals 10–12 × 3 mm, broadly lanceolate to ovate, acuminate; inner sepals shorter and narrower, c. 8 × 2 mm; corolla 1.5–2 cm, pinkish, unlobed, midpetaline bands pilose; ovary comose; style glabrous or with a few hairs, divided c. 2.5 mm above base, stigmas c. 2 mm long; capsule comose, seeds pubescent. [Sa’ad 1967: 156; Nowroozi 2002: 77 (plate), 105 (map); Austin and Ghazanfar 1979: 20, 21 (plate); Jongbloed 2003: 311 (photo); Pickering and Patzelt 2008: 168 (photo)]

**Notes.** We recognise two, not very well-defined subspecies, which are bridged by intermediates:
181a. *Convolvulus cephalopodus* subsp. *cephalopodus*

Figure 23, t. 9–15

*Convolvulus sericeus* Burm.f., Fl. Indica 49. 1768, nom. illeg., non *Convolvulus sericeus* L. (1767). (Burman 1768: 49).

Type. IRAN, Garzin s.n. (holotype G).

Type. OMAN, A.S.G.Jayakar 171 (holotype BM000049219!).

Type. PAKISTAN, Balochistan, *Ramchandra Rao* & *Krandaikar* 30 (holotype CAL; isotype BM001014563!).

Type. IRAN, Bandar Abbas, *Parsa* 564 (holotype K!).

Type. IRAN, Charbar, *Parsa* 565 (holotype K!).

**Distinguishing features.** Leaves relatively short, usually less than 5 cm long, indumentum asperous. Style glabrous or with a few hairs.


**Notes.** One collection from Iranian Baluchestan (*Pierce* s.n. [11/1880]) appears to be intermediate with *C. pyrrotrichus*.

Fruiting heads often become distinctly scorpioid in structure as in *Western* 421, *Ghazanfur* 4254 & *Osborne* 602. Occasionally the heads are sessile as in *Collenette* 4159 and 9385 from Saudi Arabia and *Parsa* 565 from Iran; these forms resemble *C. kotschyanus* morphologically but can be distinguished by the undulate leaves and hirsute ovary.


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Figure 23, t. 1–8


Type. IRAN, Bushehr, *Köie* 272 (holotype C; isotype B!).

**Type.** Based on *Convolvulus bushiricus* Bornm.

**Distinguishing features.** Diffs from subsp. *cephalopodus* in the longer, softer villous indumentum, the longer leaves (2.5–9 v. 1.5–4 cm) with less obviously undulate margins, the hairy style, in which the stigmas are longer than the united part,
the lanceolate bracteoles and narrower sepals, the outer only 2–2.5 mm wide. The defining characters are not well differentiated and intermediates are known to occur. The ovary is hirsute, not glabrous as stated by Rechinger (1964: 486). [Sa’ad 1967: 151; Collenette 1999: 228 (photo); Daoud and Al-Rawi 1985 (Plates 215–217)]

**Distribution.** Principally around the head of the Persian/Arabian Gulf: Iran (Kasy 356); Iraq (Rawi & Rechinger 17242, Rechinger 8812); Kuwait (Dickson 60, 748, Rawi et al. 10521); Saudi Arabia (Holm 60, Mandaville 552, Collenette 2497, 9406).

**Notes.** Mandaville (1990: 246) suggests that the distinguishing features of subsp. *bushiricus* may be the result of seasonal or edaphic factors. This seems unlikely in the case of *C. cephalopodus* as only material from around the head of the Gulf seems to conform to subsp. *bushiricus*.

*Convolvulus euphraticus* is similar morphologically but has consistently larger heads c. 2.5 cm in diameter as opposed to 1.5 cm in diameter in *C. cephalopodus* subsp. *bushiricus*.


Figure 23, t. 24–33

**Type.** IRAQ [probably], inter Arrah et Deîr, Strauss s.n. (B!).

**Description.** Perennial herb from a woody taproot and base with stems to 40 cm, plant roughly tomentose with longish white hairs. Basal leaves 5–11 × 0.6–1.7 cm, oblongate, obtuse or rounded, margin entire to slightly undulate, base narrowed into a pseudopetiole c. 2–4 cm long; stem leaves and bracts sessile, 2–5 × 1.5–2 cm, ovate, acute, base broadly cuneate. Flowers in many-flowered, axillary, pedunculate heads, mostly 2–2.5 cm in diameter, occasionally somewhat elongate; peduncles 1.5–5 cm; bracteoles 10–15 × 1–3 mm, linear to lanceolate, long acuminate, pilose; pedicels absent; sepals 8–9 × 2.5–3 mm, lanceolate, acuminate, long-pilose, inner sepals slightly narrower, c. 2 mm wide; corolla 2–2.3 cm long, pink, midpetaline bands pilose, very shallowly lobed with midpetaline bands terminating in a comose point; ovary glabrous; style glabrous, divided 5 mm above base, stigmas 4 mm. Capsule glabrous; seeds glabrous. [Sa’ad 1967: 157; Rechinger 1961: 24]

**Distribution.** Iran, Iraq (Barkley & Palmatier 2266; Rechinger 9797, 9959; Alizzi & Husain 34096; Rawi & Nur 27028; Hamad 48878); Saudi Arabia? Common in Iraq but very rare or absent elsewhere.

**Notes.** Resembles *C. cephalopodus* subsp. *bushiricus* very closely in overall morphology but the heads are larger, pedunculate almost to the apex of the stem, the bracteoles are much longer and the ovary and style are glabrous.


Figure 23, t. 34–43
A foundation monograph of *Convolvulus* L. (Convolvulaceae) 247


**Type.** SAUDI ARABIA, Asir, *Nasher* H-20 (holotype E00285433!).

**Description.** Cushion-like perennial from a woody rootstock with decumbent to ascending stems up to 75 cm long, plant densely white-tomentellous. Basal leaves petiolate, 0.3–2 × (0.1-)0.4–0.8 cm, broadly oblanceolate, acute, base cuneate, petiole up to 2 cm long; stem leaves sessile, 2–5 × 0.5–0.8 cm, similar in shape, diminishing in size upwards and merging into bracts. Inflorescence of sessile axillary clusters towards the branch tips, raceme-like; bracteoles 3 × 2 mm, elliptic, acute; outer sepals 7 × 2 mm, oblong-lanceolate, acute, pilose; inner sepals narrower (c 1 mm wide) and slightly shorter, the margins membranous; corolla 1.6–2 cm, pink or white, undulate, midpetaline bands thinly pilose; ovary comose; style glabrous; capsule comose, seeds glabrous (or puberulent fide R.R.Mill). [Sa’ad 1967: 150; Collenette 1999: 226 (photo)]

**Distribution.** Endemic to Saudi Arabia: Asir region (*Collenette* 1686, 4159, 6815).

**Notes.** Distinguished by the cushion habit, sessile heads and usually small leaves.


*Convolvulus lanuginosus* sensu Aitch., Cat. Pl. Punjab Sindh: 98. 1869, non *Convolvulus lanuginosus* Desr. (1792).

**Type.** AFGHANISTAN/PAKISTAN, Kurram Valley, *Aitchison* 15 (holotype K!).

**Description.** Cushion/hummock forming plant with woody taproot, branched just below the ground surface to produce many very short shoots from which arise flowering stems 1–9 cm high. Leaves aggregated at the shoot tips, sessile, 2–2.5 × 0.2–0.3(-0.4) cm, oblanceolate, acute, margin entire, attenuate at the base, densely villous. Flowers 1–4 in subsessile helicoid cymes, usually reduced to heads which arise in the axils of the upper bracts; bracts 1.5 cm long, oblong, villous; peduncles 0–2 mm; bracteoles 10 × 0.5 mm, linear, acuminate, villous; pedicels absent; outer sepals villous; outer sepals 11–13 × 2–3 mm, ovate acuminate; inner sepals narrower, lanceolate c. 2 mm wide; corolla 1.4–1.5 cm long, cream (?), weakly lobed, midpetaline bands pilose; ovary and style glabrous; style divided c. 3 mm above base, stigmas 4–4.5 mm long; Capsule and seeds not known. [Sa’ad 1967: 134; Austin and Ghazanfar 1979: 19]

**Distribution.** Pakistan (*Drummond* 14414, *Duthie* 14984, *Rechinger* 30916); Afghanistan (*Rechinger* 35506, 35719).

**Notes.** Distinguished by its cushion-like habit and subsessile heads borne on a short stem.


Description. Prostrate perennial to 50 cm from a woody taproot, the whole plant densely velvety-tomentose of characteristic dark brown colour in herbarium specimens; stems 2–3 mm thick. Leaves bullate above, reticulate and greener beneath, becoming leathery when old; lower leaves up to 9 × 2.2 cm, oblong-elliptic, obtuse, entire, attenuate at base; stem leaves and bracts ovate, acute, abruptly rounded at base. Flowers in pedunculate (below) or subsessile (above) or all subsessile, axillary several-flowered heads; bracts c. 1.5–3 × 1–2.2 cm, ovate, nearly as broad as long; peduncles 0–5 cm, tomentose; bracteoles 6–10 × 2–5 mm, lanceolate to elliptic, acute; sepals 8–11 × 1.5–2.5 mm, lanceolate, acuminate, pilose; inner sepals narrower, c. 0.5–1 mm wide; corolla 1.2–1.5 cm long, white, unlobed but slightly undulate, midpetaline bands adpressed brown-pilose; ovary glabrous; style glabrous, divided c. 3 mm above base; stigmas 4 mm; capsule glabrous; seeds pubescent (fide Sa’ad). [Sa’ad 1967: 165]

Notes. We recognise two subspecies:

185a. *Convolvulus reticulatus* subsp. *reticulatus*

Distinguishing features. Stems relatively slender 2–3 mm wide, bracteoles lanceolate 2–3 mm wide, sepals lanceolate, 1.5 to 2.5 cm wide.


Type. IRAN, Behbehan, *Haussknecht* s.n. (lectotype G, designated by Sa’ad 1967: 166); isolecotypes JE, W!

Type. Based on *Convolvulus waltherioides* Boiss. & Hausskn.

Distinguishing features. Distinguished by its stout stems, c. 5 mm thick, elliptic bracteoles 4–5 mm wide and obovate sepals c. 4 mm wide. [Sa’ad 1967: 166; Rechinger 1963: 16]

Notes. Appears to be mostly sympatric with subsp. reticulatus and might be best treated as as a variety although the differences between the subspecies are relatively substantial.

Figure 23, t. 44–49

**Type.** IRAN, W. Kazerun, *Stapf* 374 (holotype W!).

**Description.** Perennial herb from a woody rootstock stems to c. 30 cm, the whole plant densely velvety-tomentose of characteristic dark brown colour in herbarium specimens. Basal leaves unknown; stem leaves sessile, 4–7 × 1.2–2 cm, oblong-lanceolate, acute, margin entire, base cuneate, leathery in texture. Flowers in sessile clusters in the axils of bracts along the upper part of the stem; bracts triangular-ovate, 3.5 cm long below but diminishing in size upwards, bracteoles 10 × 1 mm, linear, villous; sepals 10–11 × 3 mm, ovate, finely acuminate to a long aristate point, densely villous; corolla 2–2.2 cm long, colour unknown, unlobed, midpetaline bands adpressed pilose; ovary apically pilose; style glabrous, divided c. 12 mm above base; stigmas (fide Sa’ad 1967) c. 3 mm long. Capsule not seen. [Sa’ad 1967: 172; Nowroozi 2002: 69 (plate), 104 (map)]

**Distribution.** Endemic to Iran (*Stapf* 1042). Apparently very rare and we have seen no recent collections.

**Notes.** Shares with *C. reticulatus* a distinctive indumentum in texture and colour but differs in the sessile flower clusters, pilose ovary, long style and aristate sepals. It is a poorly known species apparently not collected recently.

Figure 23, t. 16–23

**Type.** IRAN, *Kotschy* 138 (holotype G; isotypes E!, FHO!, P!).

**Description.** Perennial herb from a woody rootstock with stems to at least 40 cm, the whole plant densely but very shortly tomentose leaving leaf veins visible; branches somewhat woody. Lower leaves c. 8 × 1.5 cm, oblanceolate, narrowed to a long petiole-like base; stem leaves 2.5–4.5 × 1.5–2.5 cm, ovate, obtuse, margin entire, base cordate and subsessile. Flowers in dense axillary heads, sessile above, shortly pedunculate below; bracts 1.3–2.5 × 1–2.2 cm, ovate, acuminate, basally cordate; peduncles 0–1.5 cm; bracteoles 10–15 × 1–2 mm, linear, long-pilose; pedicels absent; outer sepals 14–16 × 3.5–4 mm, ovate, abruptly narrowed, rounded and with a long, aristate point, long pilose; inner sepals somewhat smaller, c. 12 × 1.5–3 mm; corolla 1.5–1.8 cm, pink, midpetaline bands long-pilose; ovary comose; style glabrous, divided c. 6 mm above base, stigma 3 mm; capsule not seen. [Sa’ad 1967: 155; Nowroozi 2002: 75 (plate), 104 (map)]
Distribution. Endemic to Iran (Stapf 373, Haussknecht s.n. [4/1868], Stutz 984). Apparently rare.

Notes. Sa’ad described the ovary as glabrous but it is comose as in her illustration.


Figure 25, t. 21–27

Type. IRAN, Acher-Eloy 4948 (holotype G; isotype P!).

Description. Perennial undershrub to about 25 cm with stems and branches rigid and somewhat spinescent, tomentellous with matted hairs. Leaves sessile, 1–2.5 × 0.2–0.8 cm, linear-oblancoelate, obovate-elliptic to subspathulate, acute, margin entire, base attenuate, adpressed pubescent with matted hairs. Inflorescence of more or less globose terminal heads; bracts 9–12 × 4–6 mm, broadly ovate, acute; pedicels 0; bracteoles 14 × 1–1.5 mm, lanceolate, acuminate; outer sepals 10–12 × 2.5–3.5 mm, oblong-elliptic, acute, densely pilose; inner sepals similar but lanceolate; corolla 1.5–1.8 cm long, colour unknown, mid-pelline bands pilose; ovary and style glabrous; style divided 3 mm above base, stigmas c. 6 mm long; capsule glabrous. [Sa’ad 1967: 84; Nowroozi 2002: 41 (plate), 101 (map)]

Distribution. Endemic to southern Iran (Rechinger 3211, 3864, 4005, Assadi et al. 1878, Popov 51/201).

Notes. This species has an inflorescence of terminal heads like C. scindicus, but lacks the reddish-brown hairs and the distinctive leaves of that species.


Figure 25, t. 15–20

Type. OMAN, Muscat, Acher-Eloy 4936 (holotype G; isotypes BM000049125!, LE!, P!, W!).

Description. Intricately branched spiny undershrub to c. 30 cm, both the main and side branches spinescent, young stems sericeous. Leaves sessile, (6-) 8–11 × 4–6 mm, obovate or spatulate, apex rounded, margin entire, base attenuate, sericeous especially abaxially. Flowers in dense sessile, axillary clusters of up to 4; bracts 2–4 × 1–3 mm, oblong-elliptic; peduncles absent; bracteoles 1–3 × 1–2 mm, elliptic, apiculate or retuse, sericeous and with spreading hairs; outer sepals 5–6 × 2 mm, narrowly elliptic, acute, densely covered in long woolly hairs; inner sepals similar but smaller, c. 4 × 1 mm; corolla 11 mm long, white, midpetaline bands woolly; ovary apically pilose; style glabrous, divided 2–3 mm above base; stigmas 6 mm. Capsule not seen. [Sa’ad 1967: 78; Jongbloed 2003: 315 (photo)]

Distribution. Almost restricted to Oman (Mandaville 3446, 6230; Popov 57/86, Lebrun 91, McLeish 3561, Edmondson 3285); United Arab Emirates (fide Jongbloed 2003: 315).

Notes. A little-known species similar to C. acanthoclados, differing in the obovate leaves, flowers arranged in sessile, axillary clusters and elliptic bracteoles. The corolla size may also be significant.


**Type.** “Scinde” [Sind], *Stocks* s.n. (G-BOIS?).

**Type.** PAKISTAN, Sind, *Stocks* 433 (holotype K!).

**Description.** Perennial undershrub with rigid but not spinescent branches, 20–60 cm high, branches softly grey-tomentellous. Leaves alternate or more or less clustered, sessile, coriaceous, 5–15 × 4–6 mm, obovate or elliptic, rounded to obtuse, margin undulate, gradually narrowed at base, grey or rufous-tomentose, veins strongly impressed. Inflorescence of sessile terminal heads covered in reddish-brown hairs; bracteoles 6–7 × 4 mm, obovate-elliptic, lacking veins, villous; sepals 6–7 × 1.5 mm, lanceolate, densely reddish-brown villous; corolla 10–12 mm long, white, shallowly lobed, midpetaline bands pubescent; ovary and style glabrous; capsule glabrous, apparently always 1-seeded; seeds glabrous, smooth. [Austin and Ghazanfar 1979: 17]

**Distribution.** Probably endemic to Pakistan (Lamond 810, Jaffri 3712, Rechinger 28498). Records from India (Bhandari 1978: 248) require confirmation.

**Notes.** Very distinctive because of the reddish-brown-haired terminal heads combined with the woody, but not spinescent, branches and the small, often clustered leaves with strongly impressed veins.

**Excluded and poorly understood species**

The following is a list of species placed in *Convolvulus* in recent literature such as Austin et al. (2012) and here treated as belonging to other genera together with names of species correctly placed in *Convolvulus* but not treated in the main text because their exact identity is unknown or they were never correctly published. Historically many species of Convolvulaceae were originally described in *Convolvulus* but have long since been transferred to other genera. Most of these names and their modern equivalents, where known, can be found in Staples (2014).


Uncertain species with no type at GOET. Probably = *C. crenatifolius* subsp. *montevidensis* (Spreng.) J.R.I.Wood & R.W.Scotland and possibly based on *C. montevidensis* Spreng. although this is not cited as basionym (Staples et al. 2012).

*Bucharea atlantica* Raf., Fl. Tellur. 4: 84. 1838. = Unidentified *Convolvulus* sp. from North Africa.

*Convolvulus adscendens* Steud., nom nud. (Boissier 1875b: 100) = *C. reticulatus* Choisy

*Convolvulus argenteus* Lam., Fl. Franç. (Lamarck) 2: 266. 1779. No type known; unlikely to be *Convolvulus cneorum* L. (unless cultivated) but could be an older name for *C. lanuginosus* Desr.
Convolvulus argyrophyllus Hoffmans., Verz. Pfl.-Kult. 53. 1824, nom. nud. = Convolvulus althaeoides subsp. tenuissimus (Sm.) Batt.

Convolvulus aridus Greene, Pittonia 3(19C): 330. 1898. = Calystegia macrostegia subsp. arida (Greene) Brummitt


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Convolvulus arvensis var. cordifolius Lasch, Linnaea 4: 407. 1829, nom. nud. = Convolvulus arvensis L.

Convolvulus arvensis var. minutus Maire, Cat. Pl. Maroc 3: 587. 1934, nom nud.; no description has been traced.


Convolvulus binghamiae Greene = Calystegia sepium subsp. binghamiae (Greene) Brummitt


Convolvulus capensis var. bowienanus (Rendle) A.Meeuse = Merremia sp. (probably).


Convolvulus cyclostegius House = Calystegia macrostegia subsp. cyclostegia (House) Brummitt

Convolvulus dasyccephalus Pall., nom. nud = ? Convolvulus calvertii Boiss.


Convolvulus flavus Willd. = Merremia hederacea (Burm.f.) Hallier f.
Convolvulus fulcratus (A.Gray) Greene = Calystegia occidentalis subsp. fulcratus (A.Gray) Brummitt


Convolvulus hastatus Sieber (Choisy, 1845: 412) = Convolvulus fatmensis Kunze


Convolvulus japonicus Thunb. = Calystegia hederacea Wall.

Convolvulus jeemensis Kotschy = unknown species, neither protologue nor specimen can be traced.

Convolvulus linoides Bornm. = Seddera virgata Hochst. & Steud. ex Hochst.

Convolvulus longipes S.Watson = Calystegia longipes (S. Watson) Brummitt

Convolvulus macrostegius Greene = Calystegia macrostegia (Greene) Brummitt

Convolvulus malacophyllus Greene = Calystegia malacophyilla (Greene) Brummitt

Convolvulus mazzicum var. atlantis Sauvage & Vindt, Fl. Maroc 2: 38 (1954), not validly published; no type or Latin description. = Convolvulus mazzicum Emb. & Maire


Convolvulus nodiflorus Desr. = Jacquemontia nodiflora (Desr.) G.Don

Convolvulus nytageinus Greene = Calystegia atriplicifolia Hallier f. subsp. buttensis Brummitt in part

Convolvulus occidentalis A.Gray = Calystegia occidentalis (A.Gray) Brummitt

Convolvulus peirsonii Abrams = Calystegia occidentalis (A.Gray) Brummitt

Convolvulus pilosellifolius var. orreanus Murb. (Maire 1936: 251). Appears to be a nom. nud. = Convolvulus prostratus Forssk.

Convolvulus polymorphus Greene = Calystegia occidentalis (A.Gray) Brummitt


Convolvulus rozynskii (Standl.) Lewis & Oliver = Jacquemontia rozynskii Standl.

Convolvulus rubescens Poir., Encycl. [Lamarck et al.] Suppl.3: 466 (1814) = C. erube- scens Sims


Convolvulus schimperi var. ellipticus Post, Fl. Syria: 561. 1896. from Gaza with no cited type, most likely = Convolvulus secundus Desr.
Convolvulus sepium L. = Calystegia sepium (L.) R.Br.
Convolvulus soldanella L. = Calystegia soldanella (L.) R.Br.
Convolvulus spathameus L. = Calystegia spathameus (L.) Pursch.
Convolvulus subacaulis (Hook. & Arn.) Greene = Calystegia subacaulis Hook. & Arn.
Convolvulus tomentellus Greene = Calystegia occidentalis (A.Gray) Brummitt
Convolvulus tournefortii Sieber ex Spreng., Syst. Veg. 1: 611. 1824, nom. nud. = Convolvulus cantabrica L.
Convolvulus translucens Hance, J. Bot. 7: 165. 1869; Type. Williams 14690 (BM001014564, fragment) from Mongolia, = ? C. arvensis L.
Convolvulus wallichianus Spreng. = Calystegia hederacea Wall.

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All references cited in the text are provided in full below. However the user’s attention is drawn to the increasing availability of images and particularly photographs on the internet. The following website, not specifically cited in the text, for example, provides photographs and distribution maps of all Italian species: http://luirig.altervista.org/flora/convolvulus.htm


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