

## Systematics of the southern African *Lapeirousia corymbosa* complex (Iridaceae–Ixioidae), with *L. neglecta* sp. nov.

Peter Goldblatt

B.A. Krukoff Curator of African Botany, Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166, U.S.A.

and

John C. Manning

National Botanical Institute, Kirstenbosch, Private Bag X7, Claremont, 7735 Republic of South Africa

Received 4 December 1991; revised 21 May 1992

Circumscription of *Lapeirousia corymbosa*, type species of subgenus *Paniculata* section *Fastigiata*, previously regarded as comprising three subspecies, is restricted to plants with small blue (or white) flowers with symmetrical white markings, and usually symmetrically disposed stamens. Subsp. *fastigiata* is elevated to species rank as *L. fastigiata*, and comprises plants with large yellow, actinomorphic flowers. *Lapeirousia azurea*, until now included in subsp. *fastigiata*, is treated as a separate species for plants with large dark blue, zygomorphic, and typically resupinate flowers. Field studies indicate that *L. corymbosa* subsp. *alta* is a distinct species, here described as *L. neglecta*. Floral morphology differs consistently in each species, as do aspects of leaf, capsule and seed morphology. Comparison of seeds in the two sections of subgenus *Paniculata* shows that species of section *Fastigiata* are derived in their smaller, reticulate (to rugose), ovoid seeds with a large funicular appendage. Seeds of section *Paniculata* accord closely with those of the presumed outgroup, *Savannosiphon*: they are comparatively large, smooth to rugulose and have a small appendage. *Lapeirousia neglecta* has seeds and chromosome morphology characteristic of section *Paniculata*, and it is now assigned to that section. The addition of *L. neglecta* to section *Paniculata* extends the range of the section from tropical and subtropical Africa to the south-western Cape.

Omskrywing van *Lapeirousia corymbosa*, tipe-spesie van subgenus *Paniculata* seksie *Fastigiata*, voorheen beskou as bestaande uit drie subspesies, word beperk tot plante met klein blou (of wit) blomme met simmetriese wit merke en gewoonlik simmetries gerangskikte meeldrade. Subsp. *fastigiata* word verhef tot spesierang as *L. fastigiata*, en bestaan uit plante met groot, geel, aktinomorfiiese blomme. *Lapeirousia azurea*, tot nou by subsp. *fastigiata* ingesluit, word behandel as 'n afsonderlike spesie vir plante met groot, donkerblou, sigomorfiiese en tipies geresupineerde blomme. Ondersoek in die veld dui daarop dat *L. corymbosa* subsp. *alta* 'n afsonderlike spesie is, hier beskryf as *L. neglecta*. Blommorfologie, asook aspekte van blaar-, vrug- en saadmorfologie, verskil deurgaans by elke spesie. Vergelyking van sade van die twee seksies van subgenus *Paniculata* toon dat spesies van seksie *Fastigiata* afgelei is deurdat hulle kleiner, geretikuleerde (tot rimpelrige), eiervormige sade met 'n groot funikulêre aanhangsel het. Sade van seksie *Paniculata* stem nou ooreen met dié van die vermoedelike buitegroep, *Savannosiphon*; hulle is betreklik groot, glad tot fyngerimpel en het 'n klein aanhangsel. *Lapeirousia neglecta* se sade en chromosoom-morfologie is kenmerkend van dié van seksie *Paniculata*, en dit word nou by daardie seksie ingesluit. Die toevoeging van *L. neglecta* tot seksie *Paniculata* brei die verspreidingsgebied van die seksie uit vanaf tropiese en subtropiese Afrika tot die Suidwes-Kaap.

**Keywords:** Seed morphology, chromosome cytology, taxonomy, phytogeography.

### Introduction

The widespread African genus *Lapeirousia* comprises some 40 species, currently assigned to one of two subgenera, *Paniculata* and *Lapeirousia* (Goldblatt & Manning 1990). Subgenus *Paniculata* is subdivided into section *Paniculata*, largely tropical African, and section *Fastigiata*, restricted to the south-western Cape. Over the past 20 years evidence has accumulated indicating a need for redefinition of Goldblatt's (1972) circumscription of *Lapeirousia corymbosa*, type species of section *Fastigiata*. Although regarded as comprising three subspecies, subsp. *fastigiata*, subsp. *alta*, and subsp. *corymbosa* by Goldblatt, extended studies of living populations indicate that *L. corymbosa* is best treated as constituting four separate species. Of these, *L. corymbosa*, *L. fastigiata* and *L. azurea*, constitute a close-knit alliance

within section *Fastigiata*. The fourth, *L. neglecta* (formerly subsp. *alta*), appears to belong to section *Paniculata*. The four species grow in different habitats and do not intergrade, although locally there may be interspecific hybridization, and they can always be immediately distinguished in the field (and usually in the herbarium). Although *L. corymbosa*, *L. fastigiata* and *L. azurea* are more closely related to one another than to other species of section *Fastigiata*, they seem sufficiently distinct from one another to be accorded specific rank.

The profuse flowering of *Lapeirousia neglecta* in 1989 for the first time in some 25 years, has made it possible to examine fresh flowers, and also capsules and seeds, previously unknown, and to determine its chromosome number. Differences between it and the other species of section

*Fastigiata* make it amply clear that *L. neglecta* is not only separate from *L. corymbosa* but that it is better placed in section *Paniculata* (Goldblatt & Manning 1990).

The recognition of *Lapeirousia fastigiata* and *L. azurea* increases the number of species in section *Fastigiata* to five. Addition of *L. neglecta* to section *Paniculata* brings the total number of species in that section to 15 and extends its total range to include the south-western Cape as well as a large part of tropical and subtropical Africa.

### Materials and Methods

Only fully mature seeds were examined, these either harvested in the field or from herbarium specimens collected in mature fruit. Seeds were examined under the dissecting microscope to score for characters listed in Table 1. Representative examples of each type were also examined under the scanning electron microscope (SEM). In the latter case, untreated seeds were glued with adhesive on aluminium stubs, and sputter-coated with gold. Specimens were observed at an accelerating voltage of 15 kV.

For chromosome analysis, root tips of germinating seeds were pretreated in saturated aqueous M-bromonaphthalene at room temperature for 4 h, then fixed in 3:1 absolute ethanol:glacial acetic acid. Tips hydrolysed in 10% HCl at 60°C for 6 min were then squashed in FLP orcein (Jackson 1973).

### Seed morphology

#### Section *Fastigiata*

Seeds of *Lapeirousia corymbosa* (Figures 1, 2), representative of section *Fastigiata*, are broadly ovoid, somewhat obliquely flattened to concave at the chalazal end, and  $0.75 - 1.25 \times 0.75 - 1$  mm, *i.e.*, somewhat longer in the funicle–chalaza axis than the diameter at right angles to this. The seed has a conspicuous appendage, a thickened funicle, at the hilum, sometimes up to 0.5 mm long (the appendage may break off the seed). The appendage is surrounded at its base by a micropylar collar of cells continuous with the rest of the seed surface, and is continuous with the raphe which terminates near the chalazal end of the seed. The seed surface is coarsely and irregularly reticulate, with the individual cells polygonal with more or less straight anticlinal walls and the margins slightly sunken (Figure 2). Seeds of *L. micrantha*, *L. fastigiata* and *L. azurea* conform to this pattern although they differ somewhat in size (Table 1) and in having a less developed funicular appendage, which in *L. azurea* seldom reaches 0.4 mm in length. The seed surface of *L. azurea* is only lightly reticulate to obscurely rugose. A funicular appendage appears to be lacking in *L. micrantha* but the micropylar collar is particularly well-developed in our sample.

#### Section *Paniculata*

Usually larger than those of section *Fastigiata*, the seeds of section *Paniculata* are generally 2 – 2.5 mm in diameter (Table 1). Fully developed seeds are either uniformly rounded or randomly faceted by pressure from adjacent seeds (Figures 3 – 6). Surfaces are smooth to lightly rugose to obscurely reticulate. Individual cells have flat to lightly domed outer periclinal walls with sunken margins (Table 1), but possibly due to collapse, the outer wall may also be flat

in parts of the same seed. Seeds of *Lapeirousia neglecta* prove to be fairly representative of the section (Figures 3 – 4), and are more or less globose,  $2 - 3 \times 1.75 - 2.5$  mm, and the chalazal end is slightly flattened to concave. The micropylar end terminates in a small appendage 0.25 – 0.5 mm long, also surrounded by a small collar-like fold of cells continuous with the outer cell layer of the rest of the seed (Figure 3). The rugulose (– weakly reticulate) surface consists of polygonal cells (often hexagonal) with straight anticlinal walls and mostly sunken margins (Figure 4).

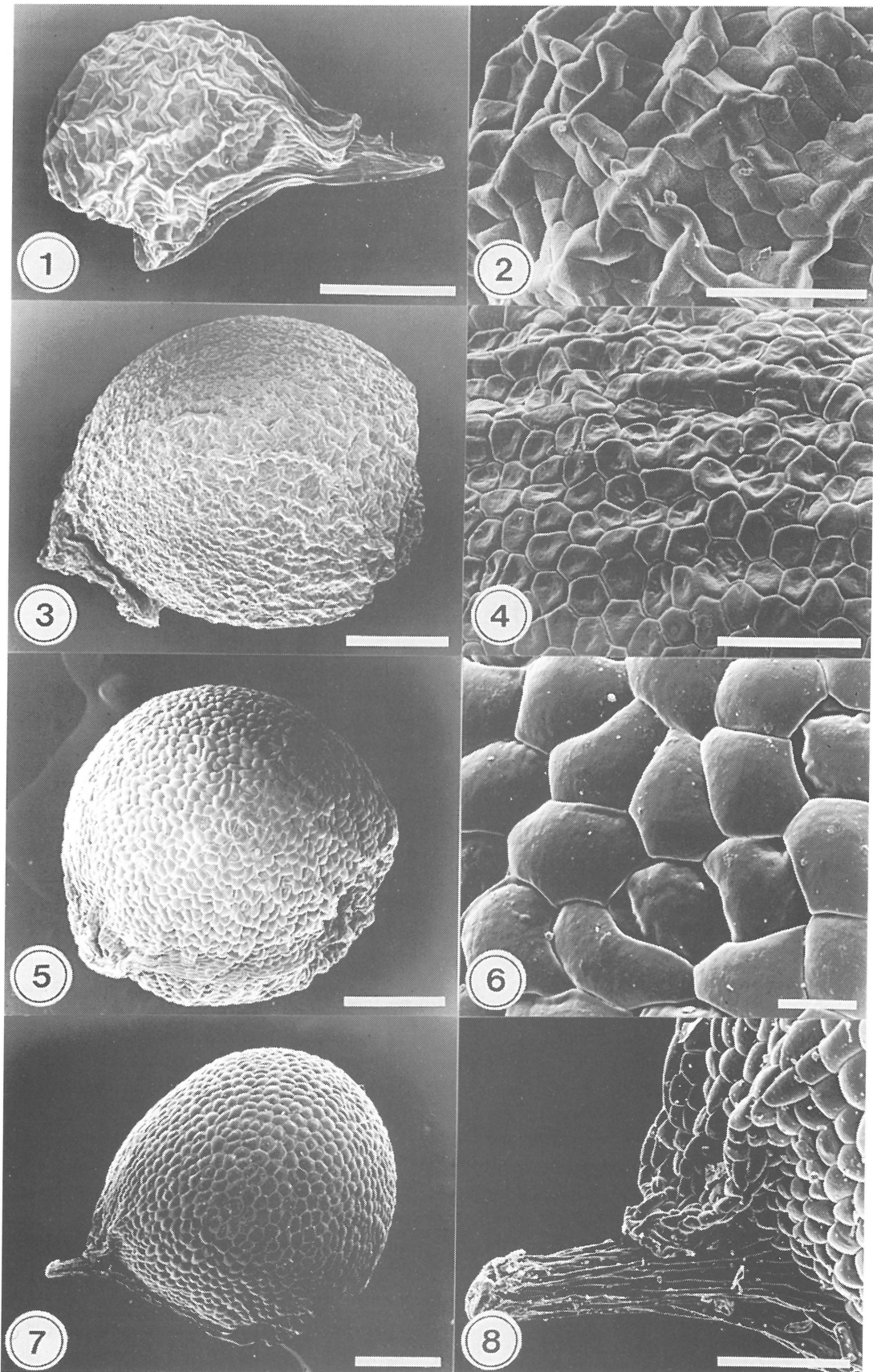
While most species of the section have seeds of similar size and shape, one member of the section, *L. setifolia* (Table 1), has seeds as small as those of section *Fastigiata*, although they correspond in other features to those of section *Paniculata*.

#### Subgenus *Lapeirousia*

In this predominantly southern African subgenus, two south-western Cape species, *L. jacquinii* and *L. arenicola* (Table 1) have seeds that correspond most closely with those of section *Paniculata*, both in their comparatively large size and in their globose shape with rather small funicular appendages (Figure 7). However, their surfaces are evenly rounded, lacking primary sculpturing. The epidermal cells are colliculate (Figure 8), having strongly domed outer walls with recessed margins (Table 1). Seeds of the two tropical members of the subgenus, *L. littoralis* and *L. odoratissima*, differ from this pattern in having a lightly rugose surface, but the individual cells are generally domed or have flat outer periclinal walls with recessed margins. These seeds are indistinguishable from those of section *Paniculata*, in contrast to the distinctive, uniformly colliculate seeds of *L. jacquinii* and *L. arenicola*.

Seeds of *Savannosiphon*, the genus probably most closely related to *Lapeirousia* (Goldblatt & Marais 1979; Goldblatt 1989; Goldblatt & Manning 1990), were examined as an outgroup for assessing the variation within *Lapeirousia*. The seeds are comparable in size and shape with those of subgenus *Paniculata* section *Paniculata* and subgenus *Lapeirousia* (Table 1),  $1.8 - 2.2 \times 1.9 - 2.3$  mm. Although the diameter is sometimes greater than the length, this is not sufficiently consistent to be considered a stable feature of the seed, which must be described as more or less globose. The funicular appendage is small and the collar weakly developed. Individual cells are lightly domed or more or less flat and the overall surface is lightly sculptured, thus rugulose. Placed side by side with *L. erythrantha* and *L. coerulea* (both section *Paniculata*), seeds of *Savannosiphon* can be distinguished only by an almost imperceptibly greater surface irregularity and slightly larger size. Seeds of *L. neglecta* and *Savannosiphon* appear to be identical.

It seems reasonable to assume that the type of seed found in section *Paniculata* and *Savannosiphon* represents the basic type for the clade. Thus the seeds of section *Fastigiata* are apomorphic in their small size, reticulate sculpturing, a well-developed appendage and ovoid shape (longer funicular axis). These four characteristics presumably represent synapomorphies for the section. The absence of primary sculpturing in the seeds of some of the species of subgenus *Lapeirousia* and their strongly domed cells may represent a second line of specialization within the genus.



Figures 1 – 8 SEM micrographs of lateral views and surface detail of seeds of *Lapeirousia*. 1, 2. *L. corymbosa*. 3, 4. *L. neglecta*. 5, 6. *L. erythrantha*. 7, 8. *L. jacquinii*, with detail of funicular appendage. Magnification: scale bar for Figures 1, 3, 5, 7: 500  $\mu\text{m}$ ; for Figures 2, 4, 6, 8: 200  $\mu\text{m}$ .

### Chromosome cytology

Chromosome number in *Lapeirousia neglecta* is  $2n = 12$  (Table 2) and the karyotype is bimodal, consisting of one

pair of very large acrocentric chromosomes, ca. 6  $\mu\text{m}$  long, and five pairs of small submetacentric to metacentric chromosomes, 1.5 – 2  $\mu\text{m}$  long (Figure 9A). Mean total

**Table 1** Seed characteristics of *Lapeirousia* and *Savannosiphon*<sup>a</sup>

Taxon	Seed shape	Diam. (mm)	Length (mm)	Surface sculpturing	Cell surface
<b>Subgenus <i>Paniculata</i> section <i>Fastigiata</i></b>					
<i>L. azurea</i>	ovoid	0.8–1.1	1–1.3	rugose-reticulate	± flat
<i>L. corymbosa</i>	ovoid	0.7–1	0.7–1.25	reticulate	± flat
<i>L. fastigiata</i>	ovoid	0.8–0.9	0.9–1	reticulate	± flat
<i>L. micrantha</i>	ovoid	1.3–1.6	1.4–1.6	reticulate	± flat
<b>Subgenus <i>Paniculata</i> section <i>Paniculata</i></b>					
<i>L. coerulea</i>	± globose	1.3–2	1.3–2	smooth	flat (–domed)
<i>L. erythrantha</i>	globose	1.8–2	1.6–1.9	smooth	mostly ± domed
<i>L. neglecta</i>	ovoid to globose	2–2.5	1.75–2.5	rugulose	flat
<i>L. gracilis</i>	globose	1.9–2.4	2–2.2	smooth	± flat
<i>L. setifolia</i>	globose	1.3–1.8	1–1.3	smooth	mostly flat
<b>Subgenus <i>Lapeirousia</i></b>					
<i>L. arenicola</i>	globose	1.4–1.5	1.4–1.5	smooth	domed
<i>L. jacquinii</i>	globose	1.3–1.5	1.3–1.5	smooth	domed
<i>L. littoralis</i>	globose	2–2.5	2–2.3	rugose – reticulate	± domed
<i>L. odoratissima</i>	globose	2.3–2.5	2.2–2.5	rugulose	domed
<i>Savannosiphon euryphylla</i>	globose	1.7–2.2	1.9–2.3	rugulose	± flat or lightly domed

<sup>a</sup> Seed length is measured through the funicular–chalazal axis; seed diameter is the short axis at right angles to the funicular–chalazal axis.

chromosome length in *L. neglecta* is 30  $\mu\text{m}$ .

In contrast, the species of section *Fastigiata* (Table 2) have  $2n = 20$  (– 22) (Goldblatt 1972, 1990a). However, they also have a bimodal karyotype with one long acrocentric chromosome pair *ca.* 8  $\mu\text{m}$  long and the remaining nine small pairs 2 – 2.5  $\mu\text{m}$  long (Figure 9B). A rough measure of the total length of the chromosome complement suggests that species of section *Fastigiata* may have some 30% more chromosome material (Table 2) than *L. neglecta*. However, linear measure of total chromosome length is so crude an estimate of comparative genome size that this difference may be accounted for by greater contraction of the chromosomes. Nevertheless, the relationship between the karyotypes of *L. neglecta* and the species of section *Fastigiata* clearly cannot be one of direct polyploidy as both have only one pair of large chromosomes.

Chromosome numbers in other species of section *Paniculata* (Table 2) range from  $2n = 16$  to 6 (Goldblatt 1990a). Among the varied karyotypes in the section, three species have bimodal karyotypes with one large chromosome pair: *L. avasmontana* ( $2n = 16$ ), *L. gracilis* ( $2n = 12$ ) and *L. sandersonii* ( $2n = 10$ ). The karyotype of *L. neglecta* thus falls within the range found in section *Paniculata* and, except for the apparently smaller amount of chromosome material, is strikingly like that of *L. gracilis* (Figure 9C).

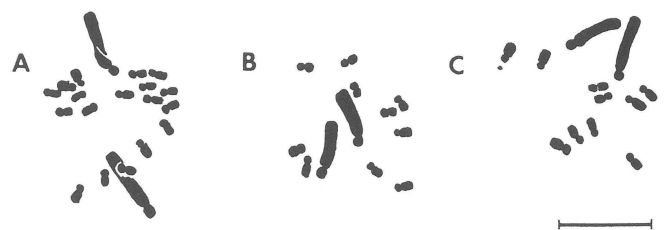
### Flower and leaf morphology

*Lapeirousia corymbosa* consistently has relatively small

**Table 2** Chromosome numbers and mean total length of the chromosome complement in *Lapeirousia* (from Goldblatt 1990a) with original data for *L. neglecta*<sup>a</sup>

Taxon	Diploid number	Total chromosome length ( $\mu\text{m}$ )
<b>Subgenus <i>Paniculata</i></b>		
<b>Section <i>Fastigiata</i></b>		
<i>L. corymbosa</i>	20	—
<i>L. fastigiata</i>	20	—
<i>L. falcata</i>	20	—
<i>L. micrantha</i>	20	41.2
<b>Section <i>Paniculata</i></b>		
<i>L. abyssinica</i>	8	40.5
<i>L. avasmontana</i>	16	40.0
<i>L. bainesii</i>	6	45.5
<i>L. coerulea</i>	8	40.7
<i>L. erythrantha</i>	12	57.3
<i>L. gracilis</i>	12	34.1
<i>L. neglecta</i>	10	30
<i>L. otaviensis</i>	10	46.8
<i>L. rivularis</i>	12	59.5
<i>L. sandersonii</i>	10	38.2
<i>L. schimperi</i>	10	49.1
<i>L. setifolia</i>	8	38.2
<b>Comparative data for subgenus <i>Lapeirousia</i></b>		
<b>Section <i>Sophronia</i></b>		
<i>L. littoralis</i>		
subsp. <i>littoralis</i>	16	43.6
subsp. <i>caudata</i>	16	40.6
<i>L. odoratissima</i>	16	39.5
<i>L. anceps</i>	20	43.5
<b>Section <i>Lapeirousia</i></b>		
<i>L. arenicola</i>	16	38.8
<i>L. dolomitica</i>	16	34.1

<sup>a</sup> Measurements were made from camera lucida drawings of karyotypes of estimated comparable degree of contraction, all at the same magnification. The low reading for *L. neglecta* may be due to a difference in degree of contraction, especially as this species was studied at a later date from all the others. No comparable measurements of total chromosome length are available for *L. corymbosa*, *L. fastigiata* or *L. falcata*, cytological preparations of which were made using a different technique (Goldblatt 1971).



**Figure 9** Metaphase chromosomes of *Lapeirousia*. A. *L. neglecta*,  $2n = 12$ . B. *L. micrantha* (section *Fastigiata*),  $2n = 20$ . C. *L. gracilis* (section *Paniculata*),  $2n = 12$ . Scale bar: 5  $\mu\text{m}$ .

flowers, either pale or medium blue, or occasionally white, with a central white star-shaped marking outlined in dark blue (Figure 10). The tepals (7 – 10 mm long) and bracts (4 – 7 mm long) of this species are the smallest in the complex, and the flowers are normally actinomorphic. In populations in the north of its range between Wellington and Tulbagh,



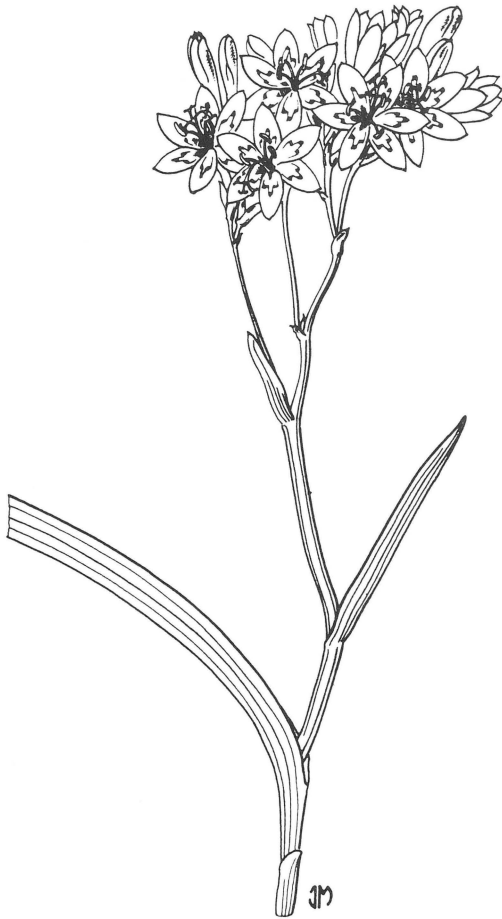


Figure 10 Morphology of *Lapeirousia corymbosa*. Scale:  $\times 50\%$ .

plants have flowers with asymmetrically disposed, unilateral stamens but a regular perianth with symmetrical markings.

*Lapeirousia fastigiata* and *L. azurea* have larger flowers (tepals 12 – 18 mm long) and bracts (5 – 10 mm long), and typically broader and shorter leaves, usually with crisped and undulate margins (Figures 11A, 11B). These leaves are rather different from those of *L. corymbosa* which generally has narrower, plane, or sometimes lightly undulate to weakly crisped leaves. The flowers of *L. fastigiata* are always actinomorphic and pale yellow with a dark brownish to purple mark near the base of each tepal (Figure 11A). In contrast, *L. azurea* has a nearly regular perianth but the stamens are unilateral and the three abaxial tepals have deep blue to black markings (sometimes outlined in white). In especially crowded inflorescences the flowers sometimes appear resupinate owing to an adaxial tilting so that the stamens appear declinate, and are so oriented that they lie above the adaxial (and in non-resupinate zygomorphic flowers normally upper) tepals (Figure 11B).

*Lapeirousia neglecta* has zygomorphic flowers with either a white or blue perianth and unilateral, arcuate stamens (Figure 12). It also differs from the three species of the *L. corymbosa* complex in having (2 –) 3 – 5 linear-lanceolate and plane basal leaves, a relatively lax inflorescence, and membranous bracts that become dry apically towards the end of the flowering season. All these features are consistent with section *Paniculata*, and the last two are diagnostic for the section (Goldblatt & Manning 1990; Goldblatt 1990b).

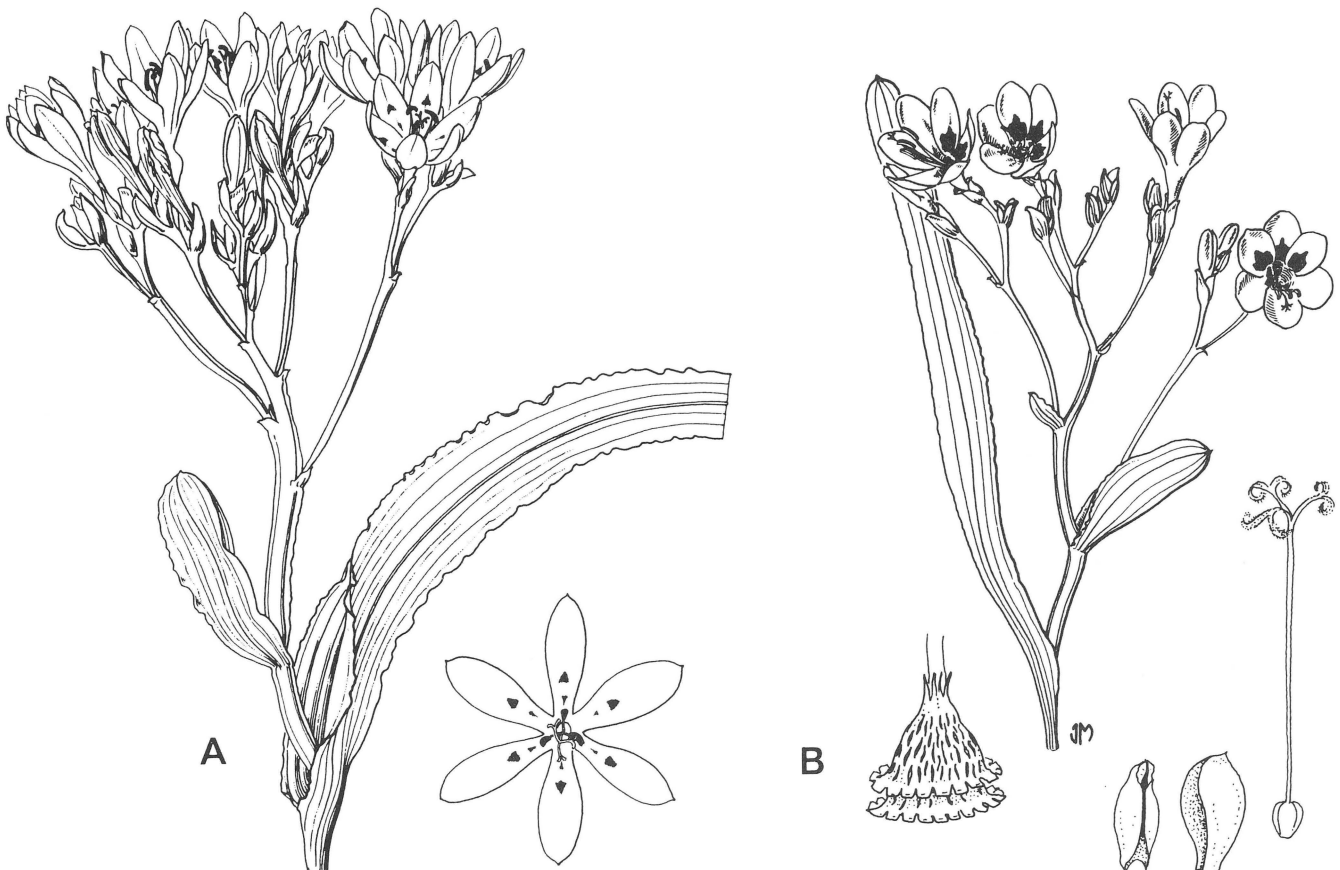


Figure 11 Morphology of *Lapeirousia fastigiata* (A) and *L. azurea* (B). Scale: whole plants:  $\times 50\%$ ; single flower of *L. fastigiata*, corm, and bracts of *L. azurea*: full size; style much enlarged.



Figure 12 Morphology of *Lapeirousia neglecta*. Scale: 50%.

### Ecology and geography

*Lapeirousia corymbosa* is a species of low altitudes, occurring on lower mountain slopes and flats in stony sand or gritty granite-derived gravel. *Lapeirousia fastigiata* occurs only on lower mountain slopes in shale soils in renosterveld while *L. azurea* is a lowland species mostly of granite-derived sands. The remaining species of section *Fastigiata*, *L. micrantha* and *L. falcata* occur in montane habitats in fynbos vegetation, typically in rocky sites, in sandstone-derived soils. *Lapeirousia falcata* shows a marked preference for rock outcrops where it thrives in shallow soils among mosses. This pattern indicates a strong degree of habitat partitioning among the five species of section *Fastigiata*.

*Lapeirousia neglecta* grows in rocky sandstone-derived soil typical of the Cape mountains, and it shares with much of the geophytic montane flora of the region the habit of flowering in mass after fires and seldom at other times. Its infrequent flowering and scattered montane distribution make it one of the least known species of the genus. Flowering in the species of section *Fastigiata* is also enhanced after fires or brush-clearing, but rarely to the same extent as

in *L. neglecta*. The discovery that *L. neglecta* is misplaced in section *Fastigiata* and belongs in the otherwise tropical to subtropical section *Paniculata*, poses some interesting questions about the phylogeography of the section. Is *L. neglecta* a relict of the once wider range of the section or a recent arrival to the Cape region? And might *L. neglecta* be ancestral to the section *Fastigiata* clade, which is derived in seed and leaf morphology, and in its congested inflorescence?

### Systematics

Key to *Lapeirousia* subgenus *Paniculata* in the southwestern Cape

The numbers against species names indicate the sequence dealt with here. *L. falcata* and *L. micrantha* are not included in the systematic treatment and are thus not numbered.

- 1a. Inflorescence laxly paniculate with at least some of the ultimate branches bearing 2 – 4 sessile flowers; basal leaves 2 – 5, linear to narrowly lanceolate (section *Paniculata*) ..... 4. *L. neglecta*
- 1b. Inflorescence either a spike or a congested, more or less corymbose panicle with the ultimate branches bearing 1 – 5 sessile flowers; basal leaf single, usually falcate, often with crisped margins (section *Fastigiata*)
  - 2a. Inflorescence a simple or few-branched spike ... *L. falcata*
  - 2b. Inflorescence a corymbose pseudopanicule with the ultimate branches bearing 1 – 5 sessile flowers
    - 3a. Perianth tube 8 – 20 mm long, cylindrical for most of its length, and 2 – 3 times as long as the tepals
      - 4a. Flowers dull yellow, brown or maroon; tube 8 – 10 mm long, tepals 3 – 5 mm long ..... *L. micrantha*
      - 4b. Flowers blue; tube 18 – 20 mm long, tepals 7 – 8 mm long ..... 1. *L. corymbosa* variant
    - 3b. Perianth tube 4 – 12 mm long, funnel-shaped, the tepals more or less cupped and usually 7 – 15 (– 20) mm and about as long as, or longer than, the tube
      - 5a. Flowers blue (rarely entirely white) with a white star-shaped pattern in the centre; leaf margins straight or rarely the margins lightly undulate to crisped; tepals 7 – 10 mm long ..... 1. *L. corymbosa*
      - 5b. Flowers pale yellow or if deep blue, then without white markings; leaf margins undulate and strongly crisped; tepals usually 12 – 15 (– 18) mm long
        - 6a. Flowers actinomorphic, pale yellow with a small dark marking in the lower midline of each tepal; stamens symmetrically disposed, ascending, with filaments ca. 10 mm long ..... 2. *L. fastigiata*
        - 6b. Flowers zygomorphic, deep blue with a dark blue to blackish mark (sometimes outlined in white) on each of the three lower tepals; stamens unilateral with filaments 11 – 15 mm long .... 3. *L. azurea*

Section *Fastigiata* Goldblatt1. *Lapeirousia corymbosa* (L.) Ker (Figure 10)

Curtis's Bot. Mag. 16: tab. 595 (1802). Baker, Fl. Cap. 6: 90 (1896), in part excl. var. *azurea*. Marloth, Fl. S. Africa 4: pl. 43 (1915). Goldblatt, Contrib. Bolus Herb. 4: 20 (1972), excl. *L. azurea* and *L. fastigiata* as subsp. *fastigiata* and *L. neglecta* as subsp. *alta*.

*Ixia corymbosa* L., Sp. Pl. 51 (1753).

*Ixia crispifolia* Andrews, Bot. Rep. 1: tab. 35 (1798). TYPE: South Africa, Cape, without precise locality, figure in Bot. Rep. tab. 35.

*Lapeirousia corymbosa* var. *purpurea* Klatt, Trans. S. African Phil. Soc. 3: 204 (1885). TYPE: S. Africa, Cape, Fish Hoek, MacOwan 2284 (SAM, as Noordhoek).

TYPE: South Africa, Cape, near Camps Bay, sandy rocky ground, MacOwan in Herb. Norm. Austr. Afr. 268 (neotype, SAM; isotypes, BM, BOL, G).

Plants 6 – 15 (– 21) cm high. *Corms* 10 – 15 mm in diam. at the base, tunics blackish. *Cataphylls* 2, membranous, pale or brownish, the inner reaching shortly above the ground. *Leaves* 2 (– 3), the lower one (or rarely 2) basal, usually falcate, 10 – 25 (– 40) cm long, 4 – 8 (– 14) mm at the widest, margins usually straight, sometimes undulate, rarely lightly crisped, subacute to acute, with a prominent midrib and one or a pair of secondary veins on either side almost as prominent, the upper inserted in the middle third of the stem, 2.5 – 8 cm long, narrowly oblong, margins more or less straight, not or hardly sheathing at base. *Stem* flexuose, compressed and winged, 4 – 10 branched, the branches subtended by bracts (1 –) 2 – 5 mm long, these sometimes leaf-like below and then longer. *Inflorescence* a congested pseudopanicule, more or less corymbose, the flowers crowded at the apices of the branches, the ultimate branchlets 1 – 2 flowered; *bracts* herbaceous, usually red on the margins, 4 – 7 mm long, the inner about as long as the outer, obtuse or the inner slightly emarginate. *Flowers* actinomorphic, light to dark blue with a white throat and lower half of the tepals, rarely whitish with pale bluish markings; *perianth tube* funnel-shaped, 4 – 7 (– 8) mm long; *tepals* elliptic, obtuse, 7 – 10 mm long, (2.3 –) 3 – 4 mm wide. *Filaments* symmetrically disposed, 6 – 8 mm long, exerted for 3 – 4 mm; *anthers* 2.5 – 3 mm long, pollen blue to grey, or whitish. *Ovary* globose, 1.5 mm long, style dividing between the base and upper third of the anthers, the branches 1.5 – 2 mm long, divided for about half their length. *Capsules* trigonous-turbinate, 4.5 – 5.5 mm long, with up to 6 seeds per locule; *seeds* broadly ovoid, somewhat obliquely flattened to concave at the chalazal end, dark brown, 0.7 – 1 × 0.7 – 1.25 mm, funicular appendage up to 0.5 mm long.

Flowering October to mid-November (rarely in December).

## Distribution and habitat

The relatively late spring-flowering *Lapeirousia corymbosa* is found on sandy, well-drained soils derived from Cape sandstone or weathered granite. It extends from the western Cape coastal plain near Darling through the Cape Peninsula and Cape Flats to Hermanus and Bredasdorp. Once fairly common, it is becoming rare, especially on lowland sites,

now mostly given over to farmland or urban development. It can still be found on lower mountain slopes and, especially after fires, may be common.

## Diagnosis and relationships

The crowded, more or less corymbose pseudopanicule of pale to deep blue and white flowers immediately distinguishes *Lapeirousia corymbosa* from other southern African members of the genus. The flowers are also distinctive in their actinomorphic perianth with a star-shaped central mark (Figure 10). Although plants in the north of its range have unilateral stamens, the perianth shape and coloration remain constant. Confusion is possible with the deep blue-flowered *L. azurea* especially in the case of poorly preserved specimens. However, the flowers and bracts of *L. corymbosa* are always smaller than those of *L. azurea*, the tepals seldom more than 7 – 10 mm long, compared with 12 – 20 mm in *L. azurea*. When alive, the larger, dark blue, zygomorphic and sometimes resupinate flower of *L. azurea* is unmistakable.

White-flowered plants occur occasionally in several populations across the range of *Lapeirousia azurea* but at Riverlands near Malmesbury all plants have white flowers. In other respects the plants from Riverlands appear to conform closely with other populations of *L. corymbosa*.

A particularly unusual population of *Lapeirousia* section *Fastigiata* from the Cape Point Reserve is tentatively included in *L. corymbosa*. Plants collected by N.S. Pillans in November 1921, but only recently incorporated in the Bolus Herbarium, resemble *L. corymbosa* in general appearance, but the flowers have a slender tube 18 – 20 mm long, ca. 1 mm diam. at the base and ca. 2 mm diam. at the mouth, and tepals 7 – 8 × ca. 3 mm. Orientation of the tepals is unrecorded and cannot be determined from the available specimens. The tepals appear self-coloured, which accords with Pillans's comment 'flowers blue'. These plants do not accord exactly with any species of section *Fastigiata* and we have tried without success to relocate living plants in an effort to learn more about them. The locality mentioned by Pillans, west end of the plateau west of Buffels Bay, Cape Point, was burned in the summer of 1991, providing ideal conditions for spring-flowering of *Lapeirousia*. Only typical *L. corymbosa* plants were located in this general area. Until more material can be located we prefer not to give taxonomic recognition to the four poorly preserved specimens that comprise the collection. These plants are accounted for in the key as '*L. corymbosa* variant', but we have not altered the description of *L. corymbosa* to accommodate this variant.

## History

Known to science at least since the last decade of the 17th century when it was figured by Plukenet (1696) as *Caryophyllus monomatapensis*, *Lapeirousia corymbosa* was assigned to the genus *Ixia* by Linnaeus in 1753. The English botanist, John Bellenden Ker (née Gawler), was the first to realize that it belonged in *Lapeirousia*, then spelled *Lapeyrouisia*, a genus erected by Pourret in 1788 for *L. compressa* (now *L. fabricii*). Baker's treatment of the species in Flora Capensis (1896) included as a variety of *L. corymbosa* the plant we here recognize as *L. azurea*. Baker

also regarded what we consider a second species, *L. fastigiata*, as a synonym of typical *L. corymbosa*, although he did recognize *L. purpureo-lutea*, the type of which is conspecific with *L. fastigiata*. *Lapeirousia azurea* and *L. fastigiata* were regarded by Goldblatt (1972) as a single subspecies of *L. corymbosa*. We consider this treatment no longer tenable for reasons already outlined.

A neotype is designated for *Lapeirousia corymbosa* as the original specimen on which Linnaeus based the species is lost. The specimen now in the Linnaean Herbarium was collected by Anders Sparrman, ca. 1771, some years after the publication of the protologue of *L. corymbosa*. Because of its good condition, known geographic source, and duplication in several herbaria, we have chosen *MacOwan 268* as a neotype.

### Selected specimens examined

South Africa, Cape

—**33.18** (Cape Town): Riverlands between Mamre Road and Malmesbury (–BC), *Esterhuysen s.n.* (MO); Lions Head (–CD), *H. Bolus 2819* (K), *Salter s.n.* (SAM 55615), *Steyn 679* (NBG); Table Mt., *Ecklon s.n.* or *545 'L. azurea'* (C, G, K); Claremont flats, *Wolley Dod 389* (BOL, K); Paarl Mt, southern end near Taal Monument (–DB), *Goldblatt 7922* (MO); between Groot Drakenstein and the foot of Paarl Mts (–DD), *Drège 8510* (E, G, MO); Jonkershoek, *Garside 75* (K), *269* (K), *Werdermann & Oberdieck 353* (B, MO).

—**33.19** (Worcester): Tulbagh (–AC), *Pappe s.n.* (SAM 20983); 1 mile south of Tulbagh Road Station, *Goldblatt 203* (BOL); Tulbaghskloof, *Ecklon & Zeyher Irid. 245* (77.9) (G); Bains Kloof, lower west slopes (–CA), *Goldblatt 590* (BOL); Botha, farm Schoonuitzig (–CB), *Walters 1230* (NBG); French Hoek, between Kriel and Robertsvei (–CC), *Phillips 1314* (SAM); Villiersdorp (–CD), *de Lange 18424* (BM).

—**34.18** (Simonstown): Bergvliet farm (–AB), *Purcell s.n.* (SAM 90197, 90200); burnt lower slopes of Klaasjagersberg, opposite Cape Point Reserve, *Goldblatt 5259* (MO); Smitswinkel (–AD), *Compton 8024* (NBG); near entrance to Cape Point Reserve (–AB), *Lavranos 3747* (MO); Buffels Bay (–AD), *Compton 6381* (NBG); near Sir Lowrys Pass, 250 m (–BB), *Schlechter 5362* (G, GRA, K); Lourensford Estate, Somerset West, *Parker 4208* (BOL, NBG); Steenbras River mouth, *Compton 18831* (NBG); Betty's Bay, Porter Reserve (–BD), *Ebersohn 162* (NBG).

—**34.19** (Caledon): Caledon, 300 m (–AB), *Schlechter 5569* (B, GRA, MO, Z); Hermanus, Vogelklip (–AD), *Williams 511* (MO); Fernkloof Nature Reserve, *Orchard 291* (MO), *493* (MO); Vogelgat near Hermanus, *Goldblatt 7914* (MO); 8 miles from Stanford on the road to Elim, *Gillett 4503* (MO); between Baard-scheerdersbos and Elim (–DA), *Goldblatt 7106* (MO).

—**34.20** (Bredasdorp): Strandkloof (–CA), *Martin 601* (NBG).

## 2. *Lapeirousia fastigiata* (Lam.) Ker in König & Sims Ann. Bot. 1: 238 (1804).

*IXIA fastigiata* Lam., Encycl. Méth. 3: 337 (1789).

*Lapeirousia corymbosa* subsp. *fastigiata* (Lam.) Goldbl., Contrib. Bolus Herb. 4: 25 (1972) (Figure 11A).

*Oviada purpureo-lutea* Klatt, Linnaea 32: 781 (1863). TYPE: South Africa, Cape, Tulbagh, collector unknown in Herb. Bergius s.n. (lectotype, SBT, designated by Goldblatt, 1972). *Lapeirousia purpureo-lutea* (Klatt) Baker, J. Linn. Soc. Bot. 16: 515 (1878); Fl. Cap. 6: 91 (1896).

TYPE: South Africa, Cape, without precise locality or collector (holotype, P – Herb. Lamarck).

Plants 10 – 20 cm high. *Corms* 10 – 16 mm in diam. at the base, tunics blackish. *Cataphylls* 2, membranous; pale or brownish, the inner reaching shortly above the ground. *Leaves* 2, the lower inserted at ground level, largest, falcate, 8 – 15 (– 25) cm long, 11 – 18 mm at the widest, margins usually undulate and crisped, rarely more or less straight, obtuse to subacute, with a prominent midrib and a pair of secondary veins on either side almost as prominent, the upper inserted in the middle third of the stem, (1.2 –) 2.5 – 4.5 cm long, oblong-lanceolate, margins more or less straight, not or hardly sheathing at base. *Stem* flexuose, compressed and winged, 3 – 5 branched, the branches subtended by bracts (1 –) 2 – 3 mm long, the lower sometimes more or less leaf-like and longer. *Inflorescence* a congested pseudopanicule, more or less corymbose, the flowers crowded at the apices of the branches, the ultimate branchlets (1 –) 2 – 5 flowered; *bracts* herbaceous, usually red on the margins, 6 – 10 mm long, the inner about as long as the outer, obtuse or the inner emarginate. *Flowers* actinomorphic, pale yellow with a purple triangular mark in the midline of the lower third of each tepal; *perianth tube* funnel-shaped, 6.5 – 8 mm long; *tepals* elliptic, obtuse, 14 – 15 mm long, 5 – 6 mm wide. *Filaments* symmetrically disposed, diverging, ca. 10 mm long; anthers 3 – 4 mm long, pollen cream. *Ovary* globose, 2 – 3 mm long, style dividing between the base and middle of the anthers, the branches 2.5 – 3 mm long, divided for ca. half their length. *Capsules* trigonous-turbinata, 5 – 6 mm long, with up to 6 seeds per locule; *seeds* ovoid, reticulate, reddish-brown, darker on the ridges, 0.8 – 0.9 × 0.9 – 1 mm, the funicular appendage up to 0.4 mm long.

Flowering late September to mid-October.

### Distribution and habitat

*Lapeirousia fastigiata* is fairly common locally in the western Cape where it occurs from Saron and Moorreesburg in the south to Piekienerskloof Pass in the north. It is restricted to shale soils on hills and lower mountain slopes, thus growing in renosterveld, which typically occurs in such places. Its flowering is enhanced by clearing or burning, but it also blooms in undisturbed vegetation. A collection from Gydouw (in the Ceres valley), *Leipoldt 3867*, some distance from the rest of the range of *L. fastigiata*, requires verification. Gydouw is perhaps a mistranscription of Gouda, where the species does grow.

### Diagnosis and relationships

Pale yellow flowers and large perianth (the tube 6 – 8 mm long and tepals 14 – 15 mm long) are sufficient to distinguish *Lapeirousia fastigiata* within section *Fastigiata*. Other species of the section have light to dark blue or violet flowers except *L. micrantha*, which has a buff to brown or maroon perianth but a much smaller flower. Both perianth and stamens of *L. fastigiata* are symmetrically arranged. Thus, *L. azurea*, which has flowers of similar size and shape, can immediately be distinguished by its asymmetrically disposed stamens and perianth with markings only on the lower three tepals, as well as by its dark blue perianth.



Collections from Piketberg (*Guthrie 2696*) and Gouda (as Piketberg Station) (*H. Bolus 13650*) that comprise plants with either yellow or blue flowers, were thought by Goldblatt (1972) to represent populations of plants intermediate between *Lapeirousia fastigiata* and *L. azurea*. Largely on this evidence, Goldblatt concluded that the two were conspecific. Additional field study has failed to reveal any other intermediates while several more populations corresponding exactly to one or other of the two species have been found. We conclude that *L. fastigiata* and *L. azurea* are separate species; the two gatherings of intermediates now seem more likely to represent hybrid individuals. That the flowers of the yellow-flowered plants of these collections differ in the intensity of purple coloration on the reverse of the tepals seems to support this argument. Comparable intrapopulational variation is rare, except among hybrids.

### History

*Lapeirousia fastigiata* seems to have been collected first before 1789, when the species was described by the French biologist Lamarck. The source of several Cape species now in the Lamarck and Jussieu collections at the Paris herbarium is uncertain, although sometimes attributed to Commerson, who is thought never to have visited the Cape (Gunn & Codd 1981). Specimens in the Bergius Herbarium in Stockholm, Sweden, assembled between 1760 and 1790, are contemporary, but their source is also unknown.

Later collections made by Ecklon and Zeyher, probably in 1829, as well as the material in the Bergius Herbarium, formed the basis for Klatt's *Ovieda purpureo-lutea*, described in 1863. Baker recognized the species, transferring it to *Lapeirousia* in 1878. *Lapeirousia purpureo-lutea*, *L. fastigiata* and *L. azurea* were united at subspecific rank under *L. corymbosa* by Goldblatt (1972), a decision based primarily on two collections of plants that appeared to be intermediate between the two species. Our knowledge of the consistently different floral morphology of *L. azurea* from several populations now suggests that it is distinct from *L. fastigiata*.

### Selected specimens examined

South Africa, Cape

—**32.18** (Clanwilliam): top of Greys Pass (Piekenierskloof) (–DB), *Taylor 967* (BOL); Piketberg (–DC), *Fremantle s.n.* (BOL 30698), *Grant 3441* (MO), *Guthrie 2696* (BOL) (partly hybrid), *Edwards s.n.* (MO); farm Deze Hoek, Piketberg, *Letty 92* (C); between Piketberg and Berg River bridge, *Barnes s.n.* (NBG); 5 miles N of Piketberg, *Salter 2720* (BOL); slopes of Versveld Pass, Piketberg, *Goldblatt 671* (BOL); north slopes of Heuningberg (–DD), *Goldblatt 650* (BOL).

—**32.19** (Wuppertal): foot of Dasklip Pass, Porterville, *Goldblatt 593* (BOL); lower slopes of the Olifants R. Mts at Cardouw Pass (–CC), *Goldblatt 4211* (MO).

—**33.18** (Cape Town): Moorreesburg (–BA), *Bachmann 775* (B), clay soil near Moorreesburg, *H. Bolus 9983* (BOL); Porterville (–BB), *Loubser 498* (NBG).

—**33.19** (Worcester): near Saron (–AA), *Schlechter 10622* (BM, E, G, GRA, K, MO, P, PH); Tulbaghskloof (–AC), *Ecklon & Zeyher Irid. 246* (G, MO); Gydouw (–CD), *Leipoldt 3867* (BOL).

—Without precise locality: between Greys Pass and Graafwater, *Leipoldt 3597* (BOL).

### 3. *Lapeirousia azurea* (Ecklon ex Baker) Goldbl., comb. et stat. nov. (Figure 11B)

*Lapeirousia corymbosa* var. *azurea* Ecklon ex Baker, Fl. Cap. 6: 90 (1896). *Lapeirousia azurea* Ecklon, Topographisches Verzeichnis 31 (1827), nom. nud.; Dietrich, Fl. Universalis t. 877 (1847–1852), name only.

*Lapeirousia corymbosa* var. *grandiflora* Klatt, Trans. S. African Phil. Soc. 3: 204 (1885). TYPE: South Africa, Cape, mountains near Houw Hoek (probably an error for Noord Hoek), *MacOwan 2284* (K, SAM).

*Ixia corymbosa* sensu Jacquin, Ic. Pl. Rar. 2: tab. 288, right fig. (1791).

*Lapeirousia corymbosa* subsp. *fastigiata* (Lam.) Goldbl., Contrib. Bolus Herb. 4: 25 (1972) in part.

TYPE: South Africa, Cape, between Paarl and Pont, *Drège 8509a* [lectotype, K, here designated from among the several collections cited by Baker (1896) because of its good preservation and duplication in other herbaria — no specimens were cited in the protologue (Baker 1892); isolecotypes, BM, G, MO, P].

Plants 7–18 (–26) cm high. *Corms* 12–16 mm in diam. at the base, tunics blackish. *Cataphylls* 2, membranous, pale or brownish, the inner reaching shortly above ground. *Leaves* 2, the lower inserted at ground level, largest, falcate, 5–12 (–24) cm long, (6–) 10–15 mm at the widest, margins undulate and crisped, obtuse to subapiculate, with a prominent midrib and a pair of secondary veins (rarely one) on either side almost as prominent, the upper inserted in the middle third of the stem, 2–7 cm long, oblong-lanceolate, margins more or less straight, not or hardly sheathing at base. *Stem* flexuose, compressed and winged, 5–7 branched, the branches subtended by bracts (1–) 2–5 mm long, these sometimes leaf-like below. *Inflorescence* a congested pseudopanicule, more or less corymbose, the flowers crowded at the apices of the branches, the ultimate branchlets 1–2 flowered; *bracts* green, firm-textured, usually red on the margins, 5–10 mm long, the inner smaller but about as long as the outer, obtuse or the inner slightly emarginate. *Flowers* zygomorphic, arcuate or resupinate, dark blue, the three abaxial, and sometimes the adjacent adaxial tepals, each with a triangular blackish, or rarely black and white, marking in the midline; *perianth tube* funnel-shaped, 8–12 mm long; *tepals* elliptic, obtuse, 12–20 mm long, 7–8 mm wide. *Filaments* unilateral and either arcuate, or due to resupination appearing declinate, 11–15 mm long, exerted for 8–10 mm; *anthers* 3–5 mm long, pollen blue or red-brown. *Ovary* globose, 2–3 mm long, style dividing opposite the upper third of the anthers, the branches 2.5–3 mm long, divided for ca. half their length. *Capsules* trigonous-turbinate, 6 mm long, with up to 8 seeds per locule; *seeds* reddish-brown, ovoid, truncate at the chalazal end, rugulose-reticulate, 0.9–1.1 × 1–1.3 mm, the funicular appendage 0.2–0.4 mm long.

Flowering late September to late October.

### Distribution and habitat

*Lapeirousia azurea* is restricted to lowland sites in the south-western Cape between the Cape Peninsula and Piketberg. It favours granitic gravel soils rather than the predominant shale-derived clay soils of the region. The high fertility of these soils has resulted in their being cultivated

or planted with vines, and *L. azurea* has consequently become rare, but it is probably not in immediate danger of extinction as it persists in a few sites distant from areas presently cultivated. It is all but certain, however, that it is extinct on the Cape Peninsula where it grew at low altitudes at Hout Bay and Noordhoek at least until the end of the nineteenth century.

#### Diagnosis and relationships

Although its general morphology suggests a close affinity with *Lapeirousia corymbosa*, *L. azurea* can always be distinguished by its larger, zygomorphic flower, with a tube 8 – 12 mm long and tepals 12 – 20 mm long, and an intensely dark blue perianth. The flower is sometimes resupinate, especially in crowded inflorescences, when the posterior (adaxial) tepals, usually erect, are tilted out of position and come to lie horizontally, thus below the abaxial (normally lower) tepals. This is unique in *Lapeirousia* and in this it resembles in particular *Babiana secunda* (Thunb.) Ker and *B. angustifolia* Sweet [= *B. pulchra* (Salisb.) G. Lewis] (Lewis 1959), in which the unilateral stamens also face the erect abaxial tepals that arch over the adaxial tepals. Although united with *L. fastigiata* as *L. corymbosa* subsp. *fastigiata* by Goldblatt (1972), *L. azurea* is probably not directly related to *L. fastigiata* despite their comparably large perianth and similar vegetative morphology. It is more likely independently derived from *L. corymbosa* or their common ancestor.

#### History

Although *Lapeirousia azurea* was figured as early as 1791 by Jacquin in the *Icones Plantarum Rariorum*, the earliest herbarium records now extant appear to be the collections of Ecklon and Zeyher, made in the late 1820's, and those made by Drège at about the same time or shortly thereafter. It is not entirely clear whether Ecklon considered *L. azurea* distinct from *L. corymbosa*, for although he mentioned both names in his *Topographisches Verzeichnis* (1827), *L. azurea* without description, collections of both *L. corymbosa* and *L. azurea* bear the latter manuscript name. *Lapeirousia azurea* was regarded as a variety of *L. corymbosa* by Baker (1896) and as conspecific with *L. corymbosa* subsp. *fastigiata* by Goldblatt (1972). Only recently have sufficient specimens been available to help establish the status and rank of this species. Reasons for now treating *L. azurea* and *L. fastigiata* as distinct are discussed in detail under the latter species.

#### Specimens examined

South Africa, Cape

—33.18 (Cape Town): Darling (–AC), *Guthrie 2069* (NBG); Groene Kloof (–DA), *MacOwan 2280* (SAM), *Zeyher s.n.* (GRA); commonage at Malmesbury (–BC), *Lewis 3644* (SAM), *Barker 8047* (NBG), *Goldblatt 6279* (MO), *8016* (MO); hills around Malmesbury, *Schlechter 1616* (B, G, GRA, P); veld near Malmesbury, *Garside 4519* (B); Riebeeck Kasteel (–BD), *Pillans 10710* (G, MO), *Barker 1311* (NBG); top of Bothmas Kloof, Riebeeck Kasteel, *Esterhuysen 6033* (BOL); clay flats near Paarl (–DB), *Goldblatt 2740* (MO, NBG); N slopes of Paardeberg, *Goldblatt 647* (BOL); E slopes of Paardeberg, *Pillans 7785* (BOL); hillside near Joostenberg (–DD), *Esterhuysen 17339* (BOL).

—33.19 (Worcester): Tulbaghskloof etc., (–AC), *Ecklon & Zeyher s.n.* (77.9) (MO); Gouda (as Piquetberg Road Station), *Guthrie*

*2697* (NBG), *H. Bolus 13650* (BM, BOL, PH) (mixed with hybrids with *L. fastigiata*); Tulbagh, *Grant 2427* (MO); foot of the Elandskloof Mts, farm Elandsrivier, *Goldblatt 5852* (MO); Gydouw (–AD), *Leipoldt 4068* (BOL); bottom of Bains Kloof, Wellington (–CA), *Strauss 50* (NBG)

—33.19 (Simonstown): low-lying sandy places near Hout Bay (–AB), *MacOwan 269* (BOL, G, P, SAM).

#### 4. *Lapeirousia neglecta* Goldbl., sp. nov. (Figure 12)

*Lapeirousia corymbosa* subsp. *alta* Goldbl., *Contrib. Bolus Herb.* 4: 24 – 25 (1972). TYPE: South Africa, Cape, near Steenbras Dam, 12.1945, *Lewis 1595* (holotype, SAM; isotypes, BOL, SAM).

TYPE: South Africa, Cape, Jonkershoek, slopes near Berg River Nek, 11.1989, *Esterhuysen 36923* (holotype, BOL; isotypes, B, BR, E, G, K, LE, M, MO, NBG, P, PRE, S, SRGH, STE, US, WAG).

Plantae 28 – 45 (–55) cm altae, cormi ca. 14 mm in diam., foliis 3 – 6, angusto-lanceolatis, ad 70 cm longis, inflorescentiis laxe pseudopaniculatis, ramis terminalibus (1 –) 2 – 5 florum, floribus zygomorphis albis, tubo perianthii 10 – 14 mm longis, tepalis inequalibus, 9 – 13 mm longis, staminibus unilaterialibus arcuatis, filamentis 4 – 5 mm longis, antheris 3.5 – 4 mm longis.

Plants 28 – 45 (–55) cm high. *Corms* ca. 14 mm in diam. at the base, tunics blackish, with a cormlet in each of the lower leaf axils. *Cataphylls* 2, membranous, pale, the inner reaching shortly above the ground. *Leaves* 3 – 6, the lower 2 – 4 inserted below ground level and largest, narrowly lanceolate, the lowermost 20 – 70 cm long, often reaching or exceeding the inflorescence, 7 – 15 mm at the widest, margins straight, acute to attenuate, with a prominent midrib and one pair of secondary veins (rarely two) on either side almost as prominent, the secondary veins unequally distant from the midrib, the upper 1 – 3 leaves inserted in the lower half of the stem, progressively decreasing in size above, lanceolate, margins more or less straight, not or hardly sheathing at base. *Stem* nearly straight, compressed, 2-winged below, often more or less square above and 4-angled to 4-winged, laxly 5 – 7 branched, the branches also branched, each branch subtended by bracts 3 – 5 (–12) mm long, those subtending the lower branches sometimes leaf-like. *Inflorescence* a lax pseudopanicule, rounded in outline, the flowers borne in the upper half of the branches, the ultimate branchlets 1 – 2 (–4) flowered; *bracts* herbaceous, usually red on the margins, 3 – 5 mm long, the inner usually slightly longer than the outer and more or less membranous above at anthesis, acute or the inner slightly emarginate. *Flowers* zygomorphic, either white and usually the lower tepals each with a blue to purple marking in the midline or blue with darker blue to violet markings, with a light sweet scent; *perianth tube* nearly cylindrical, widening from 1 mm at the base to 2 mm at the mouth, 10 – 14 mm long, the lower third containing nectar; *tepals* elliptic, obtuse, unequal, the upper 9 – 13 mm long, ca. 4.5 mm wide, the lower held closely together, 10 – 12 mm long, ca. 4 mm wide. *Filaments* unilateral and arcuate, exerted for 4 – 5 mm; *anthers* 3.5 – 4 mm long, pollen whitish. *Ovary* globose, ca. 2 mm long, style arching between the filaments and the upper (posterior) tepal, dividing between the base and middle of the anthers, the branches ca. 2 mm long, divided for ca. one-third of their length. *Capsules* trigonous-

turbinate, 4 – 5 mm long, often red-flushed before drying; seeds globose to ovoid, sometimes faceted by pressure, rugulose, 1 – 2 (– 3) per locule, 2 – 2.5 × 1.75 – 2.5 mm, funicular appendage small.

Flowering mid-November to late January.

#### Distribution and habitat

*Lapeirousia neglecta* is restricted to a 65-km portion of the north–south trending western Cape mountain ranges between Steenbras Dam in the south and Bains Kloof in the north. Before 1989, when it flowered profusely at Jonkershoek near Stellenbosch, *L. neglecta* had been recorded only three times since its discovery by G.J. Lewis and R.H. Compton in January 1945, in Baviaans Kloof, a tributary valley of Bains Kloof. It grows in rocky sandstone-derived soil at elevations of 400 – 1000 m, generally in sheltered, wetter sites in gullies, slopes below cliffs and near streams where additional moisture is present. Its habit of flowering in the early summer following a fire the previous summer or autumn partly explains why it is so seldom collected. It is fairly common locally at Jonkershoek, where it occurs in several isolated sites. It can form extensive and dense populations, notably at Berg River Nek, and can carpet the slopes with white when in bloom. Plants from Baviaans-kloof differ at least in their blue flower colour and examination of living plants is necessary to confirm that they are conspecific with the populations to the south.

#### Diagnosis and relationships

Among the species of *Lapeirousia* from the southern African winter rainfall area, *L. neglecta* stands out in its large size, and it is particularly tall compared with other species with a pseudopaniculate inflorescence, the character that indicates its relationship with subgenus *Paniculata*. The comparatively lax branching pattern and the short bracts that become dry while plants are still in flower, suggest affinities with section *Paniculata* rather than with any species of section *Fastigiata*. The large, rounded seeds with a rugulose surface and small funicular appendage, and chromosome number of  $2n = 12$ , also accord with section *Paniculata* and differ from section *Fastigiata*, all species of which have  $2n = 20$  (– 22) and smaller, ovoid seeds with a reticulate to rugose surface. We now consider *L. neglecta* to belong to the otherwise tropical and subtropical African section *Paniculata* ( $2n = 16$  – 6) and not to the SW Cape section *Fastigiata*. Its flowers (Figure 12) closely resemble in general size and form those of the south tropical African *L. erythrantha*, especially in having the upper tepal reflexed to lie in the same plane as the lower tepals. The soft papery to corky corm tunics of *L. neglecta* (Figure 12) immediately distinguish it from other species of section *Paniculata* in which hard, fibrotic to nearly woody tunics are the rule.

#### History

Although thought by G.J. Lewis, the late specialist on southern African Iridaceae, to be a new species when it was first collected in 1945, this plant remained unnamed until Goldblatt (1972) treated it as subsp. *alta* of *Lapeirousia corymbosa*. Only with examination of living material in 1989 at Jonkershoek has it become clear that subsp. *alta* is

not closely related to the *L. corymbosa* complex. Its position in the otherwise tropical and subtropical section *Paniculata* poses an interesting phytogeographical puzzle. We prefer to treat *L. neglecta* as a new species, rather than to transfer subsp. *alta* to species rank. The type locality of the latter is some distance from our study sites for *L. neglecta* at Jonkershoek, on which we based our conclusions about the species. There is always the possibility that when living plants from the type locality of subsp. *alta* are found, they will differ from the populations at Jonkershoek.

#### Additional specimens examined

South Africa, Cape

—33.18 (Cape Town): Jonkershoek Valley, wet gully along trail to Berg River Nek (–DD), *Goldblatt 9022* (B, K, MO, NBG, PRE, WAG); Jonkershoek, Dwarsberg, upper contour path, among rocks in recently burnt firebreak, *Kerfoot & Haynes 14* (MO); along trail at foot of cliffs above Berg River Nek, *Goldblatt 9031* (K, MO, NBG, PRE, WAG).

—33.19 (Worcester): Baviaans Kloof (as Bains Kloof) (–CA), 17.1.1945, *Compton 16918* (NBG); Baviaans Kloof, 1.1945, *Lewis 979* (SAM).

—34.18 (Simonstown): Jonkershoek, Swartboskloof, upper west-facing slope at base of cliffs, 1000 m (–BB), *Oliver 9338* (STE).

#### Acknowledgements

Support for this study by grants BSR 85-00148 from the U.S. National Science Foundation is gratefully acknowledged. We thank Elsie Esterhuysen, University of Cape Town, for her assistance in the field, and the South African Department of Environment Affairs for collecting permits and allowing access to field sites.

#### References

- BAKER, J.G. 1896. Iridaceae. In: *Flora Capensis* 6: 7 – 171. Reeve & Co., Ashford.
- ECKLON, C.F. 1827. *Topographisches Verzeichnis der Pflanzensammlung von C.F. Ecklon*. Esslingen.
- GOLDBLATT, P. 1971. Cytological and morphological studies in the southern African Iridaceae. *Jl S. Afr. Bot.* 37: 317 – 460.
- GOLDBLATT, P. 1972. A revision of the genera *Lapeirousia* Pourret and *Anomatheca* Ker in the winter rainfall region of South Africa. *Contr. Bolus Herb.* 4: 1 – 111.
- GOLDBLATT, P. 1989. The Genus *Watsonia*. *Ann. Kirstenbosch Bot. Gdn.* 17: 1 – 148.
- GOLDBLATT, P. 1990a. Cytological variability in the African genus *Lapeirousia* (Iridaceae–Ixioidae). *Ann. Mo. Bot. Gdn.* 77: 375 – 382.
- GOLDBLATT, P. 1990b. Systematics of *Lapeirousia* (Iridaceae–Ixioidae) in tropical Africa. *Ann. Mo. Bot. Gdn.* 77: 430 – 484.
- GOLDBLATT, P. & MANNING, J.C. 1990. Leaf and corm structure in *Lapeirousia* (Iridaceae–Ixioidae) in relation to phylogeny and infrageneric classification. *Ann. Mo. Bot. Gdn.* 77: 365 – 374.
- GOLDBLATT, P. & MARAIS, W. 1979. *Savannosiphon* gen. nov., a segregate of *Lapeirousia* (Iridaceae–Ixioidae). *Ann. Mo. Bot. Gdn.* 66: 845 – 850.
- GUNN, M. & CODD, L.E. 1981. *Botanical Exploration of Southern Africa*. Balkema, Cape Town.
- JACKSON, R.C. 1973. Chromosomal evolution in *Haplopappus gracilis*: a centric transposition race. *Evolution* 27: 243 – 256.
- KER, J.B. (née J. GAWLER) 1804 (as 1805). *Ensatarum Ordo. König & Sims Ann. Bot.* 1: 219 – 247.
- LEWIS, G.J. 1959. The genus *Babiana*. *Jl S. Afr. Bot. Suppl.* 3.
- PLUKENET, L. 1696. *Almagestum Botanicum* (Phytographiae Pt. 4) 87 & fig. 275, f. 1. London.