

# A revision of *Lachenalia* (Hyacinthaceae) in the Eastern Cape, South Africa

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**Keywords:** Eastern Cape, Hyacinthaceae, *Lachenalia* Jacq.f. ex Murray, South Africa, taxonomy

## ABSTRACT

A taxonomic account of the genus *Lachenalia* Jacq.f. ex Murray in the Eastern Cape, South Africa, is given. Eight species are recognised, and descriptions of these are amended and elaborated as necessary, three taxa have been reduced to synonymy and five species erroneously recorded within the province are excluded. Three of the species are endemic to the province. An identification key is provided.

## INTRODUCTION

The genus *Lachenalia* is confined to southern Africa and consists of a little over 100 species (Arnold & De Wet 1993). The majority of these species occur in the winter rainfall region of the Western Cape in the sclerophyllous shrublands or 'fynbos' of the Cape floristic region (sensu White 1983). The geographic range of a few species extends from this region into the western parts of the Eastern Cape and one even occurs as far northeast as the Free State. The few remaining species are endemic to the Eastern Cape. The genus has attracted attention as an horticultural subject, and some of the more decorative species have become well known through cultivation. Despite this, no revision of the genus has been attempted since Baker's (1897) treatment in *Flora capensis*; however the work of Barker (see Arnold

& De Wet 1993 for references) and Duncan (1988, 1996, 1997), has resulted in the species from Western Cape becoming reasonably well known taxonomically. The same cannot be said for the Eastern Cape species. They have mostly been unknown in cultivation, and they are generally represented only by few, rather old herbarium specimens.

In the course of field work in the Eastern Cape it became clear that Baker's treatment was far from adequate. Observations of populations of certain species indicated that they are very variable, and that many of Baker's diagnostic characters are unreliable. It was clear that a knowledge of the plants in the field would be essential in producing an effective treatment for the genus in the province, and that a wider range of characters should be considered.

## Key to the species of *Lachenalia* in the Eastern Cape

- 1a Perianth more than 15 mm long, always yellow-green; flower erecto-patent (45° or less to inflorescence axis) at and after anthesis; confined in Eastern Cape to coastal grassland ..... 1. *L. algoensis*
- 1b Perianth less than 15 mm long, usually white to deep pink or purple, sometimes dull green with brown markings or rarely yellow-green (see *L. bowkeri*); flower cernuous to patent at anthesis, sometimes erecto-patent after anthesis; not confined to coastal grassland:
- 2a Inner perianth segments always recurved at tips, usually exceeding outer by at least 1.4 mm:
- 3a Leaf irregularly marked with brown, green or maroon blotches on upper surface, margin coriaceous; stamens pale to dark maroon, well exerted ..... 8. *L. karooica*
- 3b Leaf not marked on upper surface, margin not coriaceous; stamens white, included or exerted:
- 4a Stamens nearly twice as long as inner perianth segments, exerted by 3–13 mm, spreading; perianth campanulate, inner lobes exceeding outer lobes by up to 2 mm ..... 5. *L. latimeriae*
- 4b Stamens included or exerted up to 3 mm, declinate; perianth oblong-campanulate, inner lobes exceeding outer by 2 mm or more:
- 5a Stamens not or very slightly exerted; outer perianth lobes recurved, lower inner lobe broadly flared; leaf banded dark green below, confined to an area extending from Eastern Cape to Karoo ..... 7. *L. perryae*
- 5b Stamens exerted by  $\pm 2$  mm or more; outer perianth lobes not recurved, lower inner lobe not broadly flared; leaf not banded below; extending from coastal areas to Karoo ..... 2. *L. bowkeri*
- 2b Inner perianth segments straight or slightly spreading but not recurved at tips,  $\pm$  equal in length to outer segments:
- 6a Stamens included; perianth broadly cup-shaped, as long as broad,  $\pm 5$  mm long, segment apices not spreading; flower cernuous at anthesis; inflorescence lax, 3–5 mm, between adjacent pedicels ..... 4. *L. convallarioides*
- 6b Stamens shortly exerted (up to 2 mm); perianth campanulate, longer than broad,  $\pm 5.5$  mm long or more, segment apices spreading; flower patent at anthesis; inflorescence very dense with less than 2 mm between adjacent pedicels:
- 7a Perianth up to 5.6 mm long, campanulate; endemic to high mountains of Eastern Cape ... 3. *L. campanulata*
- 7b Perianth at least 8 mm long, oblong-campanulate; confined in Eastern Cape to coastal areas in extreme west ..... 6. *L. youngii*

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In addition to more conventional macro-morphological characters, Barker (1978) found seed morphology to be particularly useful in delimiting the different taxa in the Western Cape. Ornduff & Watters (1978) and Johnson & Brandham (1997) have provided chromosome counts for several species. The value of these characters in understanding the Eastern Cape species has not previously been assessed.

#### MATERIALS AND METHODS

The present account is based on a study of herbarium specimens from relevant herbaria (see acknowledgements), and of living plants in the field and in cultivation. A total of 16 populations representing five of the Eastern Cape species were located and detailed descriptive notes of living plants were made. Particular attention was paid

to differential characters used by previous researchers and to characters that appeared to be variable within each population. Representative specimens were collected for cultivation and as herbarium specimens. Seeds of all species were examined with a JEOL-JSM 840 scanning electron microscope.

1. *Lachenalia algoensis* Schönland in Transactions of the Royal Society of South Africa 1: 443 (1910); Fourc.: 101 (1941); A.Batten & Bokelmann: 16 (1966); E.Gledhill: 70 (1981); A.Moriarty: 34 (1982); Bond & Goldblatt: 51 (1984); G.D.Duncan: 35 (1988). Type: Eastern Cape, Port Elizabeth, 13 August 1903, Drège 64 (GRA, syn.!); Redhouse, Paterson 92 (syn. non vide).

*Lachenalia algoensis* was described in detail by Schönland in 1910. No elaboration of Schönland's mor-

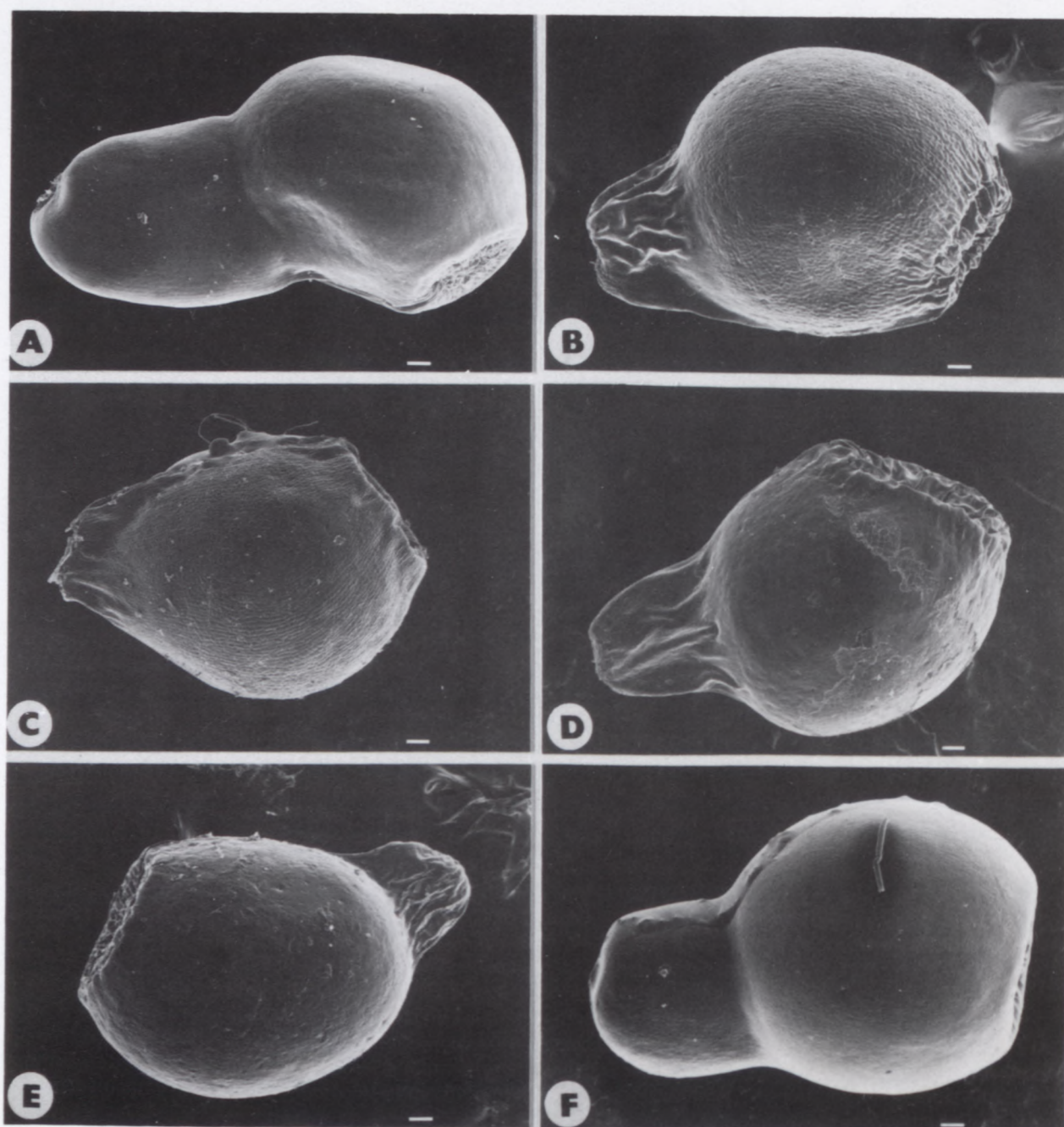


FIGURE 1.—Seeds of *Lachenalia*. A, *L. algoensis*, Tait 155; B, *L. bowkeri*, Dold 280; C, *L. campanulata*, Dold 1233; D, *L. convallarioides*, Dold 1018; E, *L. latimeriae*, Dold 1802; F, *L. youngii*, Hops 33. Scale bars: 100 μm.





FIGURE 2.—Inflorescences of *Lachenalia*. A, *L. algoensis*, plant from Linton Grange, Port Elizabeth (no voucher). B–D, *L. bowkeri*: B, Dold 2267; C, Dold 2269; D, Dold 1766. E, *L. campanulata*, Dold 1233; F, *L. convallarioides*, Dold 1018. Scale bars: 10 mm.

phological description is necessary, except to note that the seeds are  $\pm 2.2 \times 1.1$  mm, black and shiny, with a smooth testa and a blunt decurrent arillode,  $\pm 1.0$  mm long (Figure 1A). It is relatively well known and is clearly distinct from all other species that occur in the Eastern Cape, being by far the largest flowered species in the area (Figure 2A).

#### *Distribution and habitat*

In the Eastern Cape it ranges from the Knysna District in the west to the Bushman's River in the east, always near the coast (Figure 3). According to Duncan (1988), it extends to Worcester in the Western Cape.

Vouchers: Burrows 3355 (GRA); Cruden 388 (PRE); Dold 691 (GRA); Schönland s.n. (GRA); Tait 3761 (PEU).

2. *Lachenalia bowkeri* Baker in Flora capensis 6: 427 (1897); Bond & Goldblatt: 52 (1984); G.D.Duncan: 32 (1988); Urton & D.Page: 124 (1993). Type: Somerset Division, *Bowker* s.n. (K, holo.).

*L. subspicata* Fourc.: 79 (1934); Fourc.: 101 (1941). Type: Humansdorp Division, Flats Zuur Anys, on road to Kouga, *Fourcade* 3044 (BOL, holo.).

Plant (50–)110(–210) mm tall. *Bulb* globose, 8–17 mm diam., inner flesh translucent, white, outer tunics dry, coarsely papery, dark brown, often flaking, inner tunic minutely white-spotted, sometimes forming a short, coarse, brush-like neck of 5–10 mm, just visible at ground level; leaf sheath membranous, translucent, extending above neck by 5–15 mm, loosely clasping. *Leaves* 1–2(–4), (45–)60–120(–300)  $\times$  (5–)8–10(–30) mm, but frequently eaten by herbivores and thus appearing unnaturally short, deeply channelled, erect, slightly fleshy,



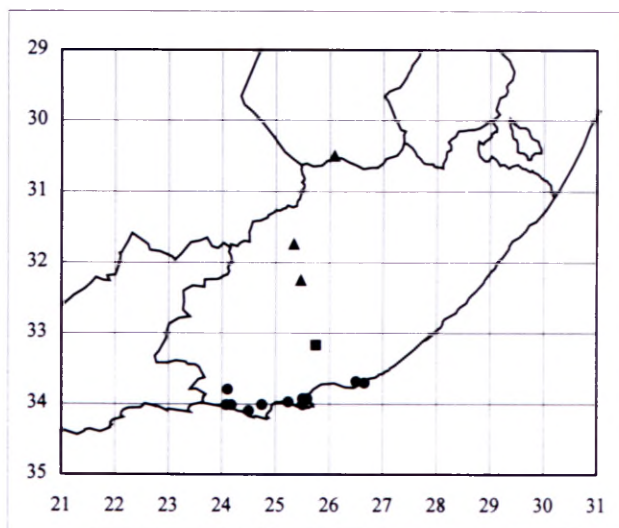


FIGURE 3.—Distribution of *Lachenalia algoensis*, ●; *L. karooica*, ▲; and *L. perryae*, ■.

smooth, pale green, sometimes with faint purple margin, sometimes with bluish blush; base often clasping peduncle up to 20–40 mm, extreme base white, occasionally very faintly purple-spotted just above ground; apex bluntly acute, often dry; keel indistinct. *Inflorescence* erect, (40–)60–80(–140) mm tall, spicate to subspicate; peduncle and inflorescence axis usually slender, up to 2–3 mm thick, thickest just below first flower, pale green, very pale at base, sometimes spotted dull purple; fertile part (10–)30–50(–70) × 15–25 mm, with 4–25 (often about 10) flowers; sterile tip tufted, 2–6 mm long; bracts cupped, deltoid, with slightly winged margins, white to greenish white, 1.1–1.8 × 1.1–1.8 mm, with basal spur up to 0.7 mm long, apex acute, 0.7–0.9 mm long, facing downwards or curling under. *Flowers* sometimes (but not always) sweetly scented; pedicels held at 40° to stem, 0.5–2.0 × 0.3–0.4 mm, white to pale green; perianth patent or more usually somewhat cernuous, oblong campanulate, (6.5–)9.0(–11.0) mm long, (3.0–)3.6(–4.0) mm diam. at base, slightly swollen at base, varying from white to pale green or very pale purple to purple with green or purple distal keels, becoming darker with age; inner lobes obovate, 6–10 × 3.0–4.5 mm, spreading outwards, all 3 inner lobes of equal length, exceeding outer by (1.5–)2.0(–3.0) mm; apex obtuse, recurved; base cuneate, sometimes speckled with blue; outer lobes ovate, 4.6–6.0 × 2.1–3.1 mm, not spreading outwards; apex obtuse; base truncate with very slight gibbositities which are most pronounced on upper lobe, unevenly speckled or blotched with pale purple or pale blue. *Stamens* declinate; filaments white, 7–9 mm long; anthers 0.8–1.4 × 0.5–0.8 mm, maturing in stages, lowest pair first and upper pair last, included within perianth before maturity and purple, then exserted by (1–)2(–3) mm and yellow when mature and finally becoming black, and eventually, as fruit develops, being drawn back into perianth. *Ovary* green, 1.7–3.2 × 1.5–2.0 mm; style exserted, 6.3–9.0 mm long, white. *Capsule* ovoid, 2.4–4.0 × 1.5–4.0 mm, papery, brown. *Seed* 1.4–2.2 × 1.1–1.5 mm; testa reticulate or smooth, black, shiny; arillode bluntly pointed, 0.45–0.5 mm sometimes shortly decurrent. *Chromosome number*:  $2n = 16$  (Dold 280, Kew reference 95–30, Kew accession 1995–26, Johnson & Brandham 1997). Figures 1B; 2B–D.

Duncan (1988) described *L. bowkeri* as a poorly known species. We interpret it as an extremely variable species, which is actually well represented in herbaria compared to most of the other Eastern Cape species. The variation in *L. bowkeri* is so great that during the course of the present study we were convinced for a long time that it represented at least three distinct species. Variation occurs in several characters, notably: overall size, number of leaves, flower orientation, pedicel length, perianth colour and degree of exsertion of the stamens. Variation in these characters can be seen among individual plants in a population, and is certainly attributable in part to phenotypic responses to minor variations in microhabitat. Considerable phenotypic plasticity has also been noted in plants brought into cultivation. However, different populations of *L. bowkeri* do show certain relatively constant and distinct features and these appear to some extent to be related to geographical distribution. It may eventually be possible to describe infraspecific taxa within *L. bowkeri* and thus delimit these variations formally, but at present we understand too little of the nature of the species' variability to enable us to do so confidently. Further cytological studies of the different populations will be done at Kew and may help to clarify this variation.

Interpretation of herbarium material is complicated by the tendency in old flowers for the stamens to be drawn into the perianth and for the inner perianth lobes to become constricted at the mouth (Figure 2C). In this condition the flowers closely resemble those of certain other species and present a very different facies to that of carefully pressed specimens with freshly opened flowers. At anthesis, stamen exsertion varies from 1 to 3 mm, but the type specimen is a plant with old flowers and thus in Baker's (1897) original description, *L. bowkeri* is stated to have included stamens.

Baker also states that the leaf is solitary. However, occasional 2-leaved plants were found in the populations we studied. Very rarely, exceptionally vigorous bulbs were found that had three or even four leaves and two inflorescences. Plants of *L. bowkeri* have regularly been misidentified in herbaria (often as *L. orchoides* (L.) Aiton), since they are frequently at variance with Baker's description with respect to the exsertion of the stamens and the number of leaves.

Plant height, leaf dimensions and the number of flowers per inflorescence vary considerably within populations and from one population to another depending on exposure. Plants found in open karroid grassland are smaller than those shaded by grass clumps in open coastal grassland. Plants found in salt pans are more robust but not necessarily taller. In several localities robust plants with particularly thick peduncles have been collected. The bulb tunic appears to be influenced by the type of substrate and plants growing in hard, dry, rocky ground will always have thick, dry flaking scales with a short brush-like neck, whereas in loam or sandy soil the tunics will be less scaly and most often without a neck at all. The base of the leaf often tightly clasps the peduncle for up to a third of its length and then opens abruptly. This is seen predominantly in karroid areas, whereas under favourable conditions leaves are broader and seldom clasping, sometimes in pairs, one always much smaller than the other. From observations in the field and

from herbarium specimen labels it is also clear that *L. bowkeri* is variable in coloration. The perianth of plants from the dry Subtropical Thicket of the Fish River valley vary from white, tinged with green, with pale mauve distal keels, to entirely purple. Those from Naude's Hoek in the Keiskamma River valley are pale green to dull yellow-green with dull purple markings, while further west at Ghio Marsh Nature Reserve, the perianth is white with green speckling on distal keels and blue speckling on the base of the outer lobes, and older flowers already closed become tinged with dull purple. Within populations the flower colour seems to be more or less uniform, although, as in other species in the Eastern Cape, the individual flowers become darker in colour with age, tending to fade to dull purple as the fruit develops. Flower size, orientation and the extent to which the perianth lobes are recurved or spread, particularly at the tips, is somewhat variable (Figure 2B–D), but tends to be relatively constant within populations. Pedicel length shows little variation, from sessile to only 2 mm long.

Seed morphology is variable from one population to another. Seeds from herbarium sheets and live plants have been examined. Figure 1B is representative of plants from the Fish and Keiskamma River valleys. Seed from collections further west are of similar size, but tend to have a rather variable arillode, which is often more blunt and less strongly decurrent.

*Lachenalia subspicata* was described in 1934 by Fourcade, who compared his new species only with *L. orchoides* and *L. youngii* Baker. It appears that he overlooked the similarity between his plant and *L. bowkeri*, possibly because Baker (1897) incorrectly described the latter as having 'quite sessile flowers'. On examination of the type, a few very short pedicels can be seen on one inflorescence. Following 'Pretoria National Herbarium practice', Arnold & De Wet (1993) have placed *L. subspicata* into synonymy with *L. bowkeri*. On examination of the type collections and consideration of the variability of the species we concur with this practice.

#### Distribution and habitat

*Lachenalia bowkeri* is virtually confined to the Eastern Cape, with only two known collections from the Western Cape. The type locality is 'Somerset' (presumably Somerset East), but this is the only collection known from there, the majority of collections are from the Albany District, with others from the Alexandria and Port Elizabeth Districts (Figure 4). All collections are from below 850 m and by far the majority of these are found at altitudes below 600 m. It usually occurs in open grassland and often on margins of salt pans usually partially shaded under grass clumps, or, less commonly, in drier, rocky areas of Subtropical Thicket on south-facing slopes. Populations are small and localised and plants occur singly or in small groups of two or three in areas not exceeding 10 m<sup>2</sup>.

Vouchers: Dold 2267, 2268, 2418 (GRA); 2269, 2419 (GRA, PRE).

3. *Lachenalia campanulata* Baker in Journal of Botany 12: 6 (1874); Baker: 432 (1897); Bond & Goldblatt: 52 (1984). Type: Somerset East, In lapidosis summii Montis Boschberg, 4800ft, (–DA), MacOwan 1836 (K, holo.; GRA, iso.).

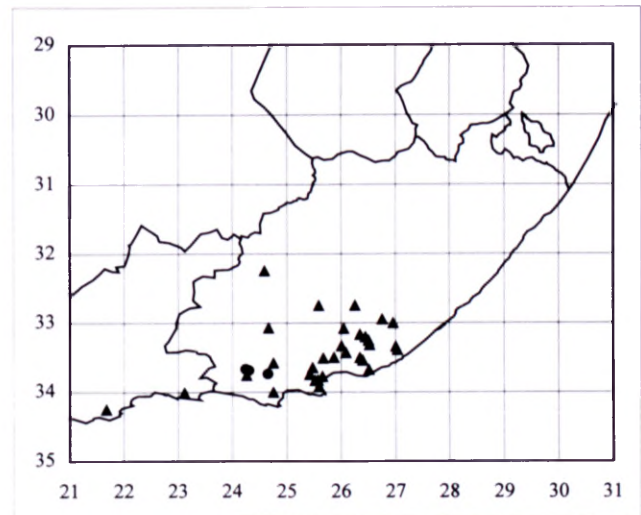


FIGURE 4.—Distribution of *Lachenalia bowkeri*, ▲; and *L. latimeriae*, ●.

*L. rhodantha* Baker: 430 (1897). Type: Graaff Reinet, Sides of grassy mountains, Oudeberg, Graaff Reinet, 4300ft, (–DD), Bolus 719 (K, holo.).

Plant (50–)110(–230) mm high depending on amount of shade. *Bulb* globose, 5–15 mm diam., white, fleshy, outer tunics dry, membranous, pale brownish, peeling in places, not neck-forming. *Leaves* 2, rarely 1, linear, erect, (15.0–)8.6(–30.0) × 1–7 mm, not sheathing, smooth, entire, drying at tips, base white with purple spots, blade light green and unmarked to densely covered with minute red spots, subterete, keel indistinct. *Inflorescence* subspicate to racemose, 10–20 × 2–3(–5) mm, flowers dense, number of flowers (4–)16(–34); peduncle erect with slight curve, white at base to green often densely to entirely covered with minute red spots, thickest at base, 2.0–3.5 mm, becoming thinner closer to inflorescence; sterile tip 2–3 mm, not tufted; pedicels spreading, rarely sessile, 2.5(–3.0) mm, white to pale red; bracts 2 mm wide, with acute spreading apex, cup-shaped, 1.5 mm deep, slightly spurred at base, white tinged green and minutely red-spotted; lower bracts ± 2 mm long; upper bracts ± 1 mm long. *Flowers* unscented, perianth spreading to horizontal, not becoming cernuous in lower half of inflorescence, campanulate, base rounded, slightly swollen, 5.6 mm long, 3.3 mm at broadest point, inner segments oblong, 5.5 × 1.3 mm, outer segments oval elliptic, 5.5 mm long, 2.6 mm wide at base, inner segments not exceeding outer, segments spreading in distal end, ranging from pure white to red at anthesis, darkening soon afterwards to purple; gibbositities indistinct, tinged faintly greenish. *Stamens* shortly exserted by up to 2 mm, becoming included soon after anthesis, yellow; filaments white. *Ovary* ovoid, green, 2.1 × 1.4 mm; style 2.7 mm, finally exserted, persistent. *Capsule* ovoid, 3.8 × 2.4 mm, papery, brown. *Seed* black, shiny, ovoid, ± 1.7 × 1.2 mm, testa reticulate, arillode short, tapering, asymmetrical, decurrent, 0.2 mm long. Figures 1C; 2E.

*Lachenalia campanulata* can be distinguished by the combination of its spreading to horizontal flowers about 5.6 mm long with exserted stamens and subequal perianth lobes, and its (usually) paired leaves. In the Eastern Cape it most closely resembles *L. convallarioides* Baker which has flowers of similar size and also has subequal



perianth lobes. The two species differ in several characters. *L. campanulata* has a relatively dense inflorescence and the thickest point of its peduncle is at the base; in *L. convallarioides* the inflorescence is rather lax and the thickest point of its peduncle is immediately below the first flower. In *L. campanulata* the perianth is campanulate and the lobes are reflexed, whereas in *L. convallarioides* it is cup-shaped and the lobes are not reflexed. In *L. campanulata* seeds are  $\pm 1.7$  mm long and have a short, tapering, assymetrical, decurrent arillode, and a reticulate testa; those of *L. convallarioides* are  $\pm 2$  mm long, and have a rounded, symmetrical, terminal, arillode, and a smooth testa.

Plants of *L. campanulata* are variable in size depending on the degree of exposure and individuals 230 mm tall can be found in sheltered positions in close proximity to others only 60 mm tall in exposed positions. Colour is also very variable from pure white to pink to deep red at anthesis, darkening to purple.

Baker's description of *L. rhodantha* is based only on the type collection, *Bolus 719*. It was said to be distinguished from *L. campanulata* by having a single leaf rather than two, lower flowers cernuous rather than horizontal, stamens exserted, not included, and being bright red rather than white tinged with red. Not having seen these plants in their natural habitat Baker could not have known of the variability of these supposedly diagnostic characters, and plants closely matching the type specimens of both species can be found growing together. In all three populations we have studied in the field, most of the plants were 2-leaved, whereas occasional 1-leaved and even 3-leaved plants were found in each. All of the specimens we have examined (living and preserved), including the type of *L. rhodantha*, have spreading to horizontal flowers in the lower part of the inflorescence. Baker's description of the orientation of the lower flowers of *L. rhodantha* is an error, as they are clearly horizontal. The type collection of *L. campanulata*, *MacOwan 1836*, consists of plants past anthesis which have their stamens included and style excluded, dark perianths and ovaries obviously swollen. In the field we have recorded that young plants consistently have spreading flowers with a slightly swollen base, an open mouth and exserted stamens. After anthesis the flower becomes horizontal and darker in colour, the perianth lobes close at the mouth and the stamens become drawn into the perianth and the base of the flower swells with the ovary.

#### Distribution and habitat

*Lachenalia campanulata* is confined to the mountains of the interior of the Eastern Cape between 24° and 29° E and 30° to 33° S, and has been recorded at altitudes from 1 200 to 2 400 m on steep, open slopes (Figure 5).

Vouchers: *Cotterrell 52* (GRA); *Dold 1233, 1993* (GRA, PRE); *Hilliard & Burt 14718* (NU, PRE); *Van Der Walt 256* (PRE).

4. *Lachenalia convallarioides* Baker in *Journal of the Linnean Society* 11: 407 (1871); *Martin & Noel*: 26 (1960); *Dold*: 29 (1994). Type: Eastern Cape, Krel's Country, Caffraria, *Bowker 444* (K, holo.!; TCD, iso.!).

*L. convallarioides* Baker var. *robusta* Baker: 407 (1871). Type: Albany, *Williamson s.n.* (TCD, holo.!).

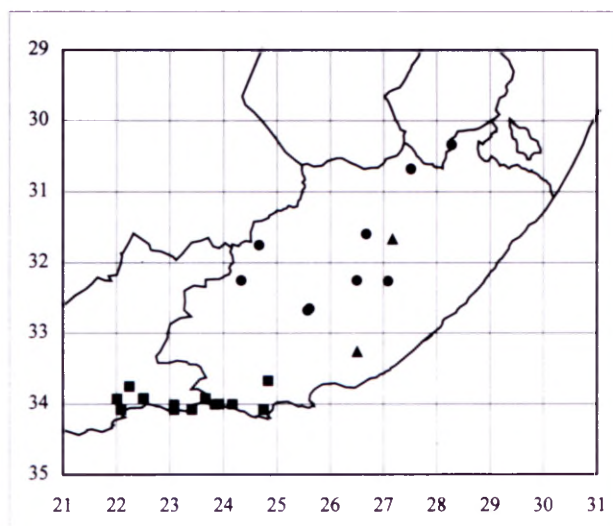


FIGURE 5.—Distribution of *Lachenalia campanulata*, ●; *L. convallarioides*, ▲; and *L. youngii*, ■.

Plant (80–)135(–250) mm high, depending on amount of shade. *Bulb* globose 10–15 mm diam., white fleshy, outer tunics dry, membranous, pale brownish, peeling in places, not neck-forming. *Leaves* 1(–2), 80–280 mm long, as long as inflorescence or occasionally up to one third of its length longer than inflorescence, especially in more robust specimens; sheathing up to 20 mm, 8–20 mm wide at broadest point, linear to lorate, margin entire, apex acute, erect with a shallow 40° curve away from peduncle, fleshy, often with a slight twist in axis, persistent apex dry and shrivelled, deeply U-shaped in cross section; keel indistinct, smooth, glabrous, pale green, extreme base white or densely, minutely spotted purple red (BCC 822). *Inflorescence* racemose, flowers sparse (5–)19(–60), (20–)40(–110) mm long; peduncle erect, slender, (50–)95(–140) mm, shallowly curved, thickest point 1–2 mm, immediately below first flower, pale green to pale pink near apex; sterile tip 2 mm, not tufted; pedicels erect-patent, spreading, 2.5–5.0 mm, white to pinkish; bracts 2 mm across, deeply cupped, 1 mm long, with acute patent apex, 0.9 mm, and basal spur. *Flowers* unscented; perianth horizontally spreading to cernuous at anthesis and then horizontal in older flowers, campanulate, rounded at base, 5 mm long, 4 mm diam. at base, inner segments obovoid, 5 mm long, 3.5 mm at broadest point, shorter than the outer, outer segments white, 2.5 mm long; anthers white at anthesis, black after anthesis. *Ovary* ovoid, green, 3-locular, 3.0 × 2.5 mm; style 2.5 mm long. *Capsule* ovoid, 4 × 3 mm, tissue-like, finely net-veined, golden yellow. *Seed* black, shiny, smooth, ovoid, 2.0 × 1.2 mm; terminal arillode symmetrical, blunt, 0.56 mm. *Chromosome number*: 2n = 30 (*Dold 1018*, Kew reference 95–31, Kew accession 1995–27). Figures 1D; 2F.

*Lachenalia convallarioides* is recognised by its rather lax inflorescence of nodding flowers with included stamens and subequal perianth lobes, and its (usually) single leaf. Other characters that serve to distinguish it from *L. campanulata*, the Eastern Cape species it most closely resembles, are given under that species.

*L. convallarioides* is very variable in leaf and inflorescence size depending on the plant's degree of exposure



to the sun. The most exposed plants are the most conspicuous in natural populations but as a result of their exposure are also the smallest, and these match the type collection. Plants growing in shaded places, partly hidden by other vegetation are rather inconspicuous, and can be much larger. Baker, not having seen this variation within populations, assigned varietal status to Williamson's collection (*T. Williamson s.n.*) which clearly matches shade-growing plants in populations we have seen. The chromosome number of  $2n = 30$  is unusual in the genus *Lachenalia*, where the common basic number is  $x = 7$  or  $8$ , although  $x = 5, 9, 10, 11, 12, 13$  and  $15$  have also been found. Johnson & Brandham (pers. comm.), have suggested that the  $2n = 30$  ( $x = 15$ ) could be an allotetraploid derived from taxa with  $x = 7$  and  $x = 8$  following hybridisation and chromosome doubling.

#### Distribution and habitat

*Lachenalia convallarioides* is only known from the Albany District near Grahamstown in the Eastern Cape, where it grows on rocky outcrops of Witteberg Quartzite, and from the Mount Arthur Range about 180 km to the northeast, at altitudes of around 17 to 1 800 m (Figure 5). Populations are very localised resulting in their being easily overlooked even in well-explored localities such as on Mountain Drive, Grahamstown. This locality is within walking distance from the Botany Department at Rhodes University but, remarkably, only three collections have ever been made from this generally well-collected area.

Bowker's type collection from Kreli's Country, Caffraria, and Barber's Zuurberg collection, both numbered 444, are almost certainly the same collection from what was known in 1856 as the Zuurberg in the extreme northwest of Chief Kreli's territory in Caffraria (Hall 1856). These mountains are now known as the Mount Arthur Range. Bowker, a soldier, was stationed in this area and collected plant specimens for his sister, Mrs M.E. Barber (née Bowker), (Thorpe 1977; Gunn & Codd 1981), who sent them to Harvey at TCD. Baker saw this material much later (Dr John Parnell, Trinity College, Dublin, pers. comm.). The Bowker/Barber collection is the only known collection from outside the Albany District.

Vouchers: Barber 444 (TCD); Borman s.n. sub RUH10632 (GRA); Dold 1018 (GRA, K); Pym s.n. (GRA); Williamson s.n. (TCD).

5. *Lachenalia latimerae* W.F. Barker in Journal of South African Botany 45:196 (1979); Bond & Goldblatt: 52 (1984); G.D. Duncan: 60 (1988). Type: Ferndale Farm, Patensie, (–DD), July 1949, Courtenay-Latimer s.n. sub NBG72287 (NBG, holo.!).

*Lachenalia latimerae* was described by Ms W.F. Barker in 1979 from the type and from cultivated material collected near Patensie (Bayliss 7102). Recently we have located two new populations of this species. Barker's description needs no further elaboration. In common with most of the other species in the Eastern Cape it should be noted that overall size varies considerably. Seed morphology of our collections conforms to that of the type collection. Figures 1E; 6.

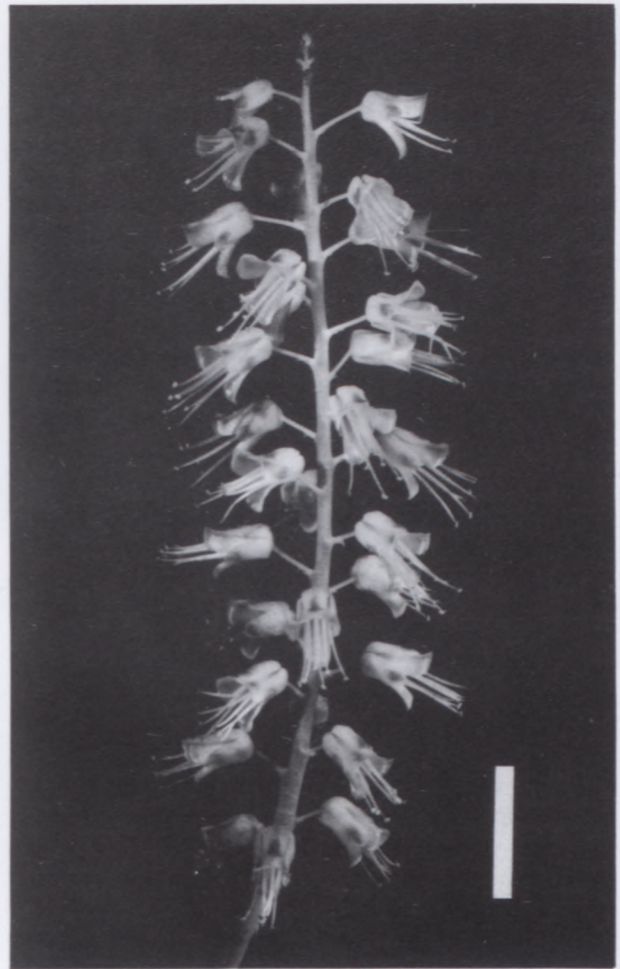


FIGURE 6.—Inflorescence of *Lachenalia latimerae*, Dold 1802. Scale bar: 10 mm.

#### Distribution and habitat

*L. latimerae* is found in the Kouga Mountains near Patensie in the Eastern Cape and it has also been collected at the Cango Caves near Oudtshoorn in the Western Cape. It has been found at altitudes from 320 to 1 000 m (Figure 4). The two populations of *L. latimerae* that have been examined in the field were both very localised, with less than 50 plants occurring in an area of  $\pm 8 \text{ m}^2$  in each case. Both were situated at the base of a very steep south-facing rocky slope with dense pockets of bush. The plants occur in open vegetation, often in moss-covered patches of about  $1 \text{ m}^2$  in full shade.

Vouchers: Bayliss 7102 (NBG); Clark 1031 (GRA, PRE), DC1014 (GRA, K); Dold 1802 (GRA, PRE), 2417 (GRA).

6. *Lachenalia youngii* Baker in Flora capensis 6: 433 (1897); Fourc.: 101 (1941); Bond & Goldblatt: 54 (1984); G.D. Duncan: 42 (1988). Type: Oudtshoorn, Montagu Pass, (–CD), 1200 ft, September 1889, Young 5545 (K, holo.!, and iso.!, BOL, iso.!).

*Lachenalia youngii* was described by Baker (1897) and by Duncan (1988). No further elaboration is necessary.

Baker (1897) only cited a single sheet of Young 5545 under *L. youngii*. He identified a second sheet labelled



*Young 5545* as *L. unicolor*. We have examined both sheets, and conclude that they are without any doubt duplicates and they conform perfectly to Baker's description of *L. youngii*. Baker's misidentification of the sheet accounts for erroneous distribution records for *L. unicolor* in the literature. It is uncertain whether seed morphology is diagnostic or not as only a single specimen has been examined (Figure 1F).

#### *Distribution and habitat*

*Lachenalia youngii* has been recorded from numerous localities in the mountains of the southeastern part of the Western Cape, and extends into the Eastern Cape near Humansdorp (Figure 5), growing in fynbos.

Vouchers: *Fourcade 347* (BOL, GRA), *5385* (BOL); *Rogers 27962* (GRA); *Vlok 1207* (K); *West 231* (GRA).

7. ***Lachenalia perryae*** G.D.Duncan in *Bothalia* 26: 3 (1996). Type: Western Cape, Karoo National Botanical Garden veld reserve, Worcester, Aug. 1985, *Perry s.n.* (NBG, holo., PRE).

Duncan's (1996) description needs no elaboration. *Lachenalia perryae* may be recognised as follows: it usually has a single narrowly lanceolate, banded leaf, which does not widen abruptly at the base; patent or slightly cernous, oblong-campanulate flowers with pale blue outer perianth segments and whitish inner segments, and included stamens.

#### *Distribution and habitat*

The species is essentially a Western Cape species with the majority of collections from the Karoo National Botanical Garden at Worcester. It has been recorded from Worcester District south to Port Beaufort and eastwards to Albertinia (Duncan 1996). One isolated record from Kommadagga in the Eastern Cape is a wide disjunction (Figure 3). The occurrence of the plant in the Eastern Cape needs further study, especially since the species appears to be quite closely related to *L. bowkeri*.

Vouchers: *Bayliss 5919* (PRE).

8. ***Lachenalia karooica*** W.F.Barker ex G.D.Duncan in *Bothalia* 26: 1 (1996). Type: Free State, Fauresmith, veld, 0.5 km on road from Fauresmith to Koffiefontein, 6 Aug. 1976, *Chaplin s.n.* (NBG, holo.).

Duncan's (1996) description needs no elaboration. *Lachenalia karooica* is easily recognised in the Eastern Cape by its maroon stamens and the coriaceous margins of its leaves together with its northwestern distribution.

#### *Distribution and habitat*

*Lachenalia karooica* has been recorded from scattered localities in the Great Karoo in the Western Cape, the Northern Cape and the Free State, and extends into northern parts of the Eastern Cape just south of the Orange River (Figure 3). At the type locality plants grow on south-facing aspects on dolomite outcrops.

Vouchers: *Burrows 2157* (PRE); *Meyer 206* (PRE).

### EXCLUDED SPECIES

#### *Lachenalia aloides* (L.f.) Engl.

Baker (1897) cited a specimen from Hill Park, Port Elizabeth (*East South Central African Herbarium 49 K!*) as *L. aloides*. The specimen was wrongly identified by Baker—it is *L. algoensis*. Duncan (1988) regards *L. aloides* as restricted to the Western Cape, a view with which we agree.

#### *Lachenalia orchioides* (L.) Aiton

Baker (1897) cited two specimens from what is now the Eastern Cape, both from Grahamstown: *MacOwan 1337* (GRA!) and *Galpin 228* (PRE!). On examination of the specimens it is immediately clear that they are both *L. bowkeri*. A view shared by Barker (*determinavit* labels, no dates). We have not seen any collections of true *L. orchioides* from our area, and this species appears to be confined to the extreme southwestern part of the Western Cape. A large number of other specimens of *L. bowkeri* have been misidentified in herbaria as this species.

#### *Lachenalia pustulata* Jacq.

A Western Cape species, Baker (1897) cited a single specimen for the summer rainfall area: *Ecklon & Zeyher 38* (PRE!), Zwartkops River, Uitenhage. This specimen is *L. bowkeri* Baker, a view shared by Barker (*determinavit* label, no date).

#### *Lachenalia reflexa* Thunb.

Baker (1897) cited *Bolus 2635* (K!) from the Zuurberg Range, Alexandria Div. in the Eastern Cape. This was incorrectly determined and is *L. algoensis*. A view shared by Barker (*determinavit* label, 9/5/1967).

Another collection, just out of the province, *Fourcade 1447* (K!), (locality Knysna), is also *L. algoensis* incorrectly determined as *L. reflexa*.

#### *Lachenalia trichophylla* Baker

Baker originally cited the type of *L. trichophylla* as *MacOwan 2197* from Somerset East, i.e. within the Eastern Cape, and cited no other specimens. In *Flora capensis* (Baker 1897), however, he cited a single specimen for the species: *Mader sub herb. MacOwan 2167* from Clanwilliam (in the Western Cape). The reason for this change is unknown but MacOwan in his list of distributed collections recorded *MacOwan 2197* as *Catha edulis*, whereas *MacOwan 2167* is recorded as *Gladiolus spathaceus*. No specimens of a *Lachenalia* bearing the collection number 2197 have been traced in relevant herbaria; however, specimens of *Mader sub herb. MacOwan 2167* are present in K and SAM. The description of *L. trichophylla* does not match any known Eastern Cape material, but does agree with the Mader specimens, and other material from the Western Cape referred to as *L. trichophylla*. It is concluded that the original citation contains two errors, firstly the collection number should have been 2167 not 2197, and the specimen was not collected in Somerset East.



## SPECIMENS EXAMINED

*Acocks* 16543 (3) PRE; 21174 (6) PRE; 21461 (1) PRE. *Anon. s.n.* (4) GRA. *Archibald* 4388 (2) GRA; 4522 (1) GRA; 5983 (2) GRA.

*Barber* 444 (4) TCD. *Barnard* 574 (2) PRE. *Bayliss* 5919 (7) PRE; 7102 (5) NBG. *Bolus* 719 (3) K. *Borman s.n. sub RUH10632* (4) GRA. *Botha* 5881 (2) PRE. *Bowker s.n.* (2) K; 444 (4) K. *Burrows* 2157 (8) PRE; 3355 (1) GRA.

*Clark DC1014* (5) GRA, K; 1031 (5) GRA. PRE. *Cook* 20452 (2) BOL. *Cotterrell* 52 (3) GRA. *Courtenay-Latimer s.n. sub NBG72287* (5) NBG. *Cruden* 5a (2) GRA; 22 (2) GRA; 388 (1) PRE; 453 (2) GRA.

*Dold* 233 (3) GRA, PRE; 280 (2) GRA, K; 691 (1) GRA; 1018 (4) GRA, K; 1765 (2) GRA; 1766 (2) GRA; 1802 (5) GRA, PRE; 1993 (3) GRA, PRE; 2076 (3) GRA, K, PRE; 2267, 2268, (2) GRA; 2269 (2) GRA, PRE; 2270 (2) GRA; 2272 (2) GRA; 2273 (5) GRA; 2417 (5) GRA; 2418 (2) GRA; 2419 (2) GRA, PRE; 2420 (2) GRA. *Drège s.n.* (1) GRA; *s.n.* (1) GRA; *s.n.* (2) GRA; 61 (1) GRA; 64 (1) GRA, PRE. *Dyer* 2085 (2) GRA.

*Ecklon* 38 (2) PRE. *Esterhuysen* 10702 (6) BOL.

*Fourcade* 347 (6) BOL, GRA; 3044 (2) BOL; 4694 (2) BOL; 5350 (6) BOL; 5385 (6) BOL; 6213 (6) BOL. *Fries* 182 (1) PRE.

*Galpin* 228 (2) PRE; 1689 (3) PRE; 6280 (3) BOL, GRA, PRE. *Giffen* 782a (2) BOL, UFH. *Gilfillan sub Herb Galpin s.n.* (8) PRE. *Gillet* 1266 (6) BOL.

*Hilliard & Burt* 14718 (3) NU, PRE; 18667 (3) KEI, NU, PRE. *Hops* 33 (6) BOL; *sub Bolus* 12393 (6) PRE, BOL. *Hutton s.n.* (2) GRA.

*Jacot-Guillarmod* 9431 (2) GRA. *Jessop* 1071 (2) GRA. *Johnson* 1032 (2) GRA.

*Koopowitz s.n.* (2) GRA.

*Laughton* 47 (6) BOL. *Liebenberg* 7248 (8) PRE. *Linger* 2099 (2) PRE. *Long s.n.* (1) PEU; 436 (1) GRA, PEU, PRE.

*MacOwan* 1337 (2) GRA; 1836 (3) GRA, K. *Martin* 9252 (2) GRA. *McGaffin RUH1391* (6) GRA. *Meyer* 206 (8) PRE.

*Paterson* 10 (2) PRE; 42 (2) BOL; 91 (2) GRA. *Pym s.n.* (4) GRA.

*Rodin* 1025 (1) PRE. *Rogers* 3092 (1) GRA; 3093 (2) GRA; 23796 (6) PRE; 27962 (6) GRA.

*Schönland s.n.* (1) GRA. *Seagrief s.n.* (6) GRA. *Skinner* 5 (2) GRA. *Story* 2773 (2) PRE.

*Tait* 155 (PEU); 376i, 376ii (1) PEU.

*Urton* 962 (2) GRA.

*Van Der Walt* 256 (3) PRE. *Vlok* 1207 (6) K.

*West* 231 (6) GRA; 338 (2) GRA; 339 (1) GRA. *White* 351 (2) GRA. *Williamson s.n.* (4) TCD.

*Young sub Bolus* 5545 (6) BOL, K.

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## REFERENCES

- ARNOLD, T.H. & DE WET, B.C. 1993. Plants of southern Africa: names and distribution. *Memoirs of the Botanical Survey of South Africa* No. 62. National Botanical Institute, Pretoria.
- BAKER, J.G. 1871. *Lachenalia convallarioides*. *Journal of the Linnean Society* 11: 407.
- BAKER, J.G. 1874. *Lachenalia campanulata*. *Journal of Botany* 12: 6.
- BAKER, J.G. 1897. Liliaceae. In W.T. Thiselton-Dyer, *Flora capensis* 6: 421–436. Reeve, London.
- BARKER, W.F. 1978. Ten new species of *Lachenalia*. *Journal of South African Botany* 44: 391–418.
- BARKER, W.F. 1979. Ten more new species of *Lachenalia*. *Journal of South African Botany* 45: 193–219.
- BATTEN, A. & BOKELMANN, H. 1966. *Wild flowers of the eastern Cape Province*. Books of Africa, Cape Town.
- BOND, P. & GOLDBLATT, P. 1984. Plants of the Cape flora. A descriptive catalogue. *Journal of South African Botany*, Suppl. Vol. 13: 51–54.
- DUNCAN, G.D. 1988. The *Lachenalia* handbook. *Annals of Kirstenbosch Botanical Gardens* 17. National Botanical Institute, Cape Town.
- DUNCAN, G.D. 1996. Four new species of *Lachenalia* (Hyacinthaceae) from arid areas of South Africa. *Bothalia* 26: 1–9.
- DUNCAN, G.D. 1997. Five new species of *Lachenalia* (Hyacinthaceae) from arid areas of South Africa. *Bothalia* 27: 7–15.
- FOURCADE, H.G. 1934. *Lachenalia haarlemensis* and *L. subspicata*. Contributions to the flora of the Knysna and neighbouring divisions. *Transactions of the Royal Society of South Africa* 21: 75–102.
- FOURCADE, H.G. 1941. Check list of the flowering plants of the divisions of George, Knysna, Humansdorp and Uniondale. *Memoirs of the Botanical Survey of South Africa* No. 20.
- GLEDHILL, E. 1981. *Eastern Cape veld flowers*. Creda Press, Cape Town.
- GUNN, M. & CODD, L.E. 1981. *Botanical exploration of southern Africa*. Balkema, Cape Town.
- HALL, H. 1856. *Map of the eastern frontier from military and other surveys*. Edward Stanford, London.
- JOHNSON, M.A.T. & BRANDHAM, P.E. 1997. New chromosome numbers in petaloid monocotyledons and in other miscellaneous angiosperms. *Kew Bulletin* 52: 121–138.
- MARTIN, A.R.H. & NOEL, A.R.A. 1960. *The flora of Albany and Bathurst*. Rhodes University, Grahamstown.
- MORIARTY, A. 1982. *South African wild flower guide 2. Outeniqua, Tsitsikamma and eastern Little Karoo*. Botanical Society of South Africa, Cape Town.
- ORNDUFF, R. & WATTERS, P.J. 1978. Chromosome numbers in *Lachenalia*. *Journal of South African Botany* 44: 387–398.
- SCHONLAND, S. 1910. On some flowering plants from the neighbourhood of Port Elizabeth. *Transactions of the Royal Society of South Africa* 1: 441–446.
- THORPE, C. 1977. *Tharfield. An eastern Cape farm*. Thorpe, Port Alfred.
- URTON, N. & PAGE, D. 1993. *Plants of the Swartkops Valley Bushveld*. Swartkops Trust, Port Elizabeth.
- WHITE, F. 1983. *The vegetation of Africa*. UNESCO, Paris.