

788. LACHENALIA BULBIFERA

Asparagaceae

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Summary. The South African geophyte *Lachenalia bulbifera* (Cirillo) Engl. is one of the most striking and variable members of the genus and has a long coastal distribution. Details of its history, relationships and pollination biology are given, a recently published name for this species is reduced to synonymy, and notes on cultivation are provided.

The German botanist, physician and traveller, J.C. Buxbaum (c. 1693–1730) first described this plant using the phrase name *Orchis hyacinthoides, monophyllos flore coccineo* in his *Plantarum minus cognitarum*, accompanied by a monochrome figure of a stylised flowering plant with a single leaf (Buxbaum, 1729). Following Linnaeus's binomial system of classification it was described as *Aletris bifolia* Burm. f. by N.L. Burmann in his *Prodromus Florae Capensis* (Burmann, 1768). It was again illustrated in monochrome in *Histoire universelle du règne végétal* by the French physician, naturalist and artist, Pierre-Joseph Buc'hoz (Buc'hoz, 1773–1778) and later described and illustrated under the genus *Phormium* as *P. bulbiferum* Cirillo by the Italian physician and naturalist Domenico Cirillo in his *Plantarum Rariorum Regni Neapolitani* (Cirillo, 1788).

The species was introduced into cultivation at Kew in 1774 by Francis Masson (Aiton, 1811) and William Aiton published it as *Lachenalia pendula* Aiton in the first volume of *Hortus Kewensis*, apparently unaware that Cirillo had published his own name for the same species the year before (Aiton, 1789). Lamarck (1792) published it as *Lachenalia linguiformis* Lam., a superfluous, illegitimate name for *Aletris bifolia*, citing *Aletris bifolia* under it and, mistakenly, the phrase name *Orchis hyacinthoides, foliis caule & floribus maculatis* for the species now known as *L. punctata* Jacq.

More than a century passed before Engler (1899) placed *Lachenalia pendula* in synonymy under *L. bulbifera* in the German periodical *Notizblatt des Königlichen Botanischen Gartens und Museums zu Berlin*, yet for more than half of the twentieth century the plant continued to be known as *L. pendula* until



Plate 788 *Lachenalia bulbifera*

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Ingram (1966) drew attention to the German publication *Synopsis der Mitteleuropäischen Flora* (Ascherson & Graebner, 1905) in which it was listed as *L. bulbifera* (Cirillo) Hort. ex Ascherson & Graebner. Following Ingram's publication, the latter authors were regarded as the legitimate authors of the species until W.F. Barker drew attention to Engler's (1899) publication and authorship of the species changed to *L. bulbifera* (Cirillo) Engl.

Although the specific epithet *bifolia* is the earliest published one for the plant, it cannot be used for this species due to the fact that Ker Gawler published the name *Lachenalia bifolia* Ker. Gawl. for another species (Ker Gawler, 1814), now a synonym of *L. rosea* Andrews. Owing to a misinterpretation of Code Article 11. 4(b) in the *International Code of Botanical Nomenclature for Algae, Fungi and Plants (Melbourne Code)*, the name *Lachenalia bifolia* (Burm. f.) W.F. Barker ex G.D. Duncan was published in *The Genus Lachenalia* (Duncan, 2012), but is an illegitimate later homonym (Katherine Challis, pers. comm.) and is here reduced to synonymy. The correct name for the plant is thus *Lachenalia bulbifera* (Cirillo) Engl.

Lachenalia bulbifera is one of the most robust members of the genus; it is highly variable in inflorescence length, tepal colour and length, capsule size and flowering time (Plate 788). It forms a polyploid complex with a basic chromosome number of $x = 7$, with ploidy levels ranging from diploid to octoploid and chromosome numbers of $2n = 14, 28, 42, 49$ and 56 ; ploidy levels are constant within populations (Kleynhans & Spies, 1999). Although chromosomal divergence has taken place in this species, morphological expression of these changes is still in progress, producing variations to which it is not yet possible to assign taxonomic rank (Duncan, 2005). Collectively, *L. bulbifera* has the longest flowering period of all the *Lachenalia* species, beginning in late April in a short-flowered, orange form from Stilbaai, and ending in early September in a longer-flowered, pinkish-red form from Bredasdorp, both in the southern Cape; the longest-flowered forms (up to 37 mm) occur along the Cape west coast and on the Cape Flats east of Cape Town. The species is readily identified by its light to dark orange, red, vermillion

or rarely yellow outer tepals that are almost as long as, or slightly longer than, the inner tepals, with green or brown apical gibbositities, overlapping inner tepals with dark magenta or purple zones in the uppermost part, with green, dark magenta or purple apical gibbositities, included, straight stamens, and one or two slightly to deeply canaliculate, lanceolate or ovate leaves with plain or heavily purple- or green-maculate upper surfaces. It is closely related to *L. punctata* which shares tubular, pendulous to cernuous flowers with long perianth tubes, oblong outer tepals, oblong obovate inner tepals and globose seeds with inflated strophioles (Duncan *et al.*, 2005). The latter species is almost always a smaller plant with pink, pink-mottled or rarely yellow perianths borne on shorter pedicels (1–4 mm long). With respect to perianth morphology, the outer tepals of *L. punctata* are distinctly shorter than the inner tepals and the lower inner tepal is distinctly shorter than the upper inner tepals. It also differs in its globose bulb, partially hysteranthous, usually glaucous leaves, declinate infructescence, shorter strophiole (0.8 mm long) and prostrate, flat primary seedling leaves.

Lachenalia bulbifera has the second-longest coastal distribution of all *Lachenalia* species after *L. punctata*, occurring from Brand-se-Baai on the west coast of the Western Cape to George in the southern Cape. It is associated primarily with deep sandy, acid or alkaline soils on flats and primary or secondary dunes and is often encountered close to the high water mark. Populations also occur along the margins of coastal dune forest and in humus in crevices and shallow pans of granite outcrops. The accompanying photograph was taken on sandy flats near Atlantis north of Cape Town on the west coast, where especially robust specimens occur (Fig. 1). The plants grow in small to large colonies, exposed, in light shade of granite boulders or within the protection of surrounding low shrubby growth, and often occur in close proximity to populations of *L. punctata* that flower earlier in the season. The flowering period varies markedly between the southern (mainly early-flowering) and western (mid-season to late-flowering) parts of its range. While its numbers have been greatly reduced due to coastal housing



Fig. 1. *Lachenalia bulbifera* on deep sand dunes on the west coast near Atlantis north of Cape Town. Photograph: Graham Duncan.

developments, by virtue of its wide distribution the species is not yet considered threatened.

Lachenalia bulbifera is a bird-pollinated species adapted to pollination by sunbirds, in particular Southern Double-collared Sunbirds (*Cinnyris chalybeus*) and its scapes are sufficiently sturdy to support the weight of the bird as it probes the perianth tube for nectar. The bird clings to the base of the scape and inserts its curved beak into the tube, and in so doing, lifts the perianth into a horizontal or suberect position. Pollen is deposited onto the head of the bird, in the area just above the base of the beak, and transferred to the stigma of subsequently visited flowers. Despite the absence of temperate sunbirds, *L. bulbifera* has become naturalised in parts of western and southern Australia, where it is considered a weed. Unlike *L. punctata*, whose scapes change orientation during the fruiting stage and bend downwards, often touching the ground, those of *L. bulbifera* remain erect to suberect and the seeds are released from the ripe capsules by the shaking action of wind. Considerable variation in tepal length and colour (from light

orange to deep red) occurs within certain populations, such as those near Atlantis on the Cape west coast. Because *L. bulbifera* is one of the few species with red-flowered forms, it has been used extensively in breeding programmes in the development of new pot plant cultivars at the Vegetable and Ornamental Plant Research Institute at Pretoria.

The specimen illustrated here by Fay Anderson originates from material collected in 1980 near Saldanha on the west coast of the Western Cape (*G.D. Duncan 90*, in NBG) and the painting was completed in August 2013.

CULTIVATION. *Lachenalia bulbifera* is one of the easiest and most rewarding species to grow; its inflorescences are long-lasting and the plants perform well in quickly draining, sandy soils in full sun or bright light. The bulbs multiply rapidly by offsets, bulblet formation at the tips of subterranean stolons, and in certain forms, bulbils develop along the lower leaf margins, both above and below soil level. It is also very easily propagated by leaf cuttings and from seed. The plants grow well in rock garden pockets, window boxes and pots, provided the dormant bulbs are kept completely dry in summer. The cut stems of the larger forms make excellent long-lasting specimens for the small vase. The robust nature of the species results in excessive leaf growth or the formation of a third leaf when grown in soils that are too rich, or when high nitrogen fertilisers are used. The plants perform well without any supplementary feeding but if desired, a monthly application of an organic fertiliser high in macro- and micronutrients can be given once per month when plants are in active growth.

Lachenalia bulbifera (Cirillo) Engl., Notizblatt des Königlichen Botanischen Gartens und Museums zu Berlin 2 (18): 321 (1899).

Phormium bulbiferum Cirillo, Plantarum Rariorum Regni Neapolitani 1: 35, t. 12 (1788). Type: South Africa, Cape, collector and precise locality unknown, figure in D. Cirillo, Plantarum Rariorum Regni Neapolitani 1: 35, t. 12 (1788); (lectotype, designated by Duncan (2012)).

Aletris bifolia Burm.f., Prodromus Florae Capensis: 10 (1768).

Lachenalia linguiformis Lam., Encyclopédie Méthodique Botanique 3: 372 (1792), nom. illegit. et superfl.

Lachenalia bifolia (Burm.f.) W.F.Barker ex G.D.Duncan, *The Genus Lachenalia*: 155 (2012), hom. illeg., non *L. bifolia* Ker Gawl. (1814).

Type: South Africa, Cape, collector and precise locality unknown, figure in J.C. Buxbaum, *Plantarum minus cognitarum*, Centuria 3: t. 19 (1729) (neotype, designated by Duncan (2012)).

Lachenalia pendula Aiton, *Hortus Kewensis* 1: 461 (1789). Type: South Africa, Cape, precise locality unknown, *F. Masson s.n.* (BM!, holo).

DESCRIPTION. *Deciduous, winter-growing geophyte*, 100–300 mm high. *Bulb* subglobose, 10–30 mm in diam., offset-forming, sometimes developing bulblets on subterranean stolons; tunic multilayered, outer layers dark brown, spongy; inner cataphyll translucent white in lower two thirds, tinged with dull magenta in upper third, adhering to leaf bases, apex obtuse. *Leaves* 1–2, lanceolate or ovate, 60–200 × 15–90 mm, spreading to suberect, fleshy, slightly to deeply canaliculate, bright to dark green, yellowish-green or glaucous, upper surface with faint depressed longitudinal veins, plain or heavily marked with few to many dark green, brown or brownish-purple spots or blotches, lower surface plain or tinged with dull maroon; leaf bases clasping, 15–80 mm long, lower portion white, upper portion light green, sometimes developing bulbils on subterranean and aerial margins; primary seedling leaf terete, erect. *Inflorescence* racemose, few- to many-flowered, lax to sturdy, sterile apex short; scape erect to suberect, 50–150 mm long, slender to sturdy, light green to greyish-brown, plain or with small to large purplish-brown spots or blotches; rachis uniformly light green, dull red or orange, often light green in lower two thirds, shading to dull red or orange in upper third; pedicels suberect to cernuous, 4–7 mm long, light green, brownish-green, purplish-brown or dull red; bracts ovate, 1–6 × 2–3 mm, translucent white, sometimes tinged with magenta. *Perianth* zygomorphic, tubular, pendulous; tube cylindrical, 6–11 mm long; light yellow, light to dark orange, light to dark red or vermillion; outer tepals oblong, 13–32 × 4–7 mm, light to dark orange, plain or mottled with darker orange, light to dark red or vermilion, rarely light to bright yellow; apical gibbosity light to dark green, greenish-yellow or brown, uppermost outer tepal gibbosity usually conspicuously protruding; inner tepals oblong obovate, 22–37 × 8–11 mm, overlapping, translucent light yellow, upper half tinged with light magenta or orange, upper margins with broad, dark purple to purplish magenta margins, apices purplish or green, apical gibbosity prominent, light to bright green, dark magenta or purple, median keels light magenta. *Stamens* included, straight; filaments white, 20–39 mm long; pollen yellow at anthesis, ageing to dull purple. *Ovary* ellipsoid, 4–5 × 2–3 mm, bright green; style included, straight, 25–42 mm long, white, protruding beyond tepals as ovary matures. *Capsule* ellipsoid, 10–20 × 7–10 mm. *Seed* globose, 1.3–1.4 × 1.3–1.4 mm; glossy, black; strophiole inflated, 1.4–1.6 mm long, smooth; raphe translucent, white, joined to strophiole. *Chromosome number*: 2n = 14, 56 (Crosby, 1986); 2n = 28, 42 (Moffett, 1936); 2n = 42 (Hamatani *et al.*, 1998; Spies *et al.*, 2008); 2n = 42, 56

(Johnson & Brandham, 1997); $2n = 28, 42, 49, 56$ (Kleynhans & Spies, 1999).

DISTRIBUTION. Western Cape Province of South Africa, from Brand-se-Baai west of Bitterfontein to George.

HABITAT. Sand flats and primary or secondary dunes, and humus-rich crevices and shallow pans of granite outcrops.

FLOWERING PERIOD. April to September, with a peak from May to early August.

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