A revision of the genus *Melolobium* (Genisteeae, Fabacaeae)

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Abstract

*Melolobium* is a hitherto poorly known southern African papilionoid genus of the family Fabaceae. Although 20 species have previously been described, in the present revision, we recognize only 15 species. The genus appears to have close affinities with a number of other African genistoid genera (*Adenocarpus*, *Argyrolobium*, *Dichilus* and *Polhillia*), but can be distinguished by the often spiny habit, auriculate stipules and presence of glands (stalked and sessile) in most species of the genus. A cladistic analysis of morphological and anatomical characters resulted in a partially resolved cladogram in which virgate, non-spiny species are sister to the divaricately branched spiny group of species. The correct nomenclature, typification of names, descriptions, geographical distributions and a key to all the species of *Melolobium* are presented.

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1. Introduction

*Melolobium* Eckl. and Zeyh. is a papilionoid legume genus restricted to southern Africa. Within the African Genisteeae, it is related to *Adenocarpus* DC, *Argyrolobium* Eckl. and Zeyh., *Dichilus* DC and *Polhillia* C.H. Stirton (Polhill, 1976; van Wyk and Schutte, 1995). Among them, *Melolobium* has not been comprehensively revised since Harvey’s (1862) treatment, while the other genera have been dealt with during the past 30 years. *Adenocarpus* was revised in 1976 (Gibbs, 1967), *Polhillia* in 1986 (Stirton, 1986), *Dichilus* in 1988 (Schutte and van Wyk, 1990), tropical African species of *Argyrolobium* in 1968 (Polhill, 1968) and the southern African contingent of *Argyrolobium* in 1994 (Edwards, 1994). The species of *Melolobium* have remained poorly known and their circumscriptions complicated by extreme regional variation and lack of critical evaluation in recent publications. As a result, it has become very difficult to identify and name *Melolobium* species.

The aim of this paper is to present: (a) taxonomic relationships within *Melolobium* based on morphological and anatomical data and (b) a taxonomic revision of this genus.

2. Materials and methods

Morphological data was gathered during field trips and mainly from herbarium specimens loaned from BOL, NBG (including SAM) and PRE and those housed in JRAU (abbreviations according to Holmgrem et al., 1990) and also from preserved material. The typification of names of *Melolobium* species was based on specimens from the above herbaria and also from BM, K, P and S. Lists of voucher specimens of all material used are given in Moteetee (2003). Each species description includes measurement ranges of the various plant parts; the numbers in the parentheses represent extreme values. The specimens examined are arranged in numerical sequence according to the grid reference system; the locality records are given to within a quarter degree square. The type localities are also cited according to this system. Methods for the preparation of anatomical sections have been presented in Moteetee et al. (2002). Data collected for *Melolobium* was manipulated using the exact search algorithm (“ie” command) of the computer program HENNIG 86 version 1.5 (Farris, 1988). A total of 12 characters from 16 taxa, including the outgroup *Dichilus*, were analyzed. Characters and character states are listed in Table 1 and the data matrix in Table 2.

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Table 1
Characters and polarization of character states used in cladistic analysis of Melolobium with Dichilus as outgroup

(1) Growth habit: suffrutescent = 0; woody = 1; (2) growth form: erect, virgate = 0; erect, branched (taller than wider) = 1; divaricate or prostrate (shorter than wider) = 2; (3) spines: absent or slightly spiny (only flowering branches spine-tipped) = 0; present (all branches spine-tipped) = 1; (4) sessile glands absent = 0; sessile glands present on calyces only = 1; sessile glands present on leaves only = 2; sessile glands present on leaves and calyces = 3; (5) stalked glands absent = 0; stalked glands present on leaves and calyces = 1; stalked glands present on calyces only = 2; (6) leaves upper surface: glabrescent = 0; hairy (lamina visible between the hairs) = 1; densely hairy (lamina not visible) = 2; (7) stipules: absent or strongly reduced = 0; present = 1; (8) number of flowers per inflorescence: many (more than 6 flowers) = 0; few (1 – 3, rarely up to 6 flowers) = 1; (9) fruit vestiture: hairy = 0; hairy and glandular = 1; smooth = 2; (10) seed number: many (more than 4 seeds) = 0; few (1 – 4 seeds) = 1; (11) C14 α-pyridone alkaloids: absent = 0; present = 1; (12) piperidyl alkaloids: present = 0; absent = 1.

Morphological characters

Habit

Melolobium is a genus of small shrubs or perennial herbs (Harvey, 1862; Baker, 1926), recognizable by their usually spiny habit. While Polhill (1976) indicated that, in the Genistae sensu lato, “the development of spine-tips to long or short branches or to the inflorescence-axis is common in some, rarely all species of many genera”, this character is not common among the African Genistae, except in Melolobium, where many species are spiny. However, as Polhill points out, this character is of little taxonomic value above species level. In terms of spinescence, Melolobium can be divided into two groups: (a) those that are slightly spiny or lack spines completely (M. adenodes Eckl. and Zeyh., M. aethiopicum (L.) Druce, M. alpinum Eckl. and Zeyh., M. exudans Harv., M. humile Eckl. and Zeyh., M. macrocalyx Dummer, M. obcordatum Harv., M. stipulatum (Thunb.) Harv., M. subspicatum Conrath and M. wilmsii Harms) and (b) those that are strongly spiny (M. calycinum Benth., M. candidans (E. Mey.) Eckl. and Zeyh., M. canescens Benth., M. lampolobum (E. Mey.) A. Moteetee and B.-E. van Wyk, and M. microphyllum L.f.). The growth form in this genus can either be divaricate, where the branching occurs above the ground, resulting in a shrubby appearance (all the spiny species have a shrubby growth form), or virgate, where branching is mainly at ground level only. Many species are pubescent and in some cases glands and hairs co-occur. In the Genistae sensu lato, modifications of the branching system frequently occur but the branches are generally alternate (Polhill, 1976), this also being true for Melolobium.

Leaves

In Melolobium, the leaves are consistently trifoliolate. The shape of the leaflets ranges from linear-lanceolate through oblong-ovobate to obcordate. The apex of the blade is mucronate to somewhat emarginate or rounded as in M. macrocalyx. Leaflet shape is of little taxonomic value since unrelated species have similar shapes of leaflets. However, it is of diagnostic value in some species, for example M. obcordatum has distinctly obcordate leaflets and M. wilmsii has elongated, linear leaflets. The length of the petiole is quite variable but has limited diagnostic value, since regional forms within a species are often more different than the species.

While Polhill (1976) indicated that the presence of stipules in the Genistae is more of an exception than a rule, in the African genera, stipules are usually present, though not in all species. Stipules can either be free or fused; they can be very much reduced or large (Polhill, 1976). In Melolobium, auriculate stipules are a diagnostic feature; they are present in all species, except one (M. subspicatum). However, except for the last mentioned species, they do not appear to be of any taxonomic value at species level. The point of attachment is narrow resulting in the typical auriculate stipule.

Inflorescence

In Melolobium, the inflorescence is strictly a terminal racemce. In many species of the genus, the inflorescence is modified into a spine, often with only one flower at the base of the spine. The spiny species have much shorter inflorescences (no longer than 60 mm, but usually less than 30 mm), while the non-spiny ones have inflorescences as long as 170 mm. The greatest variation is in M. macrocalyx (ranging from 25 to 120 mm long).

Bracts and bracteoles

In all species of Melolobium, bracts and bracteoles are consistently present (Fig. 1). The bracts are mostly ovate-lanceolate or cordate, but they can also be linear as in M. wilmsii (Fig. 1b) or almost orbicular as in M. humile (Fig. 1f). Bracteoles are mostly narrowly ovate to lanceolate, but can also be linear as in M. wilmsii (Fig. 1b). Generally, the bracteoles are smaller than the bracts, but in some species such as M. exudans (Fig. 1e), the bracteoles can be as long as the bracts. The length of the bracts is variable in species of Melolobium ranging from 1.6 mm in M. canescens to 7.8 mm in M. exudans. M. exudans and M. stipulatum have the largest bracts in the genus. Within species there is not much variation, except in a few species such as M. exudans where the variation shows potential diagnostic differences between the three regional forms. Bract width does not follow the same trend; the widest
bracts are those of *M. macrocalyx* var. *macrocalyx*, ranging from 3.6 to 5.5 mm wide. As with the bracts, *M. stipulatum* has the largest bracteoles ranging from 5.1 to 6.8 mm long and 1.2 to 1.8 mm wide. The bracts and bracteoles are usually hairy and/or glandular.

**Calyx**

The tribe Genisteae is characterized by a bilabiate calyx consisting of two upper lobes and three lower ones. The upper lobes, separate or joined, form an upper lip. The three lower lobes are joined into a relatively short toothed lower lip. However, in rare cases, the calyx is spathaceous (*Spartium*) or the lobes subequal or breaking up (*Calicotome*) (Polhill, 1976). The structure of the lower lip is characteristic of the Genisteae, while the upper lobes are much more labile. In *Melolobium*, the lateral sinus is usually the deepest and the upper sinus is always deeper than the lower ones. In this genus, the structure of calyx is uniform among the species, the differences being subtle only. For example, the lower lip in species such as *M. humile* and *M. wilmsii* has very short teeth while the teeth are much longer in *M. calycinum* and *M. exudans*. The upper and lower lobes are acute, obtuse or even rounded. In some species, the upper lip is equal to the lower lip (*M. aethiopicum*, *M. alpinum*, *M. humile*, *M. macrocalyx* and *M. obcordatum*), while in the remaining species the upper lip is shorter than the lower lip. Although these variations do not exhibit any pattern, they seem to be of some diagnostic value. They however have limited phylogenetic significance since closely related species do not show similar patterns. In *M. adenodes*, for example, the lower lip is deeply trifid, while in the closely related *M. humile* the lower lip has short teeth. The calyx structure does not seem to reflect relationships but is nevertheless of some value to distinguish similar or closely related species. In almost all the species, the calyx is pubescent and/or glandular but it is never glabrous.

**Corolla**

Unlike the calyx, there is no type of corolla which can be regarded as basic to the subfamily Papilionoideae and no tribe can be characterized by the structure of the corolla (Polhill, 1976). In *Melolobium*, the calyx is generally shorter than the corolla. The petals are yellow in most species but some tend to turn orange or purple with age.

**Standard petal**

In African Genisteae, the standard petal is generally of an unspecialized type. The standard lacks any appendages but in *Dichilus* the base of the lamina has callosities. In *Melolobium*, the standard petal shows very little morphological variation. It can either be suborbicular or ovate-oblong, with a well-developed claw. The shape of the standard petal does not appear to be of any phylogenetic importance since related species have different shapes. The character is nevertheless of some diagnostic value to distinguish between species. For example, in *M. candicans*, the standard is suborbicular, while in the closely related *M. canescens* (both species have spiny inflorescences and sessile glands on leaves and calyces) the standard is ovate-oblong. In some populations of some species (*M. alpinum*, *M. exudans*, *M. microphyllum*, *M. stipulatum*, *M. subspicatum* and *M. wilmsii*), the dorsal side of the standard is glandular. The dorsal side never has sericeous hairs, as is the case in the other related genera (*Dichilus*, *Adenocarpus*, *Argyrolobium* and *Polhillia*).

**Wing petals**

In the Genisteae sensu lato “the wing and keel petals tend to become interconnected by means of auricles, corresponding hollows and pouches or just by transverse intervenal puckering of the wing petals corresponding to a ridge on the keel petals” (Polhill, 1976). In *Melolobium* (and *Dichilus*), the wing and keel petals are always interlocked by infolded auricles.

In *Melolobium*, the lamina of the wing petal is generally oblong (but sometimes the distal end is extended and quite broad, e.g., in *M. humile*) and the base is invariably clawed (with linear claws) (Fig. 2). There is not much variation in petal width between species. One of the most striking features of the wing petals is the sculpturing of the abaxial surface. Stirton (1981) has indicated that when studied with SEM, petal surfaces exhibit striking differences among different families of angiosperms and that, within Fabaceae, these variations are at tribal, generic and even specific levels. In *Wiborgia* Thunb., for example, nine different patterns were found, whereas in *Aspalathus* L. 12 were observed (Stirton, 1981). In the Papilionoideae, surface sculpturing of the wing petals consistently occurs in nine tribes, including the Genisteae and Crotalarieae. In Genisteae, the sculpturing ranges from the typical lunate type (*Lupinus L.*) through coalescing lunae (*Argyrolobium*) to lamellate lunae (*Cytisus Desf.*) and pockets (*Gonocytisus*).

All species of *Melolobium* have sculpturing on the wing petals (Fig. 2). In this genus, the sculpturing is invariably

![Fig. 1. Variation in the shape, size and indumentum of bracts and bracteoles among some species of Melolobium: (a) *M. alpinum* (B.-E. van Wyk 2631a); (b) *M. wilmsii* (A.L. Schutte 402); (c) *M. macrocalyx* (A. Moteetee 8); (d) *M. canescens* (S.J. Dean 648); (e) *M. exudans* (B.-E. van Wyk 2602); (f) *M. humile* (B.-E. van Wyk 2351). Scale bars: a–f, 1 mm.](image-url)
a linear claw. In some populations of some species (M. alpinum, M. exudans, M. microphyllum and M. stipulatum), the keel petals are glandular. The keel petals are always shorter than the wing petals. In Adenocarpus and Polhillia, the keel petals are more or less equal to the wing petals in length. In Melolobium and Argyrolobium, the keel petals are shorter than the wing petals, whereas in Dichilus they are always longer than the wing petals. This character appears to be an autopomorphy for Dichilus. There does not seem to be much variation in keel petal length and width among species of Melolobium.

**Androecium**

The tribe Genisteae is characterized by stamens that are joined into a closed tube. In this tribe, the arrangement of the anthers is variable. The carinal anther either resembles the long ones (5+5 arrangement) or it is intermediate (5+4+1 arrangement). In Melolobium, the androecium is uniform throughout. The anthers exhibit a 5+4+1 arrangement: five short, dorsifixed anthers; four long, basifixed ones; and the carinal one intermediate in size and attachment.

**Gynoecium**

The gynoecium is generally similar in all species of Melolobium. As in all members of the Genisteae, the style is curved upwards, differing only in the extend of the curvature. The ovary is subsessile and narrowly oblong, differing only in the number of ovules. It is sometimes pubescent and/or glandular, but never glandular in species that do not have glands on other parts of the plant. The smallest ovaries are those of M. macrocalyx (with one or two ovules) and M. subspicatum (containing two ovules) and the largest ovary is that of M. aethiopicum (with four to six ovules).

**Fruits**

Fruit structure in the Genisteae sensu lato has been discussed comprehensively by Polhill (1976). In Melolobium and related genera, the fruits are generally narrowly oblong, flat in lateral view (agrees with the shape of the ovary) and in some species somewhat constricted between the seeds or rarely flexuous-plicate. In Adenocarpus and Melolobium, the fruits are characterized by the presence of glandular trichomes; however in the former the glands are multicellular, while in the latter they are unicellular (Moteetee et al., 2002). In all the genera of the Genisteae, the funicles are short (relatively longer, often several times longer than the diameter of the ovules in the Crotalarieae). In Melolobium, the valves are continuous over the seeds.

In all species of Melolobium, the pods are dehiscent. The pod is either straight or falcate, but in some species straight at first and then tending to curve as they mature. Fruit shape appears to be of limited taxonomic value but can be useful in identifying some species of the genus. For example, the closely allied M. candicans and M. canescens are both spiny and velutinous-canescenth, but can be distinguished mainly on the basis of their fruit shape (straight in M. candicans, falcate in M. canescens). Fruit size is more variable than the shape in Melolobium. The size ranges from 10 mm long in the smallest

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Fig. 2. Examples of wing petals showing the type and position of surface sculpturing in species of Melolobium: (a) M. alpinum (B.-E. van Wyk 2361a); (b) M. subspicatum (A.L. Schutte 108); (c) M. wilmsii (A.L. Schutte 402); (d) M. macrocalyx (A. Moteetee 8); (e) M. aethiopicum (B.-E. van Wyk 4040); (f) M. lambolobum (B.-E. van Wyk 2143); (g) M. calycinum (A. Moteetee 10); (h) M. candicans (B.-E. van Wyk 3072); (i) M. canescens (S.J. Dean 648); (j) M. exudans (B.-E. van Wyk 2692); (k) M. stipulatum (B.-E. van Wyk 2562); (l) M. adenos (B.-E. van Wyk 3070); (m) M. humile (B.-E. van Wyk 2351); (n) M. microphyllum (B.-E. van Wyk 1585); (o) M. obcordatum (A. Moteetee and B.-E. van Wyk 4). All voucher specimens at JRAU. Scale bars: a–o, 1 mm.
fruits (M. macrocalyx and M. calycinum) to 30 mm long in the largest fruits (M. aethiopicum) and 3 mm wide in a number of species to 5 mm wide (M. aethiopicum). Fruit size therefore does present some taxonomically useful discontinuities among species.

The vestiture is perhaps the most important diagnostic feature of fruits of Melolobium. With the exception of one species (M. lampolobum), the type and distribution of the vestiture largely corresponds with the vestiture on the calyx (see Moteetee et al., 2002). For example, species with stalked glands on their calyces (M. adenodes, M. exudans, M. humile, M. microphyllum, M. obcordatum and M. stipulatum) also have stalked glands on their pods. In M. lampolobum, the calyces have sessile glands but the pods lack both glands and hairs; they are smooth and shiny.

The way the pods are held, sessile or subsessile and pointing upwards, or hanging down on slightly curved pedicels may be a useful taxonomic character.

Seeds
In the Genistae sensu lato, the size of the seeds varies from 1 mm in Lotononis (DC) Eckl. and Zeyh. and related genera to over 10 mm in Lupinus (Polhill, 1976). The shape ranges from almost circular to oblong-ovate to oblong-elliptic, but when the radicular lobe is pronounced, oblique-cordiform and oblique-reniform shapes may be obtained. Due to the hilum, some asymmetry may result. Polhill (1976) has argued that the shape of the seed further supports his idea of regional groupings in the Genistae sensu lato. The Genistae sensu stricto tends to have transversely oblong to rounded seeds, while the Crotalareae (as most other papilionoid legumes) often shows markedly oblong seed shapes. Indeed, the transversely oblong seed shape found in Melolobium and most other genera of the Genistae may be viewed as a synapomorphy for the tribe.

In Melolobium, the colour ranges from pale yellow (sometimes almost cream) or pale olive (or olive) through different shades of brown to black. The seeds can also be mottled or have streaks of brown or black. Seed colour appears to be quite variable even within species. For example, in M. obcordatum, the seeds are brown, black or mottled brown; in M. microphyllum, they are rusty brown, dark brown, pale yellow mottled light brown or dark brown; and, in M. alpinum, they are pale yellow mottled black. However, no colour is exclusive to one species or a group of related species. Seed size in Melolobium ranges from 1 mm wide in a number of species including M. macrocalyx and M. candidans to 3 mm in M. stipulatum and M. aethiopicum and from 1.3 mm long in M. canescens to 3.5 mm long in M. lampolobum. There appear to be no taxonomically useful discontinuities among species of Melolobium presented by seed size, colour and shape.

Phylogenetic relationships
The genus Melolobium has been classified in the same group (tribe or subtribe) as the genus Dichilus by many authors (e.g., Bentham and Hooker, 1865; Hutchinson, 1964; Polhill, 1976, 1981), indicating a relationship between the two genera. Bentham (1844) placed the two genera in the tribe Genistae. In 1865, he further subdivided the Genistae into five subtribes and placed Dichilus and Melolobium in the subtribe Crotalarieae. Hutchinson (1964) raised the rank of Bentham’s subtribes to tribes and divided the subfamily Papilionoideae (which he treated as a separate family Fabaceae) into 50 tribes. He then included Dichilus and Melolobium in the tribe Lotononideae (Bentham’s Crotalarieae). Polhill (1976) also placed the two genera close together in Crotalarieae, on the basis of bilabiate calyces with trifid lower lips. There has not been any evidence to the contrary.

Petaliole anatomy indicates a close relationship between Dichilus and Melolobium. A group of fibers occurs along the adaxial side of the primary vascular bundle of the petiole. Although this feature is not exclusive to these two genera (also observed in species of Argyrolobium and Adenocarpus), it is consistent in all species of Dichilus and Melolobium. This sister group relationship has further been supported by Crisp et al. (2000) DNA sequences of the rbcL gene and the ITS region. Dichilus was therefore chosen as outgroup for a cladistic analysis.

DNA was used to further investigate phylogenetic relationships between species of Melolobium. Sequences from the plastid genes rbcL, trnL-F and the ITS region of the nuclear DNA were obtained and analyzed using the methods outlined in Moteetee (2003). Four genistoid genera (Adenocarpus, Argyrolobium, Dichilus and Polhillia) were used as outgroups in the analyses.

3. Results and discussion
3.1 Cladistic analysis of morphological and chemical characters

The cladistic analysis of morphological characters in Melolobium resulted in 25 most parsimonious trees, with a length of 33 and consistency index of 54. The topology of the strict consensus tree of 25 cladograms is shown in Fig. 3. Two main clades are observed in Melolobium: (1) a clade consisting of taxa with an erect, virgate growth habit (M. alpinum, M. subspicatum and M. wilmsii) and a northeastern distribution in the grassland region; (2) a second clade, representing the remaining species. M. macrocalyx and M. aethiopicum are sister to this clade, but their exact position is not resolved. Within this second clade, the topology is influenced by two apomorphies: stalked glands and spiny inflorescences. As a result, two groups are seen: (1) a paraphyletic assemblage of taxa with stalked glands, occurring in the Cape floristic region (M. adenodes, M. humile, M. exudans and M. stipulatum) and (2) a monophyletic group of taxa with spiny inflorescences, all from dry central and western parts of southern Africa (M. calycinum, M. candidans, M. canescens, M. microphyllum and M. obcordatum). Within the first group, M. exudans and M. stipulatum are sister taxa, while the positions of M. adenodes and M. humile are not resolved. M. exudans and M. stipulatum share a number of characters; they both have sessile glands on leaves and stalked glands on calyces, and have glabrescent leaflets. Within the spiny group, M. microphyllum and M. obcordatum are sister taxa (both have stalked glands) as well as
N. candicans and N. canescens (both without stalked glands but with sessile glands). The positions of M. calycinum and M. lampolobum are not fully resolved, M. lampolobum is the only spiny Cape species.

Anatomical studies of species of Melolobium indicated that the type and distribution of trichomes, particularly of glands, were very important in distinguishing between the species, such that it was possible to construct a key to the species based mainly on these characters (Moteetee et al., 2002). It appears that the development of glands (both sessile and stalked) is a convergent character. The overall pattern seems to reflect the development of scleromorphic characters, possibly in response to increasing aridification and/or herbivore pressure.

Cladistic analysis of DNA sequences studied (rbcL, trnL-F and ITS)

DNA sequences of the three genes were found not to be useful in resolving phylogenetic relationships within the genus Melolobium but all three strongly supported the monophyly of the genus. All the sequences are remarkably similar between species, with only a few potentially informative sites (36 for rbcL, 43 for trnL-F and 46 for ITS). The resulting trees are shown as phylograms in Fig. 4. Analysis of rbcL resulted in a polytomy with only two resolved subclades, which place M. humile and M. candidans together as sister taxa and all but M. microphyllum in a large polytomy. The monophyly of Melolobium, however, is strongly supported by a Fitch branch length of 54. Morphologically, the two species are not related; M. candidans is strongly spiny, while M. humile is not. From the trnL-F analysis, there is also poor resolution, as distantly related species are grouped together. For example, M. adenodes (a non-spiny Cape species) is grouped together with M. calycinum (a spiny species with a much wider distribution). Here again, the genus is shown to be monophyletic (Fitch branch length of 64). The tree resulting from ITS analysis appears to be better resolved but several clades are not in agreement with clear-cut groups based on morphology. For example, M. aethiopicum (a Cape species) and M. obcordatum (with a northeastern distribution) are grouped as sister taxa even though they share no morphological apomorphies. The lack of congruence between morphology and DNA patterns is possibly an indication of reticulation (hybridization) that occurs in Melolobium, or that speciation in this genus is relatively recent. The branch lengths separating Melolobium from the closely related genistoid genera show that DNA sequences are at least useful in supporting the generic concept. It should be noted that at generic level there is also lack of resolution when using these three genes, but the sister group relationship between Argyrolobium and Polhillia is consistently supported.

Taxonomic history

When several species (which are now placed in Melolobium) were originally described, the genus did not exist. As a result, these species were included in various genera. Linnaeus described one species as Cytisus aethiopicus L. (1753) and the other as Ononis cernua L. (1763). The younger Linnaeus described Ononis microphylla L. (1782). Thunberg (1823) placed two species in Ononis: O. microphylla and Ononis stipulata Thunb., and three others in Trigonella: Trigonella armata Thunb. [= Melolobium microphyllum (L.) Eckl. and Zeyh.], Trigonella hirsuta Thunb. [= Melolobium aethiopicum (L.) Druce] and Trigonella villosa Thunb. [= Melolobium adenodes Eckl. and Zeyh.]. Meyer (1832) placed one species in the genus Dichilus DC [Dichilus candidans, now Melolobium candidans (E. Mey.) Eckl. and Zeyh.]. The generic concept of Melolobium was only established later by Ecklon and Zeyher (1836), who first formally described it in January. In February of the same year, Meyer (1836) described eight species in his new genus Sphingium (a superfluous name). All other botanists accepted Ecklon and Zeyher’s Melolobium concept and added new species. These include Bentham (1844), Harvey (1862), Conrath (1908), Dummer (1912), Harms (1912) and Druce (1914).
Virgate or divaricately branched shrubs or perennial herbs, recognizable by their usually spiny habit and presence of glands. Leaves digitately trifoliolate, petioled and except in one species (M. subspicatum) stipulate; leaflets linear-lanceolate to oblong-ovate, (3–)7–14(–25) × (1–)2–4(–6) mm; petioles adaxially grooved. Inflorescences terminal, one- to many-flowered; flowers small; bract invariably present, linear, ovate-lanceolate to cordate; bracteoles invariably present, linear-lanceolate to narrowly ovate. Calyx shorter than the corolla, shortly to deeply bilabiate, with a bifid upper lip and trifid lower lip, glandular and/or pubescent, but never glabrous; upper lobes acute, the tips acute to obtuse, lower lobes acute, the tips acute or obtuse. Corolla yellow, but in many species turning purple or orange when fading; standard oblong-ovate (4–)6–9 × 3–4(–6) mm to suborbicular (6–)8–12 × 4–7 mm, in some species dorsally glandular, with a well-developed, channelled claw; wing and keel petals always interlocked by infolded auricles; wing petals oblong and sculptured, with a linear claw; keel petals oblong, apically rounded, claw linear. Androecium monadelphous, invariably split on its upper side, consisting of four long basifixed anthers, five short dorsifixed anthers and the carinal one intermediate. Gynoecium oblong, usually pubescent (except in one species, M. lampolobum), often glandular; style curved upwards, with a capitulate stigma. Fruits oblong, narrowly oblong, oblong-lanceolate or ovate, straight to falcate, (6–)10–26(–30) × 2–4 mm. Seeds transversely oblong to round.

Key to the species of Melolobium based mainly on trichome type and distribution (Moteetee et al., 2002), included to facilitate the identification of species and supplemented by a field key below:

1a Stalked glands present (at least on the calyx):
   2a Stalked glands on calyces only:
      3a Plants unarmed:
         4a Plants hairy:
         4b Plants almost glabrous:
      3b Plants spiny:
         5a Pods straight:
         5b Pods falcate:
   2b Stalked glands on stems, leaves and calyces:
      6a Plants glabrous or subglabrous:
      6b Plants sparsely to densely hairy:
         7a Plants unarmed or slightly spinescent:
         8a Leaflets distinctly obcordate, apex sharply emarginate; bracts obliquely lanceolate to ovate:
         8b Leaflets obovate-oblong, apex mucronate; bracts cordate to suborbicular:
      7b Plants distinctly spiny:
   1b Stalked glands absent from all parts:
      9a Sessile glands present, at least on calyces (visible under 20× magnification):

1a Stalked glands present (at least on the calyx):
9. M. stipulatum
8. M. exudans
14. M. candidans* (glandular forms)
15. M. canescens* (glandular forms)
6. M. adenodes
12. M. obcordatum
7. M. humile
11. M. microphyllum

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Fig. 4. Molecular phylogeny of Melolobium (numbers above branches are Fitch lengths): (a) one of 30,359 most parsimonious trees (tree length=422) from the analysis of the ITS region (CI=0.84, RI=0.75); (b) one of four most parsimonious trees (tree length=415) from the analysis of rbcL (CI=0.84, RI=0.89); (c) one of 2229 most parsimonious trees (tree length=412) from the analysis of trnL-F region (CI=0.86, RI=0.79).
10a Plants distinctly spiny, main stems divaricate, much-branched:
11a Stems and pods subglabrous, the latter distinctly shiny
11b Stems and pods usually densely hairy, velutinous-canescent:
12a Pods straight
12b Pods falcate
10b Plants unarmed; main stems erect, often virgate and sparsely branched:
13a Sessile glands on leaves and calyces
13b Sessile glands absent:
14a Stipules semi-cordate to auriculate; leaflets hairy to some extent (widespread)
14b Stipules obliquely linear-lanceolate to narrowly oblanceolate, 1–2 mm wide, glabrescent
15a Plants distinctly spiny 13.
15b Plants unarmed:
16a Leaves and calyces densely silky; pods short, subglobular, 5–28 mm long, (2–)3–6-seeded,
16b Leaves and calyces pubescent; pods several times longer than calyx

*Some forms of M. candidans and M. canescens are glandular as in M. microphyllum. Since there is no strong geographical pattern in the distribution of glandular forms of M. candidans and M. canescens, it is possible that there is hybridization/introgression between M. microphyllum and these two species.*

Field key to the species of Melolobium (kindly provided by Roger Polhill)

1a Inflorescence axes ending in flower buds, often elongate and ascending, with 5–28 flowers, in fruit sometimes subspinoscent but the tip not branched, differently coloured and rigidly sharp:
2a Perennial herbs, soon with numerous stems from a woody rootstock; stems erect and mostly unbranched to procumbent and laxly branched, with extended distal racemes; bracts linear-lanceolate or narrowly elliptic, 0.3–1.0–(2.0) mm wide (plateau or montane species from Gauteng eastwards):
3a Stipules lacking
3b Stipules present:
4a Stipules semi-cordate to auriculate; leaflets linear-oblong to oblanceolate or narrowly obovate, 2–4 mm wide, sparsely pubescent
4b Stipules obliquely linear-lanceolate to lanceolate-falcate; leaflets linear to linear-oblanceolate, 1–2 mm wide, glabrescent
2b Herbs or subshrubs with a taproot, the stem branching shortly above ground level, much branched above, the flowering branches usually rather short and divaricate, terminating in short or extended racemes; bracts ovate to cordate, rarely ovate-lanceolate, (1–2–4 mm wide:
5a Pods directed upwards, not much longer than the sessile calyx, 6–12 mm long, 1–2–seeded, sericeous, eglandular; bracts cordate, sessile, (3–)4–6 mm wide
5b Pods directed upwards, much longer than calyx, borne on a short curved pedicle, mostly 10–30 mm long, (2–)3–6-seeded, less hairy and often glandular, rarely pointing upwards (M. stipulatum) but then much larger; bracts ovate-lanceolate to rounded, if slightly cordate (M. humile) then slightly stalked, 1–4 mm wide:
6a Plants pilose with fine spreading hairs overall, glands lacking or occasionally small on the calyx
6b Plants conspicuously glandular, glabrous to pubescent:
7a Stems decumbent, forming cushions or mats; standard (5–)6–12 mm long; leaflets emarginate, pubescent and glandular
7b Stems ascending; standard (5–)6–12 mm long; leaflets slightly emarginate, but then still mucronate, glabrous to hairy:
8a Plants conspicuously hairy; hairs on stems antrorse, retorse or spreading, also with stipitate glands; bracts broadly ovate to round or cordate
8b Plants soon glabrescent, densely glandular; bracts elliptic to narrowly ovate:
9a Leaflets narrow, conduplicate, 1–2 mm wide; points apparently pointing upwards, lanceolate, straight, 10–15 × 3–4 mm; standard 9–12(–15) mm long
9b Leaflets not folded lengthwise, obovate to oblanceolate, 2–4 mm wide; pods hanging down, straight to somewhat falcate, (10–)15–20(–30) × (2–)3–4 mm; corolla as next couplet:
10a Corolla 6–8 mm long; leaflets mid-green with many stalked glands
10b Corolla (7–)10–12 mm long; leaflets dark green, with sessile glands
10b Inflorescence axes ending in a pale, rigid, spine developed at flowering stage and persistent on relatively short divaricate fertile branches, generally with only 1–3 flowers, occasionally up to 6 (exceptionally 12 in M. lamppolobum):
11a Leaves mostly crowded on short shoots; whole plant villous with hairs ca. 1 mm long, eglandular; pods shortly oblong, 6–10 mm long, villous, 1–2–(3–)seeded
11b Leaves mostly dispersed along branchlets; plants with much shorter hairs, with sessile to stalked hairs; pods narrowly oblong, straight or falcate, 10–18 mm long, glabrous to shortly hairy and more or less glandular, 2–5-seeded:
12a Pods broad, flat, glabrous, shiny, slightly falcate; leaflets glabrous (Little Karroo and vicinity)
12b Pods hairy and glandular to varying degrees; leaflets hairy to some extent (widespread)

Zeyher 1331 (SAM!, lectotype, here designated, K!, isolecotype). [Note: the sheet in SAM is a mixture of two collections. The three twigs in the middle were collected by Wood and the two twigs on either side by Ecklon and Zeyher; the one on the far left is chosen as lectotype].

*Melolobium pegleri* Dummer in Kew Bull. 1912: 227 (1912); E. Phillips in Ann. S. Afr. Museum 16: 76 (1917). Type: EASTERN CAPE, Cala, hillside near Wier [3127 DA, Lady Frere], Pegler 1739 (PRE!, lectotype, here designated; BOL!, K!, isolecotypes). [Note: since Dummer worked at Kew at the time when the species was published, the K specimen is chosen as lectotype].

Unarmed virgate shrublet, up to 0.5 m high. Leaves stipulate, leaflets linear-oblong to oblanceolate or narrowly obovate, 12–13 × 2–4 mm, with sessile glands, sparsely hairy, apex mucronate; petiole 5–7 mm long, stipules semi-cordate to auriculate, 4–6 × 1–3 mm, with sessile glands. Inflorescence terminal, 40–80(–120) mm long, with (14–)16–24(–28) flowers, flowers 8–10 mm long; bracts lanceolate to ovate, 4–6 × 0.5–1.0 mm; bracteoles linear to narrowly ovate, 2–4 × 0.2–0.7 mm. Calyx shortly bilabiate, with sessile glands, pubescent; upper lobes acute; upper lip 4–5 mm long, the apices obtuse, upper sinus 1–2 mm deep; lateral sinus 1.5–4.0 mm deep; lower lobes acute; lower lip 4–5 mm long, the apices obtuse, lower sinuses 0.5 mm deep. Corolla yellow; standard sub-orbicular, 6–7 × 6–7 mm, with a well-developed, channelled claw 3–4 mm long; wing petals oblong, sculptured, 8–11 × 2–3 mm, with a linear claw 2–4 mm long; keel petals shorter than the wing petals, 7–8 × 2.5–3.5 mm, with a linear claw 2–4 mm long. *Gynoeicum* narrowly oblong, glandular, hairy, 3–4-ovuled. Fruit oblong-lanceolate, somewhat falcate, (14–)18–20 × 3–4 mm, hairy, 3–4-seeded; seeds round, 2.0–2.3 × 1.6–2.3 mm, pale yellow mottled black (Fig. 5).

**Diagnostic characters**

*M. alpinum* is an erect shrub with ascending stems, much branched from near the base.

**Distribution and habitat**

This is an alpine species that grows in grassland valleys and mountain slopes at altitudes of 1800–2300 m in the southern and northern parts of Lesotho, the Free State, Eastern Cape and KwaZulu-Natal Provinces in South Africa (Fig. 6).

**Selected specimens**

– 2828 (Bethlehem): Bethlehem (–AB), B. van Ginkel 310 (PRE), L.C.C. Liebenberg 7480A (PRE); Caledon Ridge (–CA), J. Thode 6364 (PRE); Leribe (–CC), A. Dieterlen 552 (SAM); Golden Gate National Park (–DA), Gertenbach and Groenewald 9206 (PRE), G. Germishuizen 691 (PRE), A.L.

Fig. 5. Vegetative and reproductive morphology of *M. alpinum*: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixd anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixd anther; (j) pistil; (k) lateral view of pod. Vouchers: (a and k) from B.-E. van Wyk 2631 (JRAU); (b – d) from A. Moteetee and B.-E. van Wyk 6 (JRAU); (e – j) from A.L. Schutte 332 (JRAU). Scale bars: a–c, e–h, j, 1 mm; d and k, 2 mm.
Fig. 6. Known distribution of *M. alpinum*.

**Schutte 570** (JRAU); Witsieshoek (–DB), H.A. Junod 17331 (PRE), C.H. Stirton 11945 (PRE).

**–2829** (Harrismith): between Kestell and Harrismith (–AD), J.P.H. Acocks 11205 (PRE); Bergville, Mahai river bank (–CB), E.E. Galpin 9846 (PRE); Cathedral Peak (–CC), D.J.B. Killick 1199 (PRE).

**–2929** (Underberg): Garden Castle Nature Reserve (–AB), Hilliard and Burtt 7832 (PRE); Loteni Nature Reserve (–AD), B.-E. van Wyk 1959 (JRAU); Giants Castle Nature Reserve (–BA), A.L. Schutte 158, 159, 160 (JRAU); Sani Pass (–CB), B.-E. van Wyk 2631a (JRAU).

**–3028** (Maclear): Farm Wide Valley, 24 km NW of Maclear (–CC), S.P. Bester 137 (PRE).

**–3029** (Kokstad): Mzimkhulu, NE of Nsikeni Mountain (–AB), A.M. Ngwenya 971 (PRE), Weza State Forest (–DA), M. Jordaan 889 (PRE), Griqualand East (–DC), W. Tyson 942 (SAM), 1247 (BM, SAM).

**–3126** (Queenstown): Broughton near Molteno (–AD), Flanagan 1576 (SAM).

**–3127** (Stutterheim): Happy Valley, Cathcart (–AC), W.F. Barker 2446 (NBG), G.C. Theron 1670 (K); Stutterheim (–CB), J.P.H. Acocks 9475 (PRE).

2. **Melolobium subspicatum** Conrath in Kew Bull.: 222 (1908). Type: GAUTENG, Irene [2528 CC Pretoria], *Conrath 138* (K!, holotype).

Virgate suffrutex, 0.3–0.6 m high. Leaves without stipules, leaflets linear to oblanceolate, 12–18 × 2 mm, sparsely hairy, apex emarginate, petiole 5–6 mm long. Inflorescence terminal, (40–)85–130(–150) mm long, with (8–)10–15(–26) flowers; flowers 5–6 mm long; bracts ovate, 2.0–2.5 × 0.5 mm; bracteoles narrowly ovate, 1.5–2 × 0.2–0.5 mm. Calyx shortly bilabiate, with sessile glands, hairy; upper lobes acute, upper lip 3–4 mm long, the apices obtuse; upper sinus 0.5–2 mm deep; lateral sinus 1–3 mm deep; lower lobes acute; lower lip 4–5 mm long, the tips obtuse; lower sinuses 0.5–1 mm deep. Corolla yellow; standard ovate-oblong, 4–6 × 2–3 mm, with a well-developed, channelled claw 1–2 mm long; wing petals oblong, sculptured, 3–4 × 1–2 mm, with a linear claw 1–2 mm long; keel petals incurved, with a blunt tip, shorter than the wing petals, 3–4 × 1–2 mm, with a linear claw 1–2 mm long. Gynoecium narrowly oblong, glandular, hairy. *Fruit* oblong lanceolate, straight, (10–)15–20 × 2–3 mm, hairy, 2–4-seeded; seeds round, 1.6–2.6 × 1.6–2.3 mm, olive to pale yellow mottled brown (Fig. 7).
**Diagnostic characters**

*M. subspicatum* is the only exstipulate species—all others have auriculate stipules. It has an affinity with *M. wilmsii* from which it differs in the trifid lower lip (tridentate in *M. wilmsii*) and the ovate-oblong standard (suborbicular in *M. wilmsii*).

**Distribution and habitat**

*M. subspicatum* is a rare and localized species endemic to Gauteng Province in South Africa. It grows exclusively in grassland on dolomite and is known from only three localities (Fig. 8). One of these (the type locality) has recently been destroyed by urbanization at Cornwall Hill in Irene. The species has been recorded as endangered by Pfab and Victor (2002), but was not included in the southern African Red Data Lists (Golding, 2002).

**Specimens examined**


−2627 (Krugersdorp): farm Waterval 74 (−BA), *A.O.D. Mogg 22810, 29658 (PRE).

−2628 (Johannesburg): ca. 30 km N of Randburg on the R512 (−AA), *A. de Castro 109 (JRAU).*


[Note: the K specimen is designated as a lectotype and not as holotype because it is highly likely that when Harms published this species he had studied a specimen at Berlin Herbarium].

Virgate suffrutex, 0.3–0.6 m high. *Leaves* stipulate, leaflets linear to narrowly lanceolate, apex acute, 14–18(−25) × 1–2 mm; petiole 4–8 mm long, stipules subulate, (4–)7–9 × 0.5–1.0 mm. *Inflorescence* terminal, 8–120(140–150) mm long, with numerous flowers; flowers 5–8 mm long; bracts linear, 2–5 × 0.3–0.5 mm; bracteoles linear, 1–2 × 0.2–0.3 mm. *Calyx* shortly bilabiate, with sessile glands, hairy; upper lobes acute; upper lip 4–5 mm long, the apices obtuse; upper sinus 0.5–1.0 mm deep; lateral sinus 1.5–2.0 mm deep; lower lip with very short teeth, 4–6 mm long, the apices obtuse, lower sinuses 0.1–0.8 mm deep. *Corolla* yellow; standard suborbicular, 6–7 × 4–5 mm, with a well-developed, channelled claw 2–3 mm long; wing petals oblong, sculptured, 6–7 × 1–2 mm, with a linear claw 2–3 mm long; keel petals straight, 6–7 × 2–3 mm, with a linear claw 2–3 mm long. *Gynoeicum* narrowly...
oblong, hairy. Fruit narrowly oblong, 16–18×3–4 mm, hairy, 3–5-seeded; seeds round, 1.6–2.0×1.6–2.0 mm, olive to pale yellow dotted brown (Fig. 9).

Diagnostic characters

*M. wilmsii* is closely related to *M. subspicatum* (they both have a virgate growth habit and sessile glands on the calyces) but differs in the presence of stipules (the latter species lacks stipules). The species can be recognized by the linear to oblanceolate leaflets and the long, many-flowered, terminal racemes.

Distribution and habitat

*M. wilmsii* grows in open grasslands at altitudes of about 1500 m in KwaZulu-Natal, Free State, Mpumalanga and Gauteng Provinces in South Africa (Fig. 10).

Selected specimens


–2528 (Pretoria): outside Pretoria on N4 to Witbank (–CB), B.-E. van Wyk 2914 (JRAU); Donkerhoek (–CD), R. Schlechter 2304 (K, PRE), 3720 (BOL, PRE).

–2529 (Witbank): 16 km from Witbank on N4 road to Pretoria (–CA), A.L. Schutte 485 (JRAU), A. Moteetee and B.-E. van Wyk 1 (JRAU); near Witbank Station (–CC), D.F. Gilfillan 7170 (PRE); Middelburg (–CD), R.F. Rand 1109 (BM); Wonderhoek, Middelburg (–DA), D.F. Gilfillan 363 (BOL); Wonderfontein (–DD), H. Bolus 11779 (K, PRE).

–2530 (Lydenburg): Machadodorp (–CB), E.E. Galpin s.n. sub BOL 55694 (BOL).

–2628 (Johannesburg): veld near Boksburg (–AA), D.P. Murray s.n. sub PRE 54408 (PRE); 11.3 miles S of Heidelberg (–AB), J.P.H. Acocks 20855 (PRE); Suikerbosrand (–AD), J.G. Bredenkamp 543 (PRE).

–2629 (Bethal): 25 km from Witbank on road to Hendrina (–AA), L. du Toit 13 (PRE), 1.5 miles SW of P.O. Vaalkrans (–AB), L.E.W. Codd 3681 (K, PRE), R. Leendertz 9395 (PRE); between Bethal and Hendrina (–BA), B.-E. van Wyk 2629 (JRAU); Breyton, Ermelo (–AD), M. Steyn 801 (NBG); Ermelo (–DB), E. Tennant s.n. sub PRE 54410 (PRE), M. Collins 13448 (PRE).


–2828 (Bethlehem): 13 km from Bethlehem on the road to Reitz (–AB), A.L. Schutte 402 (JRAU); Lohasiekamp (–AB), B. van Ginkel 333 (PRE); Danielsrust farm (–AB), J.C. Scheepers 1761 (K, PRE); between Kestell and Harrismith (–BC), J.P.H. Acocks 11205 (PRE).

–2829 (Harrismith): hillside near Harrismith (–AC), J. Medley-Wood 5062 (PRE).
Fig. 9. Vegetative and reproductive morphology of *M. wilmsii*: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a – d) from A. Moteetee and B.-E. van Wyk 1 (JRAU); (e and i) from A.L. Schutte 485 (JRAU); (f and k) from B.-E. van Wyk 2914 (JRAU); (g, h, j) from A.L. Schutte 402 (JRAU). Scale bars: a, b, c, k, 2 mm; c, d, f–h, 1 mm; j, 0.5 mm.

Fig. 10. Known distribution of *M. wilmsii*. 
Melolobium macrocalyx

4a. Melolobium macrocalyx Dummer var. macrocalyx in Kew Bull. 1912: 227 (1912); Harms in Fedde Repert. 11: 84 (1912); Baker f., The Leguminosae of Tropical Africa 1: 22 (1926); A. Schreib. in FSWA 60: 89 (1970). Type: NORTHERN CAPE, between Klip Fontein and Knegt’s Fontein [2823 AA Griquatown], Burchell 2224 (K!, lectotype, here designated). NAMIBIA, Okahandja [2116 DD Okahandja], Dinter 319 (BM!, K!, SAM!, syntypes). BOTSWANA, between Pintado Fountain and Thermometer Fountain [2723 BD Kuruman], Burchell 2169 (K!, syntype). [Note: since Dummer used a syntype when describing the species, Burchell 2224 is chosen as lectotype].

Melolobium psammophilum Harms in Fedde Repert. 11: 85 (1912). Type: NAMIBIA, “Okahandja sandiges Rivierbett” [Okahandja, 2116DD], Dinter 261 (B†; SAM!, lectotype here designated; BM!, K!, islectotypes). [Note: since the specimen in B was destroyed, the SAM isotype is chosen as lectotype].


Unarmed shrublet, 0.3–0.8 m high. Leaves stipulate, leaflets elliptical to obovate-oblong, 8–10(–14) × 2–3 mm, densely silky; petiole 4–5 mm long, stipules large, semi-ovate to auriculate, 5–8(–10) × (1–)2–4(–5) mm. Inflorescence terminal, 50–90(–120) mm long, with 4–8(–12) flowers; flowers 6–7 mm long; bracts cordate, (3–)4–5(–7) × (3–)4–5(–6) mm, hairy; bracteoles ovate, 4–5 × 1–2 mm. Calyx shortly bilabiate, densely silky; upper lobes acute, upper lip 5–6 mm long, the apices acute, upper sinus 3–4 mm deep; lateral sinus 3.5–4.5 mm deep; lower lobes acute; lower lip 5–6 mm long, the apices acute, lower sinuses 1–2 mm deep. Corolla yellow; standard ovate-oblong, 4–5 × 3–4 mm, with a well-developed, channelled claw 2–3 mm long; wing petals oblong-ovate, scultured, 4–5 × 2–3 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, 3–4 × 2–3 mm, with a linear claw 2–3 mm long. Gynoecium hairy, narrowly oblong. Fruit ovate, scarcely longer than the calyx, 10–12 × 3–4 mm, 1–2-seeded; seeds round, 2.0–2.3 × 1.5–2.0 mm, pale yellow, brown, light brown mottled brown, or olive mottled brown (Fig. 11).

Diagnostic characters

M. macrocalyx differs from all the other species of Melolobium in having a dense, silvery-grey, silky vestiture. The typical variety differs from M. macrocalyx var. longifolium in having much smaller, obovate to oblong (not linear) leaflets.

Fig. 11. Vegetative and reproductive morphology of M. macrocalyx var. macrocalyx: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a–d, k) from B.-E. van Wyk 3061 (JRAU); (e–j) from A. Motteете & B.-E. van Wyk 3061 (JRAU). Scale bars: a and b, 2 mm; c–k, 1 mm; j, 0.5 mm.
This variety can also be distinguished by the distinctly cordate bracts.

**Distribution and habitat**

This variety grows on deep Kalahari sand, brown soil among dolerite, calcrete and ironstone rocks and occasionally in grassveld on brown gravelly loam at altitudes of about 900 m in Botswana, Namibia and the Northern Cape Province in South Africa (Fig. 12).

**Selected specimens**

- **2116** (Okahandja): Okahandja (–DD), Dinter 319 (BM, K, SAM).
- **2217** (Windhoek): Windhoek (–CA), M. Wilman 15344 (BOL), W.J. Hanekom 33 (K, PRE), Merxmüller 1031 (K).
- **2218** (Gobabis): Gobabis (–BD), P.A. Basson 105 (PRE), R. Steydel 1522, 2394, 3660 (K).
- **2317** (Rehoboth): Rehoboth (–AD), N. Giess 13728 (K, PRE).
- **2320** (Ghanzi): 4 km N of Dongdong bore hole between Ghanzi and Kgalagadi districts (–DB), C. Skarpe S-185 (PRE).
- **2425** (Gaborone): Molepolole (–BC), R. Story 4884 (PRE).
- **2520** (Mata-Mata): Kalahari Gemsbok National Park (–CB), N. van Rooyen and G. Bredenkamp 100 (PRE).
- **2622** (Tsabong): Snuki farm (–CC), A.A. Gubb 92/37 (PRE).
- **2624** (Vryburg): Vryburg (–DC), R. Story 4586 (K, PRE).
- **2720** (Noinieput): Langvlei (–CC), A.A. Gubb 271/60 (PRE); Picardi (–DA), A. Brueckner 875 (BOL).
- **2722** (Olifantshoek): Kuruman to Upington road near Dingle (–DD), Verdoorn and Dyer 1766 (K, PRE).
- **2723** (Kuruman): near Brettey mine S of Kuruman (–AD), J.P.H. Acocks 17676 (K, PRE); Makethle, Bophuthatswana (–BC), A.A. Gubb 263/56 (PRE); between Pintado Fountain and Thermometer Fountain (–BD), Burchell 2169 (K).
- **2821** (Upington): between Upington and Tweerivieren (–AC), C. Thorne 52670 (SAM).
- **2822** (Glen Lyon): near Brulsand, ca. 2 km from Panvlei/Vaalkop/Padkloof intersection towards Groblershoop (–CB), B.-E. van Wyk 3061 (JRAU); Blackbridge (DC), E.G. Bryant 3663 (BOL, K); Hay (–DD), J.P.H. Acocks 475 (PRE).
- **2823** (Griquatown): between Klip Fontein and Knecht’s Fontein (–AA), Burchell 2224 (K); Darehope farm, between Asbestos Hills (–AB), Gubb 212/60 6 miles E of Danielskuil (–BA), O. Leistner 854 (K, PRE); Asbestos Mts (–CB), A.A. Schreiber 2081 (PRE).
- **2824** (Kimberley): 67 miles ENE of Upington, Gordonia (–BA), O. Leistner 2801 (PRE); 7 miles NE of Kimberley (–DA), O. Leistner 1183 (K, PRE).

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Fig. 12. Known distribution of *M. macrocalyx*. Circles, *M. macrocalyx* var. *longifolium*; boxes, *M. macrocalyx* var. *macrocalyx*. 

–2920 (Boom River): Bienab known as Groot Kolk (–BC), C. Thorne 52699 (SAM), C. Thorne s.n. sub PRE 54396 (PRE), C. Thorne s.n. sub NBG 10599 (NBG).

–2922 (Prieska): on slopes of Asbestos Hill, Hay District (–AD), J.P.H. Acocks 2423 (K, PRE); ca. 4 km from Prieska to Niekerkshoop (–DA), A. Moteetee 10 (JRAU).

–2924 (Hopetown): De Hoek near confluence of Orange and Vaal rivers (–BA), O.A. Leistner 1307 (PRE).


–2926 (Bloomfontein): Modder River (–DA), M. Henrici 3559 (PRE); Helvetia (–DC), J.P.H. Acocks 378 (K, PRE).

4b. M. macrocalyx Dummer var. longifolium Dummer in Kew Bull. 1912: 228 (1912); Harms in Fedde Repert. 11: 84 (1912); A. Schreib. in FSWA 60: 89 (1970). Type: NORTHERN CAPE, ‘Buffel’s Bout’ [Buffelsbout, 3022 AD Carnarvon], Burchell 1610 (K!, holotype).

M. stenophyllum Harms in Fedde Repert 11: 86 (1912). Type: NAMIBIA, ‘Sandverhaar’ [Buffelsbout, 3022 AD Carnarvon], Burchell 1610 (K†; SAM!, lectotype, here designated); Dinter 1176; Ebenhard, Schäber 278 (syntypes). [Note: it is likely that Harms studied a specimen of this species in B, but since the specimens were destroyed, the SAM specimen is chosen as lectotype].

Unarmed shrublet, up to 1 m high. Leaves stipulate, leaflets linear, very densely sericeous to canescent, 10–20(–30) mm long, petiole 6–10(–13) mm long; stipules semi-cordate to auricate, 1–3(–4) × 1–2 mm. Inflorescence terminal, (25–35) 50–90(–120) mm long, with 6–10(–18) flowers; flowers 5–6 mm long; bracts ovate, very hairy, 2–3(–4) × 1–2 mm; bracteoles narrowly ovate, 2.5–3.5 × 0.5–1.0 mm. Calyx shortly bilabiate; densely silky, upper lobes acute, upper lip 5–6 mm long, the apices acute, upper sinus 2–3 mm deep; lateral sinus 2.5–3.5 mm deep; lower lobes acute, lower lip 6–7 mm long, the apices acute; lower sinuses 1.0–1.5 mm deep. Corolla yellow; standard suborbicular, ±6 × ±3 mm, with a well-developed, channelled claw 1.0–1.5 mm long; wing petals oblong, sculptured, ±6 × 1.5–2.0 mm, with a linear claw ±2 mm long; keel petals shorter than the wing petals, 6.0–6.5 × ±2 mm, with a linear claw ±2 mm long. Gynoecium narrowly oblong, extremely hairy. Fruit oblong-ovate, scarcely longer than the calyx, (3–)6–8 × 3–4 mm, very densely hairy, 1–2-seeded; seeds transversely oblong to almost round, 1.3–2.3 × 1.0–1.3 mm, olive speckled with light brown (almost cream coloured) (Fig. 13).

Diagnostic characters

This variety differs from the typical variety in having linear and much longer leaflets (elliptic to ovate in the latter) and in the ovate bracts (cordate in the latter).

Distribution and habitat: M. macrocalyx var. longifolium has distribution similar to that of var. macrocalyx and occurs in Namibia, the Northern Cape and Free State Provinces in South Africa.

Selected specimens

–2419 (Aranos): Farm Kowisekolk (–AA), W. Giess 5022 (PRE).

Fig. 13. Vegetative and reproductive morphology of M. macrocalyx var. longifolium: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a e) from S.J. Dean 607 (JRAU); (f, i, j) from O. Leistner 1183 (PRE); (g, h, k) from O. Leistner 1307 (PRE). Scale bars: a and b, 2 mm; c–k, 1 mm; j, 0.5 mm.
Melolobium spicatum (E. Mey.) Eckl. and Zeyh., Enum. part 2: 190 (Jan. 1836). Type as above.

Sphingium spicatus E. Mey., Comm.: 66 (Feb. 1836). Type as above.

Sphingium spicatum var. hirsutissulcum E. Mey., Comm.: 66 (Feb. 1836), pro parte. Type: WESTERN CAPE, “inter Holrivier et Mierenkasteel” [between Hol River and Mierenkasteel, 3118 CB Vanrhynsdorp], Drège s.n. (Pl!, lectotype, here designated).

Sphingium spicatum var. heterotricum E. Mey., Comm.: 66 (Feb. 1836). Type: NORTHERN CAPE, Kasparskloof [3018 AC Kamiesberg], Drège 3317 (Pl!, lectotype, here designated), Drège s.n. sub Herb. Benth. (K!, isolectotype). [Note: Meyer’s handwriting appears on both specimens but the Kew specimen has no locality details, therefore Drège 3317 is chosen as lectotype].

Ascending suffrutex, 0.2–0.7 m high, without spines. Leaves stipulate, leaflets oblongate to obovate, (6–)10–14 × 2–4 mm, pubescent, apex mucronate; petiole 5–7(–10) mm long, stipules semi-cordate to auriculate, 4–5(–10) × 1–3(–4) mm, pubescent. Inflorescence terminal, (70–)90–150 (–170) mm long, with (10–)14–20(–25) flowers, flowers 8–10 mm long; bracts ovate-lanceolate to cordate, 3–4 × 1–2 mm; bracteoles narrowly ovate, 4–5 × 0.5–1.0 mm. Calyx shortly bilabiate, densely pubescent; upper lobes acute; upper lip 6–7 mm long, the apices acute, upper sinus 3–4 mm deep; lateral sinus 2–4 mm deep; lower lobes acute; lower lip 6–7 mm long; the apices acute, lower sinuses 1–2 mm deep. Corolla yellow; standard suborbicular, 8–10 × 6–7 mm, with a well-developed, channelled claw 2–3 mm long; wing petals oblong, sculptured, 6–9 × 2–3 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, 5–6 × 2–3 mm, hairy, with a linear claw 2–3 mm long. Gynoecium narrowly oblong, pubescent. Fruit oblong, straight to somewhat falcate, 20–26(–30) × 2–4 mm, hairy, 4–6-seeded; seeds transversely or oblong to round, 2.3–3.0 × 2.3–3.0 mm, light brown to dark brown or light brown mottled dark brown (Fig. 14).

Diagnostic characters

M. aethiopicum may be confused with M. humile as this species superficially resembles it, but close microscopical examination shows that the latter is covered with stalked glands all over, whereas M. aethiopicum lacks glands completely (stalked or sessile). In addition, M. aethiopicum is more densely hairy than M. humile.

Distribution and habitat

M. aethiopicum grows on sand dunes, coastal hills, rocky outcrops along the coast, chalky flats and on light grey well-drained sandy soil as far north as Springbok in the Northern Cape Province. Towards the south, it is found along the coast as far as Bredasdorp in the Western Cape Province (Fig. 15).

Two regional forms can be distinguished, based on size of leaflets, stipules and flowers and shape of pods.
Typical form

*M. aethiopicum*, *M. cernuum*, *T. hirsuta*, *M. spicatum var. spicatum*, *M. spicatum var. hirsutiusculum*, *M. spicatum var. heterotrichum*

Leaflets 8–12/C2 2–4 mm. Inflorescence (70–)90–1 10(–130) mm. Stipules 4–5/C2 1–3 mm. Upper lip of the calyx 5–6 mm long; upper sinus 2–3 mm deep; lateral sinus 2.5–4.0 mm deep; lower lip 5–6 mm long; lower sinuses 1–2 mm deep. Fruits straight at first but becoming curved as they mature, 20–25/C2 2–3 mm.

Diagnostic characters

The typical form of *M. aethiopicum* can be distinguished from the Clanwilliam form in having smaller and curved pods (straight and very large in the latter). The stipules and seeds are also smaller in this form.

Selected specimens

- **–3017** (Hondeklipbaai): 4 km from Wallekraal to Hondek-\lipbaai (–AD), *C.H. Stirtone 6051* (K, PRE).
- **–3018** (Kamiesberg): Draaiklip (–AA), *H.H.W. Pearson 6790* (K); Kasparskloof (–AC), *Dre`ge 3317* (P).
- **–3118** (Vanrhynsdorp): Zout River (–BC), *R. Schlechter 832* (PRE); Strandfontein (–CC), *C.H. Stirtone 6066* (K, PRE); between Hol River and Mierenkasteel (–CB), *Dre`ge s.n.* (P); 11.5 km from Doringbaai to Donkinbaai (–CD), *C.H. Stirtone 6078* (K, PRE).
- **–3218** (Clanwilliam): Yserfontein (–BC), *S.M. Johnson 166* (NBG); Rocher Pan Nature Reserve, Velddrif (–CB), *Le Roux and van Rooyen 31* (PRE); Berg River Station (–CD), *W.F. Barker 4064* (NBG), *J.P.H. Acocks 23980* (PRE); Blaauwberg (–DB), *Zeyher s.n. sub SAM 15347* (SAM).
- **–3318** (Cape Town): Koperfontein (–AB), *G.J. Lewis 1818* (SAM); Darling (–AD), *H. Bolus 12662* (PRE); Saldanha Bay (–BB), *C.L. Leipoldt 3751* (BOL); between Mamre and Darling (–BC), *L. Bolus 21514* (BOL, K); Sea Point, slope above Bantry Bay (–CB), *C.A. Smith 2877, 2935* (PRE); 24 km from Cape Town (–CD), *B.-E. van Wyk 2685, 4040* (JRAU); Riet valley (–DC), *Ecklon and Zeyher 1329* (S, BOL).
- **–3420** (Bredasdorp): Nacht Wacht (–CA), *C.A. Smith 3067* (PRE).

Clanwilliam form

Leaflets (6–)10–14/C2 3–4 mm; stipules 5–10 × 1–4 mm. Inflorescence (80–)90–150(–170) mm long. Calyx upper lip
6–7 mm long; upper sinus 3–4 mm deep; lateral sinus 2.0–3.5 mm deep; lower lip 6–7 mm long; lower sinuses 1–2 mm deep. Fruit straight, 23–26(–30) × ±4 mm.

Diagnostic characters

Whereas pods in the typical *M. aethiopicum* tend to curve as they mature, in this form the pods are straight even at maturity. The stipules, pods and seeds are much larger than in the typical form.

Distribution and habitat

This form occurs mainly in the Clanwilliam region but extends further north to Vanrhynsdorp and Springbok and southwards to Malmesbury.

Selected specimens

−2917 (Springbok): Spektakelberg (−DA), N. Grobbelaar 2589 (PRE); 11 km from Springbok on road to Hondelkipsbaai (−DC), D. Strydom 5 (PRE).

−3118 (Vanrhynsdorp): Zandkraal (−DA), M. Steyn 431 (NBG); Hol River (−DA), Drège 10 (PRE); 12.5 miles SE of Klawer (−DC), J.P.H. Acocks 19637 (PRE).

−3218 (Clanwilliam): Nortier Exp. Station near Lambertsbay (−AB), *van Breda* 4342 (K, PRE); near Trawal (−BD); 0.9 miles from St. Helena Bay to Slipper Bay (−CA), *J.A. Marsh* 189 (PRE); Kaptein’s Kloof (−DA), *T.P. Stokoe* 55939 (SAM); Pieknerskloof Pass (−DB), B.-E. van Wyk 2450 (JRAU); 7 km from Piquetberg on road to Velddrif (−DC), N. Grobbelaar 1144 (PRE); De Hoek, Piquetberg near Renosterveld (−DD), B.-E. van Wyk 2452 (JRAU).

6. *Melolobium adenodes* Eckl. and Zeyh., Enum. part 2: 190 (Jan. 1836); Walp. in Bot. Rep. Syst. 1: 618 (1842); Benth. in Hook., Lond. J. Bot. 3: 352 (1844); Harv. in Harv. and Sond., Fl. Cap. 2: 79 (1862); A. Schreib. in FSWA 60: 88 (1970). Type: WESTERN CAPE, „...ad flumen Bergrivier et in Zwartland...“ [between the Berg River and in the Zwartland, 3318 BD Cape Town], *Ecklon and Zeyher* 1327 (SAM!, specimen on the right hand side, lectotype, here designated, specimen on the top right hand side, isolectotype; S!, specimen in the middle of three, with Enumeratio label, possible isolectotype). [Note: The specimen in SAM is chosen as lectotype, because it has locality details written in Zeyher’s handwriting. There are two sheets in S; one has three different specimens with three different labels. All three are *M. adenodes*, but the middle specimen, agrees with other specimens in S and SAM].
Trigonella villosa Thunb., Fl. Cap.: 585 (1823), non Melolobium villosum Harms in Fedde Repert. 11: 87 (1912).

Type: WESTERN CAPE: ‘e Cap. b. Spei’ [Cape of Good Hope, without precise locality], Thunberg s.n. sub THUNB-UPS 17786 (UPS, microfiche!, holotype). [Note: The oldest name for this taxon is Trigonella villosa, but this name is blocked by Melolobium villosum Harms].


Sphingium viscidulum E. Mey., Comm.: 66 (Feb. 1836). Type as above.

Melolobium viscidulum (E. Mey.) Steud. in Nom. Bot. 2 (2): 123 (1841). Type: WESTERN CAPE, Cape district near Ebenezar [3318 DC Cape Town], Drège s.n. (P!, lectotype, here designated). [Note: Since Meyer’s handwriting appears on the sheet, the specimen is chosen as lectotype].

Melolobium karasbergense L. Bol. in Ann. Bolus Herb. 1: 14 (1914); A. Schreib. in FSWA 60: 88 (1970), synon. nov. Type: NAMIBIA, between Krai Kluft [2718 BA, Granau] and Wasserfall [2617 AD, Bethanie], Pearson 7887 (BOL!, lectotype, here designated, BM!, K!, isolectotypes). [Note: Since Louisa Bolus worked in the Bolus Herbarium, it is assumed that she worked with this specimen, hence it is chosen as lectotype].

Slightly spiny suffrutex, up to 0.3 m high and 0.5 m wide, with all parts covered with stalked glands. Leaves stipulate; leaflets broadly obovate, (6–)8–12(–14) × 2–4 mm, glandular, apex emarginate; petiole 4–9 mm long; stipules semicordate to auriculate, 2–5 × 1–2 mm, glandular. Inflorescence terminal, (60–)90–120(–150) mm long; with (5–)11–18(–20) flowers; flowers 6–11 mm long; bracts ovate, 4–5 × 2–3 mm; bracteoles narrowly ovate, 2–3 × 0.5–1.0 mm. Calyx shortly bilabiate, glandular, sparsely hairy; upper lobes acute; upper lip 4–5 mm long, the apices acute, upper sinus 2–3 mm deep; lateral sinus 2.2–3.0 mm deep; lower lobes acute; lower lip 5–6 mm long, the tips acute, lower sinuses 0.5–1.0 mm deep. Corolla yellow; standard suborbicular, 6–8 × 3–4 mm, with a well-developed, channelled claw 3–4 mm long; wing petals oblong, scuptured, 7–8 × 2–3 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, 5–7 × 2–3 mm, with a linear claw 2–3 mm long. Gynoecium narrowly oblong, glandular, hairy. Fruit oblong-lanceolate, 15–18(–30) × 3–4 mm, glandular, hairy, (2--)4–5(–6)-seeded; seeds round, 1.6–2.2 × 1.6–2.0 mm, dark brown to light brown mottled dark brown.

Diagnostic characters

M. adenodes has close affinity with M. humile (both these species have stalked glands all over the plants) but differs from it in being much less hairy.

Fig. 16. Vegetative and reproductive morphology of M. adenodes: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a, b, d–j) from B.-E. van Wyk 3101 (JRAU); (c and k) from A.L. Schutte 592 (JRAU). Scale bars: a–i, 1 mm; j, 0.5 mm; k, 2 mm.
Distribution and habitat

*M. adenodes* grows on sand dunes, sandy flats, rocky mountain slopes, dry river beds, sandstone or shale ridges, well-drained soils on granite and on coastal plains at altitudes of 350–1140 m in the southern parts of Namibia, the Northern Cape, Western Cape and Eastern Cape Provinces in South Africa (Fig. 17).

Three regional forms are recognized according to extent of spinescence, leaf shape and the extent to which the plants are glandular.

Typical form

*M. adenodes, M. viscidulum*

Leaflets (6–)8–12(–14) × 2–4 mm. Inflorescence (60–)90–120(–150) mm long, with (5–8)11–18(–20) flowers. Calyx upper lip 4–5 mm long; upper sinus 1.5–2.2 mm deep; lateral sinus 2.4–3.0 mm deep; lower lip 5.0–5.5 mm long; lower sinuses 0.6–0.8 mm deep. Fruits 15–18(–30) × 3–4 mm.

Diagnostic characters

*M. adenodes* is scarcely spiny, but the typical form is more spiny than the other two forms. *M. adenodes* is also characterized by being more heavily glandular when compared to other species. The typical form is more glandular than the other forms. This form also has longer inflorescences.

Selected specimens

- **2816** (Oranjemund): top of Hellskloof (–BD), *G. Germishuizen 5445* (PRE); Richtersveld, Goariepvlakte (–DB), *N. Jurgens 23102* (PRE).
- **2817** (Vioolsdrif): Vandersterberg, NE of Khubus (–AC), *G. Germishuizen 4566* (PRE); Richtersveld, 5 km from Eksteenfontein on road to Khubus (–DD), *G. Germishuizen 4725* (PRE).
- **2819** (Ariamsvlei): Sandflächen, geges Udabis (–AD), *H. Merxmüller and W. Giess 3301* (PRE); Kleinstrauch, Namibia (–CC), *W. Giess and M. Müller 12177* (K, PRE).
- **2917** (Springbok): Anenous pass, 11 km W of Steinkopf (–BA), *A.L. Schutte 592* (JRAU); 6 miles N of Concordia (–DB), *G.J. Lewis 3395* (NBG).
- **2919** (Pofadder): 55.5 km from Pofadder to Kakamas (–AB), *B.-E. van Wyk 3070* (JRAU).
- **3017** (Hondeklipbai): between Hondeklipbai and Zwartplintjes River (–AD), *K. Pillans 17972* (BOL); Kamieskroon to Kamiesberg road (–BB), *B.-E. van Wyk 2258, 2374* (JRAU); Kamiesberg Pass, Kamieskroon side (–BB), *B.-E. van Wyk 3101* (JRAU); Horees River (–BC), *K.S. Pillans 17973* (BOL); Brakdam (–BD), *R.H. Compton 17192* (NBG); Groene River mouth (–DC), *P. A. Bean and M. Viviers 1692* (BOL).
- **3018** (Kamiesberg): Platbakkies (–BC), *M.F. Thompson 2864* (K, PRE).

![Fig. 17. Known distribution of *M. adenodes*. Circles, typical form; filled boxes, Uitenhage form; open box, Karasberg form.](image-url)
-3118 (Vanrhynsdorp): Kareebergen (–AB), Schlechter 8227 (K); sandy flats near foot of Tigerberg (–DA), S.G. Lewis 68723 (SAM).

-3119 (Calvinia): Lokenburg (–CA), Acoks 16883 (K).

-3218 (Clanwilliam): Clanwilliam (–BB), M.G.A. Henrici 3294 (PRE); Modderfontein, Citrusdal (–DB), W.J. Hanekom 1187 (K, PRE); Klipvei between Kamieskroon and Garies (–DD), C. Thorne 49962 (PRE).

-3318 (Cape Town): Hopefield (–AB), Bolus 655 (PRE); between the Berg River and in the Zwartzand (–BD), Ecklon and Zeyher 1327 (SAM, S); Darling (–DA), F.A. Guthrie 2100 (NBG); Piquetberg (–DC), H. Bolus s.n. sub PRE 54393 (PRE).

-3319 (Worcester): Gydouw pass (–AB), B.-E. van Wyk 2296 (JRAU); Nieuwekloof (–AC), R. Schlechter 3304, 4028 (PRE), 9020 (K, PRE); road between Ceres and Lakenvlei (–AD), A.L. Schutte 332, 333 (JRAU); Langerug koppie (–CB), H.M. Walters 1764 (NBG).

-3320 (Montagu): NW of Touwsberg (–DB), G. Ger mishuizen 6880 (PRE).

-3321 (Ladismith): near entrance to Santo farm (–AD), B.-E. van Wyk 2159 (JRAU); Zeekoeogat (–CC), S.J. Dean 749 (JRAU).

-3322 (Oudtshoorn): Kleinsleutelfontein (–AB), S.J. Dean 756 (JRAU); Vrolijkheid Nature Reserve (–BC), C. van der Merwe 2534 (K).

-3323 (Willowmore): 1 mile E of Willowmore, (–AD), R.D.A. Bayliss 4945 (NBG).

Uitenhage form

M. collinum var. collinum, M. collinum var. brevifolium, T. villosa

Sparcely spiny suffrutex with all parts covered with stalked glands. Leaflets cuneate-oblong, 6–8 × 2–4 mm. Inflorescence 30–50 mm long, with 5–7 flowers. Calyx upper lip 4–5 mm long; upper sinus 1.6–1.7 mm deep; lateral sinus 2.5–3.0 mm deep; lower lip 5–6 mm long; lower sinuses 0.5–1.0 mm deep. Fruits 14–18 × 3–4 mm.

Diagnostic characters

Previously known as a distinct species (M. collinum), this form is known only from a few localities in the Eastern Cape. It is less spiny, less glandular and has smaller leaflets than the typical form. The inflorescences are shorter with fewer flowers. Although this form has a more eastern distribution than the typical M. adenodes, we hesitate to separate it at species level, since we cannot satisfactorily distinguish them.

Specimens examined

-3324 (Steyterville): near Zwartkops River (–DB), Ecklon and Zeyher 1326 β (BOL, PRE, P).

-3325 (Port Elizabeth): Uitenhage (–CD), F.H. Holland 588 (NBG, K); Perseverance; Zwartkops road (–DC), F.R. Long 686 (BOL).

-3421 (Riversdale): near Gouritz River (–BD), Ecklon and Zeyher 1326 α (K, P), Zeyher s.n. sub SAM 15343 (SAM).

Karasberg form

M. karasbergense

Sparcely spiny suffrutex with all parts covered with stalked glands. Leaflets linear-oblong, cuneate at the base 7–10 × 2–4 mm. Inflorescence 60–80 mm long, with 4–5 flowers. Calyx upper lip 3–4 mm long; upper sinus 1.0–1.6 mm deep; lateral sinus 2.2–2.5 mm deep; lower lip 4.0–4.5 mm long; lower sinuses 0.8–0.9 mm deep. Fruits 12–14 × 2–3 mm.

Diagnostic characters

This form differs from the typical M. adenodes in the more slender habit, shorter inflorescences, fewer flowers and smaller bracts. This form was previously known as a distinct species, M. karasbergense, and is only known from the type locality. We suggest that this plant is merely a Namibian form of M. adenodes and not a separate species.

Distribution and habitat

Western and Eastern Karasberg. Grows on sandy banks of dry shallow water courses on the high plateau between Krag Kluft and Wasserfall.

Specimens examined


7. Melolobium humile Eckl. and Zeyh., Enum. part 2: 190 (Jan. 1836); Benth. in Hook., Lond. J. Bot. 3: 353 (1844); Walp. in Rep. Bot. Syst. 1: 618 (1843); Harv. in Harv. and Sond., Fl. Cap. 2: 79 (1862). Type: NORTHERN CAPE, “...prope Brackfontein (Clanwilliam)” [near Brackfontein, Clanwilliam, 3219 AD Wuppertal], Ecklon and Zeyher 1330 (SAM!), larger specimen on the left, lectotype, here designated; two smaller specimens, isolectotypes; S!, two specimens, isolectotypes. [Note: The specimen in SAM is chosen because it has locality details written in Zeyher’s handwriting; there are two specimens in S, both with original Enumeratio labels].

Sphingium spicatum var. hirsutissulcum E. Mey., Comm.: 66 (Feb. 1836), pro parte. Type: WESTERN CAPE, Groenekloof [3318 CB Cape Town], Drège s.n. b (P!, lectotype, here designated), Drège s.n. sub Herb. Hook. (K1, isolectotype).

Sphingium spicatum var. heterotrichum E. Mey., Comm.: 66(Feb. 1836), pro parte quod specim. ex: NORTHERN CAPE, Kasparskloof [3018 AC Kamiesberg], Drège s.n. (P!).


Unarmed suffrutex. Leaves stipulate, leaflets oblong, (6–8) 9–12(–14) × (2–)3–5 mm, glandular, pubescent, apex mucro-
nate; petiole (4–)6–10 mm long; stipules semi-cordate to auriculate, 2–5(–6) × 2–3(–4) mm, glandular, pubescent. **Inflorescence** terminal, (50–80)90–120(–150) mm long, with (7–)14–20(–25) flowers, flowers 5–9 mm long; bracts orbiculate, glandular, (2–)4–5 × (1–)3–4 mm; bracteoles narrowly ovate, glandular, 3–5 × 0.6–1.3 mm. **Calyx** shortly bilabiato, glandular, pubescent; upper lobes acute, upper lip 5–6 mm long, the apices obtuse; upper sinus 1–2 mm deep; lateral sinus 2–3 mm deep; lower lip with very short teeth; lower lip 5–6 mm long, the apices obtuse; lower sinuses 0.5–1.0 mm deep, the tips obtuse. **Corolla** yellow; standard ovate-oblong, (5–)7–9 × (3–)5–6 mm, channelled claw 2–3 mm long; wing petals oblong, sculptured, 6–8 × 2–3 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, oblong, (5–)7–9 × (3–)5–6 mm, channelled claw 2–3 mm long; wing petals oblong, sculptured, 6–8 × 2–3 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, 5–6 × 2–3 mm, with a linear claw 2–3 mm long. **Gynoecium** narrowly oblong, glandular, pubescent, 3–4-ovuled. **Fruit** narrowly oblong, straight to somewhat falcate, (8–)15–20(–25) × 2–4 mm, glandular, hairy, (2–)4–6-seeded; seeds round, 1.6–2.0 × 1.6–2.0 mm, pale brown to dark brown (Fig. 18).

**Distribution and habitat**

*M. humile* grows in sandy places in the Western Cape and Northern Cape Provinces. The distribution extends from the Richtersveld (Khubus) in the North southwards to Cape Town and eastwards to Montagu in the Western Cape Province in South Africa (Fig. 19).

Two regional forms are recognized in this species based on the extend of hairiness and size and shape of the pods.

**Typical form**

Leaflets (6–)9–12 × (2–)3–5 mm; petiole (4–)6–10 mm long; stipules 2–5(–6) × 2–3(–4) mm. **Inflorescence** (50–)90–120(–150) mm long with (7–)14–20(–25) flowers. **Calyx** upper lip 3.5–5.5 mm long; upper sinus 1.0–1.5 mm deep; lateral sinus 1.5–3.0 mm deep; lower lip 4–6 mm long; lower sinuses 0.3–1.0 mm deep. Fruits (8–)15–20(–25) × 2–4 mm.

**Diagnostic characters**

This form of the species has curved pods (straight in the Clanwilliam form). It also differs from the Clanwilliam form in having longer inflorescences.

**Specimens examined**

–2816 (Oranjemund): Hellskoof area, NE of Khubus (–BD), Oliver, Töllken and Venter 228 (PRE).

![Fig. 18. Vegetative and reproductive morphology of *M. humile*: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a – c) from B.-E. van Wyk 3058 (JRAU); (d – j) from B.-E. van Wyk 2351 (JRAU); (k) from B.-E. van Wyk 2543 (JRAU). Scale bars: a, b, d, k, 2mm; c, e – i, 1 mm; j, 0.5 mm.](image-url)
–2817 (Vioolsdrif): 2 km S of Ploegberg on road between Khubus and Lekkersing (−CA), P.C. and L. Zietsman 759 (PRE); Richtersveld, Karuchabpoort, 9 km of Lekkersing (−CC), Oliver, Tölken and Venter 799 (PRE); Richtersveld, Karuchabpoort, 9 km of Lekkersing (−CC), Oliver, Tölken and Venter 799 (PRE).

–2917 (Springbok): Klipfontein (−BA), H. Bolus 431 (PRE); near top of Anenous Pass, (−BC), B.-E. van Wyk 3085 (JRAU); between Springbok and Spektakel (−DA), E. Esterhuysen 5714 (PRE); 5 km from Springbok on road to Pofadder (−DB), A.E. van Wyk 6156 (PRE).

–3017 (Hondeklipbaai): 20 km from Kamieskroon to Garies (−BB), C.H. Sturton 5984 (PRE); Brakdam (−BD), Maguire 959 (NBG); 23 km N of Garies (−DB), B.-E. van Wyk 2351 (JRAU); farm Roodeheuwel, 9 km W of Nariep (−DC), S.M. Perold 1647 (PRE).

–3018 (Kamiesberg): Kamiesberg (−AC), B.-E. van Wyk 2543 (JRAU); Kasparskloof (−AD), Drège s.n. (P); Bitterfontein (−DB), R.H. Compton 11357 (NBG).

–3118 (Vanrhynsdorp): Kareebergen (−AB), R. Schlechter 8227 (BOL).

–3218 (Clanwilliam, form Leaflets 6–10 × 3–4 mm; petiole 5–8 mm; stipules 5–7 × 2–3(−4) mm. Inflorescence (40–)60–75(−100) mm, with 8–10(−20) flowers; flowers 6–9 mm long. Calyx upper lip T 5 mm long; upper sinus T 2–3 mm deep; lateral sinus T 1.0–1.5 mm deep. Fruits straight/linear, 25–35 × 3–4 mm.


–3318 (Cape Town): near Groot Post (−AB), T.M. Salter 6862 (BOL); Yserfontein, Malmsbury (−BC), S.M. Johnson 494 (NBG); Groenekloof (−CB), Drège s.n. sub Herb. Hook (K); south base of southern hump of Tigerberg (−DC), N.S. Pillans 4753 (BOL).

–3319 (Worcester): valley of Buffalo River near Charleston (−CA), J. Medley-Wood 4700 (SAM), 5572 (PRE); K.W.V grounds (−CB), J.R.B. Findlay 13 (K, PRE); between Langvlei and Vinkrivier (−DC), van Breda and Joubert 1907 (PRE).

–3320 (Montagu): Grootvlakte (−CD), M.B. Bayer 5895 (PRE).


Clanwilliam form

Leaflets 6–10 × 3–4 mm; petiole 5–8 mm; stipules 5–7 × 2–3(−4) mm. Inflorescence (40–)60–75(−100) mm, with 8–10(−20) flowers; flowers 6–9 mm long. Calyx upper lip ± 5 mm long; upper sinus 2–3 mm deep; lateral sinus ± 3 mm deep; lower lip ± 5 mm long; lower sinus ± 1.0–1.5 mm deep. Fruits straight/linear, 25–35 × 3–4 mm.

Fig. 19. Known distribution of M. humile. Circles, typical form; boxes, Clanwilliam form.

HEIGHT ABOVE SEA LEVEL

Over 1500 m
500 - 1500 m
300 - 900 m
Under 300 m

20 40 60 80 100 km

Diagnostic characters

The “Clanwilliam” form of *M. humile* is glandular in the same way as the typical form, but it is much more hairy (which would place it closer to *M. aethiopicum*). It also differs in having very large, straight pods (*M. humile* typically has falcate pods). It is possible that this form is a result of hybridization/introggression between the typical *M. humile* and *M. aethiopicum*.

Specimens examined

–3218 (Clanwilliam): Lambert’s Bay, Nortier Exp. Farm (–AB), M. Bayer 5793 (PRE); Clanwilliam (–BB), E. Esterhuyzen 22167 (BOL); Piquetberg (–DA), H. Bolus 7328 (PRE).

–3318 (Cape Town): 20 km from Hopefield to Malmesbury (–AB), N. Grobbelaar 2561 (PRE); between Salt River and Kalabas Kraal (–CD), J. Hutchinson 181 (K, PRE).

8. Melolobium exudans Harv. in Harv. and Sond., Fl. Cap. 2: 80 (1862). Type: WESTERN CAPE, Cape (without precise locality), Thomas n.s. sub. Herb. Hook. (K!, specimen on the bottom right hand side, lectotype, here designated. [Note: the specimen was annotated by Harvey and is therefore chosen as lectotype].

Unarmed suffrutex. Leaves stipulate, leaflets obovate to cuneate, (7–8)12–18(−25) × (2–)3–4(−6) mm, almost shiny, with sessile glands, glabrescent, apex retuse to mucronate; petiole (5–6)7–10(−14) mm long; stipules semi-cordate to auriculate, (3–)5–7 × (1–)2–3 mm. Inflorescence terminal, (40–)70–100(−140) mm long, with (9–)13–18(−20) flowers, flowers (7–)10–12 mm long; bracts ovate-lanceolate, glandular, (2–)5–6 × (1–)2–4 mm; bracteoles narrowly ovate to lanceolate, glandular, 4–6 × 1–2 mm. Calyx shortly bilabiately glabrous, glandular, sparsely hairy; upper lobes acute; upper lip (4–)6–8 mm long, the apices obtuse, upper sinus 4.0–5.5 mm deep; lateral sinus 3–4 mm deep; lower lobes acute; lower lip (5–)7–9 mm long, the apices obtuse; lower sinuses 1–2 mm deep. Corolla yellow; standard suborbicular, (7–)10–12 × (5–)6–7 mm, dorsal side glandular, with a well-developed, channelled claw 3–4 mm long; wing petals oblong, sculptured, 7–9 × 2–3 mm, with a linear claw 3–4 mm long; keel petals shorter than the wing petals, 6–7 × 2–3 mm, with a linear claw 3–4 mm long. Gynoecium narrowly oblong, glandular, hairy, 3–4-seeded. Fruit narrowly oblong, straight to somewhat falcate, (10–)15–20 × (2–)3–4 mm, glandular, hairy, 3–4-seeded; round, 2.0–2.3 × ± 2 mm, pale brown (Fig. 20).

Diagnostic characters

*M. exudans* appears to have an affinity with *M. stipulatum* from which it differs in having larger leaves (smaller and always conduplicate in *M. stipulatum*), which are almost glabrous (pubescent in *M. stipulatum*). The leaflets in *M.
exudans are usually covered with a white crust where the glands occur. It differs from other species in the dark green leaflets.

**Distribution and habitat**

*M. exudans* grows on sand dunes in the Western Cape Province in South Africa. The distribution extends from Cape Town along the coast north westwards to Saldanha and Piquetberg and eastwards to Ladismith in the Western Cape Province (Fig. 21).

**Regional variation**

Three distinct regional forms are recognized based on the length of the inflorescence, size and number of flowers and the shape of the pod.

**Typical form**

Leaflets (7–8)12–18(–25) × 3–4(–6) mm; petiole (5–8–10(–14) mm long; stipules (3–)5–7 × (1–)2–3 mm. Inflorescence (40–)70–100(–140) mm, with (9–)13–18(–20) flowers. Calyx upper lobes (4–)7–8 mm long; lower lobes (5–)8–9 mm long. Fruits 16–18 × (2–)3–4 mm.

**Diagnostic characters**

The typical *M. exudans* differs from the Hex River and the Verkeerdevlei forms in having longer inflorescences, with more and larger flowers.

**Selected specimens**

-3318 (Cape Town): Schrywershoek, Langebaan (–AA), C. Boucher 2959a (PRE); Yzerfontein (–AC), B.-E. van Wyk 2692 (JRAU); Melkbosch (–BD), E. Esterhuyzen 4015 (NBG); Paarden Island (–CD), R.H. Compton 13714 (NBG); West Coast road (–DC), B.-E. van Wyk 2683 (JRAU); Stellenbosch (–DD), R.N. Parker 3581 (BOL, NBG).
-3319 (Worcester): Turn off to Eilandia (–BC), B.-E. van Wyk 2707 (JRAU); farm “Lemoenpoort”, Doornrivier (–CD), J.B. Walters 1082, 1844 (NBG); Vinkrivier, Robertson (–DA), B. van Breda 4124 (PRE); roadside at De Doorns, (–DC), van Breda 647 (K); near Robertson (–DD), G. van Niekerk 378 (K, PRE), van Breda and Joubert 1909 (PRE), D. Morris 146 (NBG).
-3320 (Montagu): 18 km beyond Touw’s River on road to Laingsburg, (–AC), S. Venter 1347 (PRE); Karroo Garden, Laingsburg (–BB), R.H. Compton 2857 (BOL); on farm Klein-
Spreeufontein in Keurkloof (–BC), J.H.J. Vlok 1977 (PRE); road between Ashton and Montagu (–CC), M. Michell 15685 (BOL).

–3321 (Ladismith): 6.5 miles E by S of Ladismith (–AD), J.P.H. Acocks 14614 (PRE); Swartberg Mountains (–BD), J. Vlok 1070 (K, PRE); farm Muiskaal at foot of Garcia’s Pass (–CC), van Breda 4564 (PRE); Rietfontein near Planthuis (–DD), van Breda 4675 (PRE).


–3419 (Caledon): Marine drive (–DD), L. Bolus s.n. sub BOL 55617 (BOL).

**Hex River form**

*Leaflets (10−)12−14 × 3−4 mm; petiole 5−7 mm long; stipules 3−4 × 1−2 mm. Inflorescence 50−60 mm long with 6−9 flowers. *Calyx* upper lip 5−7 mm long; upper sinus 2−4 mm deep; lateral sinus 3−4 mm deep; lower lip 6−8 mm long; lower sinuses 1.0−1.5 mm deep. *Fruits* flexuous-plicate, 10−15 × 2−3 mm.*

**Diagnostic characters**

This form is distinguishable from the typical *M. exudans* in having flexuose-plicate pods. The leaflets have sessile glands and calyces and pods have stalked glands as is the case in the typical form.

**Distribution and habitat**

This form is restricted to the Hex River valley in the Western Cape Province. It is known from a single collection and further field studies are needed to evaluate the status of this unusual form.

**Specimens examined**

–3319 (Worcester): Hex River (–CB), H. Bolus 3054 (NBG), 8013 (PRE).

**Verkeerdevlei form**

*Leaflets somewhat conduplicate, 13−15 × 2−3 mm; petiole 6−8 mm long; stipules 3−5 × 2−3 mm. Inflorescence 70−100 mm long with (12−)13−16(−18) flowers. *Calyx* upper lip 6−7 mm long; lateral sinus 2.5−3.5 mm deep; lower lip 7−8 mm long; lower sinuses ±1 mm deep. *Fruits* 17−20 × 3−4 mm.*

**Diagnostic characters**

This form of *M. exudans* resembles *M. stipulatum* in having leaflets that are somewhat conduplicate. However, the leaflets are glabrous as in typical *M. exudans* and the inflorescence is not imbricate as in *M. stipulatum*.

**Distribution and habitat**

Restricted to the Worcester and Montagu districts in the southern parts of the Western Cape Province.

**Specimens examined**

–3319 (Worcester): Verkeerdevlei, 64.5 km from Ceres towards Touw’s River (–BD), B.-E. van Wyk 2233, 2234, 2235, 2236, 2712, (JRAU); Worcester (–CB), van Breda 113 (PRE); De Doorns (–DC), van Breda 1712 (PRE).


*Ononis stipulata* Thunb., Fl. Cap.: 585 (1823). Type as above.

*Sphingium canaliculatum* E. Mey., Comm.: 66 (Feb. 1836). Type as above.


Unarmed shrublet. *Leaves* stipulate, leaflets cuneate, (7−)9−12 × 1−2 mm, hairy, apex emarginate; petiole 3−5 mm long; stipules semi-cordate to auriculate, (4−)7−8 × 1−2 mm, glandular, sparsely hairy. *Inflorescence* terminal, 45−65(−85) mm long, with 5−8 flowers; flowers 10−15 mm long; bracts ovate-lanceolate, glandular, 5−7 × 2−3 mm; bracteoles narrowly ovate to lanceolate, glandular, 5−7 × 1−2 mm. *Calyx* shortly bilabiate, glandular, sparsely hairy; upper lobes acute; upper lip 8−10 mm long, the apices acute, upper sinus 3−4 mm deep; lateral sinus 3.5−4.0 mm deep; lower lobes acute; lower lip 8−10 mm long, the apices acute, lower sinuses 1−2 mm deep. *Corolla* yellow; standard ovate-oblong to suborbicular, 9−12 × 6−8 mm, with a well-developed, channelled claw 3−4 mm long; wing petals oblong, sculptured, 9−11 × 3−4 mm, with a linear claw 3−4 mm long; keel petals much shorter than the wing petals, glandular, 7−8 × 2−3 mm, with a linear claw ±3 mm long. *Gynoecium* narrowly oblong, glandular, hairy. *Fruit* lanceolate, straight, 10−15 × 3−4 mm, glandular, hairy, (1−)2−3-seeded; seeds round, ±2.3 mm, pale brown mottled dark brown (Fig. 22).

**Diagnostic characters**

*M. stipulatum* has an affinity with *M. exudans* from which it differs in having characteristically conduplicate, narrow leaflets. This species has the largest flowers in the genus (up to 15 mm long). The species can be distinguished by the cuneate leaflets, with sessile glands. The leaflets have sessile glands while the calyx has stalked ones.
Distribution and habitat

*M. stipulatum* is a poorly known species, recorded from only a few localities near Touws River in the Western Cape Province in South Africa. It grows at altitudes of about 900 m (Fig. 23).

Specimens examined

–3319 (Worcester): Verkeerdevlei, 64.5 km from Ceres to Touws River (–BD), B.-E. van Wyk 2234, 2237, 2562, 2711 (JRAU).

–3320 (Montagu): near Touw's River railway station (–AC), H. Bolus 8614 (BOL); near Touw's river (–AC), M.R. Levyns 896 (BOL).

10. *Melolobium lampolobum* (E. Mey.) A Moteetee and B.-E. van Wyk in Bothalia 31(2): 21–24 (2002). Type: WESTERN CAPE, Kendo [3322BD Oudtshoorn], Drège s.n. (P!, lectotype, designated here), Drège s.n. sub Herb. Benth. (K!, isolecotype), Drège 6463 (P!, syntype). [Note: Drège s.n. is a fruiting specimen with locality label "Kendo" and Drège 6463 is a flowering specimen with no locality label, therefore because of the diagnostic importance of the fruit and unambiguous type locality details, the former is chosen as lectotype].

*Sphingium lampolobum* E. Mey., Comm.: 66 (Feb. 1836). Type as above.

*Melolobium microphyllum* var. *lampolobum* (E. Mey.) Harv. in Harv. and Sond., Fl. Cap. 2: 79 (1862). Type as above.

Woody, strongly spinescent perennial shrublet, up to 0.6 m high. Leaves stipulate; leaflets oblong to broadly ovate, (3–)5–9 × 2–4 mm, glabrous, apex somewhat mucronate to emarginate; petiole 2–5 mm long; stipules semi-cordate to auriculate, 1–4 × 1–2 mm. Inflorescence terminal, 40–60 mm long, with (2–)4–6(–12) flowers; flowers 7–10 mm long; bracts ovate-lanceolate, 2–3 × 0.5–1.0 mm; bracteoles narrowly ovate to lancelolate, 2–3 × 0.5–0.7 mm. Calyx shortly bilabiate, with sessile glands, very sparsely hairy; upper lobes acute; upper lip 5–6 mm long, the apices obtuse, upper sinus 2–3 mm deep; lateral sinus 2.5–5.0 mm deep; lower lobes acute; lower lip 6–7 mm long, the apices obtuse, lower sinuses 0.2–1.0 mm deep. Corolla yellow; standard suborbicular, dorsal side glabrous, 6–8 × 2–3 mm, with a well-developed, channelled claw 2–3 mm long; wing petals oblong, sculptured, 7–8 × 2–3 mm, with a linear claw 3–4 mm long; keel petals shorter than the wing petals, 3–4 × 2–3 mm, with a linear claw 3–4 mm long. Gynoeicum narrowly oblong, glandular and hairy. Fruit narrowly oblong, falcate, compressed, 12–18 × 2–4 mm almost glabrous, shiny, 2–4-seeded; seeds transversely oblong to round, 2.3–2.5 mm, light brown (Fig. 24).

Diagnostic characters

The glabrous, obcordate leaflets and general morphology of *M. lampolobum* indicate an affinity with *M. exudans* but the pods of the former species are characteristically broad and flat, with an almost glabrous, smooth and shiny surface. The pods completely lack glands, while stalked glands occur on the pods.
of *M. exudans*. It also differs from all other spinescent species in the strongly spiny branches with thick, curved spines.

**Distribution and habitat**

*M. lampolobum* is a poorly known species occurring at lower altitudes near Robertson and further north-east in the mountains of the Little Karroo in the southern parts of the Western Cape Province, extending from the east end of Anysberg along the Klein and Groot Swartberg Mountains as far west as Oudtshoorn. It grows in mountain karroo scrub and rocky slopes at altitudes of 900 to over 1500 m (Fig. 25).

**Specimens examined**

–3319 (Worcester): Vrolykheid, Robertson (–DD), *van der Merwe* 3001 (PRE).

–3320 (Montagu): Karroo Garden, Whitehill (–BA), *Compton* 11213 (NBG); W end of Anysberg at Boplaas farm (–BC), *C.M. van Wyk* 1081 (PRE); 16.6 km SSE of Laingsburg (–BD), *B.-E. van Wyk* 2143, 2145 (JRAU).

–3321 (Ladismith): Ladismith (–AD), *Bayliss* 2818 (NBG), *Acocks* 14614 (K); Groot-Swartberg (–BD), *Marshall* 234 (JRAU, PRE); Swartberg mountains next to road to Gamakakloof (–BD), *Vlok* 1489 (PRE); Range N of Sandberg (–DA), *Wurts* 1393 (NBG).

–3322 (Oudtshoorn): Kendo (–BD), *Drège s.n.* (P).

11. *Melolobium microphyllum* (L.f.) Eckl. and Zeyh., Enum. part 2: 189 (Jan. 1836); Walp. in Rep. Bot. Syst. 1: 618 (1843); Benth. in Hook., Lond. J. Bot. 3: 351 (1844); Harv. in Harv. and Sond., Fl. Cap. 2: 79 (1862); Baker f., *The Leguminosae of Tropical Africa* 1: 22 (1926); A. Schreib. in FSWA 60: 89 (1970). Type: WESTERN CAPE, “ad Cap. bonae Spei” [Cape of Good Hope, without precise locality], LINN 896.29 (LINN, microfiche!, lectotype, here designated); *Thunberg* s.n. THUNB-UPS 16621 (UPS, microfiche!, isolectotype). [Note: When the younger Linnaeus described this species he had studied Thunberg’s specimens and LINN 896.29 possibly came from Thunberg, as it is identical to the specimen in the Thunberg Herbarium].


*Dichilus microphyllus* (L.f.) E. Mey. in *Linnaea* 7: 154 (1832). Type as above.

*Sphingium microphyllum* (L.f.) E. Mey., *Comm.*: 67 (Feb. 1836). [Note: Meyer studied the following Drège specimens, so that there is no doubt about the identity of “Sphingium
microphyllum”, despite the question mark that he inserted after “Ononis microphylla Thunb?”. [3124 DC Hanover] Drège s.n. a (P!, lectotype, here designated), Drège s.n. a sub Herb. Hook. (K!, isolectotype); “Camdeboosberg” [Camdeboo Mountain, 3223 BD Nelspoort] Drège s.n. b (P!, syntype), Drège s.n. b sub Herb. Benth. (K!, syntype); “…inter Omsamcaba et Omsamwubo” [between Msikaba River and Mzimvubu, 3129 AC Port St. Johns], Drège s.n. c (P!, syntype). [Note: Drège s.n. a is chosen as lectotype because it is a fruiting specimen and Meyer’s handwriting appears on the sheet. The Drège specimen with the numbers 694 and 6465 is also fruiting but it has no locality details].

Sphingium decumbens E. Mey., Comm.: 67 (Feb., 1836), pro parte. Type: Nieuweveldbergen, Drège s.n. (P!, lectotype).

Melolobium decumbens (E. Mey.) Benth. in Hook., Lond. J. Bot. 3: 352 (1844) pro parte, excluding Drège s.n. a; Walp. in Rep. Bot. Syst. 5: 454 (1845/46); A. Schreib. in FSWA 60: 89 (1970).

Melolobium microphyllum var. decumbens (E. Mey.) Harv. in Harv. and Sond., Fl. Cap. 2: 79 (1862), pro parte.

Melolobium microphyllum var. collinum sensu Harv. in Harv. and Sond., Fl. Cap. 2: 79 (1862), pro parte, non M. collinum Eckl. and Zeyh.

Melolobium burchellii N.E.Br. in Kew Bull. 1901: 120 (1901), synon. nov. Type: NORTHERN CAPE, Nauw Poort, Colesberg [3025CA Colesberg], Burchell 2776 (K!, holotype; BM!, isotype).

M. glanduliferum Dummer in Kew Bull. 1912: 227 (1912). Type: Lesotho, without precise locality, Cooper 703 (K!, holotype).

M. mixtum Dummer in Kew Bull. 1912: 228 (1912), synon. nov. Type: EASTERN CAPE, Queenstown [3126 DD Queens-town], Cooper 217 sub. Herb. Hook (K!, lectotype, here designated); Bosch Berg [3225 DC Somerset East], MacOwan 610 sub Herb. Hook (K!, syntype); Albert, Cooper 1393 sub Herb. Hook. (K!, syntype); Caledon River [2927 BC Maseru], Burke and Zeyher 391 (BM!, syntype); FREE STATE, Bloemfontein [2926 AA Bloemfontein], Rehmann 3816 (K!, syntype); Harrismith [2829 AC Harrismith], Wood 4789 (K!, syntype); KWAZULU-NATAL, Natal Coldstream, Rehmann 6902 (K!, syntype). [Note: The Cooper 217 syntype is here chosen as lectotype because it is a complete specimen with flowers and fruits].


Divaricately branched, spiny shrub. Leaves stipulate, leaflets oblong to broadly obovate, (3–)5–8 × 1–3 mm, glandular, hairy; petiole 2–5 mm long; stipules semi-cordate to auricu-
late, 3–4 × 1–2 mm. Inflorescence terminal, 15–25(–35) mm long, with (1–)2–3(–6) flowers; flowers (5–)7–10 mm long; bracts narrowly cordate, glandular, hairy, 2–6 × 1–3 mm; bracteoles narrowly ovate, 3–4 × 1–2 mm. Calyx shortly bilabiate, glandular, hairy; upper lobes acute, upper lip 3–6 mm long, the apices acute, upper sinus 1–3 mm deep; lateral sinus 2–5 mm deep; lower lobes acute, lower lip 4–7 mm long, the apices acute, lower sinuses 0.5–2.0 mm deep. Corolla yellow; standard suborbicular, 5–8 × 3–6 mm, with a well-developed, channelled claw 2–3 mm long; wing petals oblong, sculptured, 5–8 × 1–2 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, 5–6 × 1–2 mm, with a linear claw 2–3 mm long. Gynoecium narrowly oblong, glandular, hairy. Fruit narrowly oblong, falcate (sometimes straight, e.g., type of *M. accedens*), 12–18 × 2–4 mm, glandular, hairy, 2–4-seeded; seeds round, 2–3 × 2–3 mm, reddish brown, brown, pale yellow speckled with brown, light brown speckled with dark brown (Fig. 26).

**Diagnostic characters**

*M. microphyllum* can be distinguished from the closely related *M. obcordatum* in being much more spiny and having smaller, oblong to broadly obovate leaflets [except in the Eastern Cape form (distinctly obcordate in the latter)]. The standard petal is suborbicular and the dorsal side sparsely glandular.

**Distribution and habitat**

Slopes, rocky ledges, basalt outcrops, dry sandy soil and stony ravines at altitudes up to 2500 m. It occurs in Namibia, Lesotho, the Northern Cape, Eastern Cape, Free State and KwaZulu-Natal Provinces in South Africa (Fig. 27).

*M. microphyllum* is morphologically quite variable. Four regional forms are recognized according to the shape and size of the leaflets, size of the pods and the extent of hairiness.

**Typical form**

*M. microphyllum*, *T. armata*, *M. mixtum*, *M. microphyllum var. decumbens*, *M. microphyllum var. collinum sensu Harv.*, *M. decumbens*, *M. glanduliferum*

Leaflets (3–)5–8 × 1–3 mm; petiole 2–5 mm long; stipules semi-cordate to auriculate, 3–4 × 1–2 mm. Inflorescence 15–25(–35) mm long, with 1–3 flowers, (5–)7–10 mm long. Calyx upper lip 3–6 mm long; upper sinus 1.5–2.0 mm deep; lateral sinus 2–4 mm deep; lower lip 4–7 mm long; lower sinuses 0.5–2.0 mm deep.
Fig. 26. Vegetative and reproductive morphology of *M. microphyllum*: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a – d) from B.-E. van Wyk 3056 (JRAU); (e, g – j) from A.L. Schutte 144 (JRAU); (f and k) from B.-E. van Wyk 2634 (JRAU). Scale bars: a – c, e – i, 1 mm; d and k, 2 mm; j, 0.5 mm.

Fig. 27. Known distribution of *M. microphyllum*. Filled boxes, typical form; filled circles, Windhoek form; open circle, Fauresmith form; open boxes, Eastern Cape form.
Diagnostic characters

The typical form of *M. microphyllum* is less branched and more hairy than the Fauresmith form. It differs from the Eastern Cape form in the obovate leaflets (almost round in the latter).

Distribution and habitat

The typical form of *M. microphyllum* is much more widely distributed than the other forms, which are more localized.

Selected specimens

- **2216** (Otjimbingwe): Baumgartsbrunn, 28 miles W of Windhoek (–DB), B. de Winter 2601 (K, PRE); farm Hohenhorst (–DC), H. Merxmüller 997 (PRE).
- **2217** (Windhoek): farm Ongeama (–AD), W. Geiss 14855 (PRE); Windhoek (–CA), H. Merxmüller and W. Giess 3533 (PRE), R. Steydel 4426 (K), M. Wilman 26199 (SAM); 5 miles E of Windhoek, (–CA), A.S.L. Schelp 157 (BM).
- **2317** (Rehoboth): ±45 km from Rehoboth to Mariental (–CD), N. Grobbelaar 1871 (PRE).
- **2520** (Mata Mata): Kalahari Gemsbok National Park (–CB), N. van Rooyen and G. Bredenkamp 179 (–BC), N. Grobbelaar 1871 (PRE), H. Merxmüller 997 (K, PRE); farm Ongeama (–AD), W. Geiss 14855 (PRE); Windhoek (–CA), H. Merxmüller and W. Giess 3533 (PRE), R. Steydel 4426 (K), M. Wilman 26199 (SAM); 5 miles E of Windhoek, (–CA), A.S.L. Schelp 157 (BM).
- **2317** (Rehoboth): ±45 km from Rehoboth to Mariental (–CD), N. Grobbelaar 1871 (PRE).
- **2520** (Mata Mata): Kalahari Gemsbok National Park (–CB), N. van Rooyen and G. Bredenkamp 179 (–BC), N. Grobbelaar 1871 (PRE), H. Merxmüller 997 (K, PRE); farm Ongeama (–AD), W. Geiss 14855 (PRE); Windhoek (–CA), H. Merxmüller and W. Giess 3533 (PRE), R. Steydel 4426 (K), M. Wilman 26199 (SAM); 5 miles E of Windhoek, (–CA), A.S.L. Schelp 157 (BM).
- **2317** (Rehoboth): ±45 km from Rehoboth to Mariental (–CD), N. Grobbelaar 1871 (PRE).
- **2520** (Mata Mata): Kalahari Gemsbok National Park (–CB), N. van Rooyen and G. Bredenkamp 179 (–BC), N. Grobbelaar 1871 (PRE), H. Merxmüller 997 (K, PRE); farm Ongeama (–AD), W. Geiss 14855 (PRE); Windhoek (–CA), H. Merxmüller and W. Giess 3533 (PRE), R. Steydel 4426 (K), M. Wilman 26199 (SAM); 5 miles E of Windhoek, (–CA), A.S.L. Schelp 157 (BM).

Leribe, Lesotho (–CC), A. Dieterlen 164 (PRE), E.P.E. Phillips 956 (SAM); Golden Gate National Park (–DA), B.-E. van Wyk 4006 (JRAU).

- **2829** (Harrismith): Platberg, Harrismith (–AC), A.L. Schutte 373 (JRAU); 3 km from Harrismith towards Van Reenen Pass (–AD), B.-E. van Wyk 1926 (JRAU).
- **2922** (Prieksa): farm Nooitgedacht (–BC), A.O.D. Mogg 15115 (PRE).
- **2925** (Jagersfontein): Fauresmith (–CB), C.A. Smith 957, 4379, 4544 (PRE); ca. 57 km before Jagersfontein from Bloemfontein (–DB), A.L. Schutte 349 (JRAU).
- **2926** (Bloemfontein): N of Bloemfontein (–AA), B.-E. van Wyk 2714 (JRAU); Thaba Nchu (–BB), J.P.H. Acocks 13805 (PRE); Dewetsdorp (–DA), M. Steyn 925 (NBG).
- **2927** (Maseru): Westminster (–AA), L.C.C. Liebenberg 5252 (PRE); Tlapaneng (–BA), A. Jacot-Guillarmod 420 (K, PRE); Monethis, Berea (–BB), A. Jacot-Guillarmod 1935 (PRE); Roma Valley (–BC), M.O. Ruch 1536 (PRE), A. Jacot-Guillarmod 1521 (PRE); Matela’s peak (–BD), J. Thioe 6293, 6386 (PRE); from Mafeteng to Wepener (–CA), A. Dieterlen 1244 (PRE); Thabaneng, Mafeteng (–CD), J.M. Watt and J.M. Brandwijk 2421 (PRE).
- **2928** (Marakabei): Maluti Mountains (–AA), R.R. Staples 43 (PRE).
- **2929** (Underberg): Mokhotlong, opposite St. James Mission (–AC), D.J.B. Killick 4565 (K, PRE); Summit of Amphitheater, Sehlabathebe National Park (–CC), A.C. Beverly 721 (PRE); Mpendle, upper Loteni valley (–DA), Hilliard and Burtt 18084 (K).
- **3022** (Carnavon): Rhenosterkolk (–CA), J.P.H. Acocks 1721 (PRE).
- **3023** (Bristown): near Britstown (–DA), C.M. van Wyk s.n. sub JRAU (JRAU).
- **3025** (Colesburg): Philippolis, Smartryk Siding (–AB), C.A. Smith 4312 (PRE); Spiopenk (–AB), C.A. Smith 4465 (PRE); Trompsburg (–BB), G. Potts 3772 (PRE); 14 km from Colesburg to Cape Town (–CB), A.L. Schutte 248 (JRAU), Colesburg (–CA), Burchell 2776 (K), P. Oosthuizen 16533 (PRE); Van Schalkwykskraal, Venterstad (–DD), E. Thorne 51849 (SAM).
- **3026** (Aliwal North): Bethulie, Tussen-die-Riviere Wildtuin (–AC), B.R. Roberts 5401 (PRE), B. Grobbelaar-B35 (PRE); near top of Wolwekop, Rouxville (–BC), B.-E. van Wyk 2628 (JRAU); near Orange and Caledon Rivers (–CA), Zeyerl 391 (SAM); Goedemoed (–CB), E. Thorne 54465 (SAM); near Burgersdorp (–CD), Flanagan 1540 (PRE), 133 (BOL), B.-E. van Wyk 2598 (JRAU); Ruigtefontein (–DA), A. Thode A1846 (PRE); Eland’s Hoek near Aliwal North (–DD), F. Boulus 80 (BOL).
- **3027** (Lady Grey): 32 km from Zastron on road to Wepener (–AA), Smook and G. Russell 2250 (K, PRE); Upper Quthing valley near Makoae’s (–BC), M. Schmitz 8320 (PRE); edge of Kammelk spruit, Lady Grey (–CA), Acocks 13822 (PRE); M. Wilman 738 (PRE); Barkley East (–DC), C. van der Merve 1624 (PRE).
- **3028** (Matiatle): Ha Rapase, near Qacha’s Nek, Lesotho (–BA), E.E. Galpin s.n. sub BOL 55677 (BOL); Sebapala (–DA), E.E. Galpin 14043 (K).
−3029 (Kokstad): Kokstad, Groom’s farm (–CB), C. Haygarth s.n. sub TRV 333852 (PRE).

−3121 (Fraserburg): Walkraal, Williston (–AC), W.J. Foley 193 (PRE); Merriman Siding (–DB), F. Holland s.n. sub PRE 54354 (PRE).

−3123 (Victoria West): Victoria West (–AC), J.F. Jooste 389 (PRE); Schaalfontein, W of Victoria West (–AC), J.P.H. Acoccks 16398 (K, PRE); Murraysburg (–DD), W. Tyson 321 (PRE).

−3124 (Hanover): Lootsberg Pass, Middelburg-Graaff Reinet road (–DC), G. Jacques 5671 (NBG), Acoccks 15860 (K, PRE).

−3125 (Steynsburg): Grootfontein, Middelburg (–AC), J.C. Theron 702 (PRE), J.P.H. Acoccks 8678 (PRE), D.M. Comins 696 (K, PRE), F.G. Rogers 15411 (K); Steynsburg, Kaffer-skraal farm N of Teebus (–BC), Retief and Germishuizen 216 (PRE); Conway farm (–CB), E.E. Galpin 5714 (PRE); Hofmeyer farm (–DB), Retief and Germishuizen 444 (PRE); Sneeuwbergen (–DC); Drège s.n. a sub Herb. Hook. (K).

−3126 (Queenstown): 45 km from Molteno to Burgersdorp (–AB), M. Koekemoer 158 (PRE), Penhoek Pass (–BD), B.-E. van Wyk 1600 (JRAU); Queenstown (–DD), Cooper 217 sub Herb. Hook. (K).

−3127 (Lady Frere): 22 km W of Elliot on road to Indwe (–BC), G. Germishuizen 8723 (PRE); Cala (–DA), A. Pegler 1736 (BM, K, PRE).

−3129 (Port St. Johns): between Msibaka River and Mzimvubu (–AC), Drège s.n. c (P); Umzimvubu (–AC), R. Schlechter 6426 (BOL).

−3222 (Beaufort West): Nieuweveld Mts (–BA), E. Esterhuysen 2756 (BOL); Beaufort West (–BC), F.A. Guthrie 3240 (PRE), E. Esterhuysen 2724 (BOL).

−3223 (Nelspoort): Nelspoort (–AA), H.W.R. Marloth 5771 (PRE); Camedoo Mountain (–BD), Drège s.n. b sub Herb. Benth. (K); Vlakplaats, Richmond (–CA), H. Bolus 13854 (PRE).

−3224 (Graaff Reinet): hillside on farm Rietvlei (–BC), E.E. Galpin 11510 (K).

−3225 (Somerset East): Bergkwagga Park (–AB), A.M. Brynard 49 (PRE), C.F. du Toit 138 (PRE), M.K.P. 7510 (PRE); Mountain Zebra National Park (–AD), B.-E. van Wyk 1325 (JRAU); Karrebosch, Cradock (–BA), F.R. Long 969 (K, PRE); 11.5 miles from Dwingfontein to Cradock (–BB), R. Story 1317 (K, PRE); Mt. Boschberg (–DC), P. MacOwan 610 (PRE).

−3226 (Fort Beaufort): Winterberg Mountain Range, 15 km from Katberg Pass (–BC), J.E. Victor 1265 (PRE); Black Hills, Lovedale (–CB), L. van Niekerk 2765 (NBG).

−3227 (Stutterheim): Cathcart (–AC), J.L. Sidey 3767 (PRE); Stutterheim (–CC), P.J. Robertson 860 (PRE); Kingwilliam’s Town (–CD), T.R. Sim 19475 (PRE); Amatola Mountains near Seymour (–DB), B. Clarke 66 (PRE); Alice commonage (–DD), P.B.E. Phillipson 588 (K).

−3325 (Port Elizabeth): Zuurberg National Park (–BC), B.-E. van Wyk 927 (JRAU); North end Cemetrylands (–DC), F.R. Long 1180 (K, PRE).

−3326 (Grahamstown): Road to Southwell from Grahamstown (–DA), R.D.A. Bayliss 5757 (NBG).

Fauresmith form

A form of the eastern Free State Province in South Africa. *Leaflets* 4–6 × 2–3 mm, almost glabrous; petiole 2–5 mm long; stipules 2–4 × 1–2 mm. *Inflorescence* 15–25(–35) mm long, with 1–3 flowers; flowers 6–10 mm long. *Calyx* upper lip 6–7 mm long; upper sinus 3.0–3.5 mm deep; lateral sinus ±4.5 mm deep; lower lip 6–8 mm long; lower sinuses 1.0–1.5 mm deep. *Fruits* very broad, 10–15 × 3–4 mm.

Diagnostic characters

This form is much more densely branched than the typical *M. microphyllum*. It also differs from the latter in having thicker, green and less hairy branches. The leaflets are almost glabrous (pubescent in the typical form) and the pods are much broader than in the typical form.

Specimens examined

−2925 (Fauresmith): Fauresmith (–CB), Henrici 4350 (PRE), G. Potts 3397 (PRE), I. Verdoorn 941 (PRE).

Eastern Cape form

*Leaflets* orbicular, 3–4(–5) × 2–3 mm; petiole 2–4 mm long; stipules 2–3 × 1–3 mm. *Inflorescence* 10–17 mm long, with 1–3 flowers. *Calyx* upper lip 3.0–5.5 mm long; upper sinus 1.5–2.5 mm deep; lateral sinus 2–4 mm deep; lower lip 3–7 mm deep; lower sinuses 0.3–1.0 mm deep. *Fruits* 7–10 × 3–4 mm.

Diagnostic characters

This form differs from the typical *M. microphyllum* in having more or less rounded leaflets (obcordate to obovate in the latter).

Specimens examined

−3224 (Graaff Reinet): near Graaff Reinet (–BC), H. Bolus 37 (BOL).

−3326 (Grahamstown): Albany (–AD), R.D.A. Bayliss BS4590 (NBG).


Divaricately branched, slightly spiny decumbent forming clumps or mats, up to 0.5 m high and 0.2 m wide. *Leaves* stipulate; leaflets obovate, (5–)7–9(–10) × 3–5 mm; glandular, sparsely hairy, apex emarginate; petiole 5–8(–13) mm long,
stipules semi-cordate to auriculate, glandular, sparsely hairy, 2–3 × 0.5–1.5(–2) mm. Inflorescence terminal, 40–80(–120) mm long; with 5–8 flowers; flowers 5–6 mm long; bracts obliquely ovate, 3–4 × 2–3 mm; bracteoles, obliquely narrowly ovate, 1.5–2.0 × 0.5–1 mm. Calyx shortly bilabiate, glandular, hairy; upper lobes acute; upper lip 4–5 mm deep, the apices acute; upper sinus 1–2 mm deep; lateral sinus 2.4–2.8 mm deep; lower lobes acute, lower lip 4–5 mm long, the apices acute; lower sinuses 1–2 mm long. Corolla yellow; standard ovate-oblong, 4–5 × 3–4 mm, with a well-developed, channelled claw 1–2 mm long; wing petals oblong, sculptured, 7–8 × 2–3 mm, with a linear claw 1–2 mm long; keel petals shorter than the wing petals, 3–4 × 2–3 mm, with a linear claw 1–2 mm long. Gynoecium narrowly oblong, glandular, hairy, 2–3-ovuled. Fruit falcate, 12–16(–22) × 3–4 mm, glandular, hairy, 3–4-seeded; seeds transversely oblong to round, 2.3–1.6–2.0 mm, light brown to dark brown (almost black) (Fig. 28).

Diagnostic characters

*M. obcordatum* can be distinguished from the closely related *M. microphyllum* in the distinctly obcordate leaflets, which have emarginate apices. *M. obcordatum* also has fewer and thinner spines than *M. microphyllum*. *M. obcordatum* is also characterized by the seeds which are sometimes almost black.

Distribution and habitat

*M. obcordatum* grows on mountain grassland slopes, near river banks, boulder beds, at the foot of sandstone cliffs, cave sandstone, rocky river beds, basalt pediment, dark clay soil, rocky dolerite slopes and rocky grassland shale in mountain peaks, at altitudes of about 1950–2450 m in Lesotho and the Free State, Eastern Cape, KwaZulu-Natal and Gauteng Provinces in South Africa (Fig. 29).

Selected specimens

-2628 (Johannesburg): Suikerbosrand (–CA), G.L. Breidenkamp 437 (JRAU, PRE).
-2727 (Kroonstad): farm Blanquilla 280 (–CA), J.C. Scheepers 1689 (BM, PRE); farm Quaggafontein, Lindley (–DD), C. de Feijter 154 (PRE).
-2729 (Volksrust): Quaggakop, Vrede (–AD), J.P.H. Acoks 12756 (PRE); Volkrust (–BD), T.J. Genkins 9645 (PRE), A.O.D. Mogg 7517 (PRE); Hampstead, Ingogo rail (–DB), A.H. Mingay s.n. sub PRE 54385 (PRE).
-2730 (Vryheid): farm Nagenoeg near Utrecht (–CB), P. Delahunt 42 (PRE).
-2827 (Senekal): Willem Pretorius Wildtuin, Senekal (–AD), D.B. Müller 762 (PRE).
-2828 (Bethlehem): Fourniesburg (–CA), F.A. Rogers 15911 (K, PRE); next to road at Brandwag Hotel, Golden Gate Nat. Park (–CB), A.L. Schutte 143, 394, 569, A. Moteetee and B.-E. van Wyk 4 (JRAU); Drakensberg Nat. Park (–DB), Acoks and Hafström 699 (K, PRE).
-2829 (Harrismith): Cathedral Peak (–CC), E.E. Esterhuysen 12910 (BOL).
-2830 (Dundee): Weenen, above stream in Lambonja valley (–CC), E.E. Esterhuysen 12910 (K).

![Fig. 28. Vegetative and reproductive morphology of *M. obcordatum*: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a–c, k) from A. Moteetee and B.-E. van Wyk 4 (JRAU); (d–j) from A.L. Schutte 147 (JRAU). Scale bars: a–i, 1 mm; j, 0.5 mm; k, 2 mm.](image-url)
–2926 (Bloemfontein): Bloemfontein (–AA), G. Potts 2921 (PRE); Thaba Nchu (–BB), B.R. Roberts 2266, 2498, 2984 (PRE).

–2927 (Maseru): Maphotong valley, Roma (–BC), M. Schmitz 563 (PRE); 22 km from Wepener to Hobhouse (–CA), B.-E. van Wyk 1574 (JRAU); Thaba Putsoa, on road from Malealea to Semongkong (–DC), E.E. Esterhuysen 13167 (PRE).

–2928 (Marakabei): between Molimo-Nthuse and Blue Mountain pass Hotel (–AA), M. Schmitz 7880 (PRE); Semongkong gorge below Maletsunyane falls (–CC), E.E. Esterhuysen 13181 (K, BOL).

–2929 (Underberg): Giants Castle Game Reserve (–AB), W. Trauseld 919 (PRE); Phutha, Lesotho (–AC), R.H. Compton 21632 (NBG); Loteni Nature Reserve (–AD), B.-E. van Wyk 1960 (JRAU), Hilliard and Burtt 11814 (PRE); Little Tugela area, Drakensberg (–BA), E.E. Esterhuysen 8840 (BOL); Sani Pass (–CB), Hilliard 1131 (PRE), Balkwill, Manning and Cadman 1131 (K); Leqooa River valley, west of Sehlabathene Nat. Park (–CC), Beverley and Hoener 566 (PRE).

–3026 (Aliwal North): Bethulie, Tussen-die-Riviere Wildtuin (–AC), B.R. Roberts 5401 (PRE); 10 km S of Aliwal North along the N6 (–DA), A. de Castro 243 (JRAU).


–3028 (Matatiele): Between Ongeluk’s nek and Qacha’s nek, 2 km from Mphaki store (–AA), G.C. Mathews 925 (NBG); Maqaba Peak near Qacha’s nek, Lesotho (–BA), E.E. Galpin s.n. sub PRE 54412 (PRE); Beacon above Ramatseliso’s Gate (–BB), R.D.A. Bayliss 7786 (NBG); mountain side of Buffalo river waterfall (–CA), E.E. Galpin 6604 (K, PRE); Woodcliffs trails, opposite Reed Park (–CC), A. Abbott 5804 (PRE).

–3029 (Transkei): Mzimkhulu District, NE of Nzikeni mountain (–AB), Ngwenya 950 (PRE).

–3126 (Queenstown): Broughton near Molteno (–AD), H.G. Flanagan 1576 (K, PRE); 11 km from Jamestown on road to Aliwal North (–BB), B. Clarke 514 (PRE).

–3225 (Somerset East): Zwegarsheok, Jakkalsfontein, Cradock (–AD), J.P.H. Acocks 17510 (K, PRE).

13. Melolobium calycinum Benth. in Hook., Lond. J. Bot. 3: 350 (1844); Walp. in Rep. Bot. Syst. 5: 454 (1845/46); Harv. in Harv. and Sond., Fl. Cap. 2: 78 (1862). Type: "BETCHUANALAND, Sand River" [Northern Cape, Sand River, precise locality not certain], Zeyher 394 sub Herb. Benth. (K!, lectotype, here designated; BM!, SAM!, isolecotypes). [Note: Zeyher specimens in BM, K and SAM are most probably isotypes (all represent the same collection even though they are labelled as being collected only by Zeyher (Burke and Zeyher collected together)].

Sphingium decumbens sensu E. Mey., Comm.: 67 (Feb. 1836), pro parte quoad specim. ex: EASTERN CAPE, "Sneeubergen, prope Paardekraal" [Sneeubergen near Paardekraal, 3324 BD Graaff Reinet], Drège s.n. a (P!) non E. Mey. sensu stricto. 

Fig. 29. Known distribution of M. obcordatum.
Melolobium decumbens sensu (E. Mey.) Benth. in Hook Lond. J. Bot. 3: 352 (1844); Walp. in Rep. Bot. Syst. 5: 454 (1845/46), pro minore parte, non (E. Mey.) Benth. sensu stricto. Melolobium microphyllum Eckl. and Zeyh. var. decumbens sensu (E. Mey.) Harv. in Harv. and Sond., Fl. Cap. 2: 80 (1862), pro minore parte, non (E. Mey.) Benth. sensu stricto. Melolobium villosum Harms in Fedde Repert 11: 87 (1912); A. Schreib. in FSWA 60: 90 (1970). Type: NAMIBIA, farm Hoffnung, trockene Hügel, Dinter 970 (B††).

Divaricately branched, spiny shrub. Leaves stipulate; leaflets oblong to broadly obovate, (1–)3–7 × 1–2 mm, densely hairy; petiole 2–4 mm long; stipules semi-cordate to auriculate, 3–5 × 2–2.5 mm, densely hairy. Inflorescence terminal, 10–12 mm long, 1–3-flowered; flowers 6–10 mm long; bracts ovate-lanceolate to cordate, 4–5 × 2–3(–4) mm; bracteoles narrowly ovate to lanceolate, 3–4 × 1–2 mm. Calyx shortly bilabiate, densely hairy; upper lobes acute; upper lip 5–6 mm long, the apices acute, upper sinus 2–3 mm deep; lateral sinus 3.5 mm deep; lower lobes acute, 6–7 mm long, the apices acute, lower sinuses ±1 mm deep. Corolla yellow; standard ovate-oblong, 6–7 × 3–4 mm, with a well-developed, channelled claw ±2 mm long; wing petals oblong, sculptured, 6–7 × 1–2 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, 5–6 × 1–2 mm, with a linear claw 2–3 mm long. Gynoecium narrowly oblong, densely hairy. Fruit oblong, very short, straight to somewhat falcate, 6–10 × 2–3 mm, densely pilose, 1–2(–3)-seeded; seeds transversely oblong to round, 1.6–2.3 × 1.6–2.0 mm, pale yellow, olive, brown, light brown mottled greenish (Fig. 30).

Diagnostic characters

M. calycinum is closely related to M. candidans and M. canescens but differs from them in having more spines which are much thinner. This species is densely covered with brownish hairs while M. candidans is covered with white hairs and M. canescens is silky-canescent.

Distribution and habitat

M. calycinum grows in calcareous sand on river banks, red Kalahari sand, red-brown sand, open grasslands on calcrete bedrock and rocky karroo in Botswana, Namibia, the Free State, Northern Cape, Eastern Cape, KwaZulu-Natal and North-West Provinces in South Africa (Fig. 31).

Selected specimens

–2217 (Windhoek): farm Lichraistein, near Windhoek (–CA), Dinter 3523 (PRE).
–2422 (Mashi-a-Potsana): Mahudutlachi Pan (–AB), T.J. Cox 371 (K).
–2425 (Gaborone): Letlhakeng (–AA), F.M. Patterson 6 (PRE).
–2525 (Mafikeng): Metlojane, 26 km W of Pitsane Station, Botswana (–CB), D.T. Cole 659 (PRE); 100 miles W of Fig. 30. Vegetative and reproductive morphology of M. calycinum: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a–c) from A.L. Schutte 303 (JRAU); (d–j) from A. Moteetee 19 (JRAU); (k) from M. Koekemoer 161 (PRE). Scale bars: a–k, 1 mm.
Mafikeng, farm Wildebeeskoringlaagte (–DC), Government Official s.n. sub PRE 54334 (PRE).

–2624 (Vryburg): Panfontein (–CA), J. Burtt Davy 9542, 9592 (PRE).

–2625 (Delareyville): Barberspan Nat. Res. (–DA), N. Zambatis 79 (PRE); Sannieshof (–DB), P.C. Grobler s.n. sub PRE 54324 (PRE).

–2629 (Bethal): Standerton (–CD), S. Venter 02119 (PRE), J. Burtt Davy 7514 (PRE); 15 km from Morgenzon on road to Amersfoort (–DA), S. Venter 02052 (K, PRE); Ermelo (–DB), Scholars 64 (PRE); Klipplaatdrift farm, Amersfoort area (–DD), B.J. Turner 737 (PRE).

–2721 (Tellery Pan): 35 miles ESE of Askham (–AD), O. Leistner 3033 (K, PRE).

–2722 (Olfantshoek): near caravan park (–DC), M. Crosby 658 (PRE); 3.5 miles SSW of Olfantshoek (–DD), O.A. Leistner and J. Joyn 2765 (K, PRE).

–2724 (Taung): Zoet vley (–AA), J.G. Speedy 17/8 (PRE); 16 miles NW of Reivilo, farm Boland (–CA), R. Story 4602 (PRE); Pokwani (–DD), E.H. Bazeley s.n. sub BOL (K).

–2725 (Bloemhof): Leeuwfontein, 10 km W of Wolmaranstad (–BB), A.E. van Wyk 550 (PRE).

–2727 (Kroonstad): near Valsch River (–CA), J.W. Pont 314 (PRE).

–2730 (Vryheid): Latemanek, Daggaakraal farm (–AA), B.J. Turner 1225 (PRE).

–2822 (Glen Lyon): Blackridge (–DC), E.G. Bryant 3659 (BOL).

–2823 (Griquatown): ca. 9–10 km E of Danielskuil on gravel road to Kuruman (–BA), A. Mottee 10 (JRAU); 15 miles NE of Griquatown (–CC), L.E.W. Codd 1279 (PRE).

–2824 (Kimberley): Agric. Research Station, Koopmansfontein (–AA), P. Hattingh 148 (PRE); Barkley West (–DA), O. Cooke s.n. (K); Kimberley (–DB), M. Wilman (PRE 54327), H.W.R. Marloth 805, 8430 (PRE); Benfontein (–DD), A.A. Gubb 278/21, 289/27, 294/17 (PRE).

–2825 (Boshoff): Boshoff (–CA), J. Burtt Davy 12459 (PRE).

–2826 (Bradfort): Bulfontein (–AC), D.B. Müller 1346 (PRE); between Soutpan and Brandfort (–CB), H. Joff 412 (PRE); 122 km from Bloemfontein on N1 to Johannesburg (–DA), A.L. Schutte 303 (JRAU).

–2828 (Bethlehem): farm Dunblane 335, Bethlehem (–AB), J.C. Scheepers 1836 (K); Qoqolosing peak, Lesotho (–CC), A. Dieterlen 163 (SAM).


–2830 (Dundee): Vands Drift, 21 miles E of Dundee (–BA), L.E. Codd 1511 (K, PRE); bank of Buffalo River, north of De Jagers drift (–BA), J.P.H. Acocks 11577 (PRE); Fort Melville site, near Tugela Ferry (–CB), C.H. Stirton 11705 (PRE).

–2925 (Jagersfontein): on farm Oorlog (2474), north of the road between Bloemfontein and Petrusburg (–BB), D.B. Müller 1202 (PRE); Fauresmith, Oorlogspoort (–CB), J.C. Verdoorn 1351 (PRE); ca. 57 km before Jagersfontein from Bloemfontein (–DB), A.L. Schutte 349 (JRAU).
Type: EASTERN CAPE, ’’Sneeuwbergen, e.g., prope Zuur-...


Type: EASTERN CAPE, ’’District Uitenhagen’’ [Uitenhage, Tropical Africa 1: 22 (1926); A. Schreib. in FSWA 60: 88 (1970).

Sphenium velutinum E. Mey., var. α E. Mey., Comm.: 67 (Feb. 1836). Based on Sphenium velutinum var. velutinum.

Sphenium velutinum E. Mey. var. glutinosum E. Mey., Comm.: 67 (Feb. 1836). Type: South Africa, “Karakuis…” (locality uncertain), Drège 3325 (P!, lectotype, here designated; BOL!, K, isolecotypes). [Note: Drège 3325 is chosen as lectotype because Meyer’s handwriting appears on the sheet].


Melolobium parviflorum Bentham in Hook., Lond. J. Bot. 3: 351 (1844); Walp. in Rep. Bot. Syst. 5: 454 (1845/1846). Type: WESTERN CAPE, “Dwaka River” [Dwyka River, 3221 CD Merweville], Zeyher 392 sub Herb. Benth. (K!, lectotype, here designated; BM!, isolecotype); Burke s.n. (P!, isolecotype); Burke s.n. sub PRE 9372 (PRE!, isolecotype); Zeyher 392 (SAM!, isolecotype). [Note: Burke s.n. in P and Zeyher 392 appear to be the same collection, all the material are woody, much-branched, thorny and practically leafless. Bentham’s specimen of Zeyher 392 is chosen as lectotype because he studied it].

Melolobium decorum Dummer in Kew Bull. 1912: 226 (1912), synon. nov. Type: EASTERN CAPE, on mountains near Graaff Reynt [3324 BC Graaff Reinet] Bolus 483 (K!, specimen with herbarium Bolus label, large specimen on the left, lectotype, here designated; K!, two specimens on one sheet; PRE!, isolecotypes). [Note: there are two specimens on one sheet, the larger one is chosen as lectotype simply because a type must be a single element].

Divaricately branched, spiny shrub, 0.3–0.5 m high, covered with white hairs. Leaves stipulate; leaflets, oblong to broadly obovate, (3–)4–9(–10) × 2–4 mm, with sessile glands, apex emarginate; petiole 2–5 mm long, stipules semi-cordate to auriculate, 2–4 × 1–3 mm. Inflorescence terminal, (10–)20–35(45–) mm long, with 2–3(–6) flowers; flowers 6–8(–12) mm long; bracts cordate, 2–4 × 2–4 mm; bracteoles ovate, 2–4 × 1.0–1.5 mm. Calyx shortly bilabiate, with sessile glands, hairy; upper lobes acute; upper lip 5–6(–8) mm long, the apices obtuse, upper sinus 1.5–2.5 mm deep; lateral sinus 2.5–5.0 mm deep; lower lobes acute; lower lip 6–9 mm long, the apices obtuse, lower sinus 0.5–1.0 mm deep. Corolla yellow; standard suborbicular, 6–10 × 3–5(–7) mm, with a well-developed, channelled claw 2–4 mm long; wing petals oblong, sculptured, 6–9 × 2–3 mm, with a linear claw 2–4 mm long; keel petals shorter than the wing petals, 5–7 × 2–3 mm, with a linear claw 2–4 mm long. Gynoeicum narrowly oblong, densely hairy. Fruit narrowly oblong, straight, 10–15(–17) × 3–4 mm, very hairy, 2–3(–4)-seeded; seeds round, 1.4–2.6 × 1.4–2.3 mm, pale green, pale yellow, brown, pale yellow mottled brown (Fig. 32).

Diagnostic characters

Strongly armed with rigid spines, this species is closely related to M. canescens but differs from it in having straight pods (falcate in the latter) and in having stems covered with white hairs (M. canescens is silky-canescent). This species can also be confused with some forms of M. microphyllum but differs in the velutinous white vestiture.

Distribution and habitat

M. candidans grows on a wide range of habitats such as open grass fields, stony channels of rivers, steep slopes of mountains, clayey river banks and beds and below dolerite
ridges, at altitudes of up to 1920 m. It occurs in Lesotho and the Western Cape, Eastern Cape, Northern Cape, North-West and Free State Provinces in South Africa (Fig. 33).

Regional variation: Four forms are recognized; however, only three of these exhibit regional variation. The fourth form is recognized on the basis of the presence of stalked glands on calyces and pods (glands on calyces and pods are sessile in the other three forms). The regional variation is based on the size and number of flowers and the extent of hairiness.

Typical form

*M. candicans*, *S. velutinum* var. *velutinum*, *S. velutinum* var. *glutinosum*

Leaflets  (3–)4–9(–10) × 2–4 mm; stipules 2–4 × 1–3 mm. Inflorescence (10–15)20–35(–45) mm long with 2–3(–6) flowers; flowers 6–10 mm long. Calyx upper lip 5–6 mm long, upper sinus 1.5–2.5 mm deep; lateral sinus 2.5–3.5 mm deep; lower lip 6–7 mm long, lower sinuses 0.5–1.0 mm deep. Standard petal 6–9 × 3–5 mm; wing petal 6–8 × 2–3 mm, claw length 2–4 mm; keel petals petal 5–6 × 2–3 mm, claw length 2–4 mm.

Diagnostic characters

The typical form of *M. candicans* can be distinguished from the glandular form in having sessile glands on the calyces and pods (stalked glands on calyces and pods of the latter). It differs from the Kamiesberg form in having fewer flowers and from the Sutherland form in having stems covered with white hairs.

Distribution and habitat

This form has a more widespread distribution when compared to the Kamiesberg form and the Sutherland form, occurring in Namibia, Lesotho and the Western Cape, Eastern Cape, Northern Cape, Free State and North-West Provinces in South Africa.

Selected specimens

- **2520** (Mata Mata): Kalahari Gemsbok National Park (–CA), *L.C.C. Liebenberg* 7071 (K).
- **2523** (Pomfret): Bathurst (–CB), *J.L. Sidey* 3154 (PRE).
- **2524** (Vereeniging): Antwerp farm, banks of Logageng River (–DD), *A.A. Gubb* 243/71 (PRE).
- **2616** (Aus): Kamellagen (–CB), *Dinter* 3680 (BM).
- **2623** (Morokweng): 5 miles SE of Battlemound (–DC), *B.-E. van Wyk* 4016 (JRAU); Jarroson Estates, near Vryburg (–DC), *A.A. Gubb* 36/86 (PRE).
- **2625** (Mafikeng): Setlagoli (–AC), *J. Burtt Davy* 11039 (PRE).
- **2715** (Bogenfels): Klinghardsberge (–BC), *Dinter* 3997 (PRE).
–2722 (Olfantshoek): 10 km from Olfantshoek to Upington (–DC), *N. Grobbelaar* 1938 (K, PRE); near Port Padrone (–DD), Zeyher s.n. sub *SAM 15341* (SAM).

–2723 (Kuruman): Bophuthatswana, farm Essilmont (–BA), A.A. Gubb 265/50 (PRE), between Pintado Fontein and Thermometer Fontein (–BD), *Burchell* 2226 (K).

–2728 (Frankfort): Villiers, Mandyville (–BA), M. van der Westhuysen 7667 (PRE); Cornelia (–BD), E.R. Fuls 108 (PRE).

–2816 (Oranjemund): Zwartwater (–BD), *Burchell* 3454 (K).

–2821 (Upington): between Upington and Kakamas (–AC), *H. Bolus* 13360 (K).

–2822 (Glen Lyon): Dunmurray, slopes of Langebergen (–BC), C. Vigne 5674 (PRE).

–2823 (Griquatown): between Little Doorn River and the Great Doorn River (–CA), *W.J. Burchell* 1204 (K); between Griquatown and Moses Fontein (–CC), *Burchell* 2133 (K).

–2824 (Kimberley): Barkley West, Uitkyk (–AA), J.P.H. Acocks 1455 (PRE); Gordonia (–BA), *R. Story* 5556 (PRE), *L.C.C. Liebenberg* 7071 (PRE); Barkley West, Warrenton (–DA), J.P.H. Acocks 5738 (PRE); Dronfield (–DB), A.A. Gubb 302/52 (PRE).


–2827 (Senekal): table top of Klein Doornkop (–BC), A.P. Goossens 691 (K, PRE); Koranna berg (–CD), *J. du Preez* 1655 (PRE).

–2918 (Gamoep): Wortel, Great Bushmanland (–BB), *M. Schlechter* 112, 119 (BOL); east of Springbok, Klawermuis (–DB), *M. Crosby* 703 (PRE).

–2919 (Pofadder): Nousesse, Pofadder-Kenhard road (–AB), D.S. Hardy 749 (K, PRE); 23 km E of Aggeneys on road to Pofadder (–AC), G. Germishuizen 5307 (PRE).

–2921 (Kenhardt): Jagbult, 40 miles W of Marydale (–DA), R. Story 1130 (K).

–2922 (Prieska): Asbestos Hill (–AD), J.P.H. Acocks 5767 (K); at Brakriver, between Douglas and Prieska (–DA), Smook and Harding 686 (K).


–2925 (Jagersfontein): Fauresmith, farm Bergplaats (–CB), *C.A. Smith* 4380 (PRE).

–2926 (Bloemfontein): Naval Hill (–AA), A.L. Schutte 198 (JRAU); 6 km from Bloemfontein (–AB), *M. du Toit* 29 (PRE); Thaba-Nchu (–BB), B.R. Roberts 2673 (PRE).


–3018 (Kamiesberg): Matjiesgoed farm (–AA), C.H. Stirton 9218 (PRE); Bitterfontein (–DB), Zeyher 395 (SAM).

–3019 (Loeriesfontein): 40 km NW of Loeriesfontein (–CB), *S.M. Perold* 2236 (PRE).

–3020 (Brandvlei): at northern exit of Karreebergen (–CC), *Burchell* 1555 (K).

–3021 (Vanwyksvlei): Jan Louw’s Kolk (–AC), M.F. Thompson 3135 (PRE).
3022 (Camarvon): farm La Rochelle (–DD), M. Koekemoer 831 (JRAU, PRE).
3024 (De Aar): De Aar (–CA), C.E. Moss 4574 (PRE).
3025 (Colesberg): Vogelfontein (–AB), Henrici 4353 (PRE); Bethulie (–AC), B.R. Roberts 5429 (PRE), M.J.A. Wenger 301 (PRE); Phillipolis, 18 miles W of Springfontein (–BC), J.P.H. Acocks 13531 (PRE); Colesberg (–CA), L.G. Botha 4979 (K).
3027 (Lady Grey): Leloaleng, Quthing (–BC), A. Dieterlen 1194 (K, NBG); Senqu River gorge (–BD), M. Schmitz 8305 (PRE).
3118 (Vanrhynsdorp): Zout River valley (–BC), R.R. Schlechter 8139 (BM, BOL, K); Hol River, Vredendal (–CB), L.J. Booyens 20 (NBG); Vanrhynsdorp (–DA), E.E. Esterhuyzen 3474 (BOL); Widouw River, between Vanrhynsdorp and Klaver (–DB), J.G. Lewis 2439 (SAM).
3119 (Calvinia): 20 km from Calvinia on road to Loeriesfontein (–BC), A. Coetzee 829 (PRE); Calvinia (–BD), A.A. Schmidt 376, 308, 598 (K, PRE), 376 (K, PRE).
3122 (Loxton): Taaibosfontein, 17 km from Loxton to Victoria West (–BC), M.F. Thompson 3054 (PRE).
3123 (Victoria West): between Richmond and Nootivertewag (–BD), W.M. Wilman 13152 (BOL); Murraysburg (–DD), Drège s.n. b (P).
3124 (Hanover): near Zuureplaats (–CD), Drège s.n. a (P).
3125 (Steynsburg): 16 miles NW by W of Middleburg (–AC), J.P.H. Acocks 15989 (K, PRE), 16573 (PRE); Top of Wapadspass Pass on road to Cradock (–CC), B-E. van Wyk 2030 (JRAU).
3126 (Queenstown): Queenstown (–DD), J.L. Sidey 3741 (PRE).
3129 (Wuppertal): Tankwa Karroo Nat. Park (–BB), G.K. Theron 3908 (PRE); Ceres, Beuksesfontein farm, Ceres (–DD), M. Koekemoer 701 (JRAU, PRE).
3220 (Sutherland): 7 miles S of Sutherland (–BC), van Breda 2030 (K); Houthoek (–CA), W.J. Hanekom 1545 (K); Klipbank River (–CB), J.P.H. Acocks 16972 (K, PRE).
3221 (Merweville): Dolskraal (–BD), D.A.M.B. Shearing 1041 (PRE); Dywka River (–CD), Zeyher 392 sub Herb. Benth. (K); Merweville (–DA), M.F. Thompson 3030 (K).
3222 (Beaufort West): Karroo Nat. Res., Beaufort West (–AD), B.K. Bengis 349 (PRE); Molteno Pass, ca. 15 km N of Beaufort West (–BC), D.A.M.B. Shearing 1064 (PRE); Nieuwveld Mountains (–BD), Gibbs Russell, Robinson and Herman 495 (K, PRE), H.W.R. Marloth 2114 (PRE).
3224 (Graaff Reinet): Graaff Reinet, Karroo Nat. Res. (–AD), M.T. Linger 2107 (PRE); Graaff Reinet (–BC), J. Burtt Davy 13499 (PRE); Sunday’s River (–DA), C.L.P. Zeyher s.n. sub SAM 15343 (SAM).
3225 (Somerset East): On Bank Mountain, Cradock (–AB), L.C.C. Liebenberg 7361 (PRE); Somerset East (–CB), B-E. van Wyk 1312 (JRAU); Bakantdorp (–DA), P.T. van der Walt 168 (PRE).
3226 (Fort Beaufort): Alice (–DD), G.E. Gibbs Russell 4118 (PRE), Extension Officer 2 (PRE).
3227 (Stutterheim): 8 miles from Kingwilliam’s Town to Berlin (–CD), D.M. Comins 1665 (K, PRE); edge of Kei valley at Barter road (–DA), J.P.H. Acocks 9704 (K, PRE); grassy hills near Komgga (–DB), Flanagan 1891 (PRE); Tyson, Wood, Flanagan and Glass s.n. (K).
3319 (Worcester): Worcester (–CB), P.A.B. van Breda s.n. sub PRE 54348 (K).
3320 (Montagu): Rooiklipkop, Roggeveld Mountains (–AC), C.H. Storton 10992 (PRE); between Matjiesfontein and Laingsburg (–BA), P. Goldblatt 6075 (K); Karroo Garden Whitehill, Laingsburg (–BD), R.H. Compton 2829 (K); Grootvlakte (–CB), M.B. Bayer 6207 (PRE).
3322 (Oudtshoorn): Uitkykpoint Teeberg, Prince Albert (–AA), W. de K. Pienaar 104 (PRE); Swartberg Pass (–AC), B-E. van Wyk 3247 (JRAU); C.M. van Wyk 2669 (JRAU); Oudtshoorn (–CA), L. Britten 25865 (PRE).
3323 (Willowmore): Waenskloof, Congo valley, on edges of Renosterbos veld (–AC) R.O. Moffet 256 (PRE); Uniondale, along road to Keurboom’s River (–CA), H.G. Fourcade 3484; 4837 (BOL); George, Keurbooms’s River hill (–CD), H.G. Fourcade 5570 (BOL); Braam River, Kouga (–DB), E.E. Esterhuyzen 16297 (BOL).
3324 (Graaff Reinet): Graaff Reinet (–BC), Bolus 483 (K); Zwartkops River (–DB), C.L.P. Zeyher 738 (BOL), 2307 (SAM), 2307b (PRE).
3325 (Port Elizabeth): farm Vista, 5 km from Paterson to Addo (–BD), E. Retief 352 (K, PRE); Mondplaas, close to national road (–CC), H.G. Fourcade 6431 (K, PRE); Uitenhage (–CD), Mayson 738 (BM), Schlechter 2491 (BM); Addo (–DA), A.M. Brynard 444 (K, PRE); 26 km from Port Elizabeth to Grahamstown (–DB), A.L. Schutte 499 (JRAU); 15 miles from Port Elizabeth to Addo (–DC), F.R. Long 982 (K, PRE).
3326 (Grahamstown): Riebeek East road, Albany (–AA), Bayliss 4748 (NBG); between Salem and Wesley Woods, Albany (–AD), R. Story 2207 (PRE); Pluto’s Vale near Grahamstown (–BA), R.D.A. Bayliss 7559 (PRE); Heatherton Tower, Fish River valley near Grahamstown (–BB), P.B.E. Phillipson 301 (PRE); 10 miles from Grahamstown (–BC), R.A. Dyer 1448 (PRE), Mac Owen 3233 (SAM); top of Round Hill, Albany (–BD), A.R. Palmer 1163 (PRE); N side of Olifantshoek Forest Reserve (–CB), E.E.A. Archibald 4441 (PRE); Alexandria, Boknesstrand (–DA), H.H. Burrows 2433 (PRE).
3424 (Humansdorp): Jeffrey’s Bay (–BB), H.G. Fourcade 3286 (BOL, K).

Kamiesberg form

Leaflets 2–5 × 1–2 mm long, short and crowded; petiole 1–2 mm long; stipules 2–3 × 1–2 mm. Inflorescence (10–)15–25–(30) with (2–)4–8 flowers; flowers 7–10 mm long. Calyx upper lip 5–6 mm long; upper sinus 1–2 mm deep; lateral sinus 3.0–3.5 mm deep; lower lip 5.5–6.5 mm long; lower sinuses ±7 mm deep. Fruit 14–17 × ±3 mm.
Diagnostic characters

In this form, the stems are velutinous-canescent, as in the typical *M. candicans*, but it differs in having many-flowered inflorescences and short, fascicled leaves.

Distribution and habitat

It grows on sandy flats below granite boulders and on well-drained sandy soil. The distribution is restricted to the Kamiesberg area extending from Springbok in the North across Kamieskroon to Kamiesberg in the Northern Cape Province.

Selected specimens

- 2917 (Springbok): 3 miles N of Concordia (–DB), T.M. Salter 5562 (BM, K, PRE); bottom of Wildepaardehoek Pass (–DC), E.J. van Jaarsveld 1390 (NBG).
- 3017 (Hondeklipbaai): Kamieskroon, Skilpad Wildflower Reserve (–BB), M.W. van Rooyen 2524 (PRE).
- 3018 (Kamiesberg): near top of Kamiesberg Pass (–AC), B.-E. van Wyk 3104 (JRAU), P. Goldblatt 2406 (K, PRE); between Garies and Leliefontein (–BA), E.E. Esterhuysen 1407 (BOL).

Sutherland form

Leaflets 5–8 × 2–3 mm, petiole 2–4 mm long; stipules 3–4 × 1–2 mm. Inflorescence 40–60 mm long; with 3–5 flowers; flowers 10–12 mm long; bracts ovate, 2–3 × 0.5–1 mm; bracteoles narrowly ovate, 2–3 × 0.5–0.7 mm. Calyx upper lip 6–8 mm long; upper sinus 3–4 mm deep; lateral sinus 4.5–5.0 mm deep; lower lip 7–9 mm long; lower sinus 6–8 mm long; upper sinus 3–4 mm deep; lateral sinus 4.5–5.0 mm deep; lower lip ± 6 mm long; upper sinus 1.5–2 mm deep. Fruit 15–17 × 3–4 mm. Petal 8–10 mm long; keel petal 8–9 mm, claw length 2–3 mm; petiole 2–5 mm long; wing petal 8–10 × 2–3 mm, claw length 2–3 mm; keel petal 6–7 × 2–3 mm, claw length 2–3 mm. Fruit not seen.

Diagnostic characters

This form is very thorny and conspicuously viscous. It differs from the typical *M. candicans* in having a more robust, floriferous (with more inflorescences) habit and in having larger leaves. The stems are hairy but not velutinous-canescent as in the typical form.

Distribution and habitat

Occasional on Beaufort Series outcrops; highly localized in the Sutherland region in the Western Cape Province.

Specimens examined

- 3220 (Sutherland): Sutherland, Malansgat River between Quaggasfontein and Uitkyk (–AD), J.P. Rourke 1739 (NBG); Uitkyk, Roggeveld (–AD), P. Goldblatt 6367 (K, PRE).

Glandular form

Leaflets (3–)5–7(–10) × 2–3 mm; petiole 2–5 mm long; stipules 2–3 × 1–2 mm. Inflorescence short, 20–25 mm long, with 2–4 flowers; flowers 6–7 mm long. Calyx upper lip 5.5–6.0 mm long; upper sinus 1.5–2 mm deep; lateral sinus ± 3.5 mm deep; lower lip ± 6 mm long; upper sinus 1.5–2.0 mm deep. Fruit 15–17 × 3–4 mm.

Diagnostic characters

This form is white-stemmed like the typical *M. candicans*, but differs from it in having stalked glands on the calyces and pods. It resembles *M. microphyllum* in the stalked glands but the leaves also have sessile glands as in the typical form of *M. candicans*. Since there is no strong geographical pattern in the distribution, it is possible that this form is the product of hybridization/introgression between the typical *M. candicans* and *M. microphyllum*.

Distribution and habitat

This form occurs as widely as the typical form.

Selected specimens

- 2616 (Aus): Between Neisip and Eureka (–CB), H. Merxmüller and W. Giess 2886 (PRE); 5 miles W of Aus (–CB), W. Giess and D. van Vuuren 861 (K).
- 2717 (Chamaeites): Aiais (–CB), I.A. Ortendahl 636 (K, PRE).
- 2718 (Grunau): Kreikloof (–BA), I.A. Ortendahl 507 (PRE); W of Karas Mountain (–BB), K. Dinter 4907 (PRE).
- 2722 (Olipantshoek): Hotazel (–BB), P. Jordaan 17 (PRE); Winton (–BC), C. Whittles s.n. sub PRE 54359 (PRE).
- 2723 (Kuruman): 11 km from Kuruman to Vryburg, (–AD), B.-E. van Wyk 3036 (JRAU); Sishen (–CD), S. Collins 51 (PRE).
- 2724 (Vryburg): Zoet valley (–AA), J.G. Speedy 17/8A (PRE); Emden (–CA), A.A. Gubb 274/57 (PRE); Lynley, Compton Ranch (–DC), F. Short s.n. (K).
- 2818 (Warmbad): Warmbad (–BC), W. Giess, Volk and Bleissner 7083 (PRE); Goodhouse Poort (–CD), A.E. van Wyk 8616 (PRE).
- 2820 (Kakamas): 40 km W of Kakamas (–DC), S.J. Dean 667 (JRAU).
- 2821 (Upington): Bak Road, Upington (–AC), K.H. Barnard 32385 (SAM); Between Upington and Keimoes on farm Dyason’s Klip (–CA), R. Glover 13360 (BOL).
- 2823 (Griquatown): Jakkalfontein farm, NW of Danielskuit (–AB), G. Gernishuizen 8572 (PRE); 6.5 miles E of Danielskuit (–BA), O. Leistner 845 (PRE); Vaalkop farm (–BB), A.A. Gubb 197/77 (PRE); Griquatown, Hay Division (–CC), Acocks 4309 (PRE).
- 2824 (Kimberley): 99 km from Griquatown to Kimberley (–AC), A. Moteetee 7 (JRAU); Gordonia, Augrabies (–BA), S.G. Lewis 6704 (SAM); Kimberley (–BB), I.C. Verdoorn s.n. sub PRE 54378 (PRE); 5 km from Kimberley to Griquatown (–DB), B.-E. van Wyk 2535 (JRAU).
Melolobium canescens E. Mey., Comm.: 67 (Feb. 1836). Type as above.

Divaricately branched, spiny shrub. *Leaves* stipulate, leaflets 2–3(–10) × 2–3 mm, oblong to broadly obovate, with sessile glands; petiole 2–3 mm long; stipules semi-cordate to auriculate, 0.5–1.5 × 0.5–1.0 mm. *Inflorescence* terminal, 12–24(–50) mm long, with 1–3 flowers; flowers 5–7 mm long; bracts cordate, 2–5 × 2–3 mm; bracteoles ovate, 1–2 × 0.5–1.0 mm. *Calyx* shortly bilabiate, with sessile glands, silky-canescet; upper lobes acute; upper lip 4–5 mm long, the apices obtuse, upper sinus 1–2 mm deep; lateral sinus 2–3 mm deep; lower lobes acute; lower lip 5–6 mm long, the apices obtuse, lower sinuses 0.5–1 mm deep. *Corolla* yellow; standard ovate-oblong, 6–7 × 3–4 mm, with a well-developed, channelled claw 2–3 mm long; wing petals oblong, sculptured, 6–7 × 1.5–2.0 mm, with a linear claw 2–3 mm long; keel petals shorter than the wing petals, 2.5–3.0 × 1.5–2.0 mm, with a linear claw 2–3 mm long. *Gynoeceum* narrowly oblong, hairy. *Fruit* narrowly oblong, falcate, 10–18 × 2–3 mm, hairy, (2–)3–5-seeded; seeds round, 1.6–2.0 × 1.6–2.0 mm, light brown mottled dark brown or brown (Fig. 34).

**Diagnostic characters**

*M. canescens* appears to have a close affinity with *M. candicans* from which it differs in having falcate pods (straight in the latter) and ovate-oblong standard petals (suborbicular in *M. candicans*). Branches are silky-canescet (covered with white hairs in *M. candicans*).

**Distribution and habitat**

*M. canescens* grows on deep red or pink-red sand, moist black-grey alluvial sand, on dry rocky slopes, at altitudes of up to 1340 m. It occurs in Namibia, Botswana, the Western Cape, Eastern Cape, Northern Cape, North-West and Free State Provinces in South Africa. It is the most widely distributed of all the species and occurs in large parts of Namibia and Botswana (Fig. 35).

Regional variation: Three forms are recognized, based on the presence of stalked glands on calyces and pods.

**Typical form**

*Leaflets*, 2–3(–10) × 2–3 mm; petiole 2–3 mm long; stipules 0.5–1.5 × 0.5–1.0 mm. *Inflorescence* 12–24(–50) mm long, with 1–3 flowers; flowers 5–7 mm long. *Calyx* upper lip ±4 mm long; upper sinus 1.5–2.0 mm deep; lateral sinus 2.5–3.0 mm deep; lower lip 5–6 mm long; lower sinuses 0.5–1.0 mm deep. *Fruits* falcate 10–18 × 2–3 mm.

**Diagnostic characters**

This form of the species has sessile glands on the leaflets, calyces and pods and not stalked glands on calyces and pods as in the glandular form.

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**Diagnostic characters**

This form of the species has sessile glands on the leaflets, calyces and pods and not stalked glands on calyces and pods as in the glandular form.
Fig. 34. Vegetative and reproductive morphology of *M. canescens*: (a and b) abaxial view of leaf with stipules; (c) lateral view of flower; (d1) abaxial view of bract; (d2 and d3) abaxial view of bracteoles; (e) calyx opened out with upper lobes to left; (f) standard petal; (g) wing petal; (h) keel petal; (i1) long, basifixed anther; (i2) carinal (intermediate) anther; (i3) short, dorsifixed anther; (j) pistil; (k) lateral view of pod. Vouchers: (a–j) from S.J. Dean 648 (JRAU); (k) from O. Leistner 1443 (PRE). Scale bars: a, b, k, 2 mm; c–i, 1 mm; j, 0.5 mm.

Fig. 35. Known distribution of *M. canescens*. Circles, typical form; filled boxes, glandular form; open boxes, Sutherland form.
Specimens examined

- 1920 (Tsumkwe): Nama Pan (–DC), R. Story 5317 (K).
- 2217 (Windhoek): Bodenhausen (–BC), R. Steydel 1849, 2727 (K).
- 2218 (Gobabis): Gobabis (–BD), L.E. Codd 5852 (K), L.C.C. Liebenberg 4639 (K).
- 2417 (Mariental): 5.7 miles S of Kalkrand on road to Mariental (–BA), B. de Winter 3506 (K).
- 2520 (Mata Mata): Kalahari Gemsbok National Park (–CA), O. Leistner 2910 (K).
- 2524 (Tswaneng): West of Tswaneng (Tswaaneng?) (–DB), D. Parry 854 (PRE).
- 2525 (Mafikeng): Mafikeng (–DC), R. Story 4573 (PRE).
- 2626 (Delareyville): farm Boskop, 6 km NW of Delareyville (–CB), E. Retief 1833 (PRE).
- 2718 (Grunau): Great Karas Mountain, 30 miles S of Narubis on road to Grunau (–BB), B. de Winter 3321 (K).
- 2722 (Olfantshoek): Blackridge, Hay (–CC), E.G. Bryant 3667 (BOL).
- 2723 (Kuruman): Cotton end, 20 km north of Kuruman (–AB), G. Germishuizen 3981 (PRE); ca. 45 km from Danielskuil to Kuruman (–AD), B.-E. van Wyk 3058 (JRAU).
- 2822 (Glen Lyon): Dumnurray (–BC), J.E. Pole-Evans 61 (K); Hay (–DD), J.P. H. Acocks 2148 (K).
- 2823 (Griquatown): Khaus farm (–BA), A.A. Gubb 206/55 (PRE).
- 2824 (Kimberley): Gordonia (–BA), O.A. Leistner 2917 (PRE).
- 2921 (Kenhardt): Jagbult (–DA), J.P. H. Acocks 12647 (PRE), R. Story 1130 (PRE).
- 2922 (Prieska): sandy valley in Asbestos Hills (–AD), J.P. H. Acocks 5767 (PRE); Prieska (–DA), J.B. Pole-Evans 18794 (PRE), E.G. Bryant 3110 (PRE), 1110 (K).
- 3020 (Brandvlei): Gordonia (–BD), O.A. Leistner 2917 (PRE); Kroon (–CB), S.J. Dean 648 (JRAU).
- 3123 (Victoria West): 5 km from Three Sisters on road to Beaufort West (–CC), A.E. van Wyk 1866 (PRE).
- 3124 (Hanover): Hanover commonage (–AB), J.P.H. Acocks 8712 (K).
- 3222 (Beaufort West): near Rhenosterkop (–BB), Drege s.n. (P).
- 3418 (Simonstown): Kalkbay (–AB), J.E. Moran 5769 (PRE).

Sutherland form (dark-stemmed)

This form of the species is restricted to the Sutherland area. It differs from the typical form in having sparsely pubescent stems (with a typical dark colour) and therefore not canescent as the typical form. Leaflets 4–7 × 2 mm; petiole 2–3 mm long. Inflorescence 15–20(–25) mm long, with 1–3 flowers. Calyx upper lip 5–6 mm long; upper sinus 1.5–2.0 mm deep; lateral sinus 2–3 mm deep; lower lip 5.5–6.5 mm long; lower sinuses 0.4–0.6 mm deep. Fruit falcate, 11–14 × 1.5–2.0 mm.

Specimens examined

- 3119 (Calvinia): Kareeboomfontein (–DA), W.J. Hanekom 2395 (PRE); Uitkomst (–DB), M.F. Thompson 2440 (PRE).
- 3220 (Sutherland): Noudrift farm (–AB), J.P. Rourke 1729 (NBG, PRE), P. Goldblatt 6367 (PRE); Sutherland (–BC), van Breda 2032 (PRE).

Glandular form

This form of the species has stalked glands (rather than sessile glands) on calyces and pods; otherwise, it is similar to the typical form. Inflorescence 15–20(–25) mm long, with 1–3 flowers. Calyx upper lip 3–5 mm long; upper sinus 1.0–1.5 mm deep; lateral sinus ±2 mm deep; lower lip 4–5 mm long; lower sinuses 0.5–1.0 mm deep. Fruit falcate, 13–15 × 2–3 mm.

Diagnostic characters

As with the glandular form of M. candicans, this form differs only in having stalked glands on calyces and pods and it is likewise probably a product of hybridization/introgession between the typical M. canescens and M. microphyllum.

Distribution and habitat

This form is as widely distributed as the typical M. canescens.

Selected specimens

- 1817 (Tsintabis): Witvlei (–DC), V. van der Spuy 58 (PRE).
- 2116 (Okahandja): Okahandja (–DD), Dinter 262 (SAM).
- 2121 (Ghanzi): Ghanzi (–DB), R. Story 5057 (PRE), C.S. Skarpe 8186 (PRE).
- 2217 (Windhoek): Bodenhausen (–BC), R. Steydel 3985 (K); farm Regenstein, Windhoek (–CA), Giess 13720 (PRE), D.G. Steyn 22577 (PRE); Hohenwarte (–CC), Breda 2032 (PRE).
- 2218 (Gobabis): Gobabis (–AD), H. Schlieben 10393 (PRE).
- 2322 (Kang): 300 km W of Gaborone, Kang (–DD), P.J. Mott 777 (PRE).
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References
