

# A synoptic review of *Romulea* (Iridaceae: Crocoideae) in sub-Saharan Africa, the Arabian Peninsula and Socotra including new species, biological notes, and a new infrageneric classification

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## ABSTRACT

In a revised classification of the Afro-Eurasian genus *Romulea* two subgenera are recognized, based on characteristics of the corm and tunics. Subgenus *Romulea* is defined by a corm with a sharp crescent-shaped or circular basal ridge and tunics which split into fine teeth or fibrils while subgenus *Spatalanthus* is distinguished by a corm that is rounded or pointed at the base with the tunics splitting into coarse teeth. Within these subgenera, sections are delimited primarily on the basis of finer details of corm morphology, and informal species groups called “series” are recognized by a combination of leaf anatomical features and cytology. A synoptic treatment of the genus is presented for sub-Saharan Africa, the Arabian Peninsula and Socotra that includes revised keys to the sections and species and new distribution data. A total of 76 species are recognized for sub-Saharan Africa-Arabia, including five new species described here (*R. albiflora*, *R. discifera*, *R. lilacina*, *R. maculata* and *R. rupestris*). Two species, *R. papyracea* and *R. vanzyliae*, are reduced to synonymy.

## KEY WORDS

*Romulea*,  
Iridaceae,  
morphology,  
systematics,  
sub-Saharan Africa,  
Arabia,  
Socotra.

## RÉSUMÉ

*Révision synoptique du genre Romulea (Iridaceae : Crocoideae) pour l'Afrique sub-saharienne, la Péninsule arabique et Socotra, avec des descriptions de nouvelles espèces, des notes biologiques et une nouvelle classification infragénérique.*

Deux sous-genres sont reconnus au sein du genre Afro-Eurasien *Romulea* à partir des caractères du cormus et des tuniques. Le sous-genre *Romulea* est défini par un cormus à crête basale aiguë, en forme de croissant ou circulaire et des tuniques qui se divisent en dents fines ou fibrilles, tandis que le sous-genre *Spatalanthus* se distingue par un cormus arrondi ou pointu à la base et des tuniques formant des dents larges. Des sections sont délimitées au sein de

**MOTS CLÉS**

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Socotra.

ces sous-genres principalement d'après des détails morphologiques du cormus ; des groupes informels d'espèces appelés « séries » sont reconnus grâce à la combinaison de caractères d'anatomie foliaire et cytologiques. Un traitement synoptique est présenté pour le genre en Afrique sub-saharienne, en Péninsule arabe et à Socotra, avec l'établissement de nouvelles clés d'identification pour les sections et les espèces, et des données nouvelles pour leur distribution. Au total, 76 espèces sont reconnues pour la région considérée, dont cinq nouvelles décrites ici (*R. albiflora*, *R. discifera*, *R. lilacina*, *R. maculata* et *R. rupestris*). Deux espèces, *R. papyracea* et *R. vanzyliae*, sont mises en synonymie.

**INTRODUCTION**

The sub-Saharan African and Mediterranean-Near Eastern genus *Romulea*, a member of tribe Croceae of Iridaceae subfamily Crocoideae, comprises approximately 90 species. Some 12 to 15 species occur in the Mediterranean Basin, Canary Islands, the Azores, and southern Europe. The remaining species are found in sub-Saharan Africa including the Arabian Peninsula and Socotra. Three species occur in tropical Africa, *R. camerooniana*, *R. congoensis* and *R. fischeri*, the last two endemic in East Africa and the Arabian Peninsula. The center of diversity of the genus is the winter-rainfall zone of southern Africa where 73 species are now recognized. Collecting in southern Africa since the publication of a monograph of the genus for the region by M.P. DE VOS in 1972, followed by a floristic account of the genus for southern Africa that included some new species and nomenclatural changes (DE VOS 1983), has yielded five new species, the rediscovery of several more known only from 19th century collections, and numerous range extensions. In addition, our examination of the genus while preparing accounts for local floristic treatments of the Iridaceae has made it clear that some aspects of DE VOS's infrageneric classification require revision. We offer a new classification that recognizes two subgenera, based on corm characteristics that were described in detail by DE VOS (1972). Sections are also modified in the light of corm and leaf anatomical data. We also recognize 17 informal species groupings which we call series, sometimes equivalent to DE VOS's subsections. When last revised by DE VOS (1983),

*Romulea* included 69 species in southern Africa. The description of a further species (DE VOS 1987) brought the regional total to 70 species. This number is now increased to 73, owing to the addition of the new species described here, *R. albiflora*, *R. discifera*, *R. lilacina*, *R. maculata*, and *R. rupestris*, and the reduction of *R. vanzyliae* in *R. subfistulosa* and *R. papyracea* in *R. schlechteri*.

**GENERAL MORPHOLOGY AND RELATIONSHIPS**

*Romulea* is a member of subfamily Crocoideae (syn. Ixioidae), one of four subfamilies of the Iridaceae currently recognized (GOLDBLATT 1990, 2000). The genus is readily distinguished by its woody corm tunics, short-stemmed or stemless habit, grooved leaves, branched inflorescence with the flowers solitary on each branch, firm-textured floral bracts with membranous margins and actinomorphic, usually short-tubed, campanulate flower. The characteristics of the genus are described in detail by DE VOS (1970, 1972).

The corm and its tunics are extremely variable in *Romulea* and appear to provide the most useful characters for infrageneric classification. We distinguish two main types of corm, associating these with the division of the genus into two subgenera. In most species, here assigned to subgenus *Romulea*, the corm develops a sharp lateral or basal ridge or fold through intercalary growth of the tunics (Fig. 1A-M). The margins of the tunics along this fold consist of fine fibrils that form a fibrous fringe. In the remaining species, assigned here to subgenus *Spatalanthus*, the

corms have a rounded or pointed base and lack a basal ridge (Fig. 1N,O). The tunics split into several well-defined acuminate teeth without apical fibers.

In most species of subgenus *Romulea* the corm develops a crescent-shaped basal ridge but in section *Hirsutae* the ridge is circular, rendering the corm base plane and either horizontal or oblique (Fig. 1J,K). In a few species of that section, including *R. discifera*, the fibers of the ridge margin are grouped in small fascicles. This erratic clustering is not to be confused with the distinct fibril clusters which characterise the section *Aggregatae*. In this section the marginal fibers on the basal ridge are grouped into distinct fascicles of firm fibrils, the tips of which curve inward (Fig. 1L,M). *Romulea amoena* stands out in this section in both its chromosome number and campanulate corm (Table 1). The latter is presumably a convergent development with the corms of section *Hirsutae*. The remaining two sections in subgenus *Romulea* are less easily distinguished but in section *Romulea* the basal ridge is small, usually less than half as wide as the corm (Fig. 1B-E), while in section *Ciliatae* it is well-developed and more than half as wide as the corm or even wider than the corm itself. — (Fig. 1F-I).

Corms of subgenus *Spatalanthus* fall into two groups, treated as sections. In section *Spatalanthus* the teeth of the tunics are recurved over the rounded base of the corm (Fig. 1N) while in section *Cruciatae* the teeth are straight and converge to a point (Fig. 1O).

Outgroup comparison suggests that the corm with a small basal ridge, as found in section *Romulea*, is ancestral in the genus, for similar corm types are found in *Syringodea*, *Hesperantha* sect. *Concentrica* (GOLDBLATT 1982) and *Geissorhiza* subg. *Weihea* (GOLDBLATT 1984). The main difference between the corms of *Romulea* and *Syringodea* compared with those of *Hesperantha* and *Geissorhiza* is that the ridge margins are more or less fringed in the former and entire in the latter. We assume that the corms are homologous in these four genera, which all share asymmetrical corms with derived, woody tunics. In other genera of Crocoideae the corms are symmetrical, and with the exception of *Lapeirousia*, have fibrous, cartilaginous, or papery tunics.

One of the characteristic features of *Romulea* is the leaf, which is linear to filiform and in most species two-grooved on each surface. Like other Crocoideae the leaf is unifacial and symmetric about the central axis. Anatomically the leaf comprises a wide central rib separated from the smaller marginal ribs by wide to narrow longitudinal grooves in which the stomata are located. Unusual, multigrooved leaves occur in the two species of our series *Aquaticae* while *R. barkerae* has leaves with only two grooves, the abaxial pair lacking and in a few species, including *R. austinii* and *R. tortuosa* the leaves are largely or completely bifacial and adaxially channelled. Typically, each rib carries a single major vascular trace and usually a pair of minor or secondary vascular traces but these are lacking in some species. In several species of subgenus *Spatalanthus* and a few species of subgenus *Romulea* each leaf rib has a sclerenchyma trace at the sinus edge. The strand is associated with a small vascular strand in most species of series *Atrandrae* and *Spatalanthus*.

Apart from the distinctive corms and leaves, *Romulea* species can be recognized by their characteristic habit. The flowering stem is usually reduced and often subterranean, and the flowers are each borne singly on a branch or peduncle (which resembles, but is not homologous with, a pedicel). Flowers of all members of subfamily Crocoideae are sessile, subtended by a pair of bracts inserted on the axis immediately under the ovary, and in most genera are arranged in a spike. In many species, including all those of subg. *Spatalanthus*, the stem is subterranean at flowering time, but emergent in fruit. Occasionally even the peduncles may reach only to ground level at flowering time. In many species the peduncle recurves immediately after flowering but later straightens in fruit, except in most species of series *Atrandrae* in which it coils characteristically. The floral bracts are typically green and leathery, the outer of the pair often with narrow membranous margins and the inner bract (bracteole sensu DE VOS 1972, 1983) with broader membranous to scarious margins, either uniformly translucent or streaked with brown. The width of the membranous part of the bracts is an important character for separating several

Table 1. — Classification of southern African *Romulea*: the species are arranged in two subgenera, six sections and seventeen informal series. Extra sub-Saharan African species include 10 to 15 of Eurasia (assigned to series *Romulea*). 1. Chromosome number. 2. Corm type: 1a = *Romulea* type; 1b = *Ciliatae* type; 1c = *Hirsutae* type; 1d = *Aggregatae* type; 2a = *Cruciatae* type; 2b = *Roseae* type. 3-6. Leaf anatomy: 3. Secondary bundles: 0 = present, 1 = absent; 4. Vascular girders: 0 = absent, 1 = present; 5. Rib marginal strands: 0 absent, 1 = present; 6. Rib marginal bundles: 0 absent, 1 = present; 7. Fruiting peduncles: 0 = straight-curved; 1 = coiled. Leaf anatomical data are from DE VOS, 1972, supplemented by our own observations for the new species. Chromosome data are from DE VOS (1972) and GOLDBLATT & TAKEI (1977) with counts for Eurasian species taken from the series *Index to Plant Chromosome Numbers*.

Taxon	Character number						
	1	2	3	4	5	6	7
<b>1. Subg. <i>Romulea</i></b>							
<b>Sect. 1. <i>Romulea</i></b>							
<b>Ser. <i>Autumnales</i></b>							
1. <i>R. autumnalis</i>	22	1a	0	1	1	0	0
2. <i>R. camerooniana</i>	22, 26	1a	0	1	1	0	0
3. <i>R. fischeri</i>	?	?	?	?	?	?	?
4. <i>R. congoensis</i>	c. 78	?	?	?	?	?	?
<b>Ser. <i>Pratenses</i></b>							
5. <i>R. gigantea</i>	c. 42, 44	1a	0	0	1	0	0
6. <i>R. pratensis</i>	44	1a	0	1	1	0	0
Ser. <i>Romulea</i>	?	1a	0	0	1	0	0
(Entirely Eurasian)							
<b>Sect. 2. <i>Ciliatae</i></b>							
<b>Ser. <i>Ciliatae</i></b>							
7. <i>R. schlechteri</i>	24	1b	0	0	0	0	0
8. <i>R. saxatilis</i>	c. 28	1b	0	0	0	0	0
9. <i>R. vinacea</i>	24	1b	1	0	0	0	0
10. <i>R. flexuosa</i>	c. 24	1b	0	0	0	0	0
11. <i>R. tabularis</i>	24	1b	0	0	0	0	0
12. <i>R. leipoldtii</i>	24	1b	0	0	0	0	0
13. <i>R. biflora</i>	24	1b	0	0	0	0	0
14. <i>R. namaquensis</i>	26	1b	1	0	0	0	0
15. <i>R. kamisensis</i>	c. 26	1b	1	0	0	0	0
16. <i>R. rupestris</i>	?	1b	0	1	1	0	0
17. <i>R. neglecta</i>	?	1b	0	1	1	0	0
18. <i>R. maculata</i>	?	1b	0	1	1	0	?
19. <i>R. pearsonii</i>	?	1b	0	1	1	0	0
20. <i>R. tetragona</i>	26	1b	0	1	1	0	0
21. <i>R. citrina</i>	24	1b	0	0	1	0	0
22. <i>R. montana</i>	24	1b	0	0	0	0	0
23. <i>R. toximontana</i>	c. 28	1b	0	0	0	0	0
24. <i>R. sulphurea</i>	?	1b	1	0	0	0	0
25. <i>R. elliptica</i>	24	1b	0	0	0	0	0
26. <i>R. flava</i>	24	1b	0	0	0	0	0
27. <i>R. saldanhensis</i>	24	1b	0	0	0	0	0
28. <i>R. barkerae</i>	?	1b	0	0	0	0	0
<b>Ser. <i>Minutiflorae</i></b>							
29. <i>R. minutiflora</i>	26	1b	0	1	1	0	0
30. <i>R. sinispinosensis</i>	c. 50	1b	0	0	1	0	0
<b>Ser. <i>Aquaticae</i></b>							
31. <i>R. multisulcata</i>	24	1b	0	0	1	0	0
32. <i>R. aquatica</i>	24	1b	0	1	1	0	0
<b>Ser. <i>Stellanthe</i></b>							
33. <i>R. stellata</i>	?	1b	1	0	0	0	0
<b>Ser. <i>Tortuosae</i></b>							
34. <i>R. macowanii</i>	c. 32	1b	1	0	0	0	0
35. <i>R. austinii</i>	30	1b	1	0	0	0	0
36. <i>R. tortuosa</i>	30	1b	1	0	0	0	1
37. <i>R. sphaerocarpa</i>	c.30, 32	1b	1	0	0	0	0

Taxon	Character number						
	1	2	3	4	5	6	7
<b>Sect. 3. Hirsutae</b>							
<b>Ser. Hirsutae</b>							
38. <i>R. gracillima</i>	24	1c	1	0	0	0	0
39. <i>R. hirsuta</i>	24	1c	1	0	0	0	0
40. <i>R. tortilis</i>	?	1c	?	?	?	?	?
41. <i>R. triflora</i>	24, ?22	1c	1	0	0	0	0
42. <i>R. sladenii</i>	c. 24	1c	0	0	0	0	0
43. <i>R. discifera</i>	?	1c	1	0	0	0	0
<b>Sect. 4. Aggregatae</b>							
<b>Ser. Amoenae</b>							
44. <i>R. sanguinalis</i>	24	1d	0	0	0	0	0
45. <i>R. amoena</i>	24	1d	0	0	0	0	0
<b>Ser. Aggregatae</b>							
46. <i>R. fibrosa</i>	c. 30	1d	0	1	0	0	0
47. <i>R. longipes</i>	c. 30	1d	0	1	0	0	0
48. <i>R. dichotoma</i>	30	1d	0	1	0	0	0
49. <i>R. jugicola</i>	c.30, 32	1d	0	1	0	0	0
50. <i>R. setifolia</i>	c.30, 32	1d	1	0/1	0	0	0
51. <i>R. albomarginata</i>	30	1d	0	1	0	0	0
<b>2. Subg. Spatalanthus</b>							
<b>Sect. 5. Cruciatæ</b>							
<b>Ser. Cruciatæ</b>							
52. <i>R. cruciata</i>	18	2a	0	1	1	0/1	0
53. <i>R. eximia</i>	18	2a	0	1	1	0	0
54. <i>R. vlokii</i>	?	2a	?	?	?	?	?
55. <i>R. membranacea</i>	c. 24	2a	0	1	1	0	0
<b>Ser. Tubiformes</b>							
56. <i>R. hantamensis</i>	30	2a	0	1	1	0	0
<b>Sect. 6. Spatalanthus</b>							
<b>Ser. Roseae</b>							
57. <i>R. rosea</i>	18	2b	0	1	1	0	0
58. <i>R. lilacina</i>	?	2b	0/1	1	1	0	0
59. <i>R. cedarbergensis</i>	?	2b	1	1	1	0	0
60. <i>R. obscura</i>	22	2b	0	1	1	0	0
61. <i>R. monticola</i>	22	2b	0	1	1	0	0
62. <i>R. hirta</i>	26	2b	0	1	1	0	0
<b>Ser. Atrandrae</b>							
63. <i>R. atrandra</i>	22	2b	0	1	1	1	1
64. <i>R. multifida</i>	22	2b	0	1	1	1	1
65. <i>R. komsbergensis</i>	20	2b	0	1	1	1	1
66. <i>R. hallii</i>	22	2b	0	1	1	1	0
67. <i>R. luteoflora</i>	20	2b	0	1	1	1	1
68. <i>R. diversiformis</i>	20	2b	0	1	1	0	0
69. <i>R. malaniae</i>	24	2b	0	1	1	1	1
<b>Ser. Spatalanthus</b>							
70. <i>R. viridibractea</i>	26	2b	0	1	1	1	0
71. <i>R. subfistulosa</i>	26	2b	0	1	1	1	0
72. <i>R. unifolia</i>	?	2b	0	1	1	1	0
73. <i>R. sabulosa</i>	26	2b	0	1	1	1	0
74. <i>R. monadelphæ</i>	26	2b	0	1	1	1	0
<b>Ser. Lomurea</b>							
75. <i>R. syringodeoflora</i>	20	2b	1	1	1	0	0
76. <i>R. albiflora</i>	?	2b	1	1	1	1	0

species. As in all Crocoideae the inner bract is a paired structure whose nature is evident by the notched apex and two-veined or two-keeled surface.

Flowers of most species of *Romulea* are remarkably similar except for pigmentation which is very varied (Fig. 2A-H). The perianth is cup-shaped with a short perianth tube, narrow below and widening fairly abruptly into a flared upper part (Figs. 3, 4). The six tepals are cupped below and spreading horizontally above. Coloring ranges from uniformly yellow to white, pink, orange, red, or purple, usually with a yellow cup. Dark markings are common on the lower part of the tepals, thus below the rim of the cup. A notable exception to the standard perianth shape are the hypocrateriform flowers of *R. albi-flora* (Fig. 5), *R. hantamensis*, *R. stellata*, and *R. syringodeoflora*. In these species the perianth tube is elongate and of uniform diameter and the tepals spread horizontally from the top of the tube. The stamens are included in the floral cup and are usually contiguous and coherent while the style divides into three deeply divided style arms or branches at about mid anther level or shortly above the anther tips. In those species with an elongate tube the stamens and style are fully exerted from the flower. Despite the similarity of their flowers species with a hypocrateriform perianth are evidently not closely related and they have different corm types, leaf anatomy and chromosome numbers.

### Chromosome cytology

As a result of DE VOS's extensive research on the genus, the chromosome cytology of *Romulea* is relatively well known. The genus exhibits considerable dysploidy (aneuploidy) and some polyploidy (Table 1). The patterns of chromosome number variation are confusing and few sections and series have a single number. The European and Macaronesian species of the apparently primitive section *Romulea* have haploid numbers of  $n = 9$  and  $c. 24$  (*R. columnnae*), 14, 17 and 21 (*R. bulbocodium*), 18 (*R. clusiana* and *R. rami-flora*), and 17 (*R. requenii*) while *R. parviflora* has  $n = c. 30$ . Sub-Saharan African species of the

section have  $x = 11$ , but the reports of  $n = 11$  and 13 (GOLDBLATT & TAKEI 1997) in *R. camerooniana* are puzzling. *Romulea congoensis* with  $2n = c. 76$  is evidently hexaploid based on  $x = 13$ .

Section *Ciliatae* is less confusing with  $n = 12$  common, but  $n = 13$  in four species,  $n = c. 14$  in one more, and  $n = 16$  and/or 15 in the species of series *Tortuosae*. Section *Hirsutae* has  $n = 12$  while in section *Aggregatae* ser. *Amoena* has  $n = 12$  but  $n = 16$  and 15 in series *Aggregatae*. Based on chromosome number ser. *Amoena* seems better be referred to section *Hirsutae*. Chromosome numbers in subgenus *Spatalanthus* are almost as diverse. In section *Cruciatae* *R. membranacea* has  $n = c. 12$ , *R. cruciata* and *R. eximia* have  $n = 9$ , but *R. hantamensis* has  $n = 15$ . Section *Spatalanthus* ser. *Roseae* has  $n = 11$  with evident dysploid reduction to  $n = 9$  in *R. rosea* but *R. hirta* has  $n = 13$ . Species of series *Atrandrae* have  $n = 12, 11, \text{ or } 10$ , and all those of series *Spatalanthus* have  $n = 13$ . *Romulea syringodeoflora* of ser. *Lomurea* has  $n = 10$  which appear to ally it with series *Atrandrae*. DE VOS suggested an ancestral base of  $x = 12$  for the genus. If correct,  $n = 13$  in several sections is hard to explain because dysploid increase is rare in plants but dysploid decrease is frequent (GOLDBLATT & TAKEI 1997). A base number of  $x = 13$  seems to us equally likely for the genus. Whatever the ancestral number, dysploid changes in chromosome number in *Romulea* appear to have occurred within most sections of the genus and these changes must have been important factors in its radiation and diversification.

### Relationships of *Romulea*

*Romulea* is usually believed to be most closely allied to *Syringodea* because of their comparably reduced habit (all *Syringodea* species are acaulescent), branched inflorescences with actinomorphic flowers solitary on the branches and similar corms with woody tunics and a crescent-shaped basal ridge. There are, however, several fundamental differences between the two. The leaves of *Syringodea* are bifacial and usually channeled (or sometimes terete) and lack the grooves characteristic of *Romulea*; the outer bracts in *Syringodea* are

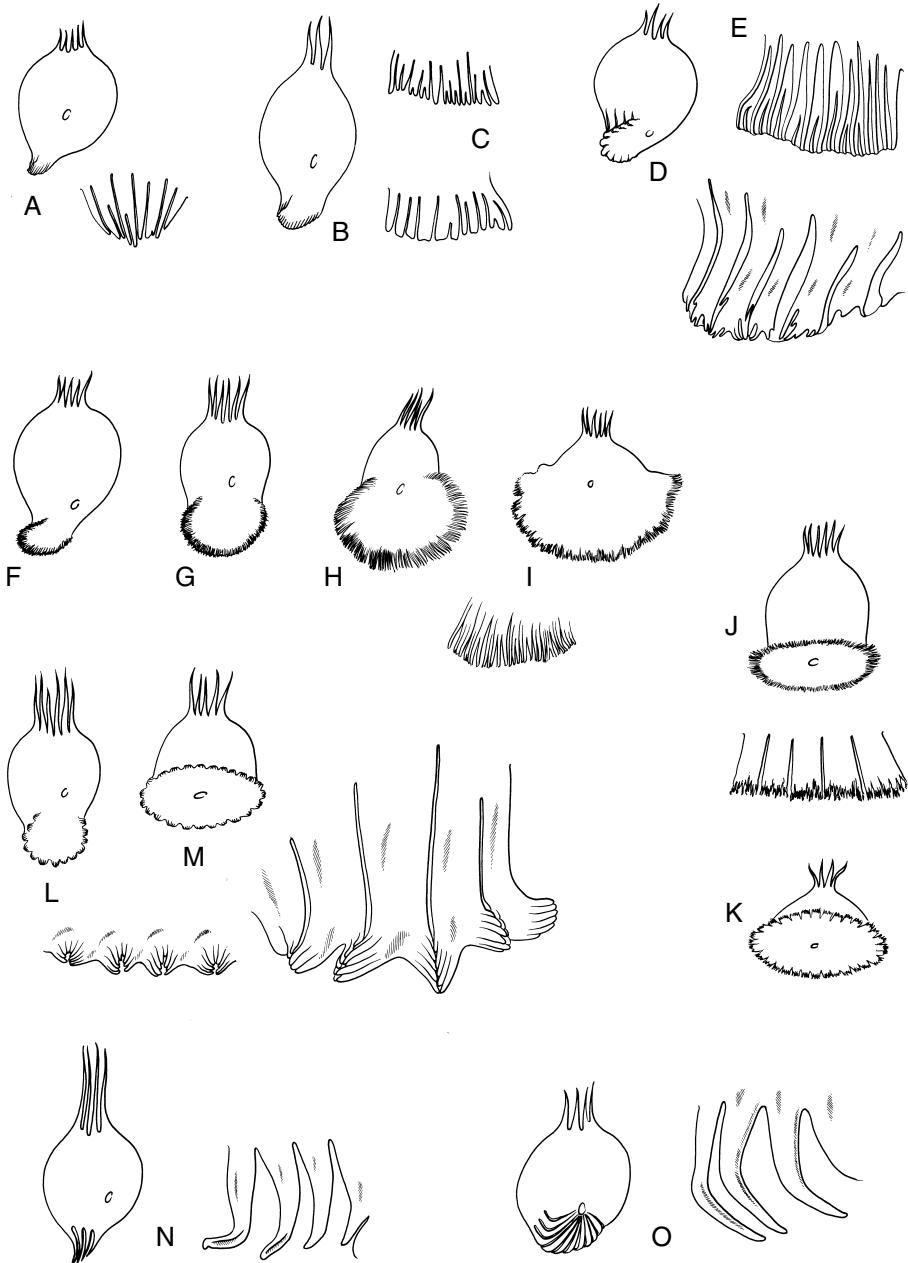


Fig. 1. — Corm and tunic details in *Romulea*: **A-E**, sect. *Romulea*: **A**, *R. autumnalis*; **B**, *R. columnae*; **C**, *R. bulbocodium*; **D**, *R. pratensis*; **E**, *R. gigantea*. **F-I**, sect. *Ciliatae*: **F**, *R. minutiflora*; **G**, *R. austini*; **H**, *R. montana*; **I**, *R. tortuosa*. **J-K**, sect. *Hirsutae*: **J**, *R. triflora*; **K**, *R. discifera*. **L-M**, sect. *Aggregatae*: **L**, *R. dichotoma*; **M**, *R. amoena*. **N**, sect. *Spatalanthus*: *R. rosea*. **O**, sect. *Cruciatiae*: *R. cruciata*. Corms full size, detail of tunic margins enlarged x 5. Drawn by John MANNING.

tubular below through fusion of the lower margins; the style branches in *Syringodea* are simple, unlike the divided style branches in *Romulea*; and the pollen in *Syringodea*, like that of *Crocus* but unlike other genera in Crocoideae, is inaperturate. In the absence of evidence to the contrary both *Romulea* and *Syringodea* are presumed to be allied to the genera *Hesperantha* and *Geissorhiza* in a clade defined by the actinomorphic flower (now believed to be derived within Crocoideae) and the asymmetric corm with woody tunics. If this proposed phylogeny is correct, the grooved leaf, inner bracts with membranous margins and divided style branches are synapomorphies for *Romulea*. The evidence for a relationship between *Syringodea* and *Romulea*, however, is weak at best, for a subterranean stem is not uncommon in the Iridaceae and an inflorescence with flowers solitary on the branches is a feature of most acaulescent Crocoideae, including *Duthieastrum*, *Ixia acaulis* and *Crocus*. Moreover, chloroplast DNA sequence data do not strongly associate the two genera nor, in fact, point to any particular relationships for *Romulea* (REEVES et al. 2000).

### Infrageneric classification

We propose recognizing two subgenera in *Romulea* based on what we consider to be fundamental differences in corm morphology (see discussion on corm morphology above). The resulting classification produces a very different arrangement of species to that presented by DE VOS (1972, 1983). In her treatment significantly more weight was given to floral differences, as a result of which the three long-tubed species known to her were associated in a second subgenus, *Lomurea*. We do not regard this floral type as homologous in the genus and associate species by differences in their corm rather than differences in flower shape. One species of her subgenus *Lomurea*, *R. stellata* has a corm with a basal ridge and is placed here in subgenus *Romulea* sect. *Ciliateae*, while the remaining two, with coarsely toothed tunics, are relocated in different sections in subgenus *Spatalanthus*. Subgenus *Romulea* thus includes all species in which the corm develops a lateral or basal ridge with fringed, fibrillar margins

while subgenus *Spatalanthus* accommodates those in which the corms do not develop a lateral or basal ridge and in which the tunics split into prominent teeth. Subgenus *Romulea* sensu DE VOS is thereby reduced by the removal of sections *Roseae* and *Cruciata* to subgenus *Spatalanthus*. This taxon is vastly expanded from its original conception by BAKER (1896), in which it comprized the single species *R. monadelpha*, which is unusual only in having the filaments normally united into a tube. Subgenus *Lomurea* becomes a nomenclatural synonym of subgenus *Spatalanthus* on the basis of its type, *R. syringodeoflora* which has a corm typical of section *Spatalanthus*.

Section *Hirtae* DE VOS also appears, on the basis of corm features, to comprise two lineages. *Romulea hirta* Schltr. has corms with recurved teeth typical of section *Spatalanthus* whereas *R. tetragona* has corms with a crescent-shaped basal ridge typical of section *Ciliateae*. The two species share an unusual leaf type which is H-shaped in transverse section (with the margins extended into wings and the midrib not thickened at all), which was the basis for uniting them in one section. This type of leaf has evolved independently in a few species of *Geissorhiza* and *Gladiolus* (GOLDBLATT 1985; GOLDBLATT & MANNING 1998) and seems likely to have done so within *Romulea* if the diverse corm morphology of *R. hirta* and *R. tetragona* is a reliable guide to phylogenetic relationships. We transfer *R. hirta* to section *Spatalanthus* of subgenus *Spatalanthus*, effectively synonymizing section *Hirtae*, and *R. tetragona* to section *Ciliateae* of subgenus *Romulea*.

Within the sections the species are grouped in series based on the congruence of several characters, in particular leaf anatomy, behaviour of the fruiting peduncle and cytology (Table 1). Yellow pigmentation in the outer half of the tepals is regarded as a derived state and species with yellow flowers are thus placed after related species with pink flowers in the sequence proposed here.

### Species limits

Species are circumscribed in this synopsis following DE VOS's (1972, 1983) taxonomy except in one instance where new collections have indi-



cated that two species must be united. The presence or absence of yellow pigmentation in the flowers (apart from in the cup, which is yellow in almost all species) seems to be a taxonomically critical character. In most cases it is correlated with differences in leaf anatomy or chromosome number or both and is therefore used to distinguish species which otherwise appear to be identical. A species with yellow to orange or salmon pink flowers is normally therefore regarded as distinct from one with magenta or lilac flowers. White forms can, however, occur in both. Differentiation between yellow and blue shades of pink is problematic and accurate determination may require anatomical dissection of the leaf. Floral markings are rather variable and few species can be recognized by the particular patterning of the tepals alone.

Species of *Romulea* can seldom be identified confidently without examining the corm. This makes field identifications difficult, especially as similarly marked and colored species often co-occur. On the Bokkeveld Plateau, for instance, several yellow-flowered species grow in the Nieuwoudtville area, five of which (*R. austinii*, *R. discifera*, *R. luteoflora*, *R. montana*, and *R. monticola*) cannot be distinguished without the corm. Similarly, several pink-flowered species that occur along the Cape west coast in the Malmesbury District (*R. cruciata*, *R. eximia*, *R. hirsuta*, *R. obscura*, and *R. rosea*) can also only reliably be distinguished by the corm although they sometimes differ in other features.

### Intraspecific taxonomy

DE VOS (1972, 1983) recognized both subspecies and varieties of some 14 species and readers who feel the need to use infraspecific categories are referred to her accounts of the genus. She did not define the use of these two infraspecific ranks and we do not feel that they are always useful, often representing local color forms or flower size morphs. Patterns of variation for these characters are common in *Romulea* and occur in species other than those in which the variants are formally named which leads to an inconsistent use of these hierarchies. The infra-

specific patterns of variation in *Romulea* need careful study. In some cases so-called varieties are genotypes that occur within populations and are selected by the environment. *Romulea rosea* var. *australis* is particularly noteworthy as it appears to represent a small-flowered, autogamous form adapted to disturbed sites, degraded soils, or trampled ground and such plants may co-occur with typical var. *rosea*, growing less than a meter away. The taxonomy of *Romulea* is sufficiently complicated at species level that we prefer not to deal with infraspecific ranks in this account.

### Ecology

Species of *Romulea* from the summer-rainfall part of southern Africa are restricted to upland and montane habitats but those in the winter-rainfall part of the subcontinent occur from sea level to high altitudes, although they are especially common at mid to high elevations. They typically favour seasonally moist or inundated open sandy or clay flats but two species, *R. aquatica* and *R. multisulcata*, grow in seasonal pools. In general the species are not as substrate-specific as are many other southern African Iridaceae and true edaphic endemic are rare. Exceptions are most of the species endemic to the western Karoo, which occur only in fine-grained doleritic clay soil and *R. barkerae*, which is restricted to coastal limestones in the Saldanha District. A few other species occur predominantly on sandstone pavement, where they often form dense stands. Relatively few species occur on clays derived from shales of the Malmesbury or Bokkeveld series and coarser substrates are preferred. The majority of winter-rainfall species flower during the spring, August to September, but a few flower early in the season during May and June. The summer rainfall species have a more extended flowering period from September to February. In general, different species do not grow in mixed communities.

### Pollination biology

The flowers of all species of *Romulea* close tightly at night, mostly opening again at around

midday in warm conditions although in *R. hirsuta* and *R. stellata* at least, the flowers open earlier in the morning. Flowers typically last three or four days and individual populations are in flower for about two weeks but can continue flowering sporadically for longer if conditions are favourable.

The majority of species are visited by female bees foraging for pollen, especially honeybees (Apidae) or halictids (Halictidae). In addition most species produce minute quantities of nectar. In these species the more or less conspicuous hairs at the base of the filaments presumably function as pseudopollen, encouraging visits even after all of the pollen has been removed from the anthers. Early-blooming species (June to July) are predominantly white or yellow, rarely lilac and all of the pink-flowered species of the winter rainfall region appear later in the season (August and September). Scent is a feature of only a few winter-rainfall species in Section *Ciliatae*, all with predominantly white or pale lilac flowers. Species with darkly colored, red or deep pink flowers prominently marked with darker blotches are specialized for pollination by hairy monkey beetles (Scarabaeidae: Hopliini) (GOLDBLATT et al. 1998) and in these species the anthers and pollen are also usually darkly colored and the filaments are smooth. Two or three species have become specialized for pollination by long-tongued flies (MANNING & GOLDBLATT 1996) and have hypocrateriform flowers with smooth filaments and produce large quantities of nectar that accumulates in the narrow floral tube. In the remaining few species with hypocrateriform flowers the long floral tube seems to function more as a pseudopedicel, lifting the flower above the ground level, rather than as a nectar tube.

## TAXONOMIC TREATMENT

### ROMULEA Maratti

Pl. Romul. Saturn.: 13, pl. 1 (1772). — Type: *Romulea bulbocodium* (L.) Seb. & Maur. (type cons.).

*Crocus* L., Sp. Pl. 1: 36 (1753), partly.  
*Bulbocodium* Mill., Fig. Pl. 160 (1760).

*Ixia* L., Sp. Pl. ed. 2: 51 (1762), partly.

*Ilmu* Adans., Fam. Pl. 2: 497 (1763).

*Trichonema* Ker-Gawl., Curtis's Bot. Mag. 16: t. 575 (1802).

*Spatalanthus* Sweet, Brit. Fl. Gard. 3: t. 300 (1829).

Deciduous perennials. Rootstock a globose, bell-shaped or asymmetric corm, often with a circular to crescent-shaped basal ridge from which roots emerge, basal in origin, tunics woody to cartilaginous or firm-papery, rarely fibrous. Stem short, subterranean or aerial, occasionally hairy, usually branched, sometimes below ground, branches (peduncles) often coiled in fruit. Leaves few to several, lower 2 or 3 cataphylls; foliage leaves 1-several, unifacial, usually with a definite midrib, all basal or some cauline, ± filiform or cylindric, straight or twisted, occasionally hairy on margins, usually midrib and margins thickened, blade thus oval to terete in transverse section with 2 sinuses on each surface between margins and midrib, occasionally up to 8-grooved or nearly plane with lightly thickened margins and midrib, sometimes winged, rarely bifacial and channelled. Inflorescence composed of solitary flowers terminal on peduncles; bracts green, margins of outer sometimes and of inner always membranous to scarious and pale or ferruginous, occasionally inner bract entirely dry, rarely hairy, inner usually acute and undivided apically. Flowers thermonastic, regular, mostly campanulate, cup deep or shallow, sometimes hypocrateriform, variously colored, often discoloured and paler in center, sometimes with darker markings; perianth tube usually short and funnel-shaped, sometimes elongate and cylindric; tepals equal or subequal, usually ascending below and spreading above. Stamens: filaments erect, ± contiguous, canaliculate on inner surface, sometimes united, frequently somewhat swollen and hairy below; anthers diverging or contiguous; pollen monosulcate, operculate, exine perforate. Style filiform, exerted from tube, enclosed by filaments, branches short, usually divided for half their length, rarely multifid. Capsules oblong to subglobose. Seeds globose or lightly angled, flattened at chalazal end, smooth, matte, surface laevigate or areolate. Basic chromosome number  $x = 14$  or 13, other base numbers 12, 11, 10, 9.

### Key to the subgenera and sections

1. Corms either obliquely or vertically flattened towards the base with a crescent- or fan-shaped basal ridge or bell-shaped with a circular basal ridge, the ridge fringed or split into fibrils or slender teeth; stems short or well-developed (subgenus *Romulea*) ..... 2
- 1'. Corms rounded or pointed at the base, the tunics splitting into coarse, bent or straight teeth without fibrous tips; stems short and subterranean (subgenus *Spatalanthus*) ..... 5
2. Basal fibers aggregated into distinct rounded clusters, the fibrils in each cluster converging and pointed, the roots emerging from the clusters ..... Section 4. *Aggregatae*
- 2'. Basal fibers not aggregated into clusters of converging fibrils, sometimes the basal ridge more deeply incised between groups of parallel fibers but the roots not emerging only from the fibril clusters, the fibrils more or less blunt ..... 3
3. Corms symmetrical and bell-shaped with a circular basal rim ..... Section 3. *Hirsutae*
- 3'. Corms obliquely flattened with a crescent-shaped basal ridge or compressed with a fan-shaped basal ridge ..... 4
4. Corms with a moderate-sized to small oblique basal ridge up to half as wide as the corm; tunics split into narrow teeth ..... Section 1. *Romulea*
- 4'. Corms with a prominent basal ridge, more than half as wide as the corm; tunics split into fine fibrils ..... Section 2. *Ciliatae*
5. Corms pointed at the base, the teeth straight ..... Section 5. *Cruciatae*
- 5'. Corms rounded at the base, the teeth curved or bent over at the ends ..... Section 6. *Roseae*

### Keys to the species

#### 1. Section *Romulea* in sub-Saharan Africa, Arabia and Socotra

1. Corm with a basal ridge at least half as wide as the corm ..... 2
- 1'. Corm with an inconspicuous basal ridge much less than half as wide as the corm ..... 3
2. Corm tunics with the basal fibrils aggregated into regular clusters of fibrils converging at the tips, each cluster dissected by a deeper cleft; bract submembranous in the lower half ..... 6. *R. pratensis*
- 2'. Corm tunics with the basal fibrils parallel and not clustered; bract green throughout ..... 5. *R. gigantea*
3. Inner bracts rust-colored and with broad scarios margins, often appearing entirely scarios; peduncles fairly thick, 1-1.8 mm diam ..... 4. *R. congoensis*
- 3'. Inner bracts green with narrow or broad membranous margins, uniformly pale or streaked with brown; peduncles slender, 0.6-1 mm diam ..... 4
4. Inner bracts with broad membranous margins irregularly streaked with brown ..... 3. *R. fischeri*
- 4'. Inner bracts with narrow to hardly visible membranous margins, usually uniformly pale ..... 5
5. Stamens and style not reaching halfway up the perianth ..... 1. *R. autumnalis*
- 5'. Stamens and style reaching more than halfway up the perianth ..... 2. *R. camerooniana*

#### 2. Section *Ciliatae*

1. Flowers with a cylindrical perianth tube more than 11-22 mm long, white to purple or cerise; filaments glabrous ..... 2
- 1'. Flowers funnel- or bell-shaped with a funnel-shaped perianth tube less than 10 mm long; filaments often hairy or papillate ..... 3
2. Perianth tube 11-17 mm long, white to purple; stamens exserted from the tube; leaf 1(-2) .... 33. *R. stellata*
- 2'. Perianth tube 17-22 mm long; stamens included; leaves 3-5 ..... 15. *R. kamisensis*
3. Basal foliage leaves 4-winged, H-shaped in section and usually conspicuously ciliate; peduncles hairy ..... 20. *R. tetragona*
- 3'. Basal foliage leaves 2- or 4-(5-8)-grooved, not H-shaped in section; peduncles glabrous ..... 4
4. Upper part of the basal foliage leaves 5-8-grooved; plants aquatic with the corms submerged ..... 5
- 4'. Upper part of the basal foliage leaves 2- or 4-grooved, sometimes channelled above; plants not aquatic although sometimes growing in marshy ground ..... 6

5. Basal foliage leaves 2; style 12-15 mm long; fruiting peduncles long and widely spreading .... 31. **R. multisulcata**
- 5'. Basal foliage leaf 1; style 4-8 mm long; fruiting peduncles short and erect ..... 32. **R. aquatica**
6. Inner bracts wholly scarious or submembranous, differing markedly from the green outer bracts; basal foliage leaf 1 when the stem is elongated; outer tepals without dark feathering on the outside ..... 7
- 6'. Inner bracts usually with a green median zone and wide membranous margins, rarely both outer and inner bracts membranous; basal leaves usually 2 when the stem is elongated; outer tepals with or without dark feathering on the outside ..... 9
7. Flowers white with large black blotches usually bordered by a yellow margin in the throat; leaves widely 2-grooved and T-shaped in section ..... 28. **R. barkerae**
- 7'. Flowers without dark blotches; leaves 4-grooved ..... 8
8. Flowers pale or sulphur yellow, white or blue; inner bracts usually scarious ..... 26. **R. flava**
- 8'. Flowers golden- or orange-yellow; inner bracts often greenish in the upper half ..... 27. **R. saldanhensis**
9. Outer bracts with conspicuous brown-streaked membranous apices and margins ..... 10
- 9'. Outer bracts with narrow or scarcely visible membranous margins ..... 13
10. Central green portion of the inner bract with c. 10 well spaced veins; membranous margins lightly flecked with brown; flowers white ..... 16. **R. rupestris**
- 10'. Central green portion of the inner bract with c. 20 very closely spaced veins; membranous margins conspicuously flecked with brown ..... 11
11. Veins of the outer bract all equally thick; flowers yellow ..... 19. **R. pearsonii**
- 11'. Central vein of the outer bract thicker than others; flowers magenta or white ..... 12
12. Cataphylls uniformly pale green; flowers magenta ..... 17. **R. neglecta**
- 12'. Cataphylls purple with white speckles; flowers white with darker veins on the outside ..... 18. **R. maculata**
13. Flowers uniformly yellow ..... 14
- 13'. Flowers not entirely yellow although usually with a yellow cup ..... 21
14. Outer bracts membranous throughout or in the lower half, rarely green; leaves often channelled for most of their length ..... 15
- 14'. Outer bracts mostly green with or without narrow membranous margins ..... 18
15. Perianth tube 13-35(-65) mm long, the lower part elongate and cylindrical; tepals often orange in the lower half ..... 34. **R. macowanii**
- 15'. Perianth tube 3-10 mm long, the cylindrical part very short ..... 16
16. Foliage leaf 1(-2), usually suberect, with adhering sand particles ..... 37. **R. sphaerocarpa**
- 16'. Foliage leaves several, usually flexuose, without adhering sand particles ..... 17
17. Basal ridge vertical, fan-shaped, much wider than the corm; outer bracts largely membranous or submembranous ..... 36. **R. tortuosa**
- 17'. Basal ridge oblique, not much wider than the corm; outer bracts green or submembranous in the lower half ..... 35. **R. austinii**
18. Filaments at least twice as long as the anthers; flowers golden- or orange-yellow ..... 24. **R. sulphurea**
- 18'. Filaments less than twice as long as the anthers, mostly more or less equal in length; flowers bright or pale yellow ..... 19
19. Inner bracts with narrow colorless margins; outside of the outer tepals green with brown flecks along the margins ..... 25. **R. elliptica**
- 19'. Inner bracts with brownish or brown-flecked margins; outside of the outer tepals irregularly streaked with darker color ..... 20
20. Corm with a narrow basal ridge; edges of the basal ridge with fibrils uniformly arranged; fruiting peduncles at first curved, later suberect ..... 21. **R. citrina**
- 20'. Corm with a wide basal ridge, often wider than the corm; edges of the basal ridge with fibrils irregularly clustered; fruiting peduncles widely spreading ..... 22. **R. montana**
21. Filaments inserted in the middle of the tube, usually red or reddish black; flowers with little or no yellow in the cup ..... 14. **R. namaquensis**
- 21'. Filaments inserted in the lower half of the tube, yellow to orange ..... 22
22. Corm higher than wide with a high, chisel-shaped basal ridge; flowers to 20 mm long; inner bracts usually with conspicuously brown-spotted membranous margins ..... 23
- 22'. Corm about as wide as high or wider; flowers to 35 mm long; inner bracts with unspotted or spotted membranous margins ..... 24
23. Flowers 7-15 mm long, often with a mauve throat, the tepals less than 3 mm wide; inner bract conspicuously brown-spotted ..... 29. **R. minutiflora**
- 23'. Flowers 15-20 mm long, the tepals 3-4 mm wide; inner bracts inconspicuously spotted ..... 30. **R. sinispinosensis**
24. Flowers rose or pink with large violet blotches in the throat ..... 13. **R. biflora**

- 24'. Flowers without blotches in the throat ..... 25
25. Anther connectives attenuate and produced 2.5-6 mm above the thecae ..... 10. **R. flexuosa**
- 25'. Anther connectives not produced ..... 26
26. Corm obliquely flattened with a wide fan-like basal ridge ..... 23. **R. toximontana**
- 26'. Corm not flattened, with a narrow crescent-shaped basal ridge ..... 27
27. Tepals usually bicolored above the cup, the lower third or half yellow and the upper part white to blue or lilac; fruiting peduncles at first recurved, later suberect; inner bract margins flecked with brown ..... 28
- 27'. Tepals unicolored above the cup; fruiting peduncles not at first recurved; inner bract margins uniformly colored or speckled ..... 29
28. Upper part of the tepals cream or white, 5-8 mm wide; outer tepals not blotched on the reverse ..... 12. **R. leipoldtii**
- 28'. Upper part of the tepals bluish, rarely white, to 5 mm wide; outer tepals often irregularly blotched on the reverse ..... 11. **R. tabularis**
29. Tepals obtuse; outer tepals shiny and wine-colored on the reverse, inner pale ..... 9. **R. vinacea**
- 29'. Tepals acute to subobtuse; outer tepals not shiny and wine-colored ..... 30
30. Stem rigid; flowers pale lilac to mauve, pink or cream; stamens 8-19 mm long; filaments pilose near the base; inner bract margins transparent ..... 7. **R. schlechteri**
- 30'. Stem slender and wiry; flowers magenta; stamens 6-8 mm long; filaments minutely pilose almost to the top; inner bract margins usually flecked with brown ..... 8. **R. saxatilis**

### 3. Section *Hirsutae*

1. Flowers yellow or cream with a yellow cup ..... 2
- 1'. Flowers apricot or pink to magenta with a yellow cup; basal rim of the corm not scalloped ..... 4
2. Corm strongly flattened, disc-shaped; flowers yellow with dark blotches in the throat ..... 43. **R. discifera**
- 2'. Corm bell-shaped; flowers cream or yellow without dark blotches in the throat ..... 3
3. Flowers yellow to white, the outer tepals greenish or cream on the reverse; basal rim of the corm narrow; fruiting peduncles suberect or lightly spreading ..... 41. **R. triflora**
- 3'. Flowers white, the outer tepals purplish or green on the reverse; basal rim of the corm wide and scalloped; fruiting peduncles abruptly spreading ..... 42. **R. sladenii**
4. Leaves tightly sinuous ..... 40. **R. tortilis**
- 4'. Leaves straight ..... 5
5. Tepals more than 6 mm wide, often with dark blotches in the throat ..... 39. **R. hirsuta**
- 5'. Tepals 5-6 mm wide, without dark blotches in the throat ..... 38. **R. gracillima**

### 4. Section *Aggregatae*

1. Flowers uniformly carmine-red or deep rosy pink with a whitish to yellow cup; anthers longer than the filaments 2
- 1'. Flowers magenta, pink, apricot, orange, yellow or white with a yellow cup; anthers shorter than or as long as the filaments ..... 3
2. Corm bell-shaped with a circular basal rim; flowers with dark blotches and sometimes stripes in a white or yellow cup ..... 45. **R. amoena**
- 2'. Corm oblique with a crescent-shaped basal ridge; flowers uniformly red ..... 44. **R. sanguinalis**
3. Inner bracts with membranous margins unmarked; stem usually short ..... 4
- 3'. Inner bracts with membranous margins brown-flecked or edged, at least in the upper part; stem usually well-developed ..... 5
4. Flowers white to pink ..... 51. **R. albomarginata**
- 4'. Flowers yellow to apricot ..... 50. **R. setifolia**
5. Basal foliage leaf 1 (rarely 2 but then the lower leaf shorter) ..... 6
- 5'. Basal foliage leaves 2 ..... 7
6. Flowers yellow to orange; leaves 4-grooved and X-shaped in cross section ..... 49. **R. jugicola**
- 6'. Flowers pink or salmon-pink; leaves with the lateral ribs reduced and thus I-shaped in cross section ..... 48. **R. dichotoma**
7. Flowers pink to magenta with violet blotches in the throat ..... 46. **R. fibrosa**
- 7'. Flowers pale greenish, cream, yellow or apricot, often with dark apricot-colored veins ..... 47. **R. longipes**

## 5. Section *Cruciatae*

1. Flowers hypocrateriform with a cylindrical perianth tube 35-70 mm long ..... 56. **R. hantamensis**
- 1'. Flowers funnel- or bell-shaped with a cup-shaped perianth tube to 10 mm long ..... 2
2. Flowers yellow; outer and inner bracts similar, both with broad membranous margins and apices ..... 55. **R. membranacea**
- 2'. Flowers pink to magenta with a yellow cup; outer bracts with membranous margins narrower than in the inner ..... 3
3. Outer bracts with distinct brown-spotted membranous margins and conspicuous membranous apices and strong, closely spaced veins; flowers without dark blotches in the throat ..... 54. **R. vlokii**
- 3'. Outer bracts with narrow, scarcely visible membranous margins and apices and usually more distantly spaced veins; flowers with dark blotches in the throat ..... 4
4. Flowers (35-)40-60 mm long, old-rose with dark red blotches in the throat, the cup pale yellow or greenish yellow; filaments 9-12 mm long ..... 53. **R. eximia**
- 4'. Flowers 25-35(40) mm long, magenta to lilac, often with purple or blue blotches in the throat, the cup golden-yellow or orange-yellow; filaments 3-6 mm long ..... 52. **R. cruciata**

## 6. Section *Spathalanthus*

1. Flowers hypocrateriform with a cylindrical perianth tube 15-30 mm long ..... 2
- 1'. Flowers funnel-shaped or bell-shaped with a cup-shaped perianth tube to 6 mm long ..... 3
2. Flowers white; leaves suberect, conspicuously hairy, more or less straight and at least twice as long as the flowers; corm with a fibrous neck ..... 76. **R. albiflora**
- 2'. Flowers pink to purple; leaves curved, sparsely hairy, curved outward below the flowers; corm without a prominent fibrous neck ..... 75. **R. syringodeoflora**
3. Inner bracts 2-keeled and with 2 stronger veins, especially in the upper half; outer bract often distinctly keeled in the upper half ..... 4
- 3'. Inner bracts not 2-keeled and without 2 stronger veins; outer bract not keeled ..... 8
4. Flowers yellow ..... 70. **R. viridibracteata**
- 4'. Flowers red, orange or pink ..... 5
5. Filaments oblong, black, fused or closely adpressed into a stout column, glabrous ..... 74. **R. monadelpha**
- 5'. Filaments tapering, pale or dark, free, usually pilose at the base ..... 6
6. Leaves c. 1 mm diam., filiform with 4 narrow grooves ..... 73. **R. sabulosa**
- 6'. Leaves 2-5 mm wide., somewhat swollen with 4 wide grooves ..... 7
7. Produced leaves 4-9; flowers pinkish-red ..... 71. **R. subfistulosa**
- 7'. Produced leaf 1(2); flowers orange-red ..... 72. **R. unifolia**
8. Outer bracts usually with narrow, hardly visible membranous margins but the tip always minutely or hardly membranous; fruiting peduncles straight or curved ..... 9
- 8'. Outer bracts usually with pronounced membranous margins but always with a large membranous tip; fruiting peduncles often coiled ..... 14
9. Basal leaves 4-winged and H-shaped in section, with two wide lateral grooves and a strong vein up the middle of each groove; flowers pale yellow ..... 62. **R. hirta**
- 9'. Basal leaves narrowly 4-grooved, without an evident vein up the middle of the grooves ..... 10
10. Flowers bright yellow with darker veins in the throat; fruiting peduncles suberect or curved ..... 61. **R. monticola**
- 10'. Flowers lilac to pink, apricot or white, rarely yellow but then fruiting peduncles widely spreading ..... 11
11. Leaves 3-6, 0.5-1.5 mm diam.; flowers 2 or more; anthers about as long or longer than the filaments .... 12
- 11'. Leaves 1 or 2, rarely 3, c. 0.5-1 mm diam.; flowers 1, rarely 2; anthers half as long as the filaments or less .... 13
12. Flowers apricot, terracotta, deep old-rose or yellow; fruiting peduncles widely spreading from the base ..... 60. **R. obscura**
- 12'. Flowers magenta, lilac-pink or rosy pink to white; fruiting peduncles straightening and suberect ..... 57. **R. rosea**
13. Leaves usually 2, not sticky; flowers with a distinct yellow cup; stamens yellow, the filaments 5-6 mm long ..... 59. **R. cedarbergensis**
- 13'. Leaf 1, sticky; flowers with yellow at the base of the tepals but without a distinct yellow cup; stamens lilac, the filaments 9-10 mm long ..... 58. **R. lilacina**

14. Flowers yellow ..... 15  
 14'. Flowers white or lilac to magenta ..... 17  
 15. Tepals unequal, the inner 2-3 mm wider than the outer; stigmas overtopping the anthers; flowers uniformly golden yellow ..... 68. **R. diversiformis**  
 15'. Tepals equal; stigmas not overtopping the anthers ..... 16  
 16. Flowers to 25 mm long, pale yellow; outer bracts and inner bracts largely membranous or green in the centre in the upper half ..... 69. **R. malaniae**  
 16'. Flowers more than 25 mm long, bright yellow, with or without dark blotches in the throat; outer and inner bracts firm and green ..... 67. **R. luteoflora**  
 17. Style branches much-divided, stigmas usually more than 12 ..... 64. **R. multifida**  
 17'. Style branches bifid, stigmas usually 6 ..... 18  
 18. Perianth cup brown at the base when fresh, not longitudinally striped; membranous margins of the inner bract as wide as the green median part throughout; anthers usually arched, later coiled, the pollen usually brown or rust-red, rarely yellow ..... 65. **R. komsbergensis**  
 18'. Perianth cup yellow at the base, often longitudinally striped; membranous margins of the inner bract as narrower than the green median at least below; anthers erect, the pollen yellow to orange ..... 19  
 19. Outer bracts with an ovate or oblong green median zone; flowers white or lilac to magenta .... 63. **R. atrandra**  
 19'. Outer bracts with a triangular green median zone; flowers pale lilac-blue ..... 66. **R. hallii**

## ROMULEA subg. ROMULEA

Corm with an oblique, crescent-shaped or circular basal ridge; ridge edges finely toothed or fringed, consisting of coarse or fine fibrils, sometimes in clusters. Leaves with or without secondary bundles, occasionally with vascular girders, usually without marginal strands and lacking rib marginal bundles. Flowering stem frequently produced some distance above the ground at anthesis.

### ROMULEA subg. ROMULEA sect. 1. ROMULEA

Corms with a small, oblique, crescent-shaped basal ridge usually less than half as wide as the corm; ridge edges finely toothed. Leaves with secondary bundles, usually with vascular girders and rib marginal strands but without rib marginal bundles.

— Ser. *AUTUMNALES*

#### 1. *Romulea autumnalis* L. Bolus

J. Bot. 69: 12 (1931); M.P. de Vos, J. S. African Bot., Suppl. 9: 203 (1972); Fl. S. Africa 7(2), fasc. 2: 50 (1983). — Type: *Dyer 2414*, South Africa, Western Cape, Grahamstown (lecto-, BOLI, designated by M.P. DE VOS, 1972).

Plant 15-35 cm, stem subterranean; corm with a small crescent-shaped basal ridge. Leaves 3-6, basal, filiform, narrowly 4-grooved, 1-2 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide colorless membranous margins. Flowers pink to white with a yellow to orange cup, tepals elliptic, 18-30 mm long; filaments 4-10 mm long, anthers 6-8 mm long. Fruiting peduncles erect. Flowering: Apr.-July.

*Romulea autumnalis* occurs on grassy slopes in the Eastern Cape from Grahamstown toward Kariga. It is closely allied to the widespread African *R. camerooniana* but can be distinguished from that species by the short stamens and style which do not reach the middle of the perianth and are thus included in the floral cup. In *R. camerooniana* the stamens and style reach the top of the floral cup.

#### 2. *Romulea camerooniana* Baker

J. Bot. 14: 236 (1876); Goldblatt, Fl. Zamb. 12(4): 65 (1993), Fl. Trop. E. Africa, Iridaceae: 36 (1996). — Type: *Mann 2135*, Cameroon, Mt. Cameroon (holo-, K!).

*Romulea campanuloides* Harms, Bot. Jahrb. Syst. 19, Beibl. 47: 28 (1894) M.P. de Vos, J. S. African Bot., Suppl. 9: 207 (1972); Fl. S. Africa 7(2), fasc. 2: 52 (1983). — Type: *Volkens 782*, Tanzania, Mt. Kilimanjaro (holo-, B!; iso-, K!).

*Romulea thodei* subsp. *gigantea* M.P. de Vos, J. S. African Bot. 21: 106 (1955). — *Romulea campanuloides* var. *gigantea* (M.P. de Vos) M.P. de Vos, J. S. African Bot., Suppl. 9: 117 (1972); Fl. S. Africa 7(2), fasc. 2: 37 (1983). — Type: *Rust* 622, South Africa, Western Cape, Riversdale (holo-, B).

Plants mostly 8-20 cm, stem subterranean; corm obliquely pointed with a narrow basal ridge. Leaves (1)2-6, basal, filiform, narrowly 4-grooved, c. 1 mm diam.; outer bracts with narrow or hardly visible membranous margins, inner bracts with narrow, colorless membranous margins. Flowers magenta or pink to white with a yellow cup, tepals elliptic, mostly 12-25 mm long; filaments 4-7 mm long, anthers 3-7 mm long. Fruiting peduncles erect. Flowering: May-Feb.

A widespread African species, *Romulea camerooniana* occurs in rocky or grassy highlands, extending from the Drakensberg of Eastern Cape Province, South Africa, near Rhodes to Kenya, Sudan, and southern Ethiopia. Outlying populations occur in Cameroon in the west. The species was treated as *R. campanuloides* by DE VOS, but she has confirmed (pers. comm.) that *R. camerooniana*, described in 1876, is conspecific with *R. campanuloides* which was described only in 1894. Different chromosome numbers in the southern African and tropical African population counted,  $2n = 22$  versus  $2n = 26$  are puzzling (DE VOS 1972; GOLDBLATT & TAKEI 1997). Additional counts from tropical African populations are needed before this difference can be assessed. DE VOS (1972, 1983) recognized two varieties of the species, the typical with flowers up to 25 mm long and the style branches usually shorter than the anthers, and var. *gigantea* with the flower 25-35 mm long and the style branches usually exceeding the anthers. The ranges of the two varieties overlap completely. The large-flowered plants do not, we believe, merit taxonomic status. Most species of *Romulea* have smaller- and larger-flowered races and flower size alone should not be used to differentiate taxa unless the difference is extreme and without intermediates.

### 3. *Romulea fischeri* Pax

Bot. Jahrb. Syst. 15: 150 (1892); Goldblatt, Fl. Trop. E. Africa, Iridaceae: 35 (1996); Fl. Somalia 4: 65 (1995). — Type: *Fischer* 587, Kenya, Aberdare Mts., Abori (holo-, B!).

*Romulea purpurascens* var. *edulis* W. Herbert ex Baker, J. Linn. Soc. 16: 87 (1878). — Types: *Schweinfurth* 580 (syn-, B), Socotra, Haghier hills; *Nimmo* s.n. (syn-, not seen); *Wellsted* s.n. (syn-, not seen); **syn. nov.**

Plants 8-40 cm, stem subterranean; corm obliquely pointed with a narrow basal ridge. Leaves 2-5, filiform, narrowly 4-grooved, c. 1 mm diam.; outer bracts with narrow membranous margins, inner bracts with broad brown-flecked membranous margins. Flowers purple to violet or white with a yellow cup, tepals elliptic, 10-16 mm long; filaments 3-4 mm long, anthers c. 3 mm long. Flowering: Mainly Aug.-Dec.

*Romulea fischeri* occurs in stony or grassy plateaus and alpine seeps in the eastern African highlands of Kenya and Ethiopia as well as in Somalia, Saudi Arabia, and Socotra in the east. Evidently closely related to the more widespread *Romulea camerooniana*, *R. fischeri* is distinguished from that species most easily by the outer floral bracts, which have narrow membranous margins and inner bracts with broad membranous margins. The outer bracts of *R. camerooniana* have hardly visibly membranous margins and the inner bracts have only narrow membranous margins. Until now collections of *Romulea* from Socotra have been associated with the Mediterranean *R. purpurascens* as var. *edulis* (BALFOUR 1888; FORBES 1903) but we have examined plants from that island and find that they differ in no significant way from the East African *R. fischeri*, which also occurs in Somalia and the Arabian Peninsula, except for a perianth that is darker purple rather than pink to light purple. The bracts match those of *R. fischeri* in their relatively broad membranous margins while the inner bracts have fairly broad membranous margins flecked with brown.



#### 4. *Romulea congoensis* Bég.

Bull. Jard. Bot. Bruxelles 15: 215 (1938); Goldblatt, Fl. Trop. E. Africa, Iridaceae: 37 (1996); Fl. Ethiopia 6: 173 (1998). — Type: *Lebrun 4982*, Congo, Karisimbi, Rukuki Plateau (holo-, BR!).

*Romulea keniensis* Hedberg, Symb. Bot. Upsal. 15: 66 (1957). — Type: *Hedberg 1784*, Kenya, Mt. Kenya, Teleki valley (holo-, UPS!; iso-, K!).

Plants (2-)5-15 cm high, stem subterranean; corm obliquely pointed with a narrow basal ridge. Leaves 3-7, basal, filiform, narrowly 4-grooved, 1-2 mm diam.; outer bracts with broad membranous margins, inner bracts with broad, rust-brown membranous margins or almost entirely membranous. Flowers pink or lilac to white with a yellow to white cup, tepals elliptic, 15-20 mm long; filaments 4-6 mm long, anthers 4-6 mm long. Fruiting peduncles erect or curved. Flowering: July-Oct. and Jan.-Mar., only the latter in south tropical Africa.

A species of alpine grasslands, seeps and scree, *Romulea congoensis* occurs in the higher eastern African mountains from eastern Zaire in the west to Ethiopia in the east. It is distinctive in the rust-colored outer and inner bracts, the latter often almost entirely membranous and dry.

— Ser. *ROMULEA*

The group is entirely extra sub-Saharan African and is not dealt with here.

— Ser. *PRATENSES*

#### 5. *Romulea gigantea* Bég.

Bot. Jahrb. Syst. 38: 333 (1907); M.P. de Vos, J. S. African Bot., Suppl. 9: 117 (1972); Fl. S. Africa 7(2), fasc. 2: 37 (1983). — Type: *Rust 622*, South Africa, Western Cape, Riversdale (holo-, B).

Plants mostly 10-20 cm high, stem subterranean or reaching 20 cm above ground; corm with a crescent-shaped basal ridge, with narrow teeth sharply bent over at the tips. Leaves 4-6, lower 2 basal, narrowly 4-grooved, 1-3 mm diam.; outer bracts with hardly visible membra-

nous margins, inner bracts with wide, brown-edged membranous margins. Flowers white, lilac or blue with greenish yellow cup, tepals elliptic, 10-15 mm long; filaments 3-7 mm long, anthers 3-4 mm long. Fruiting peduncles curved, later erect. Flowering: Sep.-Oct.

*Romulea gigantea* extends along the southern Cape coast from Kleinmond in the west to Port Alfred in the east and occurs in marshy or seasonally wet sites. The affinities of *R. gigantea* are uncertain but the narrow corm ridge cut into fine teeth is reminiscent of that of some species of subgenus *Romulea* sect. *Autumnales* and we place it here.

#### 6. *Romulea pratensis* M.P. de Vos

J. S. African Bot., Suppl. 9: 198 (1972); Fl. S. Africa 7(2), fasc. 2: 35 (1983). — Type: *Dyer 1619*, South Africa, Eastern Cape, Grahamstown (holo-, GRA; iso-, PRE!).

Plants 12-25 cm high, stem subterranean; corm with a high, crescent-shaped basal ridge, with relatively broad teeth sharply bent over. Leaves 5-8, basal, narrowly 4-grooved, 1-2 mm diam.; outer bracts usually submembranous in the lower half with hardly visible membranous margins, inner bracts with wide colorless or brown-speckled membranous margins. Flowers white, lilac or rose with greenish yellow cup, tepals elliptic, 8-15 mm long; filaments 3-4 mm long, anthers 3-4 mm long. Fruiting peduncles curved, later erect. Flowering: July-Sep.

*Romulea pratensis* is a species of grassy slopes often along the southeastern Cape coast, extending from Avontuur in the west to Alexandria in the east. The corm tunics are somewhat anomalous in the subgenus in being divided into relatively broad teeth along the basal ridge and have caused difficulty in placing the species. We have reached the conclusion that DE VOS was correct in her later account of the genus in allying the species with *R. gigantea*, which has the tunics divided into much finer teeth, but we differ from her in the subgeneric placement. She placed the two species at the beginning of her section *Roseae*

in the equivalent of our subgenus *Spatalanthus* while we place the species in section *Romulea* of subgenus *Romulea*. Both *R. gigantea* and *R. pratensis* are polyploid species, with the apparently derived basic chromosome number of  $x = 11$ .

ROMULEA subg. ROMULEA sect. 2. CILIATAE  
(M.P. de Vos) J.C. Manning & Goldblatt,  
**comb. et stat. nov.**

Subsect. *Ciliatae* M.P. de Vos, J. S. African Bot.,  
Suppl. 9: 62 (1972). — Type: *Romuleae flava* (Lam.)  
M.P. de Vos.

Corm with an oblique, crescent-shaped basal ridge; ridge edges fringed, consisting of fine parallel fibrils. Leaves sometimes without secondary bundles, occasionally with vascular girders and marginal strands but lacking rib marginal bundles.

— Ser. *CILIATAE*

### 7. *Romulea schlechteri* Bég.

Bot. Jahrb. Syst. 38: 335 (1907); M.P. de Vos, J. S. African Bot., Suppl. 9: 62 (1972); Fl. S. Africa 7(2), fasc. 2: 17 (1983). — Type: *Schlechter 8648*, South Africa, Western Cape, Pakhuis Mts. (lecto-, B, designated by M.P. DE VOS, 1972; isolecto-, BOL!, BM, G, K!, Z!).

*Romulea papyracea* Wolley-Dod, J. Bot. 38: 170 (1900); M.P. de Vos, J. S. African Bot., Suppl. 9: 66 (1972); Fl. S. Africa 7(2), fasc. 2: 19 (1983). — Type: *Wolley-Dod 3075*, South Africa, Western Cape, Table Mountain (holo-, BOL!; iso-, BM, K!); **syn. nov.**

Plants mostly 5-15 cm high, stem reaching 4-15 cm above ground, sometimes entirely subterranean; corm with a crescent-shaped basal ridge. Leaves 3-6, lower 2 basal, narrowly 4-grooved, sometimes minutely ciliate, 0.5-2 mm diam.; outer bracts with hardly visible membranous margins, somewhat to considerably longer than the inner, inner bracts with wide white membranous margins. Flowers pink or lilac to cream or white with yellow cup, scented of honey and coconut, tepals elliptic, 12-40 mm long; filaments 3-10 mm long, anthers 4-9 mm long.

Fruiting peduncles erect or suberect. Flowering: July-early Oct.

A relatively unspecialized species in series *Ciliatae*, *Romulea schlechteri* may be recognized by its lilac to pink to cream or white flowers, two basal leaves and inner bracts with broad, white membranous margins. It is restricted to sandy flats, mainly along the coast, and may be found from the Bokkeveld Mountains in the north to the Caledon district in the south. The species is somewhat variable and incompletely understood although it seems to comprise three more or less distinct geographic races. Plants from the north of the range, on the Gifberg and near Lamberts Bay, have well-developed stems and white flowers with the outer tepals flushed green on the lower surfaces. A second, montane form distributed from Clanwilliam to Caledon is distinctive in its pink flowers flushed bronze on the lower surfaces of the outer tepals, short stem and prominent fibrous neck at the top of the corm. The third race, with large, cream-flowers from the coastal sands between Mamre and Yzerfontein is particularly attractive.

Known from only a single gathering from the eastern slopes of Table Mountain on the Cape Peninsula, *Romulea papyracea* is a puzzling plant. The few specimens which comprise the type collection are unremarkable except that the outer floral bracts are unusually long in comparison to the inner. This is also a feature of *R. schlechteri* which is in every way very like *R. papyracea* and also occurs on the Cape Peninsula. The outer bracts of *R. papyracea* are said to be keeled but they are no more so than those of *R. schlechteri*. The flowering stem is underground at flowering time unlike its relatives in which the stem is usually shortly to well exerted above ground level.

### 8. *Romulea saxatilis* M.P. de Vos

J. S. African Bot., Suppl. 9: 71 (1972); Fl. S. Africa 7(2), fasc. 2: 19 (1983). — Type: *Guthrie 18558*, South Africa, Western Cape, Ceres (holo-, BOL!).

Plants 10-30 cm high, stem very slender and wiry, reaching to 15 cm above ground; corm with

a crescent-shaped basal ridge. Leaves 3-4, lower 2 basal, narrowly 4-grooved, c. 0.5 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide white or sometimes brown-spotted membranous margins. Flowers magenta-pink with yellow cup, tepals elliptic, 9-22 mm long; filaments swollen in the middle, 3-4 mm long, anthers 3-4 mm long. Fruiting peduncles erect or slightly spreading. Flowering: Sep.-Oct.

*Romulea saxatilis* is a montane species occurring in rocky sandstone soil mainly on wetter, south-facing slopes. Its range extends from the Cedarberg in the north to Michell's Pass near Ceres in the south. Allied to *Romulea schlechteri*, *R. saxatilis* may be distinguished by its slender habit, and fairly small, dark magenta flowers with short stamens. An unusual feature of the species, the very short filaments are widest in the middle instead of at the base.

### 9. *Romulea vinacea* M.P. de Vos

J. S. African Bot., Suppl. 9: 69 (1972); Fl. S. Africa 7(2), fasc. 2: 20 (1983). — Type: *Lewis 2120*, South Africa, Western Cape, Pakhuis Pass (holo-, SAM!; iso-, PRE).

Plants 7-25 cm high, stem reaching 2-10 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-4, lower 2 basal, narrowly 4-grooved, often minutely ciliate, c. 1 mm diam.; outer bracts with hardly visible membranous margins, inner bracts with wide membranous margins edged brown above. Flowers blue-violet with cream and yellow cup, outer tepals shiny and wine-colored on reverse, tepals elliptic, obtuse, 14-28 mm long; filaments 6-9 mm long, anthers 4-6 mm long. Fruiting peduncles suberect. Flowering: Aug.

Rare and poorly known, *Romulea vinacea* is restricted to sandy soils in the Pakhuis Mountains near Clanwilliam in Western Cape Province, South Africa. It is closely allied to *R. schlechteri* and *R. saxatilis* and can be recognized by the obtuse tepals and violet flowers with a yellow cup, with the outer tepals shiny and wine-red on the outside.

### 10. *Romulea flexuosa* Klatt

Abh. Naturf. Ges. Halle 15: 400 (1882); M.P. de Vos, J. S. African Bot., Suppl. 9: 66 (1972); Fl. S. Africa 7(2), fasc. 2: 19 (1983). — Type: *Drège 4038*, South Africa, Western Cape (holo-, S).

Plants 15-40 cm high, stem reaching 2-25 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-5, lower 2 basal, narrowly 4-grooved, 0.5 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide colorless membranous margins. Flowers white or rarely pale lilac with cream to buff cup, lightly sweet-acrid scented, tepals elliptic, 25-35 mm long; filaments 6-7 mm long, anthers sagittate, 12-15 mm long with attenuate connectives extending 2.5-6 mm beyond the thecae. Fruiting peduncles curved. Flowering: May-July.

An early flowering species restricted to the western half of Western Cape Province, *Romulea flexuosa* is found on rocky, sandstone slopes in moist places from Lokenberg in the Bokkeveld Mountains in the north to the Hottentots Holland Mountains in the south. The species is readily recognized by the large white or rarely pale lilac flowers marked with purple lines, the lower part of the cup cream to buff, and particularly by the characteristic anther connectives which are extended into attenuate tips up to 6 mm long.

### 11. *Romulea tabularis* Eckl. ex Bég.

Bot. Jahrb. Syst. 38: 337 (1907); M.P. de Vos, J. S. African Bot., Suppl. 9: 93 (1972); Fl. S. Africa 7(2), fasc. 2: 23 (1983). — Type: *Ecklon & Zeyher 595 Irid. 199*, South Africa, Western Cape, Cape of Good Hope (holo-, B).

Plants 10-35(-60) cm high, stem reaching 2-30 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-5, lower 1 or 2 basal, narrowly 4-grooved, 1-2 mm diam.; outer bracts with hardly visible membranous margins, inner bracts submembranous with wide brown-speckled membranous margins. Flowers blue to white with yellow cup and lower half of the tepals, sometimes fragrant, tepals elliptic, 10-28 mm

long; filaments 3-6 mm long, anthers 3-6 mm long. Fruiting peduncles arching, later erect. Flowering: July-Oct. — Fig. 2A.

*Romulea tabularis* extends from coastal northern Namaqualand to Cape Agulhas and occurs in wet, often waterlogged sandy soils or on limestone flats. It and *R. leipoldtii* comprise a vicariant species-pair distinguished by their bicolored tepals, the lower half of which is the same color as the central cup. *Romulea tabularis* has relatively small flowers with the distal half of the tepals usually pale blue or cream to whitish. Both *R. tabularis* and *R. leipoldtii* can also be distinguished from *R. schlechteri* by the bract margins which are always streaked with dark brown.

## 12. *Romulea leipoldtii* Marais

Curtis's Bot. Mag. 175: pl. 460 (1964); M.P. de Vos, J. S. African Bot., Suppl. 9: 96 (1972); Fl. S. Africa 7(2), fasc. 2: 25 (1983). — Type: *Leipoldt s.n.*, South Africa, Western Cape, Warm Baths, Citrusdal (holo-, K!).

Plants 10-30 cm high, stem reaching 5-30 cm above ground; corm with a crescent-shaped basal ridge. Leaves 4-6, lower 2 basal, narrowly 4-grooved, c. 1 mm diam.; outer bracts green with hardly visible membranous margins, inner bracts with wide colorless or brown-speckled membranous margins. Flowers white to cream with yellow to orange cup and lower part of the tepals, sweetly scented, tepals elliptic, 18-35 mm long; filaments 5-8 mm long, anthers 5-8 mm long. Fruiting peduncles bent, later erect. Flowering: Sep.-Oct.

*Romulea leipoldtii* occurs in wet habitats in sandy ground from the Bokkeveld Mountains in Northern Cape Province in the north to Klipheuwel near Malmesbury in Western Cape Province in the south. It is closely allied to *Romulea tabularis* but has larger, cream to white flowers with a dark yellow to orange center. Particularly distinctive is that the tepals are white only in the upper half; the lower half are the same yellow to orange color as the floral cup.

## 13. *Romulea biflora* (Bég.) M.P. de Vos

J. S. African Bot., Suppl. 9: 75 (1972); Fl. S. Africa 7(2), fasc. 2: 20 (1983). — *Romulea ambigua* var. *biflora* Bég., Malpighia 23: 80 (1909). — Type: *Schlechter 8694*, South Africa, Western Cape, Clanwilliam, Bidouwberg (holo-, G; iso-, B, BM, K!, GRA, PRE!, S).

Plants 10-25 cm high, stem reaching 2-15 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-6, lower 2 basal, narrowly 4-grooved, c. 1 mm diam.; outer bracts with hardly visible membranous margins, inner bracts with wide colorless or brown-streaked membranous margins. Flowers pink to rose with purple blotches around the yellow cup, unscented, tepals elliptic, 18-35 mm long; filaments 5-7 mm long, anthers 5-8 mm long. Fruiting peduncles bent or suberect. Flowering: July-Sep.

*Romulea biflora* is one of the few species of series *Ciliatae* with the tepals marked with dark blotches and has pink flowers with a yellow cup surrounded by prominent dark reddish purple blotches. Plants typically grow on stony clay on lower mountain slopes and extend from the Gifberg-Matsikamma Range in the northern Western Cape Province southwards to Biedouw valley in the northern Cedarberg.

## 14. *Romulea namaquensis* M.P. de Vos

J. S. African Bot. 21: 103 (1955); J. S. African Bot., Suppl., 9: 76 (1972); Fl. S. Africa 7(2), fasc. 2: 20 (1983). — Type: *Pearson sub Sladen Expedition 6656*, South Africa, Northern Cape, Kamiesberg, Witsand to Liefontein (holo-, BOL!; iso-, K).

Plants to 20 cm high, stem subterranean or reaching 10 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-5, the lower 2-3 basal, filiform, narrowly 4-grooved, straight or curved; outer bracts with narrow membranous margins, inner bracts with wide transparent or brown-flecked margins. Flowers pink to coppery salmon, rarely white, unscented, tepals elliptic, 16-40 mm long; filaments inserted above the middle of the tube, 4-10 mm long, often dark



Fig. 2. — Flowers of *Romulea* species: **A**, *R. tabularis*; **B**, *R. saldanhensis*; **C**, *R. tortuosa*; **D**, *R. sabulosa*; **E**, *R. eximia*; **F**, *R. sulphurea*; **G**, *R. namaquensis*; **H**, *R. komsbergensis*.

brown, anthers 5-10 mm long. Fruiting peduncles suberect. Flowering: July-Sep. — Fig. 2G.

*Romulea namaquensis* grows on sandy, granitic soil in Namaqualand in Northern Cape Province, extending from Steinkopf in the north to the Kamiesberg in the south. The species has large, pink to coppery red flowers and is distinctive in having the filaments often dark brown and inserted above the middle of the perianth tube.

### 15. *Romulea kamisensis* M.P. de Vos

J. S. African Bot., Suppl. 9: 81 (1972); Fl. S. Africa 7(2), fasc. 2: 22 (1983). — Type: *Stayner s.n.*, South Africa, Western Cape, Kamiesberg, Studer's Pass (holo-, NBG!).

Plants rarely exceeding 8 cm high, stem usually subterranean but sometimes reaching 5 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-5, the lower 2-3 basal, filiform, narrowly 4-grooved, mostly curving outward; outer bracts with narrow membranous margins, inner bracts with broad, whitish membranous margins. Flowers dark purple or cerise with darker veins, streaked pale in the throat, unscented, perianth tube cylindrical, 17-22 mm long, tepals elliptic, 11-16 mm long; filaments inserted above the middle of the tube, glabrous, 4-5 mm long, anthers included in the tube, 4-5 mm long. Fruiting peduncles suberect. Flowering: July-Aug.

*Romulea kamisensis* occurs on rock outcrops and shallow, granitic sand around granite domes in central Namaqualand of Northern Cape Province. Until recently thought to be restricted to the Kamiesberg massif, it has now been collected from granite outcrops along the northern margin of the Knersvlakte, some 50 km to the south, and certainly occurs in suitable outcrops in the intervening territory. The southern population is unusual in its cerise flowers. *Romulea kamisensis* is immediately recognized by its dark purple or cerise flowers with a more or less cylindrical perianth tube, the filaments inserted above the middle of the tube and the stamens included in the tube.

### 16. *Romulea rupestris* J.C. Manning & Goldblatt, sp. nov.

*Plantae 15-30 cm altae, caule bene supra terram pro ducto, cormo 10-15 mm diam., foliis 2 vel 3, basali solitario, filiformibus in sectione transversali ovalibus 4-sulcatis, inflorescentiae bracteis exterioribus viridibus marginibus et apice membranaceis, interioribus marginibus late membranaceis, floribus albis cupula flava, tubo perianthii infundibuliformi, 5-6 mm longo, tepalis ellipticis 25-28 × 7-8 mm, filamentis 5-6 mm longis, antheris contiguis 8-10 mm longis flavis.*

TYPUS. — *Goldblatt 5567*, South Africa, Northern Cape, Rooiberg, granite hills at Welkom, 9 June 1980 (holo-, NBG!; iso-, MO!).

Plants 15-30 cm high, the stem reaching 5-25 cm above ground. Corm globose with a crescent-shaped basal ridge about as wide as the corm, splitting into fine parallel fibrils along the ridge, the tunics drawn into prominent fibers above, 10-15 mm diam. Leaves 2 or 3, only 1 basal, c. 1.5 mm diam., oval in section and narrowly 4-grooved, cauline leaves similar but much shorter. Inflorescence of 1 or 2 solitary flowers; outer bracts green or rarely spotted with white, with narrow membranous margins, 18-25(-30) mm long, inner bracts with a narrow green centre and broad membranous margins sparsely streaked with brown mainly along the edges, 15-20 mm long. Flowers cup-shaped, white with a pale yellow cup, the outer tepals streaked with maroon or dark green on the reverse, perianth tube funnel-shaped, 5-6 mm long, tepals elliptic, 25-28 × 7-8 mm. Filaments inserted near the base or middle of the tube, free, 5-6 mm long, densely hairy below; anthers parallel and contiguous, 8-10 mm long. Style dividing opposite the upper third of the anthers, the branches c. 2 mm long, divided for half their length. Capsules and seeds unknown. Flowering: May-July.

*Romulea rupestris* is currently known from two widely separated montane localities in Northern Cape Province, South Africa, one on the Vanderster Berg in the Richtersveld, and the other on the lower slopes of the Rooiberg in the Kamiesberg. Plants grow on rocky slopes, the Kamiesberg plants in granitic ground. The

species is evidently allied to three other Namaqualand species, *Romulea maculata*, *R. neglecta* and *R. pearsonii*, in details of leaf anatomy and in the distinctive outer bracts with membranous, brown-flecked apices and margins and inner bracts with very broad membranous margins. *Romulea rupestris* differs from these species in the 7-10 widely spaced veins which occupy the central green portion of the inner bracts; in the other three species the centre of the inner bracts bears c. 20 very closely set veins. *Romulea rupestris* is characterised by its white flowers which appear early in the season, in June and July, whereas the other species in this complex flower in August and September and have white, magenta or yellow flowers respectively.

PARATYPES. — SOUTH AFRICA. *Northern Cape*: **2817** (Vioolsdrif) Vandersterrberg (AC), *Bruyns* 7282, 12 July 1997 (NBG); **3018** (Kamiesberg) Farm Welkom (AC), *Saunders s.n.*, 22 May 2000 (NBG).

### 17. *Romulea neglecta* (Schult.) M.P. de Vos

Fl. S. Africa 7(2), fasc. 2: 29 (1983). — *Ixia neglecta* Schult., Syst. Veg. Mant. 1: 279 (1822). — Type: Illustration in Curtis's Bot. Mag. 36: pl. 1476 (1812). *Romulea oliveri* M.P. de Vos, J. S. African Bot., Suppl. 9: 116 (1972). — Type: *Oliver* 3169, South Africa, Northern Cape, Kamiesberg, Farm Welkom (holo-, NBG!; iso-, PRE!).

Plants 15-30 cm high, stem reaching 3-30 cm above ground; corm with a crescent-shaped basal ridge. Leaves 2-4, the lower 1 basal, filiform, narrowly 4-grooved; outer bracts firm and closely veined with brown-flecked, membranous margins and apex, inner bracts with broad, brown-streaked membranous margins. Flowers rosy magenta, the cup striped purple and yellow, tepals elliptic, 25-35 mm long; filaments c. 4 mm long, anthers 8-10 mm long. Fruiting peduncles suberect. Flowering: Aug.-Sep.

*Romulea neglecta* occurs on stony, granitic slopes in the Kamiesberg in central Namaqualand. It is one of a small group of three closely related Namaqualand species characterised by their

prominently and closely veined inner bracts. The three species in the group are easily distinguished by flower color, *Romulea neglecta* with magenta flowers, *R. pearsonii* with yellow flowers and *R. maculata* with white flowers. In her monograph of *Romulea*, DE VOS (1972) treated this plant as *Romulea oliveri*. Only later did she realize that *Ixia neglecta* described in 1822 and typified by an illustration in Curtis's Botanical Magazine published in 1812 was an earlier name for the species (DE VOS 1983). *Romulea neglecta* remains poorly collected and is known only from the type illustration and the single collection which constitutes the type of *R. oliveri*.

### 18. *Romulea maculata* J.C. Manning & Goldblatt, sp. nov.

*Plantae* 15-30 cm altae, cormo globoso, foliis 4 [ut videtur] omnibus basalibus, filiformibus in sectione transversali ovalibus 4-sulcatis, inflorescentiae bracteae exterioribus viridibus marginibus et apice membranaceis, interioribus marginibus late membranaceis, floribus albis cupula flava, tubo perianthii infundibuliformi, 7-8 mm longo, tepalis ellipticis 27-30 × 10-13 mm, filamentis c. 6 mm longis, antheris contiguis c. 11 mm longis flavis.

TYPUS. — IPC-NGS Expedition 7, South Africa, Western Cape, northern Knersvlakte, Flaminkberg (also known as Rooiberg), north-facing upper slope in rocky loam on quartzite, 18 Aug. 1999 (holo-, NBG).

Plants 15-30 cm high, the stem reaching 2-3 cm above the ground, the base sheathed by purple cataphylls lightly speckled with white above the ground. Corm globose, with a crescent-shaped basal ridge split into fine parallel fibrils, the tunics drawn into prominent fibers above, 10-15 mm diam. Leaves 4, all evidently basal, 1-1.5 mm diam., oval in section and narrowly 4-grooved. Inflorescence of 2 or 3 solitary flowers; outer bracts green with broad, brown-streaked membranous margins widening upward to a membranous tip, 21-23 mm long, inner bracts with a green centre and broad membranous margins streaked with dark brown, 22-23 mm long. Flowers cup-shaped, white with a pale yellow cup, the outer tepals streaked with dark purple on the reverse, perianth tube funnel-shaped, 7-8 mm long, tepals elliptic, 27-30 × 10-13 mm. Fila-



ments inserted in the middle of the tube, free, c. 6 mm long, smooth above, minutely scabrid below; anthers parallel and contiguous, c. 11 mm long. Style dividing opposite the upper third of the anthers, the branches c. 1.3 mm long, divided for half their length. Capsules and seeds unknown. Flowering: Aug.

*Romulea maculata* is currently known from one collection from the summit of the Flaminkberg (also known as the Rooiberg) just southeast of Nuwerus in the Knersvlakte of Western Cape Province. It is most closely related to the Namaqualand species, *Romulea neglecta* and *R. pearsonii*, and all three have distinctive outer bracts with membranous, brown-flecked margins and apices, and inner bracts with very broad membranous margins. In *Romulea maculata*, as in *R. neglecta*, the central vein of the outer bract is enlarged and more prominent than the other veins. It is easily distinguished from these species by the spotted cataphylls and white flowers.

### 19. *Romulea pearsonii* M.P. de Vos

J. S. African Bot., Suppl. 9: 113 (1972); Fl. S. Africa 7(2), fasc. 2: 29 (1983). — Type: *Pearson sub Sladen Expedition 6550*, South Africa, Northern Cape, Kamiesberg, Khomsoap Ravine (holo-, BOL!; iso-, K).

Plants mostly to 10 cm, stem usually subterranean or reaching 3 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-5, the lower 2 basal, filiform, narrowly 4-grooved; outer bracts firm and closely veined with brown-streaked membranous margins and apex, inner bracts with broad brown-streaked membranous margins. Flowers yellow, tepals elliptic, 25-40 mm long; filaments 6-8 mm long, anthers 7-10 mm long. Fruiting peduncles suberect. Flowering: Aug.-Sep.

*Romulea pearsonii* is restricted to higher elevations in central Namaqualand from Grootvlei and the main Kamiesberg Range and grows in sandy, granitic slopes and flats. It is closely allied to *Romulea neglecta* and shares the same specialized outer and inner bracts but is distinguished by its yellow flowers.

### 20. *Romulea tetragona* M.P. de Vos

Fl. Pl. Africa 29: pl. 1136 (1952); J. S. African Bot., Suppl. 9: 259 (1972); Fl. S. Africa 7(2), fasc. 2: 65 (1983). — Type: *de Vos 1569*, South Africa, Western Cape, Ceres, Theronsberg Pass (holo-, NBG!).

Plants 8-30 cm high, stem subterranean; corm with a crescent-shaped basal ridge. Leaves 4-6, basal, 4-winged, ciliate, 1.5-7 mm diam.; outer bracts with narrow membranous margins widening above and the apex membranous, hairy on the lower part, inner bracts with wide membranous margins. Flowers with hairy peduncles, rose to lilac or pink with dark bands around the yellowish cup, unscented, tepals elliptic to oblanceolate, 12-28 mm long; filaments 3-4 mm long, diverging at the tips, anthers 2-6 mm long, mostly dark brown, occasionally yellow, curving inward. Fruiting peduncles hairy, curved, later straightening. Flowering: Aug.-Sep.

*Romulea tetragona* occurs on stony clay soils in the western karoo of Northern Cape Province and Cold Bokkeveld of Western Cape Province, extending from the Hantamsberg to Tweedside. It is readily recognized by its unusual winged leaves, hairy peduncles and pink flower. Originally placed with *R. hirta* by DE VOS (1972) in sect. *Hirtae* on account of their similar leaf structure, *R. tetragona* has the corm typical of subgenus *Romulea* sect. *Ciliatae* and is accordingly placed here.

### 21. *Romulea citrina* Baker

Handbk. Irideae: 100 (1892); M.P. de Vos, J. S. African Bot., Suppl. 9: 111 (1972); Fl. S. Africa 7(2), fasc. 2: 28 (1983). — Type: *H. Bolus 6619*, South Africa, Northern Cape, Namaqualand, near Modderfontein (holo-, K!; iso-, BOL!, GRA).

Plants mostly 8-12 cm high, stem subterranean or reaching 2 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-4, the lower 2 basal, filiform, narrowly 4-grooved, compressed-cylindric, curving outward; outer bracts with narrow membranous margins, inner bracts with broad brown-streaked membranous margins.



Flowers yellow to pale orange, unscented, tepals elliptic, 20-32 mm long; filaments 5-8 mm long, anthers 4-7 mm long. Fruiting peduncles at first curved, later suberect. Flowering: Aug.-Sep.

*Romulea citrina* occurs in wet sites in Namaqualand, and although most common in the Kamiesberg, also occurs at lower elevations around Grootvlei, west of Kamieskroon. It appears to be most closely related to *R. montana*, with which it is easily confused, although their ranges do not overlap. In *R. montana* the basal ridge of the corm is very pronounced and often wider than the body of the corm and the fruiting peduncles are widely spreading. Possibly more significantly but less obviously the two species differ in leaf anatomy, with only *R. citrina* having sclerenchyma strands at the angles of the longitudinal grooves.

## 22. *Romulea montana* Schltr. ex Bég.

Bot. Jahrb. Syst. 38: 332 (1907); M.P. de Vos, J. S. African Bot., Suppl. 9: 87 (1972); Fl. S. Africa 7(2), fasc. 2: 23 (1983). — Type: *Schlechter 10949*, South Africa, Northern Cape, Bokkeveld Mts. Oorlogskloof (holo-, G; iso-, B, BÖL., GRA, K!, P, PRE, S).

Plants 4-15 cm high, stem subterranean or reaching 15 cm above ground; corm with a wide, crescent-shaped basal ridge. Leaves 4-6, lower 2 basal, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts with hardly visible membranous margins, inner bracts with wide brownish membranous margins. Flowers yellow with dark streaks or blotches in the throat, unscented, tepals elliptic, 15-35 mm long; filaments 5-6 mm long, anthers 4-8 mm long. Fruiting peduncles widely spreading. Flowering: July-Sep.

*Romulea montana* occurs on rocky sandstone pavement, usually in shallow soil that remains wet during the growing season. The range extends from the Bokkeveld Mountains in Northern Cape to the Cedarberg Mountains of Western Cape. It and its northern vicariant, *R. citrina* are among the few yellow-flowered species of series *Ciliatae*. *Romulea montana* is most easily distinguished from *R. citrina* by the corm with a very broad basal ridge, usually wider

than the corm and the widely spreading fruiting peduncles. Anatomically the leaves lack the marginal sclerenchyma strands that characterise those of *R. citrina*.

## 23. *Romulea toximontana* M.P. de Vos

J. S. African Bot., Suppl. 9: 89 (1972); Fl. S. Africa 7(2), fasc. 2: 23 (1983). — Type: *de Vos 2020*, South Africa, Western Cape, Gifberg (holo-, NBG!; iso-, PRE).

Plants 10-25 cm high, stem subterranean or reaching 10 cm above ground; corm obliquely flattened with a wide, fan-shaped basal ridge. Leaves 3-5, lower 2 basal, narrowly 4-grooved, sometimes minutely ciliate, c. 1 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide brown-edged membranous margins. Flowers white with yellow cup, unscented, tepals elliptic, 13-22 mm long; filaments 3-5 mm long, anthers 4-6 mm long. Fruiting peduncles widely spreading. Flowering: Aug.

*Romulea toximontana* has a narrow range on the rocky sandstone plateau of the Bokkeveld, Gifberg and Matsikamma Mountain complex. It is apparently allied to *Romulea montana*, with which it shares the same corm with a very broad basal ridge and widely spreading fruiting peduncles. *Romulea toximontana* is distinguished by having white flowers with a yellow cup, and the outside of the tepals purple. The chromosome number,  $2n = c. 28$ , differs from that of *R. montana* which has  $2n = 24$ . *Romulea toximontana* is easily confused with *R. sladenii* (series *Hirsutae*) which has very similar white flowers and occurs in the same habitat on the Gifberg. The slightly longer stamens of *R. sladenii* reach just beyond the floral cup while those of *R. toximontana* are fully included. Nevertheless, the plants are so alike in appearance that their corms should be examined for certain identification.

## 24. *Romulea sulphurea* Bég.

Bot. Jahrb. Syst. 38: 331 (1907); M.P. de Vos, J. S. African Bot., Suppl. 9: 85 (1972); Fl. S. Africa 7(2), fasc. 2: 22 (1983). — Type: *Schlechter 10818*, South

Africa, Western Cape, Pakhuis Pass (lecto-, Z, designated by M.P. DE VOS, 1972; isolecto-, B, BM, BOL, GRA, K!, PRE!, S, US).

Plants 5-15 cm, stem subterranean or reaching 2 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-5, lower 2 basal, narrowly 4-grooved, 0.5 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide brown-speckled membranous margins. Flowers orange-yellow with dark marks in the cup, sweetly scented, tepals elliptic, 12-20 mm long; filaments 6-9 mm long, hairy to the top, anthers 2.5-3 mm long. Flowering: July-Aug. — Fig. 2F.

*Romulea sulphurea* was known until recently only from the type collection made by Rudolf SCHLECHTER in 1897 but in 1999 an extensive population was located at the eastern foot of the Pakhuis Mountains on the farm Alpha. The species grows in dense communities on sandstone pavement in shallow sandy soil. Although closely allied to *R. montana*, *R. sulphurea* is readily distinguished by its smaller, dark yellow to almost orange flowers with unusually short anthers, only about half as long as the filaments. The leaves are also narrower than are typically found in *R. montana*.

## 25. *Romulea elliptica* M.P. de Vos

J. S. African Bot., Suppl. 9: 83 (1972); Fl. S. Africa 7(2), fasc. 2: 22 (1983). — Type: *de Vos 2226*, South Africa, Western Cape, Vredenburg to Saldanha (holo-, NBG!; iso-, PRE).

Plants 15-30 cm high, stem reaching 16 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-4, lower 2 basal, narrowly 4-grooved, 1-1.5 mm diam.; outer bracts with hardly visible membranous margins, inner bracts submembranous below with narrow white membranous margins. Flowers yellow with dark streaks in the cup, tepals elliptic, often obtuse, 18-27 mm long, outer tepals uniformly green on the outside; filaments 6-7 mm long, anthers 4-6 mm long. Fruiting peduncles erect or suberect. Flowering: Aug.

*Romulea elliptica* has a narrow distribution, occurring on sandy flats between Vredenburg and Saldanha Bay. As far as is currently known, only one small population still exists in a patch of undisturbed vegetation close to Vredenburg, east of Saldanha. The species can be recognized among the other yellow-flowered species of series *Ciliatae* with 2 basal leaves by the uniformly translucent margins of the inner bracts. The outer tepals are distinctive in being plain green on the outside with darkly flecked edges.

## 26. *Romulea flava* (Lam.) M.P. de Vos

J. S. African Bot. 36: 273 (1970); J. S. African Bot., Suppl. 9: 98 (1972); Fl. S. Africa 7(2), fasc. 2: 26 (1983). — *Ixia flava* Lam., Tab. Encycl.: 109 (1791). — Type: South Africa, Western Cape, without locality or collector (lecto-, Herb. Lamarck, P!, designated by M.P. DE VOS, 1972).

Plants mostly 5-15 cm high, stem subterranean or reaching 30 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-4, lower 1 basal, often wider and clasping below, narrowly or widely 4-grooved, sometimes minutely ciliate, 1-4 mm diam.; outer bracts with narrowly or scarcely visible membranous margins, inner bracts membranous or submembranous, often brown-streaked. Flowers white or yellow, rarely blue or pinkish with a yellow cup, the white forms sometimes scented, tepals oblanceolate, 10-30 mm long, outer tepals uniformly green on the outside; filaments 4-7 mm long, anthers 3-7 mm long. Fruiting peduncles recurved, later erect. Flowering: June-Sep.

Widespread and common across a large part of the southern African winter-rainfall zone from Namaqualand in the north to Humansdorp in the southeast, *Romulea flava* is also extremely variable. Flowers are usually yellow but may be white or pale blue and vary greatly in size, sometimes being very small. Plants grow in sandy or clay soils, occurring in fynbos or renosterveld. The species is distinguished by having a single basal leaf, all of the leaves with fairly fleshy blades clasping below, the inner bracts entirely membra-

nous or submembranous, and the outer tepals are uniformly green on the outside.

### 27. *Romulea saldanhensis* M.P. de Vos

J. S. African Bot., Suppl. 9: 108 (1972); Fl. S. Africa 7(2), fasc. 2: 28 (1983). — Type: *de Vos 1772*, South Africa, Western Cape, Saldanha Bay (holo-, NBG!).

Plants 20–60 cm high, stem subterranean or reaching 35 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3–6, lower 1 basal, narrowly 4-grooved, sheathing below, 1–2 mm diam.; outer bracts with hardly visible membranous margins, inner bracts submembranous with wide colorless or brown-marked membranous margins. Flowers orange-yellow with dark lines in the cup, unscented, tepals oblanceolate, 20–30 mm long; filaments 5–7 mm long, anthers 5–7 mm long. Fruiting peduncles sharply curved, later erect. Flowering: Aug.–Sep. — Fig. 2B.

*Romulea saldanhensis* is a narrow endemic of the Western Cape coast between St. Helena Bay and Darling and occurs on seasonally wet granitic flats. It is allied to *R. flava* in its single basal leaf and submembranous inner bracts and is distinguished mainly by the consistently large flowers of a deep, golden yellow or orange color quite different from the lemon yellow of *R. flava*.

### 28. *Romulea barkeriae* M.P. de Vos

J. S. African Bot., Suppl. 9: 106 (1972); Fl. S. Africa 7(2), fasc. 2: 28 (1983). — Type: *Barker s.n.*, South Africa, Western Cape, Vredenburg, Cape Columbine (holo-, NBG 273/67!).

Plants 12–20 cm high, stem subterranean or reaching 3 cm above ground; corm with a crescent-shaped basal ridge. Leaves 2–3, lower 1 basal, broadly 2-grooved, T-shaped in section, 1.5–2.5 mm diam.; outer bracts with hardly visible membranous margins, inner bracts membranous, sometimes with reddish veins. Flowers white with large black blotches edged in yellow in the throat, unscented, tepals oblanceolate, 18–28 mm long, outer tepals uniformly green on

the outside; filaments 5–6 mm long, anthers 5–6 mm long. Fruiting peduncles recurved, later erect. Flowering: July–Aug.

*Romulea barkeriae* was long known only from the type collection but recent collections have extended its range to Paternoster in the north to a short distance south of Saldanha Bay in the south, still a very narrow range. It is one of the few true edaphic endemic in the genus and is restricted to coastal limestone outcrops. Although evidently allied to *Romulea flava* and sharing with it a single basal leaf and submembranous inner bracts, *R. barkeriae* is distinctive in many features. The leaves have only two broad grooves resulting in a T-shaped cross section with a narrow upper surface and broad lower surface. This is unlike the leaf structure of any other species of *Romulea* and the white flowers with large, dark brown-black blotches outlined in yellow are also unique.

#### — Ser. MINUTIFLORAE

### 29. *Romulea minutiflora* Klatt

Abh. Naturf. Ges. Halle 15: 339 (1882); M.P. de Vos, J. S. African Bot., Suppl. 9: 146 (1972); Fl. S. Africa 7(2), fasc. 2: 34 (1983). — Type: *Drège 538*, South Africa, Western Cape, Worcester, Hex River Mts. (lecto-, S, designated by M.P. DE VOS, 1972).

Plants 6–20 cm high, stem subterranean; corm obliquely flattened with a spatulate basal ridge. Leaves several, basal, narrowly 4-grooved, 0.5–1.5 mm diam.; outer bracts with narrow, often brown-speckled membranous margins, inner bracts membranous or submembranous with brown-spotted margins. Flowers pale mauve with yellowish cup, tepals elliptic, 4–9 mm long; filaments 2–4 mm long, anthers 1.5–2 mm long. Fruiting peduncles curved, later erect. Flowering: July–Sep.

This diminutive-flowered species is widespread in the South African winter-rainfall region, extending from the Bokkeveld Mountains in the west to Grahamstown in the east. It is closely allied to *R. sinispinosensis* and the two share corms with a prominent, rather spade-shaped basal

ridge which is about as high on the corm. *Romulea minutiflora* is distinguished by its very small, pale mauve or pink flowers with tepals up to 9 mm long whereas those of *R. sinispinosensis* are white and the tepals 10-12 mm long. The inner bracts of *R. minutiflora* are also distinctive in having membranous margins with fairly large brown blotches rather than flecks.

### 30. *Romulea sinispinosensis* M.P. de Vos

J. S. African Bot., Suppl. 9: 147 (1972); Fl. S. Africa 7(2), fasc. 2: 35 (1983). — Type: *de Vos 2106*, South Africa, Western Cape, Vredendal, Doringbaai (holo-, NBG!).

Plants 12-20 cm high, stem subterranean; corm obliquely flattened with a spatulate basal ridge. Leaves several, basal, narrowly 4-grooved, c. 1 mm diam.; outer bracts with narrow membranous margins, inner bracts membranous or submembranous with brown-spotted margins. Flowers cream to white with yellowish green cup, tepals elliptic, 10-12 mm long; filaments 3-4 mm long, anthers 3-4 mm long. Fruiting peduncles curved, later erect. Flowering: Aug.

Originally known from a single collection from Doringbaai on the west coast of Western Cape Province south of Elandsbaai, *Romulea sinispinosensis* has more recently been collected east of Velddrift (sight record). It remains a poorly known species restricted to deep sands along the Western Cape coastal plain west of the Piketberg Mountains. *Romulea sinispinosensis* is a polyploid species with a diploid number of  $2n = c. 50$  whereas the related *R. minutiflora* has  $2n = 26$ .

### 31. *Romulea multisulcata* M.P. de Vos

J. S. African Bot., Suppl. 9: 139 (1972); Fl. S. Africa 7(2), fasc. 2: 34 (1983). — Type: *de Vos 2183*, South Africa, Northern Cape, between Vanrhyn's Pass and Nieuwoudtville (holo-, NBG!).

Plants 30-50 cm high, stem reaching 6-25 cm above ground; corm with a crescent-shaped basal ridge. Leaves 3-4, lowermost 2 basal, narrowly

6-8-grooved, 1-2 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide colorless or brownish membranous margins. Flowers yellow or white with yellow cup and lower part of the tepals, tepals obovate, 15-25 mm long; filaments 4-6 mm long, anthers 6-8. Fruiting peduncles widely spreading. Flowering: Aug.-Sep.

*Romulea multisulcata* was described from seasonal pools on the Bokkeveld Mountains near Nieuwoudtville in Northern Cape Province but is now known also from the foot of the nearby Gifberg-Matsikamma massif, in Western Cape Province, and from the coastal flats near Hondeklip Bay in central Namaqualand. The latter populations have white flowers with a yellow center, unlike the Bokkeveld plants, which are uniformly yellow. In this respect they approach *R. aquatica*, a closely allied species which shares with *R. multisulcata* both the aquatic habit and leaves with more than 4 longitudinal grooves. *Romulea multisulcata* is a more robust species with 2 basal leaves, larger flowers with the style 12-15 mm long and widely spreading fruiting peduncles while *R. aquatica* has a single basal leaf, flowers with the style 4-8 mm long and distinctive short erect fruiting peduncles.

ADDITIONAL SPECIMENS EXAMINED. — **SOUTH AFRICA. Northern Cape:** 3019 (Hondeklipbaai), *Le Roux 2643*, 15 km east of Hondeklipbaai, 17 Aug. 1980 (JONK). **Western Cape:** 3118 (Vanrhynsdorp), *Oliver 4968*, temporary pool on the flats below the Gifberg flats (DD), 15 July 1974 (MO, NBG); *Oliver 4996*, 31 Aug. 1974 (NBG); *Snijman 1052*, 20 Aug. 1986 (NBG); *Helme 1356*, 14 Aug. 1997 (NBG).

### 32. *Romulea aquatica* G.J. Lewis

J. S. African Bot. 4: 8 (1938); M.P. de Vos, J. S. African Bot., Suppl. 9: 141 (1972); Fl. S. Africa 7(2), fasc. 2: 34 (1983). — Type: *Barker 190*, South Africa, Western Cape, Elandsvlei north of Piketberg (holo-, NBG).

Plants 20-60 cm high, stem reaching 12-35 cm above ground; corm with a crescent-shaped basal ridge. Leaves 2-3, lower 1 basal, narrowly 5-8-

grooved, 0.8-1.5 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide colorless or brown-speckled membranous margins. Flowers white with yellow cup and lower parts of the tepals, lightly sweet-scented, tepals obovate, 16-20 mm long; filaments 2-3 mm long, anthers 3-5. Fruiting peduncles short, erect. Flowering: Aug.-Sep.

*Romulea aquatica* is restricted to seasonal pools on clay flats in the Swartland of Western Cape Province from Pools near Piketberg in the north to Hopefield in the south. In suitable pools the plants grow in their multitudes. *Romulea aquatica* is distinguished from the related *R. multisulcata* by the single basal leaf and smaller, scented flowers with a shallow cup, stamens and style 5-8 mm long and distinctive short, erect fruiting peduncles. The larger flowers of *R. multisulcata* have a deeper cup with stamens and style 10-15 mm long and longer, spreading fruiting peduncles.

— Ser. *STELLATA*

### 33. *Romulea stellata* M.P. de Vos

J. S. African Bot., Suppl. 9: 291 (1972); Fl. S. Africa 7(2), fasc. 2: 71 (1983). — Type: *de Vos 2171*, South Africa, Western Cape, Pakhuis Pass (holo-, NBG!).

Plants 3-5 cm high, stem subterranean; corm with a crescent-shaped basal ridge. Leaves 1 or 2, basal, narrowly 4-grooved, 0.5 mm diam.; outer bracts submembranous, inner bracts with narrow colorless membranous margins. Flowers hypocrateriform, violet or white with yellow throat, unscented, perianth tube cylindrical, 11-17 mm long, tepals elliptic, 7-11 mm long; filaments glabrous, 2-3.5 mm long, anthers 2-3 mm long. Fruiting peduncle short, suberect. Flowering: May-July.

The montane *Romulea stellata* grows in shallow, seasonally waterlogged sand on rocky, sandstone pavement in Western Cape Province from the Gifberg to the northern Cedarberg. It is a curious plant, taxonomically isolated in the genus and superficially resembling a species of

the related genus *Syringodea*. It is distinctive in its tiny flower, cylindrical perianth tube and one, or at most two, filiform leaves. Although allied by DE VOS with *R. syringodeoflora* in subgenus *Lomurea* on the basis of the similar perianth tube the two species differ markedly in their corms and their floral similarities must be convergent.

— Ser. *TORTUOSAE*

### 34. *Romulea macowanii* Baker

J. Bot. 5: 236 (1876); M.P. de Vos, J. S. African Bot., Suppl. 9: 165 (1972); Fl. S. Africa 7(2), fasc. 2: 48 (1983). — Type: *MacOwan 1547*, South Africa, Eastern Cape, Somerset East, Boschberg (lecto-, K!, designated by M.P. DE VOS, 1972; isolecto-, BM, BOL, G, GRA, P, PRE!).

Plants 20-40 cm, stem subterranean; corm with a crescent-shaped basal ridge. Leaves 3-6, basal, filiform, narrowly 4-grooved, 0.6-1 mm diam.; outer bracts submembranous below, inner bracts submembranous with greenish apices. Flowers tubular below, golden-yellow with the cup and often the lower half of the tepals orange, perianth tube 14-65 mm long, tepals elliptic, (10-)15-45 mm; filaments 5-10 mm, anthers 5-12 mm. Fruiting peduncles recurved. Flowering: mainly Jan.-May.

A species of montane grassland and stony plateaus, *Romulea macowanii* extends from Somerset East in the west to the high Drakensberg in eastern Lesotho. It is one of only three yellow-flowered species of *Romulea* that occur in the southern African summer-rainfall zone and is distinguished among all yellow-flowered species in the genus by its long, funnel-shaped perianth tube, 14-65 mm long.

### 35. *Romulea austinii* E. Phillips

Fl. Pl. Africa 3: pl. 90 (1932); M.P. de Vos, J. S. African Bot., Suppl. 9: 153 (1972); Fl. S. Africa 7(2), fasc. 2: 45 (1983). — Type: *Austin 2572*, South Africa, Western Cape, Laingsburg, Matjiesfontein (holo-, PRE!; iso-, BOL, K!).

Plants 6-20 cm high, stem subterranean; corm with a wide, crescent-shaped basal ridge. Leaves 3-6, basal, bifacial, narrowly 4-grooved beneath and channelled above, 0.5-1 mm diam.; outer bracts with narrow membranous margins, sometimes submembranous below, inner bracts with wide brown-speckled membranous margins. Flowers yellow, with or without brown blotches in the throat, honey-scented, tepals elliptic, 14-25 mm long; filaments 5-7 mm long, anthers 3-6 mm long. Fruiting peduncles curved, slightly flexuose. Flowering: May-July.

*Romulea austinii* grows on moist stony flats, with a range extending from the Hantamsberg at Calvinia in Northern Cape Province through the western and Little Karoo to the Uniondale District in Western Cape Province in the east. The species is recognized by the largely bifacial leaves with an adaxial channel extending for much of the length, wide basal ridge on the corm and submembranous inner bracts. *Romulea austinii* is allied to *R. tortuosa*, which also has bifacial leaves but in this species the basal ridge is vertical and often wider than the body of the corm, the leaves are usually flexuose and both outer and inner bracts are submembranous. Although there is no direct overlap in their range, *R. austinii* is easily confused with *R. montana*, which has similar yellow flowers and a corm with a rather broad, crescent-shaped ridge. *Romulea montana* is distinguished by its unifacial, terete leaves which have a pair of secondary veins in each rib, a stem which is sometimes exerted above the ground and outer bracts which are never submembranous in the lower part.

### 36. *Romulea tortuosa* (Licht. ex Roem. & Schult.) Baker

J. Linn. Soc. Bot. 16: 88 (1877); M.P. de Vos, J. S. African Bot., Suppl. 9: 154 (1972); Fl. S. Africa 7(2), fasc. 2: 45 (1983). — *Ixia tortuosa* Licht. ex Roem. & Schult., Syst. Veg. 1: 375 (1817). — Type: *Lichtenstein s.n.*, South Africa, Western Cape, without precise locality (holo-, B).

Plants mostly 3-6 cm high, stem subterranean; corm laterally compressed, with a wide fan-like

basal ridge. Leaves several, usually flexuose or twisted, bifacial, narrowly 4-grooved beneath and channelled almost throughout above, 0.5-1 mm diam.; outer and inner bracts membranous or submembranous, greenish at the tips. Flowers yellow with or without black marks or blotches in the throat, sweetly scented, tepals elliptic to oblanceolate, 10-40 mm long; filaments 3-10 mm long, anthers 3-10 mm long. Fruiting peduncles curved or coiled. Flowering: June-Sep. — Fig. 2C.

A particularly common plant in places, *Romulea tortuosa* is often seen in extensive colonies in open, stony and sandy ground flowering early in the season. Its sweetly fragrant flowers can often be smelled from some distance. The species is largely restricted to high-lying country above 1000 m along the edge of the interior plateau of the western half of South Africa. It is centred in the western Karoo along the Roggeveld Escarpment but occurs northwards to the Bokkeveld Escarpment and southwards through the Cold Bokkeveld to Matroosberg Station. Most recently an isolated colony has been discovered in the Breede River valley near Worcester. This locality is far below the usual elevation at which the species is encountered. The flowers in the Worcester colony are an unusual creamy color but the plants are otherwise typical. The species occurs also on the Kamiesberg in Namaqualand. In a curious coincidence DE VOS (1972) mistakenly located the collection *Salter 668* (BOL) made "22 miles NE of Middelpost on the Leliefontein road" at the settlement of Leliefontein on the Kamiesberg instead of on the Roggeveld Escarpment where it had actually been found. More recently, however, this disjunct distribution was confirmed when the species was indeed discovered to grow on the Kamiesberg near the village of Leliefontein.

DE VOS recognized three subspecies based on flower size and tepal shape and markings but these three entities are not geographically separated and are better not recognized formally. *Romulea tortuosa* is readily recognized by its several twisted leaves which are channelled to the tips, by the compressed corm with a broad crescent-shaped ridge wider than the body of the corm and by the largely membranous outer bracts. An unusual fea-

ture of the species seldom encountered elsewhere in the genus is the variation in style length. In common with most species of *Romulea* the style is usually relatively short, dividing opposite the anther apices, but in some populations it divides well above the anthers. The submembranous outer and inner bracts of series *Tortuosae* are particularly marked in *R. tortuosa*.

### 37. *Romulea sphaerocarpa* M.P. de Vos

J. S. African Bot., Suppl. 9: 161 (1972); Fl. S. Africa 7(2), fasc. 2: 46 (1983). — Type: *de Vos 2102*, South Africa, Western Cape, Sandvlei, 23 km from Matroosberg Station to Koo (holo-, NBG!).

Plants 15-30 cm high, stem subterranean; corm obliquely flattened with a fan-shaped basal ridge. Leaf 1(2), basal, sticky, narrowly 4-grooved, 1-2 mm diam.; outer bracts with narrow membranous margins, sticky, inner bracts submembranous with wide mostly colorless membranous margins. Flowers usually solitary, yellow with brown streaks in the orange cup, unscented, tepals elliptic, 15-25 mm long; filaments 5-7 mm long, anthers 6-8 mm long. Fruiting peduncles curved. Flowering: June.

*Romulea sphaerocarpa* is an early-flowering species found scattered in sandy pockets on sandstone slopes. Originally known from near the Hex River Pass more recent collections have extended its range somewhat although it remains a relatively local endemic of the highlands south of the Tanqua Basin from the Katbakkies Pass in the north to the Waboosberg in the south. Resembling *Romulea tortuosa* in its strongly flattened, fan-shaped corm, *R. sphaerocarpa* is distinguished by the solitary, sticky leaf usually covered by grains of sand and the less pronounced compression of the corm. Plants each produce a single flower.

ADDITIONAL SPECIMENS EXAMINED. — **SOUTH AFRICA. Western Cape:** **3219** (Wuppertal), Cold Bokkeveld, Katbakkies Pass (DC), *Manning 2253*, 6 June 2000 (NBG); **3220** (Montagu) Waboosberg, *Manning 2172*, Rooihoogte Pass, farm Sandvlei (CA), 13 June 1998 (NBG); *Manning 2173*, Waboosberg, summit of Ouberg Pass, 13 June 1998 (NBG).

ROMULEA subg. ROMULEA sect. 3. HIRSUTAE (Bég.) J.C. Manning & Goldblatt, **comb. et stat. nov.**

Subsect. *Hirsutae* (Bég.) M.P. de Vos, J. S. African Bot., Suppl. 9: 120 (1972). — “Stirps” *Hirsutae* Bég., Ann. Conserv. Jard. Bot. Genève 11-12: 159 (1908). — Type: *Rinorea hirsuta* (Steud. ex Klatt) Baker.

Corm symmetrical with a circular basal ridge; ridge edges fringed, consisting of fine parallel fibrils. Leaves usually without secondary bundles.

### 38. *Romulea gracillima* Baker

Handbk. Irideae: 103 (1892); M.P. de Vos, J. S. African Bot., Suppl. 9: 133 (1972); Fl. S. Africa 7(2), fasc. 2: 33 (1983). — Type: *Drège s.n.*, South Africa, Western Cape, Drakenstein Mts. (holo-, K!; iso-, BM, G, OXF, P!).

Plants 6-25 cm, stem subterranean or reaching 10 cm above ground; corm symmetrical, bell-shaped with a circular rim of fibrils. Leaves 2-5, basal and usually cauline, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts without visible membranous margins, inner bracts with wider colorless membranous margins. Flowers pale pink sometimes with red lines in the yellow cup, tepals elliptic, 12-18 mm long; filaments 3-5 mm long, anthers 2-4 mm long. Fruiting peduncles suberect. Flowering: Aug.-Sep.

*Romulea gracillima* occurs on sandstone slopes, from the Cape Peninsula to the Agulhas flats. It is readily recognized among the species of section *Hirsutae* by the small, pale pink flowers with tepals 12-18 mm long and 5-6 mm wide and lacking dark markings in the throat.

### 39. *Romulea hirsuta* (Steud. ex Klatt) Baker

J. Linn. Soc. Bot. 16: 89 (1877); M.P. de Vos, J. S. African Bot., Suppl. 9: 125 (1972); Fl. S. Africa 7(2), fasc. 2: 29 (1983). — *Trichonema hirsutum* Steud. ex Klatt, Linnaea 34: 665 (1865-66). — Type: *Ecklon 703*, South Africa, Western Cape, Cape Peninsula, Devil's Peak (neo-, S, designated by M.P. de Vos, 1972; isoneo-, B, G, Kl, M, P, PRE!, Z).

Plants 6-30 cm, stem subterranean or reaching 20 cm above ground; corm symmetrical, bell-shaped with a circular rim of fibrils. Leaves 2-6, basal and usually cauline, narrowly or widely 4-grooved, sometimes ciliate, 0.5-4 mm diam.; outer bracts without visible membranous margins, inner bracts with narrow or wider white or brown membranous margins. Flowers pink to red or coppery orange, often with dark marks around the yellow cup, unscented, tepals elliptic to oblanceolate, 15-35 mm long; filaments 4-8 mm long, anthers 3-7 mm long. Fruiting peduncles suberect or somewhat spreading. Flowering: Aug.-Sep.

A very attractive plant, *Romulea hirsuta* has a wide range in Western Cape Province from Clanwilliam in the north to the Agulhas Peninsula in the south. The species is most often found on granitic or sands slopes and flats but occasionally occurs on clay. A distinctive feature of many populations is the strongly angled or prominently winged peduncle. Populations from the granite hills between Darling and Saldanha are exceptional in having broad leaves with wide longitudinal grooves and often larger flowers than are usual for the species. Most populations of the species have deep pink to red flowers, usually with darker blotches in the throat but the coppery orange-flowered form which occurs along the mountains from Clanwilliam to Hermanus lacks dark markings and is separated with difficulty from the *R. triflora*, which has yellow flowers.

#### 40. *Romulea tortilis* Baker

Bull. Herb. Boissier, sér. 2, 4: 1003 (1904); M.P. de Vos, J. S. African Bot., Suppl. 9: 132 (1972); Fl. S. Africa 7(2), fasc. 2: 33 (1983). — Type: *Schlechter 4890*, South Africa, Western Cape, near Porterville (holo-, Z; iso-, B, G, GRA, KI, PRE!, SAM!).

Plants 6-12 cm, stem subterranean or reaching 3 cm above ground; corm symmetrical, bell-shaped with a circular rim of fibrils. Leaves 2-5, basal and usually cauline, tightly sinuous, narrowly 4-grooved, sometimes minutely ciliate, 0.5-1 mm diam.; outer bracts without visible

membranous margins, inner bracts with wider brown or brown-edged membranous margins. Flowers old-rose with dark red blotches around the yellow cup, tepals elliptic, 15-25 mm long; filaments 5-6 mm long, anthers 3.5-5 mm long; style sometimes multifid with more than 6 branches. Flowering: July-Sep.

*Romulea tortilis* is poorly known and is distinguished from *R. hirsuta* by its sinuous or twisted leaves. Restricted to Western Cape Province, South Africa, it has been recorded on sandstone slopes from Clanwilliam in the north to Piketberg in the south.

#### 41. *Romulea triflora* (Burm. f.) N.E. Br.

Kew Bull. 1929: 131 (1929); M.P. de Vos, J. S. African Bot., Suppl. 9: 122 (1972); Fl. S. Africa 7(2), fasc. 2: 32 (1983). — *Crocus triflorus* Burm. f., Prod. Pl. Cap.: 2 (1768). — Type: South Africa, without locality or collector (holo-, Herb. Burman).

Plants 10-30 cm, stem usually reaching 2-15 cm above ground, rarely subterranean; corms symmetrical, bell-shaped with a circular rim of fibrils. Leaves 2-6, basal and cauline, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts without visible membranous margins, inner bracts with wider colorless or brown-edged membranous margins. Flowers yellow or white with or without darker zones or markings around the yellow cup, tepals oblanceolate, 14-30 mm long; filaments 4-5 mm long, anthers 4-7 mm long. Fruiting peduncles suberect or somewhat spreading. Flowering: Aug.-Oct.

*Romulea triflora* is a species of low-lying sandy flats in the western half of Western Cape Province where it extends from near Citrusdal in the north to Stanford in the south. It is best known from damp flats on the southern Cape Peninsula but this appears to be an artifact of collecting. The species is very similar to *R. hirsuta* from which it is distinguished by its golden-yellow or rarely white flowers. *Romulea hirsuta* usually has deep red to pink flowers with a yellow cup.



#### 42. *Romulea sladenii* M.P. de Vos

J. S. African Bot., Suppl. 9: 135 (1972); Fl. S. Africa 7(2), fasc. 2: 33 (1983). — Type: *de Vos 2018*, South Africa, Western Cape, Matsikamma Mts. (holo-, NBG!).

Plants 7-30 cm, stem subterranean or reaching 20 cm above ground; corms symmetrical, bell-shaped with a wide circular rim of fibrils. Leaves 3-5, basal and cauline, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts without visible membranous margins, inner bracts with wider colorless or brown-edged membranous margins. Flowers white with a yellow cup, unscented, tepals elliptic, 15-25 mm long; filaments 5-7 mm long, anthers 4-6 mm long. Fruiting peduncles sharply spreading. Flowering: Aug.-Sep.

*Romulea sladenii* is restricted to the Gifberg and Matsikamma Mountains of Western Cape Province where it grows on rocky sandstone pavement and shallow soil. Another close relative of *Romulea hirsuta*, *R. sladenii* is distinguished from other members of the alliance by the broad, lacerated basal ridge of the corm and the white flowers with a cream to yellow cup. The sharply divergent fruiting peduncles and the pink to purple outside of the tepals distinguish the species from white-flowered forms of *R. triflora*. The species bears a close superficial resemblance to another Gifberg endemic, *R. toximontana* but the corms of the two are quite different, the latter having a crescent-shaped basal ridge typical of section *Ciliatae*.

#### 43. *Romulea discifera* J.C. Manning & Goldblatt, sp. nov.

*Plantae 10-15(-20) cm altae, cormo depresso-campulato 15-20 mm diam., foliis 3 ad 5, filiformibus in sectione transversali ovalibus 4-sulcatis, 1.2-2 mm diam., inflorescentiae bracteis exterioribus 15-28 mm longis, interioribus marginibus anguste membranaceis basem versus dilatatis, floribus flavis brunneonotatis prope basem tepalorum internorum, tubo perianthii infundibuliformi c. 5 mm longo, tepalis 25-35 × 6-10 mm, laxe patentibus, filamentis 5-6 mm longis, antheris erectis contiguis 6-7 mm longis.*

TYPUS. — *Goldblatt & Manning 11075*, South Africa, Northern Cape, Bokkeveld Plateau, north of Nieuwoudtville, west of the road to the waterfall, 27 July 1999 (holo-, NBG!; iso-, K!, MO!, PRE!).

Plants 10-15(-20) cm high, the stem usually extending shortly above the ground, or subterranean and hidden by the leaf sheaths, extending shortly to well above the ground in fruit. Corm symmetrical, depressed campanulate, 15-20 mm diam., 5-7 mm high, the tunics woody, brown, the lower margins forming a spreading ridge, c. 2.5 mm wide, splitting into fine parallel fibrils clustered into fascicles, the tunics drawn into prominent fibers 5-10 mm long above. Leaves 3-5, the lower (1 or) 2 basal, oval in section and narrowly or more widely 4-grooved, 6-15 cm long, 1.2-2 mm diam., glabrous or minutely ciliate, cauline leaves 1 or 2, similar but shorter. Inflorescence of (1-)2-3 solitary flowers on reddish branches up to 10 cm long; outer bracts green, often flushed purple, with obscure, narrow membranous margins, 15-28 mm long, inner bracts green with narrow membranous margins widening toward the base, 12-15 mm long. Flowers cup-shaped, bright yellow with a darker yellow cup, the inner tepals with a narrow dark median line and sometimes a diffuse dark zone in the throat, the outer tepals with a dark median blotch in the throat, the reverse darkly streaked with reddish, longitudinal bands, unscented, 30-40 mm long, perianth tube funnel-shaped, c. 5 mm long, tepals oblanceolate, 25-35 × 6-10 mm. Filaments inserted near the base of the tube, free, c. 5-6 mm long, densely hairy below; anthers parallel and contiguous, yellow, 6-7 mm long. Style dividing opposite the middle of the anthers, the branches 2-3 mm long, divided for half their length. Capsules oblong-ovoid, c. 8 mm long, on suberect peduncles, about one third as long as the bracts and concealed by them; seeds angular-prismatic c. 1.5 mm long. Flowering: mid to late July, possibly in early August in wetter seasons. — Fig. 3.

First collected by the seed merchants and plant enthusiasts Rod and Rachel SAUNDERS in the late winter of 1998, *Romulea discifera* is currently known from a few hectares of veld a short dis-



Fig. 3. — Morphology of *Romulea discifera*: full size, detail of the stamens and style branches, seed, and transverse section of the leaf much enlarged (Goldblatt & Manning 11075). Drawn by John MANNING.

tance north of Nieuwoudtville on the Bokkeveld Plateau in Northern Cape Province. Plants grow in a renosterveld community dominated by *Elytropappus rhinocerotis* among a dense ground cover of geophytic plants. The soil is a mixture of quartzitic sand and pale-colored clay and appears to be well drained although in particularly wet years may be waterlogged during part of the

growing season. Plants are locally common and grow in dense communities. When in bloom, flowers of *R. discifera* form a dense carpet between clumps of bush. Plants are often mixed with a second *Romulea* species, *R. hirta*, which has similar yellow, cup-shaped flowers but this species flowers later and there is hardly any overlap in their flowering.

*Romulea discifera* is typical of section *Hirsutae* in its symmetrical, campanulate corm with circular marginal ridge forming a fringe of parallel fibrils and in its leaves without secondary vascular bundles in the ribs. The depressed, almost lens-like shape of the corm is, however, unique. It may be most closely allied to *R. triflora* which also has yellow flowers, sometimes with dark blotches in the throat, and suberect fruiting pedicels. This species occurs to the south, from the Olifants River valley near Citrusdal southward to Stanford and flowers from late August to October.

PARATYPE. — **SOUTH AFRICA. Northern Cape:** **3119** (Calvinia) north of Nieuwoudtville, *Goldblatt & Manning 10692*, east of road to the waterfall (AC), 6 Aug. 1998, in fruit (K, MO, NBG, S).

ROMULEA subg. ROMULEA sect. 4. AGGREGATAE M.P. de Vos

J. S. African Bot., Suppl. 9: 170 (1972).

Corm with an oblique, crescent-shaped or circular basal ridge; ridge edges fringed, the fibrils converging in clusters with the roots emerging from each cluster. Leaves usually without secondary bundles, usually with vascular girders. Chromosome number  $2n = 24, 30$  or  $32$ .

— Ser. *AMOENAE*

#### 44. *Romulea sanguinalis* M.P. de Vos

J. S. African Bot., Suppl. 9: 191 (1972); Fl. S. Africa 7(2), fasc. 2: 39 (1983). — Type: *Burger s.n.*, South Africa, Western Cape, Bokkeveld Mts., Menzieskraal (holo-, NBG 30207!).

Plants 15-35 cm high, stem reaching 4-8 cm above ground; corm with a broad, crescent-shaped basal ridge, nearly bell-shaped. Leaves 3, basal and cauline, narrowly 4-grooved, c. 0.7 mm diam.; outer bracts with scarcely visible membranous margins, inner bracts with wide colorless or brown-speckled membranous margins. Flowers uniformly red, tepals oblanceolate-cuneate, 22-35 mm long; filaments c. 5 mm long, glabrous, anthers 8-10 mm long. Flowering: Aug.

Evidently occurring on stony flats, *Romulea sanguinalis* is restricted to a small portion of the Bokkeveld plateau north of Botterkloof Pass in Northern Cape Province. Known from a single collection, *R. sanguinalis* is readily recognized by the uniformly red flower and corm with a broad, crescent-shaped basal ridge. The glabrous filaments are unusual.

#### 45. *Romulea amoena* Schltr. ex Bég.

Bot. Jahrb. Syst 38: 334 (1907); M.P. de Vos, J. S. African Bot., Suppl. 9: 194 (1972); Fl. S. Africa 7(2), fasc. 2: 37 (1983). — Type: *Schlechter 10896*, South Africa, Northern Cape, Bokkeveld Mts., Papkuilsfontein, (holo-, G; iso-, BM, BOL!, GRA, K, MO!, P, PRE!, S, Z).

Plants 5-20 cm high, stem subterranean or reaching 10 cm above ground; corms symmetrical, bell-shaped with a circular ridge of fibril clusters. Leaves 3-4, usually all basal, narrowly 4-grooved, c. 1 mm diam.; outer bracts with narrow or scarcely visible membranous margins, inner bracts with wide colorless or brown-streaked membranous margins. Flowers deep rose-pink to red with black blotches and sometimes stripes in a cream or yellow cup, tepals elliptic to oblanceolate, 18-35 mm long; filaments 3-5 mm long, anthers 8-10 mm long. Flowering: Aug.-Sep.

*Romulea amoena* is a striking plant occurring in sandy soils, mostly in rocky places in the Bokkeveld Mts. south of Nieuwoudtville. The large, brilliant red flowers with a cream cup recall those of several other red-flowered species of the Bokkeveld escarpment. *Romulea amoena* is unique in section *Aggregatae* in its symmetrical, bell-shaped corm and all other members of the section have oblique corms with a crescent-shaped basal ridge. It is allied to *R. sanguinalis* in flower colour, leaf anatomy and cytology. Both *R. amoena* and *R. sanguinalis* are anomalous in the section in their lack of vascular girders in the leaves and in their chromosome number, suggesting that they be placed in a separate series of section *Aggregatae*.

— Ser. *AGGREGATAE*

**46. *Romulea fibrosa* M.P. de Vos**

J. S. African Bot., Suppl. 9: 183 (1972); Fl. S. Africa 7(2), fasc. 2: 41 (1983). — Type: *Fourcade 2831*, South Africa, Western Cape, Uniondale, Bloubosberg (lecto-, BOLI, designated by M.P. DE VOS, 1972; isolecto-, K!).

Plants to 35 cm high, stem reaching 8-32 cm above ground; corm with a crescent-shaped basal ridge of fibril clusters, often with fibrous neck and remains of tunics. Leaves 2-6, lowest 2 basal, narrowly 4-grooved, sometimes minutely ciliate, 0.5-1 mm diam.; outer bracts submembranous or greenish in the centre with membranous, usually rusty red margins, inner bracts with wide colorless or rusty red membranous margins. Flowers magenta to pink with diffuse purple markings around a yellow cup, tepals oblanceolate, 16-25 mm long; filaments 5-8 mm long, anthers 4-6 mm long. Fruiting peduncles suberect. Flowering: Oct.-Dec.

*Romulea fibrosa* occurs at relatively high elevations in sandstone-derived soils, extending from the Langeberg and Swartberg Mountains in Western Cape Province eastward to the Great Winterhoek Mountains of Eastern Cape Province. It is distinguished in section *Aggregatae* by the fibrous neck around the base of the stem, two basal leaves and pink or magenta flowers.

**47. *Romulea longipes* Schltr.**

J. Bot. 36: 377 (1898); M.P. de Vos, J. S. African Bot., Suppl. 9: 181 (1972); Fl. S. Africa 7(2), fasc. 2: 40 (1983). — Type: *Galpin 3023*, South Africa, Eastern Cape, Bathurst, Port Alfred (holo-, B; iso-, PRE!).

Plants 15-50 cm high, stem reaching 4-35 cm above the ground; corm with a crescent-shaped basal ridge of fibril clusters. Leaves 3-5, lowest 2 basal, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide, usually brownish membranous margins. Flowers cream to apricot with small markings around the yellow cup, tepals oblanceolate, 15-30 mm long; filaments 3-8 mm long; anthers 5-7 mm long. Fruiting peduncles erect or somewhat spreading. Flowering: July-Nov.

Restricted to Eastern Cape Province, South Africa, *Romulea longipes* occurs on sandy flats along the coast from Port Elizabeth to East London. It is closely allied to *R. fibrosa* and is distinguished from it by its cream to greenish or pale apricot flowers whereas those of *R. fibrosa* are magenta to pink.

**48. *Romulea dichotoma* (Thunb.) Baker**

J. Linn. Soc. Bot. 16: 89 (1877); M.P. de Vos, J. S. African Bot., Suppl. 9: 187 (1972); Fl. S. Africa 7(2), fasc. 2: 43 (1983). — *Gladiolus dichotoma* Thunb., Diss. Gladiolo no. 10 (1784). — Type: *Thunberg s.n.*, South Africa, Western Cape (holo-, *Herb. Thunberg 1019*, UPS!).

Plants to 35 cm high, stem reaching 4-35 cm above the ground, rarely shorter; corm with a crescent-shaped basal ridge of fibril clusters. Leaves 2-3, lowest 1 basal (rarely 2 but then lowermost shorter), narrowly or more widely 4-grooved, 1-2 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide brown-speckled membranous margins. Flowers pink with yellowish cup, tepals elliptic to oblanceolate, 16-32 mm long; filaments 4-8 mm long, anthers 4-7 mm long. Fruiting peduncles spreading. Flowering: Sep.-Oct.

*Romulea dichotoma* occurs on sandy flats and slopes, extending along the south coast of South Africa from Stanford in Western Cape Province in the west to Humansdorp in Eastern Cape Province in the east and is most common in the George-Knysna area. It is similar to *Romulea fibrosa* and is easily confused with it but that species usually has a fibrous neck around the stem base, always has two basal leaves and usually bears just one or two flowers per flowering stem. The leaves of *R. dichotoma* are unique in the alliance in having the lateral ribs more or less reduced and are thus I-shaped in section.

**49. *Romulea jugicola* M.P. de Vos**

J. S. African Bot., Suppl. 9: 185 (1972); Fl. S. Africa 7(2), fasc. 2: 41 (1983). — Type: *Acocks 20592*, South Africa, Western Cape, Little Karoo, 31 km SE of Dysseldorp (holo-, PRE!; iso-, K!, M).

Plants c. 30 cm, stem reaching 4-15 cm above ground, often ciliate on the angles; corm with a crescent-shaped basal ridge of fibril clusters. Leaves 2-4, lowest 1 basal, narrowly 4-grooved, conspicuously ciliate or hairy, c. 1 mm diam.; outer bracts with narrow membranous margins, inner bracts with brown-speckled membranous margins. Flowers orange with yellow cup, tepals elliptic to obovate, 18-30 mm long; filaments 6-7 mm long, anthers 4-6 mm long. Fruiting peduncles spreading. Flowering: Aug.

*Romulea jugicola* grows in stony and clay soils in renosterveld in southern Western Cape Province where it extends from Potberg in the south into the Little Karoo. It is closely related to *R. dichotoma* and is distinguished from it by the orange flowers and by its typical, 4-grooved leaves. In *R. dichotoma* the lateral ridges are more or less reduced and the leaves are thus I-shaped in transverse section. The leaves in both species are sometimes conspicuously ciliate, especially commonly in *R. jugicola*.

#### 50. *Romulea setifolia* N.E. Br.

Gard. Chron., sér. 3, 92: 467 (1932); M.P. de Vos, J. S. African Bot., Suppl. 9: 171 (1972); Fl. S. Africa 7(2), fasc. 2: 39 (1983). — Type: *Muir 4847*, South Africa, Western Cape, Mossel Bay, Gourits River (holo-, K!; iso-, PRE!).

Plants 5-25 cm, stem subterranean or reaching 12 cm above ground; corm with a crescent-shaped basal ridge of fibril clusters. Leaves 3-6, mostly basal, narrowly 4-grooved, 0.5-1.5 mm diam.; outer bracts with narrow membranous margins, inner bracts with white or rarely brown-edged membranous margins. Flowers yellow to apricot, sometimes with dark blotches in the throat, tepals 8-35 mm long, elliptic; filaments 4-6 mm long, anthers 2-7 mm long. Fruiting peduncles remaining suberect. Flowering: July-Sep.

*Romulea setifolia* has a wide range, extending from the Bokkeveld Mountains to Port Elizabeth, this encompassing a large portion of the southern African winter-rainfall zone. Plants seem to favor sandy or stony flats. The species is distinguished in

section *Aggregatae* by the stem always branching below the ground and the inner bracts usually with colorless margins, very narrow above and broader below. Flower size is strikingly variable in the species. Smaller flowers with tepals 8-15 mm long are most common but plants from the western Karoo may have flowers with tepals 30-35 mm long.

#### 51. *Romulea albomarginata* M.P. de Vos

J. S. African Bot., Suppl. 9: 177 (1972); Fl. S. Africa 7(2), fasc. 2: 43 (1983). — Type: *de Vos 1999*, South Africa, Western Cape, 37 km N of Gydo Pass (holo-, NBG!).

Plants 12-25 cm high, stem usually subterranean or sometimes reaching 5 cm above ground; corm with a crescent-shaped basal ridge of fibril clusters. Leaves 3-4, basal and cauline, narrowly 4-grooved, 1 mm diam.; outer bracts with narrow membranous margins, inner bracts with wide white membranous margins. Flowers white or pink to magenta with dark veins around the orange-yellow cup, tepals elliptic, 15-25 mm long; filaments 4-5 mm long, anthers 4-7 mm long. Fruiting peduncles spreading at first, later suberect. Flowering: Aug.-Oct.

Closely allied to *Romulea setifolia*, *R. albomarginata* is distinguished from that species by the white or pink flowers. The outer tepals are often darkly wine-colored on the outside, recalling the flowers of *R. saxatilis* from the same area, but may also be colored dull greyish green. Originally known only from sandstone flats in the Cold Bokkeveld in Western Cape Province, the species has recently been collected high on the Hex River Mountains some distance to the south.

ADDITIONAL SPECIMENS EXAMINED. — **SOUTH AFRICA. Western Cape: 3319** (Worcester), Hex River Mountains (BC-BD), *Oliver & Oliver 11322*, 19 Aug. 1999 (NBG).

#### ROMULEA subg. SPATALANTHUS (Sweet) Baker

Fl. Capensis 6: 37 (1896), as *Spathalanthus*. — *Spatalanthus* Sweet, Brit. Fl. Gard. 3: plate 300

(1829). — Type: *Spatalanthus speciosus* Sweet [= *Romulea monadelpha* (Sweet) Baker].

*Romulea* subg. *Lomurea* M.P. de Vos, J. S. African Bot., Suppl., 9: 285 (1972). — Type: *Romulea syringodeoflora* M.P. de Vos; **syn. nov.**

Corms rounded or pointed at the base and lacking a basal ridge, the tunics splitting along preformed lines of weakness into long straight or recurved basal teeth. Leaves rarely without secondary bundles, usually with vascular girders and rib marginal strands, with or without rib marginal bundles. Flowering stem always branching underground at anthesis.

ROMULEA subg. ROMULEA sect. 5. CRUCIATAE (M.P. de Vos) J.C. Manning & Goldblatt, **comb. et stat. nov.**

*Romulea* subsect. *Cruciatae* M.P. de Vos, J. S. African Bot., Suppl. 9: 259 (1972). — Type: *Romulea cruciata* (Jacq.) Baker (= *Ixia cruciata* Jacq.).

Corms pointed, without a basal ridge, tunics bearing straight basal teeth.

## 52. *Romulea cruciata* (Jacq.) Baker

J. Linn. Soc. Bot. 16: 89 (1877); M.P. de Vos, J. S. African Bot., Suppl. 9: 259 (1972); Fl. S. Africa 7(2), fasc. 2: 65 (1983). — *Ixia cruciata* Jacq., Ic. Pl. rar. 2: pl. 290 (1790). — Type: South Africa, Western Cape, without precise locality or collector (illustration in Ic. Pl. rar.: pl. 290).

Plants 15-40 cm high, stem subterranean; corm pointed at base with straight acuminate teeth. Leaves 2-8, basal, narrowly or widely 4-grooved, 1-4 mm diam.; outer bracts with narrow, hardly visible membranous margins, inner bracts submembranous with wide, usually brown-flecked membranous margins. Flowers magenta to lilac with dark blotches around the dark yellow cup, unscented, tepals elliptic to oblanceolate, 20-35 mm long; filaments 3-6 mm long, anthers 4-8 mm long. Fruiting peduncles remaining erect or slightly spreading. Flowering: July-Sep.

*Romulea cruciata* is most common in the southwestern Cape but extends from the

Bokkeveld Mountains in Northern Cape Province in the north as far east as the Gourits River in Western Cape Province. It is most often found on clay or granitic soils in renosterveld. The central species of section *Cruciatae*, *Romulea cruciata* is recognized by the magenta to lilac flowers with a deep yellow to orange cup and unmarked membranous margins to the inner bracts.

## 53. *Romulea eximia* M.P. de Vos

J. S. African Bot., Suppl. 9: 267 (1972); Fl. S. Africa 7(2), fasc. 2: 67 (1983). — Type: *de Vos 1687*, South Africa, Western Cape, near Darling (holo-, NBG!).

Plants 20-40 cm high, stem subterranean; corm pointed at base with straight acuminate teeth. Leaves 3-8, basal, narrowly 4-grooved, 1-1.5 mm diam.; outer bracts with narrow, hardly visible membranous margins, inner bracts submembranous with wide brownish membranous margins. Flowers pink to deep red with dark blotches around the greenish or pale yellow cup, unscented, tepals oblanceolate, 33-40 mm long; filaments 9-12 mm long, anthers 7-12 mm long. Fruiting peduncles remaining erect or slightly spreading. Flowering: Aug.-Sep. — Fig. 2E.

*Romulea eximia* occurs on sandy and granitic flats along the west coast of Western Cape Province, extending from Langebaan in the north to Melkbos Strand in the south. It is closely related to *R. cruciata* and is distinguished by the larger, bright red to pink flowers, usually with a cream or greenish cup with tepals 33-40 mm long. Typical *R. cruciata* has purple-magenta flowers with a deep yellow cup and smaller tepals rarely exceeding 30 mm in length. Anatomically *R. eximia* is distinctive in having a lignified epidermis and a continuous subepidermal layer of sclerenchyma across the leaf ribs. Both these features are lacking in *R. cruciata*. Populations from granite outcrops in the Vredenburg area are anomalous in having a broader leaf than usual for the species and a deep yellow cup which is more typical of *R. cruciata*.

**54. Romulea vlokii** M.P. de Vos

Fl. S. Africa 7(2), fasc. 2: 55 (1983). — Type: *Vlok 384*, South Africa, Eastern Cape, Kammanassie Mts., Buffelsberg, near Diepkloof (holo-, NBG!).

Plants 25-35 cm high, stem subterranean; corm pointed at base with straight acuminate teeth. Leaves 3-5, basal, narrowly 4-grooved; outer bracts with distinct brown-spotted membranous margins and conspicuous membranous apices, inner bracts with wide brown-spotted membranous margins. Flowers pink, apparently without dark blotches around the orange-yellow cup, tepals oblanceolate, 32-40 mm long; filaments 4-5 mm long, anthers c. 7 mm long. Flowering: July-Aug.

A narrow endemic of the Kammanassie Mountains of the eastern Little Karoo in Eastern Cape Province, South Africa, *Romulea vlokii* is closely allied to *R. cruciata* and distinguished from it by the bracts with brown-spotted membranous margins and tips and flowers without dark blotches in the throat. The bracts recall those of several species of section *Spatalanthus* and led DE VOS to ally it to species in this section despite the differences in the corm tunics.

**55. Romulea membranacea** M.P. de Vos

J. S. African Bot., Suppl. 9: 227 (1972); Fl. S. Africa 7(2), fasc. 2: 59 (1983). — Type: *Salter 3488*, South Africa, Northern Cape, Elandsfontein, 29 km NW of Middelpos (holo-, BOL!; iso-, BM, K!).

Plants 7-12 cm high, stem subterranean; corm pointed at base with straight acuminate teeth. Leaves 3-8, basal, narrowly 4-grooved; outer bracts submembranous with wide brown-speckled membranous margins, inner bracts with wide brown-speckled membranous margins. Flowers deep yellow with dark lines in the cup, unscented, tepals oblanceolate, 15-25 mm long; filaments 5-6 mm long, anthers 3-4 mm long. Fruiting peduncles strongly recurved. Flowering: July-Aug.

The rarely seen *Romulea membranacea* is known from just four collections in the western

Karoo. The type is from near Middelpos but more recent collections south of Nieuwoudtville on the road to Botterkloof near Lokenberg significantly expand the range of the species. Another population at the foot of the Komsberg Pass near Sutherland, for which there is only a sight record requiring confirmation, probably also represents this species. *Romulea membranacea* grows in stony ground in shallow sandy soil. It is distinguished in section *Cruciatae* by its yellow flowers and by the outer bracts with broad, brown-speckled membranous margins. The latter character, along with the curved fruiting peduncles, led DE VOS to include the species in series *Atrandrae* despite the differences in the corm but both characters also occur elsewhere in the genus.

ADDITIONAL SPECIMENS EXAMINED. — **SOUTH AFRICA. Northern Cape: 3119** (Calvinia) road from Nieuwoudtville to Botterkloof Pass, at foothills of Poort se Koppe (AC), *van Wyk 1450*, 12 Aug. 1983 (NBG); drift past Lokenburg turnoff on Nieuwoudtville-Botterkloof road, *Manning 2182*, 26 July 1998 (NBG); farm Menzieskraal, south of Lokenburg, *Goldblatt & Manning 10938*, 4 Aug. 1998 (MO, NBG).

— Ser. *TUBIFORMES*

**56. Romulea hantamensis** (Diels) Goldblatt

Fl. Pl. Africa 41: pl. 1613 (1970); M.P. de Vos, J. S. African Bot., Suppl. 9: 289 (1972); Fl. S. Africa 7(2), fasc. 2: 71 (1983). — *Lapeirousia hantamensis* Diels, Bot. Jahrb. Syst. 44: 116 (1910). — Type: *Diels 732*, South Africa, Northern Cape, Calvinia, Hantamsberg (holo-, B!).

Plants 7-15 cm high, stem subterranean; corm pointed at base with straight acuminate teeth. Leaves 3-10, basal, narrowly 4-grooved; outer bracts with narrow membranous margins, inner bracts with wider white or brown-speckled membranous margins. Flowers hypocrateriform, magenta with purple veining, unscented, perianth tube cylindrical, 35-70 mm long, tepals elliptic, 10-14 mm long; filaments 3 mm long, glabrous, anthers 3-5 mm long. Fruiting peduncles suberect. Flowering: Aug.-Sep.

*Romulea hantamensis* is restricted to the summit plateau of the Hantamsberg at Calvinia in the western karoo of Northern Cape Province where it grows on damp, rocky dolerite flats in heavy red clay. It is among the more remarkable species in the genus, with its unusually marked, magenta-purple, hypocrateriform flowers with an elongate, cylindrical perianth tube. It is anomalous in section *Cruciatae* in its chromosome number  $2n = 30$  but has the corm tunics with down-pointed teeth typical of the group. The resemblance to *R. syringodeoflora*, which also has flowers with a cylindrical tube is evidently convergent, for that species has corms with recurved teeth typical of section *Spatalanthus*.

ROMULEA subg. ROMULEA sect. 6. SPATALANTHUS

*Romulea* sect. *Roseae* Bég., Malpighia 23: 60 (1909); M.P. de Vos, J. S. African Bot., Suppl. 9: 202 (1972). — Type: *Romulea rosea* (L.) Eckl.; **syn. nov.**  
*Romulea* sect. *Hirtae* Bég., Annuaire Conserv. Jard. Bot. Genève 11-12: 159 (1908); M.P. de Vos, J. S. African Bot., Suppl. 9: 269 (1972). — Type: *Romulea hirta* Schltr.; **syn. nov.**

Corms rounded, without a basal ridge, tunics with recurved basal teeth. Leaves rarely without secondary bundles, usually with vascular girders, rib marginal strands and rib marginal bundles.

— Ser. *ROSEAE*

**57. *Romulea rosea* (L.) Eckl.**

Topogr. Verz.: 19 (1927); M.P. de Vos, J. S. African Bot., Suppl. 9: 246 (1972); Fl. S. Africa 7(2), fasc. 2: 62 (1983). — *Ixia rosea* L., Syst. Nat. 75 (1766). — Type: Illustration in MILLER, Figures of Plants 160, pl. 240 (1760).

Plants 15-60 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 3-6, basal, narrowly 4-grooved, 0.5-2 mm diam.; outer bracts with very narrow membranous margins, inner bracts with wide brownish membranous margins. Flowers pink to magenta or white, often with a purplish zone

around the yellow cup, occasionally sweetly scented, tepals elliptic to oblanceolate, 10-38 mm long; filaments 4-6 mm long, anthers 3-10 mm long. Fruiting peduncles curved at first, later erect. Flowering: July-Oct.

Common and highly variable, *Romulea rosea* occurs in a variety of habitats, often on stony clay flats and slopes throughout the Cape Region from the Bokkeveld Mts. to Port Elizabeth. It is recognized in the section by the purple-magenta flowers with a pale cup and usually numerous leaves. The species is easily confused with *R. obscura* which has more or less yellow tinges to the flowers and strongly diverging, almost horizontal fruiting peduncles. DE VOS recognized five varieties of which the small-flowered plant with pale mauve flowers and a cream cup that occurs in trampled places and on roadsides seems most common. This is var. *australis* (Ewart) M.P. de Vos and is found frequently growing alongside individuals with typical, large flowers growing in undisturbed ground.

**58. *Romulea lilacina* J.C. Manning & Goldblatt, sp. nov.**

*Plantae 2-3 cm altae, caule subterraneo, cormo ovoideo 5-7 mm diam. asymmetrico, folio unico filiformi viscoso, c. 0.5 mm diam., inflorescentia ex flore solitario pallide lilicino atrovirescente constante, tubo perianthii 5-6 mm longo, tepalis ellipticis 16-17 × 5-7 mm, filamentis 8-9 mm longis in duabus tertiis partibus infernis pilosis, antheris contiguus 3.5-4 mm longis.*

TYPUS — Manning 2252, South Africa, Western Cape, Cold Bokkeveld, Zeekoegat, west bank of Riet River at foot of Katbakkies Pass, deep sand in open restio veld, 5 June 2000 (holo-, NBG!; iso-, PRE!).

Plants 2-3 cm high, the stem subterranean and the flowers borne at ground level. Corm ovoid, asymmetric, rounded at the base with curved acuminate teeth, 5-7 mm diam. Leaf 1, basal, spreading, filiform, narrowly 4-grooved, flushed maroon, sticky, c. 0.5 mm diam. Inflorescence of 1 solitary flower; outer bracts flushed maroon, with narrow membranous margins, sticky, 10 mm long, inner bracts submembranous, lightly flushed maroon in the narrow center with wide



colorless membranous margins, sticky, 11 mm long. Flowers cup-shaped, pale lilac with darker veins, especially in the cup, yellow at the base of the cup, the outer tepals streaked with purple on the reverse, unscented, perianth tube funnel-shaped, 5-6 mm long, tepals elliptic, 16-17 × 5-7 mm. Filaments inserted near the base of the tube, free, 8-9 mm long, densely hairy in the lower two thirds, lilac; anthers parallel and contiguous, 3.5-4 mm long, lilac. Style dividing between halfway and opposite the upper third of the anthers, the branches c. 1 mm long, divided for half their length. Fruiting peduncles recurved. Capsules and seeds unknown. Flowering: May-June. — Fig. 4.

Known from a single extended population at the foot of the Katbakkies Pass in the Cold Bokkeveld of Western Cape Province, South Africa, *Romulea lilacina* is an early flowering species restricted to open washes in deep sandy soils where the plants grow scattered between clumps of Restionaceae. It was first collected by Mary STOBIE, wife of the Director of the Observatory in Cape Town, in June 2000. The diminutive plants are characterized by the single, sticky maroon leaf and sticky bracts, which all become covered with adhering sand particles. The pale lilac flowers lack a distinct yellow cup and have unusually long filaments that are conspicuously hairy for most of their length. The flowers are borne at ground level on short peduncles that curve over immediately after flowering to bury the developing fruit in the sand. Another early-flowering, solitary-leaved species, *R. sphaerocarpa*, also has sticky leaves and bracts.

*Romulea lilacina* resembles *R. cedarbergensis* in its delicate habit and small, solitary flowers in which the filaments are distinctly longer than the anthers. It is distinguished from the later-flowering *R. cedarbergensis* by its solitary, sticky leaf, uniformly pale lilac flowers which lack a well-defined yellow cup and lilac stamens which have the filaments 8-9 mm long. In *R. cedarbergensis* the leaves are usually two and not sticky, the flowers are pale pink with the outer much darker on the reverse and with a well-defined yellow cup, and the stamens are pale yellow with the filaments 5-6 mm long. Anatomically the leaves of

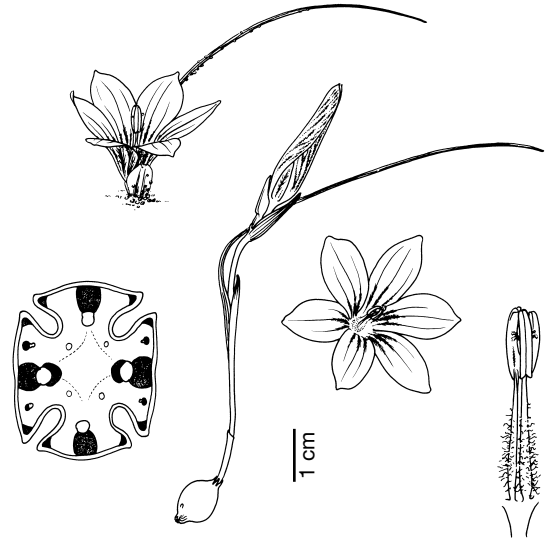


Fig. 4. — Morphology of *Romulea lilacina*: detail of the stamens and style branches and transverse section of the leaf much enlarged (Manning 2252). Drawn by John MANNING.

*R. lilacina* are intermediate between those of *R. rosea* and *R. cedarbergensis*, with secondary bundles only in the lateral ribs.

#### 59. *Romulea cedarbergensis* M.P. de Vos

J. S. African Bot., Suppl. 9: 245 (1972); Fl. S. Africa 7(2), fasc. 2: 62 (1983). — Type: *Uys sub de Vos 2030*, South Africa, Western Cape, Cedarberg Mts., Wolfsberg (holo-, NBG!).

Plants 3-15 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves (1)2 or 3, basal, filiform, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts submembranous, often purplish with narrow colorless membranous margins, inner bracts submembranous with wide brown-speckled membranous margins. Flowers 1(-2), white to pale pink with a yellow cup, tepals elliptic, 7-16 mm long; filaments 4-6 mm long, anthers 2-3.5 mm long. Fruiting peduncles suberect. Flowering: July-Sep.

A slender, delicate species, *Romulea cedarbergensis* favours shallow, wet sandy soil on sandstone pavement, and is restricted to the

Cedarberg of Western Cape Province. It has only two or three filiform leaves and small flowers with tepals 7-16 mm long. The leaves are the most reduced in the series in their anatomy, lacking secondary veins in the ribs and with only vestigial sclerenchyma strands along the rib margins.

### 60. *Romulea obscura* Klatt

Abh. Naturf. Ges. Halle 15: 399 (1882); M.P. de Vos, J. S. African Bot., Suppl. 9: 231 (1972); Fl. S. Africa 7(2), fasc. 2: 59 (1983). — Type: *Drège 4041*, South Africa, Western Cape (lecto-, S, designated by M.P. DE VOS, 1972; isolecto-, BM).

Plants 10-20 high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 3-6, basal or some cauline, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts with very narrow membranous margins, inner bracts with wide colorless or brownish margins. Flowers yellow or apricot to red, often with dark blotches around the greenish to yellow cup, unscented, tepals elliptic to oblanceolate, 10-40 mm long; filaments 3-8 mm long, anthers 3-9 mm long. Fruiting peduncles widely spreading from the base. Flowering: Aug.-Oct.

*Romulea obscura* occurs on sandy flats in Western Cape Province, extending from Clanwilliam in the north to Cape Agulhas in the south. It is very closely related to *Romulea rosea* and is distinguished by the fruiting peduncles that diverge sharply and spread horizontally and by the presence of yellow pigmentation in the flowers. The yellow- or apricot-flowered forms are easily distinguished from the typical purple-magenta of *R. rosea* but in the absence of fruiting material it is difficult, if not impossible to tell some color variants of the two apart. The two species differ in chromosome numbers, *R. rosea* having  $2n = 18$  while *R. obscura* has  $2n = 22$ .

### 61. *Romulea monticola* M.P. de Vos

J. S. African Bot., Suppl. 9: 241 (1972); Fl. S. Africa 7(2), fasc. 2: 60 (1983). — Type: *de Vos 1924*, South Africa, Western Cape, top of Vanrhyn's Pass (holo-, NBG!).

Plants 10-25 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 3-6, basal, narrowly 4-grooved, c. 1 mm diam.; outer bracts submembranous, often purplish with narrow brownish membranous margins, inner bracts with wide brown membranous margins. Flowers yellow with darker veins in the throat, unscented, tepals elliptic, 18-27 mm long; filaments 4-5 mm long, anthers 3-5 mm long. Fruiting peduncles suberect or curved. Flowering: June-Sep.

*Romulea monticola* grows in sandy loam in fynbos on the Bokkeveld Mts. and Gifberg. It resembles yellow-flowered forms of *R. obscura* but is distinguished by the fruiting pedicels which remain erect or are only slightly curved. In addition the stamens in *R. monticola* are relatively shorter than in *R. obscura* and are included in the floral cup. It is also somewhat similar to narrow-leaved forms of *R. luteoflora*, but in this species the green central portion of the bracts is much more distinct and the fruiting peduncles coil characteristically.

### 62. *Romulea hirta* Schltr.

Bot. Jahrb. Syst. 27: 91 (1900); M.P. de Vos, J. S. African Bot., Suppl. 9: 269 (1972); Fl. S. Africa 7(2), fasc. 2: 49 (1983). — Type: *Schlechter 8766*, South Africa, Western Cape, Koudeberg, Wuppertal (holo-, B; iso-, BM, K!, P!, S, Z).

Plants 5-30 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 3-6, basal, suberect or curved, 4-winged, H-shaped in section with two broad lateral grooves, the wings sometimes ciliate or crisped, 2-5 mm wide; outer bracts with narrow usually brown-speckled membranous margins, inner bracts with brownish membranous margins. Flowers pale yellow, sometimes with obscure chestnut blotches at the edge of the cup, unscented, tepals elliptic, 12-25 mm long; filaments 5-6 mm long, anthers 3-5 mm long. Fruiting peduncles recurved or suberect. Flowering: July-Sep.

*Romulea hirta* extends from the Bokkeveld Mts. and western Karoo of Northern Cape

Province, South Africa, to Wuppertal in the northern Cedarberg of Western Cape Province. Although the species is mostly found in damp sand and light clay, often along streams, populations from the western karoo occur on stony doleritic clay. *Romulea hirta* appears to comprise two series of populations. The typical form comprises plants with fairly slender leaves which flower in August and September and produce suberect fruiting peduncles. Plants flowering in July on the dolerite flats at Calvinia are much smaller, have short leaves with the marginal wings lightly crisped, and the fruiting peduncles are distinctly curved. There are, however, intermediate populations, for example, in the Nieuwoudtville Wildflower Reserve, that seem to link these plants to the typical slender form and we prefer not to recognize the variant populations as taxonomically distinct.

Highly distinctive in its leaf morphology, *Romulea hirta* is one of two species in the genus in which the leaf margins are broadly winged and the leaf is thus H-shaped in cross section. It and *R. tetragona*, which has a remarkably similar leaf, were treated as immediately related by DE VOS (1969), who placed them together in subsection *Hirtae*. The two differ markedly, however, in corm and bracts. *Romulea hirta* has rounded corms and narrow membranous margins to the bracts while *R. tetragona* has ridged corms and wide membranous margins to the bracts. These differences seem to us more significant than the leaf similarity and we place them in separate subgenera.

— Ser. *ATRANDRAE*

### 63. *Romulea atrandra* G.J. Lewis

Fl. Pl. Africa 14: pl. 544 (1934); M.P. de Vos, J. S. African Bot., Suppl. 9: 212 (1972); Fl. S. Africa 7(2), fasc. 2: 53 (1983). — Type: *Lewis s.n.*, South Africa, Western Cape, Laingsburg, Tweedside (holo-, Nat. Bot. Gard. 2703/32 in BOL!; iso-, PRE).

Plants 10-40 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 4-10, basal, narrow or somewhat swollen, narrowly or widely 4-grooved, rarely

minutely ciliate, 1-4 mm diam.; outer bracts with brown-streaked membranous margins and prominent membranous tip, inner bracts with wide brown-streaked membranous margins. Flowers magenta to pale pink or white with dark veins and dark blotches around the yellow cup which is often longitudinally veined, unscented, tepals obovate, 18-30 mm long; filaments 4-8 mm long, anthers 5-10 mm long. Fruiting peduncles recurved and later coiled. Flowering: July-Oct.

Widespread and variable in flower size and markings, *Romulea atrandra* extends from the Hantamsberg at Calvinia in Northern Cape Province through the Roggeveld Escarpment and Cold Bokkeveld in the west to Hogsback in Eastern Cape Province. Plants grow in stony clay soils, most often in dolerite or shale. Roggeveld populations of *R. atrandra* have particularly large and attractive, dark pink flowers with a darkly streaked cup. Plants from the southern Cape can be confused with *R. rosea* but this species has suberect fruiting peduncles.

*Romulea atrandra* appears to be the central species in series *Atrandrae*. This series is best developed on the Roggeveld Plateau, where it is represented by a cluster of closely related, narrowly endemic segregate species of *R. atrandra*. Differences between them are small, and mostly concern the color and markings of the flowers.

### 64. *Romulea multifida* M.P. de Vos

Ann. Univ. Stellenbosch, 28A, 3: 71 (1952); J. S. African Bot., Suppl. 9: 221 (1972); Fl. S. Africa 7(2), fasc. 2: 58 (1983). — Type: *Joubert s.n.*, South Africa, Northern Cape, plateau west of Sutherland (holo-, NBG 27158!).

Plants 10-20 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 2-3, basal, narrowly 4-grooved, 0.5-1 mm diam.; outer bracts submembranous with wide brownish membranous margins and apices, inner bracts with wide membranous margins brownish above. Flowers magenta with a narrow blue band and dark blotches around the yellow cup, tepals obovate-cuneate, 14-20 mm long; fila-

ments 5-6 mm long, anthers 3-5 mm long. Fruiting peduncles recurved and later coiled. Flowering: Aug.

This species is poorly collected and is known from three gatherings on the Roggeveld Escarpment south of Sutherland. It grows on damp clay flats. Although closely allied to *Romulea komsbergensis* in particular, *R. multifida* is immediately distinguished by the twice-divided style branches and the yellow floral cup without a brown base. The stamens are also somewhat distinctive as the filaments diverge from the base and the anthers are tightly coiled inward. Populations are evidently sympatric with *R. komsbergensis*.

#### 65. *Romulea komsbergensis* M.P. de Vos

Ann. Univ. Stellenbosch, 28A, 3: 69 (1952); J. S. African Bot., Suppl. 9: 219 (1972); Fl. S. Africa 7(2), fasc. 2: 56 (1983). — Type: *de Vos 1582*, South Africa, Northern Cape, Sutherland, north of Komsberg Pass (holo-, NBG!).

Plants 12-30 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 5-8, basal, narrowly 4-grooved, c. 1 mm diam.; outer bracts submembranous below with wide brownish membranous margins and apex, inner bracts with wide brownish membranous margins. Flowers magenta with a narrow blue band around the yellow cup which is brown at the base, unscented, tepals obovate-cuneate, 15-28 mm long; filaments 4-5 mm long, anthers 3-5 mm long, pollen brown or rust-colored or rarely yellow. Fruiting peduncles recurved and later coiled. Flowering: Aug.-Sep. — Fig. 2H.

*Romulea komsbergensis* is restricted to the Roggeveld Escarpment near Sutherland. Plants grow on seasonally inundated clay flats and rocky pavement or along watercourses. Closely allied to *Romulea atrandra*, *R. komsbergensis* is distinguished by the brown base of the floral cup, bracts with very broad, membranous margins and brown or rust-red (rarely yellow), slightly coiled anthers. *Romulea komsbergensis* was until recently known only from the area immediately north of

Komsberg Pass, a short distance south of Sutherland. Here plants have deep pink flowers with a pale cup and each tepal is marked with a dark central band outlined with a violet zone on the outer margin. The violet anthers contain reddish brown pollen and the style divides at the apex of the filament column. Populations recently collected some 60 km north of Sutherland along the escarpment west of Middelpoos appear to be the same species but are readily distinguished by an elongate style that divides c. 5 mm beyond the anther apices. In other respects the flowers seem identical in both color of the perianth and the anthers and pollen. The significance of the different style lengths in the northern and southern populations of *R. komsbergensis* is uncertain, although it is at least clear that self-pollination cannot readily occur in long-styled plants but is possible in the short-styled plants. Intraspecific variation in style length is also known in *R. tortuosa* where populations from the south of the range of the species have the style dividing below the anther apices whereas those from the Bokkeveld Plateau to the north sometimes have the style dividing c. 3 mm beyond the anther apices (DE VOS 1972).

ADDITIONAL SPECIMENS EXAMINED. — **SOUTH AFRICA. Northern Cape:** 3119 (Calvinia) Roggeveld Escarpment west of Middelpoos, Rooiwal road, in waterlogged meadow (DD), *Goldblatt & Manning 10301* (MO, NBG).

#### 66. *Romulea hallii* M.P. de Vos

J. S. African Bot., Suppl. 9: 217 (1972); Fl. S. Africa 7(2), fasc. 2: 56 (1983). — Type: *Hall 3176*, South Africa, Western Cape, Sutherland, top of Verlate Kloof (holo-, NBG!).

Plants 8-13 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 3-5, spreading, somewhat swollen, widely 4-grooved, 2-3 mm diam.; outer bracts with a triangular green lower half and wide brown-speckled membranous margins and apices, inner bracts with wide brown-speckled membranous margins. Flowers pale lilac-blue with violet and black blotches around the yellow cup, unscented, tepals

obovate-cuneate, 15-22 mm long; filaments 5-6 mm long, anthers 4-5 mm long. Fruiting peduncles strongly recurved or later flexuose. Flowering: May-July.

*Romulea hallii* is known from a small area at the top of Verlate Kloof Pass at the southwestern edge of the Roggeveld Escarpment in Western Cape Province, South Africa. It grows on seasonally moist clay flats and is among the earliest species of the southern African winter-rainfall zone to come into flower. The species is readily recognized by the lilac or wistaria blue flowers with a yellow cup and the relatively wide membranous margins of the bracts.

**67. *Romulea luteoflora*** (M.P. de Vos) M.P. de Vos

J. S. African Bot., Suppl. 9: 210 (1972); Fl. S. Africa 7(2), fasc. 2: 55 (1983). — *Romulea atrandra* var. *luteoflora* M.P. de Vos, Fl. Pl. Africa 29: pl. 1135 (1952). — Type: *de Vos 1570*, South Africa, Western Cape, Ceres, top of Theronsberg Pass (holo-, NBG!).

Plants 8-15 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 2-8, basal, narrowly or widely 4-grooved, 1-2 mm diam.; outer bracts with narrow, usually brown-streaked membranous margins and prominent membranous tip, inner bracts with wide colorless or brown-speckled membranous margins. Flowers yellow with darker yellow cup, sometimes with dark lines or blotches around the cup, unscented, tepals obovate, 18-35 mm long; filaments 4-7 mm long, anthers (4-)6-9 mm long. Fruiting peduncles recurved and later coiled. Flowering: July-Sep.

*Romulea luteoflora* occurs on loamy sands in the Kamiesberg in Namaqualand in Northern Cape Province, the Western Cape mountains from the Cedarberg and western Karoo to the Langeberg at Riversdale, and in the high Drakensberg of Lesotho. Plants from the Riversdale and Bredasdorp area are unusually slender, with more erect, filiform leaves than are typical of the species. Although closely related to *Romulea atrandra*, *R. luteoflora* differs from that

species in its yellow flowers and chromosome number of  $2n = 20$ . *Romulea atrandra* has magenta flowers and  $2n = 22$ . Hybrids between the two species with white or pale lilac flowers are known from the Roggeveld Escarpment. *Romulea luteoflora* can also be confused with *R. monticola* but in that species the central green portion of the bracts is less pronounced, the fruiting peduncles do not coil up, and the leaves lack secondary veins associated with the sclerenchyma strands along the margins of the grooves.

**68. *Romulea diversiformis*** M.P. de Vos

Ann. Univ. Stellenbosch 28A, 3: 63 (1952); J. S. African Bot., Suppl. 9: 225 (1972); Fl. S. Africa 7(2), fasc. 2: 58 (1983). — Type: *de Vos 1581*, South Africa, Northern Cape, Sutherland, Damslaagte (holo-, NBG!).

Plants 8-20 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 6-10, basal, narrowly 4-grooved; outer bracts with wide white membranous margins and apices, inner bracts with wide membranous margins. Flowers yellow, unscented, tepals obovate, dimorphic, the outer broader, 18-28 mm long; filaments 4.5-6 mm long, anthers 5-7.5 mm long. Fruiting peduncles bent. Flowering: Aug-Sep.

Recognized in series *Atrandrae* by its unmarked golden-yellow flowers with the inner tepals distinctly broader than the outer, *Romulea diversiformis* grows in moist or waterlogged dolerite and clay in the western karoo of South Africa. Unlike other members of the series, the peduncles do not coil in fruit. The species is one of few in the genus in which the style exceeds the stamens by several millimetres. Although previously recorded only on the Roggeveld and near Matjiesfontein, *R. diversiformis* has now been found on the Hantamsberg at Calvinia, a considerable distance to the north.

ADDITIONAL SPECIMENS EXAMINED. — **SOUTH AFRICA. Northern Cape: 3119** (Calvinia) Hantamsberg Plateau, in shallow pool (BD), 11 Oct. 1995, *Goldblatt & Manning 10354* (MO, NBG).

**69. *Romulea malaniae* M.P. de Vos**

J. S. African Bot., Suppl. 9: 223 (1972); Fl. S. Africa 7(2), fasc. 2: 58 (1983). — Type: *Malan s.n.*, South Africa, Western Cape, Sandvlei, 23 km S of Matroosberg Station (holo-, NBG 30312!).

Plants 12-25 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 1-3(-5), basal, narrowly 4-grooved; outer bracts submembranous or green in the centre in the upper half with pale membranous margins, inner bracts with wide membranous margins. Flowers on geniculate peduncles, pale yellow, unscented, tepals oblanceolate, 8-20 mm long; filaments 4-5 mm long, anthers 3-4 mm long. Fruiting peduncles sharply recurved and later coiled. Flowering: Aug.

A rather odd-looking and unattractive plant, *Romulea malaniae* has pale yellow flowers with a characteristic kink at the top of the peduncle. The species is also distinctive in the submembranous inner bracts with very broad membranous margins. It occurs on sandstone outcrops in the Waboomsberg between Matroosberg Station and Koo in Western Cape Province.

— Ser. *SPATALANTHUS*

**70. *Romulea viridibracteata* M.P. de Vos**

J. S. African Bot., Suppl. 9: 247 (1972); Fl. S. Africa 7(2), 2: 68 (1983). — Type: *Salter 3652*, South Africa, Western Cape, Pakhuis Pass (holo-, BOL!; iso-, BM, K!).

Plants 10-30 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 3-5, basal, filiform, narrowly 4-grooved, 1-2 mm diam.; outer bracts usually keeled above, with narrow, often brown-dotted membranous margins, inner bracts 2-keeled with colorless or brown-dotted membranous margins. Flowers yellow with dark brown markings at the edge of the cup, tepals obovate, 20-35 mm long; filaments 4-5 mm long, anthers 6-9 mm long. Fruiting peduncles at first spreading, later suberect. Flowering: Aug.-Sep.

*Romulea viridibracteata* occurs on sandstone slopes in the mountains of Western Cape Province, South Africa. Although there is a single early record from Nieuwoudtville all subsequent collections have been made on the Pakhuis Pass above Clanwilliam. The only yellow-flowered species of series *Spatalanthus*, *R. viridibracteata* appears to be most closely allied to the red-flowered *R. sabulosa*, with which it shares fairly narrow leaves.

**71. *Romulea subfistulosa* M.P. de Vos**

Ann. Univ. Stellenbosch 28A, 3: 66 (1952); J. S. African Bot., Suppl. 9: 275 (1972); Fl. S. Africa 7(2), fasc. 2: 67 (1983). — Type: *Joubert & de Vos 1585*, South Africa, Northern Cape, near Sutherland (holo-, NBG!).

*Romulea vanzylliae* M.P. de Vos, J. S. African Bot., Suppl. 9: 284 (1972) as *x vanzylliae*; Fl. S. Africa 7(2), fasc. 2: 70 (1983). — Type: *van Zyl s.n.*, South African Northern Cape, without precise locality, cultivated in Cape Town (holo-, BOL 24349!; iso-, PRE!); *syn. nov.*

Plants 10-25 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 4-9, basal, curved, somewhat spongy, broadly 4-grooved and almost winged, 2-5 mm diam.; outer bracts keeled above with narrow membranous margins, inner bracts 2-keeled with colorless or speckled membranous margins. Flowers pink with dark blotches at the edge of a yellow cup, unscented, tepals obovate, 25-50 mm long; filaments 4-6 mm long, anthers 8-11 mm long. Fruiting peduncles recurved at first, later suberect. Flowering: Aug.-Oct.

*Romulea subfistulosa* occurs on dolerite flats in the western karoo between Calvinia and Sutherland on the Roggeveld Escarpment. It is readily recognized by the fairly thick, almost fleshy, falcate leaves with wide longitudinal grooves and the magenta-pink flowers with a yellow cup, edged with black and lightly black-streaked in the cup.

*Romulea vanzylliae* was first described as a naturally occurring hybrid between *R. subfistulosa* and *R. sabulosa*. It differs from the former only in the shape of the markings in the flower, a large black

blotch at the base of each tepal, but this is most likely merely a minor local variant of the typical *R. subfistulosa* that occurs to the south along the Roggeveld escarpment and we reduce *R. vanzylliae* to synonymy here.

## 72. *Romulea unifolia* M.P. de Vos

S. African J. Bot. 53: 247 (1987). — Type: *Oliver 8933*, South Africa, Northern Cape, Roggeveld Escarpment, Farm Fransplaas (holo-, NBG!; iso-, K!, MO!, NBG!, PRE).

Plants 15-30 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 1(2), basal, curved, somewhat spongy, broadly 4-grooved, 2-4 mm diam.; outer bracts keeled with narrow white membranous margins, inner bracts 2-keeled with white membranous margins. Flowers orange-red with black and yellow blotches at the edge of the cup, unscented, tepals obovate-cuneate, 28-45 mm long; filaments 5-6 mm long, anthers 9-12 mm long. Fruiting peduncles straight. Flowering: Aug.-Sep.

*Romulea unifolia* was originally known only from the mid Roggeveld escarpment between Middelpoos and Sutherland, where the plants have orange flowers, but a red-flowered population was recently located between Nieuwoudtville and Calvinia on the Bokkeveld Escarpment (sight record). The plants occur on dolerite flats in heavy clay soil. The species is recognized by the single, or rarely two foliage leaves and large orange or reddish flowers. The thick, widely grooved leaves suggest that it is most closely related to *R. subfistulosa*, which has four or more leaves and a magenta flower.

## 73. *Romulea sabulosa* Schltr. ex Bég.

Bot. Jahrb. Syst. 38: 334 (1907); M.P. de Vos, J. S. African Bot., Suppl. 9: 279 (1972); Fl. S. Africa 7(2), fasc. 2: 68 (1983). — Type: *Schlechter 10964*, South Africa, Northern Cape, Bokkeveld Mts., Oorlogskloof (lecto-, G, designated by M.P. DE VOS, 1972; isolecto-, B, BM, BOL!, GRA, K!, P, PRE!, S, Z).

Plants 12-40 cm high, stem subterranean; corm rounded at base with curved acuminate

teeth. Leaves 3-5, basal, filiform, 4-grooved, c. 1 mm diam.; outer bracts usually keeled above, with narrow, usually brown membranous margins, inner bracts 2-keeled usually with brown membranous margins. Flowers dark red, rarely pink, with black blotches at the edge of a creamy green cup, unscented, tepals obovate-cuneate, 25-40 mm long; filaments 3-5 mm long, anthers 8-12 mm long. Fruiting peduncles suberect. Flowering: July-Sep. — Fig. 2D.

*Romulea sabulosa* is a local endemic that grows in large populations in renosterveld on clay and sandy soils on the Bokkeveld Escarpment west of Nieuwoudtville. It is closely related to *R. monadelpha*, which has similar large red flowers with a pale cup and prominently marked with dark blotches at the base of the tepals. The leaf anatomy of both species is also similar, with a band of subepidermal sclerenchyma along the ribs. The species are best distinguished by details of the filaments. In *R. sabulosa* the filaments are usually pale greenish and taper from a pubescent base as in most other species of *Romulea* while in *R. monadelpha* the black filaments are either united into a short, stout glabrous column or when free are oblong and do not taper toward the apex. Another difference is in the peduncle, which in *R. sabulosa* is subterete and remains suberect in fruit, but in *R. monadelpha* is somewhat stouter, with the upper side conspicuously flattened, and is curved in fruit.

## 74. *Romulea monadelpha* (Sweet) Baker

Handbk. Irideae: 104 (1892); M.P. de Vos, J. S. African Bot., Suppl. 9: 283 (1972); Fl. S. Africa 7(2), fasc. 2: 68 (1983).

*Trichonema monadelphum* Sweet, Hort. Brit. ed. 2: 399 (1830). — Type: South Africa, Western Cape, without precise locality, illustration in Brit. Fl. Gard. 3: pl. 300 (1829).

Plants 15-30 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves 3-5, basal, filiform, 4-grooved, 1-2 mm diam.; outer bracts usually keeled above, with narrow, usually brown membranous margins, inner bracts 2-keeled with usually brown

membranous margins. Flowers dark red with black blotches at the edge of a creamy cup, unscented, tepals obovate-cuneate, 25-40 mm long; filaments oblong, adnate or fused into a stout column, 3-4 mm long, usually glabrous, anthers 10-15 mm long. Fruiting peduncles curved. Flowering: Aug.-Sep.

Restricted to Northern Cape Province of South Africa, *Romulea monadelphæ* occurs on dolerite clay in the western Karoo along the Bokkeveld and Roggeveld Escarpments from near Nieuwoudtville southwards as far as the top of the Gannaga Pass near Middelpos. The flowers are usually a deep red in color but the Gannaga Pass population has salmon pink flowers with unusually large silvery grey and black markings in the cup. Although *R. monadelphæ* was originally distinguished from its ally *R. sabulosa* by the fused filament column, recent collecting shows that it is more usual for the filaments to be merely adnate. The filaments are, nevertheless, characteristically short, oblong in shape and black in color, and quite unlike the slender, tapering filaments of *R. sabulosa*, which are usually pale green. In addition, the peduncles in *R. monadelphæ* are typically stout and semiterete with the upper side conspicuously flattened and are curved in fruit whereas those of *R. sabulosa* tend to be more slender and almost round in section and remain suberect in fruit. The two species differ also in habitat. *Romulea monadelphæ* is found on heavy, dolerite clay in several localities along the Bokkeveld and Roggeveld Escarpments but *R. sabulosa* is a much narrower endemic restricted to light sandy clay soils near Nieuwoudtville.

— Ser. *LOMUREA*

### 75. *Romulea syringodeoflora* M.P. de Vos

Ann. Univ. Stellenbosch 28A, 3: 74 (1952); J. S. African Bot., Suppl. 9: 287 (1972); Fl. S. Africa 7(2), fasc. 2: 70 (1983). — Type: *de Vos 1587*, South Africa, Northern Cape, near Sutherland (holo-, NBG!).

Plants 12-20 cm high, stem subterranean; corm rounded at base with curved acuminate teeth. Leaves c. 5, basal, curved, narrowly to

widely 4-grooved, 1.5-2.5 mm diameter, sparsely hairy; outer bracts with narrow white membranous margins, inner bracts with white membranous margins. Flowers hypocrateriform, magenta-pink with a small yellow center edged in dark purple, unscented, tube 15-20 mm long, tepals elliptic, 10-17 mm long; filaments 4-5 mm long, anthers 4-6 mm long. Flowering: Sep.-Oct.

*Romulea syringodeoflora* occurs on stony shale flats and slopes in the southern Roggeveld Escarpment between Komsberg and Sutherland in Northern Cape Province, South Africa. It is one of four species of *Romulea* with a narrow, cylindrical perianth tube and is immediately distinguished from *R. hantamensis* and *R. stellata* by its corm tunics with recurved basal teeth and from its close ally, *R. albiflora*, in details of the leaves and flowers. *Romulea albiflora* has white flowers with a somewhat longer tube and straight, densely hairy leaves while *R. syringodeoflora* has curved, sparsely hairy leaves and pink flowers with a small yellow centre.

### 76. *Romulea albiflora* J.C. Manning & Goldblatt, *sp. nov.*

*Plantae 5-8(-12) cm altae, foliis plerumque caule longioribus, cormo ovoideo 8-10 mm diam., foliis filiformibus in sectione transversali ovalibus 4-sulcatis, pilosis, 1.5-2 mm diam., inflorescentiae bracteis viridibus exterioribus 18-25 mm longis, interioribus marginibus late scariosis, floribus albis saepe pallide purpureonotatis prope basem tepalorum externorum, tubo perianthii cylindrico 20-33 mm longo, tepalis 12-16(-20) × 2.5-4 mm, laxe patentibus, filamentis c. 4 mm longis, antheris erectis contiguis 6-7 mm longis atropurpureis, pollinibus rubrobrunneis.*

TYPUS. — *Goldblatt & Manning 10367*, South Africa, Northern Cape, Roggeveld Escarpment, Farm Blomfontein, west of Middelpos, 13 Oct. 1995 (holo-, NBG!; iso-, K!, MO!, PRE!, S!, WAG!).

Plants 5-8(-12) cm high, the leaves usually somewhat longer than the stem, tending to grow in clumps, the stem subterranean with up to five branches reaching 2-5(-10) cm above the ground. Corm ovoid, asymmetric, the base rounded, the tunics split into curved, acuminate teeth below,



drawn into coarse fibers above, these accumulating with age and forming a neck around the base of the stems, 8-10 mm diam. Leaves c. 5, all basal, up to twice as long as the flowering stems, narrowly 4-grooved, softly hairy throughout, 1.5-2 mm diam. Inflorescence of up to 5 solitary flowers, outer bracts green with narrow, translucent or white membranous margins, 18-25 mm long, inner bracts with fairly broad membranous margins c. 2 mm wide, about as long as the outer. Flowers hypocrateriform, white, the tepals flushed mauve on the reverse, the inner distinctly veined, the tube streaked with broad bands of mauve opposite the outer tepals and yellow opposite the inner tepals, unscented; perianth tube cylindrical, 20-33 mm long; tepals narrowly oblong, 12-16(-20) × 2.5-4 mm long, the inner slightly smaller than the outer. Filaments inserted at the mouth of the tube, c. 4 mm long, glabrous, anthers parallel and contiguous, 6-7 mm long, dark purple, the pollen reddish brown. Style dividing near the anther apices, the branches c. 2 mm long, divided to slightly below the middle. Capsules and seeds unknown. Flowering: late Sep. and Oct. — Fig. 5.



Fig. 5. — Morphology of *Romulea albiflora*: with transverse section of the leaf much enlarged (Goldblatt & Manning 10367). Drawn by John MANNING.

First collected in 1983 by botanists Pauline PERRY and Dee PETERSON-JONES, *Romulea albiflora* is known only from a small portion of the Roggeveld Escarpment west of Middelpos in Northern Cape Province. The rocky edge of the steep escarpment rises abruptly about 600 m above the arid Tanqua-Doorn River basin and receives considerably more rainfall in the winter months than the country to the interior. The immediate escarpment area supports a remarkable number of highly local endemics, especially geophytes (e.g., Hyacinthaceae: *Daubenya aurea* and *Lachenalia congesta*; Iridaceae: *Babiana virginea*, *Devia xeromorpha*, *Gladiolus marlothii*, *Hesperantha teretifolia*, *Ixia thomasiae*, *Lapeirousia montana*, and several species of *Romulea*).

*Romulea albiflora* is closely allied to *Romulea syringodeoflora* but may be recognized by its filiform, pilose leaves and white flowers, the tepals sometimes marked near the base with a light purple mark, and perianth tube 22-30 mm long. *Romulea syringodeoflora* has relatively short,

curved, sparsely pilose leaves that do not usually exceed the flowers and pinkish magenta flowers with a small yellow center edged in dark purple and perianth tube 17-22 mm long. The strongly falcate leaves, up to 2 mm wide, are unlike the suberect, filiform, conspicuously pilose leaves of *R. albiflora* which are at least twice as long as the flowers. The neck of fibers around the underground part of the stem which is so conspicuous in *R. albiflora* is only weakly developed in *R. syringodeoflora*.

PARATYPE. — SOUTH AFRICA. **Northern Cape:** 3119 (Calvinia) Farm Matjesfontein, 26 km W of Middelpos (DD), Perry 3064, 28 Oct. 1983 (MO, NBG).

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