Agapanthus coddii Agapanthaceae

South Africa

Agapanthus coddii *F.M.Leight.* in Journal of South African Botany, suppl. 4: 36 (1965); Letty et al.: 21 (1962) [as *Agapanthus* sp.]; Retief & Herman: 86 (1997); Snoeijer: 120 (2004); Duncan: 198 (2021); Kremer-Köhne: 218 (2021); Wadley et al.: 32 (2021).

Species of *Agapanthus* L'Hér. are renowned as ornamental plants, widely used in pots, as cut flowers and in landscaping projects (Duncan 2003, 2004; Zhang et al. 2015). Members of the genus *Agapanthus* have been cultivated in Europe since the 17th century, with records of cultivation in the Netherlands as early as 1683 and in the Royal Garden at Hampton Court, England, in 1692 (Letty et al. 1962). It was only about a century later that the genus *Agapanthus* was formally established by L'Héritier de Brutelle (1789). Through selection and hybridisation, hundreds of cultivars have been developed and named (Snoeijer 2004; Duncan 2021). '*Agapanthus*, South Africa's Flower' was the title of an article (Leonard 1967) describing members of this genus, indigenous to South Africa, now cultivated in gardens worldwide. It is remarkable that the genus is naturally confined to southern Africa (Eswatini, Lesotho, Mozambique, South Africa), despite being globally cultivated. New cultivars continue to appear annually in nurseries worldwide (Figure 1).

The generic name *Agapanthus* is derived from the Greek words *agape* (love) and *anthos* (flower), possibly meaning 'lovely flower' or 'flower of love' (Singh & Baijnath 2018), though the precise origin of the name remains unclear. The specific epithet, *coddii*, honours Dr L.E.W. Codd (1908–1999), a South African botanist and former director of the Botanical Research Institute from 1963 to 1973 (now the South African National Biodiversity Institute) (Gunn & Codd 1981; Glen & Germishuizen 2010).

Since the establishment of the genus, *Agapanthus* has been classified under various related families, including Liliaceae (Duncan 1985), Alliaceae (Dahlgren et al. 1985; IPNI 2024) and Amaryllidaceae (Fay & Chase 1996), and at the subfamily level (Agapanthoideae) within Amaryllidaceae (Chase et al. 2009). Currently, in the South Africa National Plant Family Classification (Klopper 2024), it is placed in its own family, Agapanthaceae (see also Kubitzki 1998; Meerow et al. 1999; Koekemoer et al. 2023), although other sources still contribute it to Amaryllidaceae following APG IV (Angiosperm Phylogeny Group 2016; POWO 2024).

The Agapanthaceae family is monogeneric, containing only the genus *Agapanthus*, which comprises eight species, some with various infraspecific taxa (Kubitzki 1998; Duncan 2021; Koekemoer et al. 2023). The most recent addition to the genus is *A. pondoensis* F.M.Leight. ex G.D.Duncan (Duncan 2021). The native range of the genus (and family)

PLATE 2402.—1, scape with umbel of flowers in full anthesis, × 0.7; 2, habit, × 0.25; 3, umbel just starting to flower showing the bracts covering the head before it opens, × 0.7. Voucher specimen: *Bester & De Smidt 20516* in National Herbarium (PRE), Pretoria. Artist: Gail Irene de Smidt.

PLATE 2402 *Agapanthus coddii*

FIGURE 1.—Trademarked *Agapanthus* cultivars currently available at local nurseries in Pretoria, Gauteng: a, b, Twist Again; c, d, Buccaneer; e, f, Bingo White. Photographs: a–f, S.P. Bester.

extends from the Western Cape along the eastern parts of the subcontinent, including Lesotho and Eswatini, into Limpopo in South Africa, and further north into Mozambique (Duncan 2003, 2005; Koekemoer et al. 2023). Members of this family are cultivated globally and have become naturalised in Australia, the United Kingdom, New Zealand, the United States of America, Mexico, Jamaica, Ethiopia and Eritrea (Chawla et al. 2022). In some of these countries, *Agapanthus* species have become noxious weeds.

Due to the lack of distinguishing characteristics and extreme variability within and between species, it has been suggested that all species should be attributed to a single taxon (Letty et al. 1962). However, eight species are currently recognised (SANBI 2024). The very first plant featured in the initial volume of this series (then known as *The Flowering Plants of South Africa*) was *Agapanthus umbellatus* L'Hér. (Pole Evans 1921), now a synonym of *A. africanus* (L.) Hoffmanns. Subsequent publications in this series included *A. praecox* Willd. subsp. *orientalis* (F.M.Leight.) F.M.Leight. (Dyer 1966a); *A. campanulatus* F.M.Leight. subsp. *patens* (F.M.Leight.) F.M.Leight. (Dyer 1966b), now subsumed under *A. campanulatus* F.M.Leight.; *A. inapertus* Beauverd subsp. *inapertus* (Dyer 1966c); *A. inapertus* subsp.

pendulus (L.Bolus) F.M.Leight. (Dyer 1966d); *A. walshii* L.Bolus (Rourke 1973); and *A. dyeri* F.M.Leight. (Duncan 1993), now a synonym of *A. inapertus* subsp. *intermedius* F.M.Leight.

Based on an investigation of genome size using nuclear DNA content and pollen characteristics, *Agapanthus coddii* is closely related to *A. caulescens* Spreng. and *A. campanulatus*, all of which have lilac pollen grains, leaves with a purple base and deciduous growth (Zonneveld & Duncan 2003). In most species pollen grains are yellow or light brown, only in *A. walshii* is it dark brown and in the three species, *A. coddii*, *A. campanulatus* and *A. caulescens*, is it lilac (Duncan 2021). Morphologically, however, Leighton (1965) considers *A. coddii* to be most closely related to *A. campanulatus*, whereas Duncan (2021) regards *A. caulescens* as the closest ally to *A. coddii*. The differences between these taxa are summarised in Table 1.

In the protologue of *Agapanthus coddii* (Leighton 1965), the holotype is cited as the specimen *Erens & Codd 2081* at the National Herbarium (PRE) (barcode PRE0112952-0), with two isotypes cited from the Compton Herbarium (NBG) (namely *NBG 145/55* and *NBG 768/54*). The specimen labels of the presumed isotypes also contain the collector details as *Erens & Codd 2081*, with *NBG 145/55* marked as 'isotype'. The *NBG 145/55* and the *NBG 768/54* specimens consist of two sheets each (barcodes NBG0018221-1 and NBG0018221-2 labelled as 'Sheet I' and 'Sheet II', and barcodes NBG1561112-0 and NBG1561113-0 labelled as 'Sheet I' and 'Sheet II' respectively). However, the holotype material was collected on 27 January 1960 (https://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.pre0794039-0) and the presumed isotypes more than a year earlier: the *NBG 145/55* material on 18 January 1959 (https://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.nbg0018221-1 and https://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.nbg0018221-2) and the *NBG 768/54* material two days later on 20 January 1959 (South African National Biodiversity Institute 2024). The holotype also bears the number *NBG 145*/55. The material preserved as the holotype and presumed isotypes (especially that of *NBG 145/55*) may have originated from the same collecting event at the same locality (Kranskop) but they were cultivated at Kirstenbosch National Botanical Garden under different accession numbers and were pressed as specimens on different dates. Therefore, according to Article 8.2 of the *International Code of Nomenclature for algae, fungi, and plants* (the *Code*, Turland et al. 2018), these specimens represent three different gatherings and the NBG specimens (cited as 'isotype' by Leighton 1965), although being original material, cannot be considered type material. It is worth noting that the *Code* provides guidelines for the selection and designation of type specimens but does not specifically address cases where specimens indicated as 'isotypes' are collected or prepared at different times from the holotype. The rules and examples of Article 8 imply how such cases should be treated. Any discrepancies between the collection dates of presumed type material must be carefully documented and treatment of specimens as type (or not) must be justified by taxonomists to ensure the accuracy and stability of botanical nomenclature.

To lawfully collect material in South Africa from any plant species, especially those of conservation concern, collectors must first obtain written permission from the landowners, then a collecting permit from the provincial authority, and, in some cases, a transport permit for moving the specimens. A voucher specimen is then made from this material as a pressed specimen, which, along with habitat information and collecting details, is later

Table 1. Characters distinguishing *Agapanthus coddii* from *A. campanulatus* and *A. caulescens*. Adapted from key and descriptions in Duncan (2021)

Character	*A. coddii*	*A. campanulatus*	*A. caulescens*
Flower size	Larger flowered	Small-flowered	Larger flowered
Tepals	Spreading, usually widely, never reflexed; 25–28 mm long, pale blue	Spreading to 90° from axis, sometimes reflexed; 10–20 mm long, pale to bright blue to deep blue, rarely white	Spreading, suberect or nodding, radiate more than 30° from axis; 20–35 mm long, bright blue or violet-blue
Perianth shape	Widely funnel-shaped	Widely or narrowly funnel-shaped	Widely funnel-shaped
Perianth length	35–40 mm long	20–35 mm long	15–25 mm long
Perianth tube	Relatively long, 8–12 mm long	Relatively short, 5–10 mm long	Relatively long, 15–25 mm long
Leaf width	30–55 mm broad	6–25 mm broad	20–60 mm broad
Leaf apex	Obtuse, rarely sub-acute	Sub-acute	Obtuse, sub-acute or acute
Leaves	Green; in erect or sub-erect fans	Green or glaucous; in arching erect or sub-erect fans	Light to bright green, dark green or intensely glaucous; in strongly arching, erect or sub-erect fans
Pollen	Lilac	Lilac	Lilac
Scape	Stout, to 0.6–1.5 m long	Slender, 0.4–0.7(–1.0) m long	Robust or gracile, 0.6–1.5 m long
Pedicels	Spreading, 30–60 mm long	Erect, suberect or spreading, 22–70 mm long	Radiating, straight, 30–90 mm long
Distribution	Western Limpopo (Waterberg)	Eastern parts of Eastern Cape to southwestern Limpopo	Central parts of Eastern Cape to northern Limpopo (Soutpansberg) and western Limpopo (Waterberg)
Habitat	Steep montane grassland slopes below cliffs in permanently moist seepage areas	Seepage areas in montane grassland amongst rocks in fertile black soils	Wide range: open grassland on rocky mountain and hill slopes, shaded gullies, below cliffs, along wooded streams, on sheer rock faces, in marshy or black turf soils

deposited in a herbarium. Accordingly, the Trustees of Welgevonden Game Reserve (representing the landowner) were officially requested to grant permission to remove plants for illustration purposes. The voucher specimen (*Bester & De Smidt 20516*) is lodged in the National Herbarium (PRE) of South Africa in Pretoria.

From 2021 to 2025 a Foundational Biodiversity Information Programme (FBIP) project, funded by the National Research Foundation (NRF) and known as the Waterberg Mountain Complex Biodiversity Project (WMCBP), was conducted throughout the Waterberg region,

and a collection permit was obtained from the Limpopo Economic Development, Environment and Tourism Department (LEDET), the permit-issuing authority in Limpopo, South Africa. The permit issued for the WMCBP was used for the collection and transport of material of *Agapanthus coddii* to Gauteng, where PRE and the artist's studio are located.

The artist's engagement with Codd's agapanthus began when a friend and fellow botanical artist, Gillian Condy, invited her to contribute a painting of *Agapanthus coddii* for this series. This rare *Agapanthus* is known to grow in a mountainous area of the Welgevonden Game Reserve. The reserve, in which the big five (lion, leopard, rhinoceros, elephant and buffalo) occur, required that a guide accompany the team of volunteers who collected material for the illustration (Figure 2, 3). Permission to remove the plant for painting was obtained, and the CEO of the reserve joined the search for this elusive floral beauty. Several blooming plants were spotted at the base of a cliff and two specimens were collected (Figure 4).

At the reserve lodge, the collected plants were photographed, roughly sketched, and colour samples for the plate were prepared. Upon returning to Johannesburg, where the artist resides, the painting was completed with the flowering scape lasting long enough for the artist to finalise the plate. For the artist, and all others involved, it was a truly memorable excursion in search of a special plant.

Agapanthus coddii is one of the lesser-known *Agapanthus* taxa due to its limited distribution range. It is deciduous, shedding all its leaves in autumn, remaining dormant during winter, and producing new leaves in spring (Notten 2002). Also known as the *Waterberg bloulelie* in Afrikaans, it grows along stream banks and steep, moist, rocky mountainsides (Retief & Herman 1997) and has been recorded at altitudes from 1 432 to 1 829 m a.s.l. The species flowers from December to February, peaking from middle to late January depending on environmental conditions, such as the onset of spring rains. The plant figured here was found in a narrow pocket of humus-rich soil, approximately 2–3 m long, located on the side of a stream directly below a steep rocky slope.

Codd's agapanthus is indigenous to South Africa and endemic to the western Waterberg region of Limpopo (Figure 5). It has been Red List assessed as Rare due to its restricted distribution range. The species mostly occurs in inaccessible habitats, with many known populations located within private conservancies and the Marakele National Park. Consequently, the species is not considered threatened (Von Staden 2004).

In Africa, *Agapanthus* species hold cultural significance as both magical and medicinal plants. The Zulu people use it to treat various ailments, including heart disease, paralysis, coughs, colds and chest pains, as well as during pregnancy (Hutchings et al. 1996). These plants are also widely used elsewhere, particularly against reproductive and central nervous system disorders, but also for medicinal applications such as anti-inflammatory, antioxidant, antibacterial, antifungal, uterotonic and anti-hypertensive effects (Younis et al. 2022). Despite the widespread use of *Agapanthus* in traditional medicine for its pharmacological properties, there is very little literature on any of the uses or even on basic biological aspects of *A. coddii*. At the very least, full phytochemical investigations of *A. coddii*, which currently remain limited, need to be conducted (Younis et al. 2022).

FIGURE 2.—*Agapanthus coddii* in habitat: a, upper section of drainage line where plants grow at the base of vertical cliffs at Welgevonden Game Reserve, Limpopo, 20 January 2024; b, amongst dense vegetation at Welgevonden Game Reserve, Limpopo, 20 January 2024; c, sprouting leaves from rhizome (note purple leaf bases) at Hartbeesfontein farm, 19 October 2021; d, remains of inflorescence with some remaining capsules at Hartbeesfontein farm, 19 October 2021. Photographs: a, G.I. de Smidt; b, I. van Zyl; c, d, R. Heydenrych.

Agapanthus coddii is deciduous and frost-hardy, thriving in humic, well-drained soil enriched with compost and ample water during summer (Du Plessis & Duncan 1989; Duncan 1998; Notten 2002). It tolerates irrigation during its winter dormant period and flourishes in the winter-rainfall areas of the Western Cape, notably in the Kirstenbosch National Botanical Garden (Notten 2002). Waterberg blue lilies are suitable for mass displays in large gardens or containers, with their umbels making excellent cut flowers. *Agapanthus coddii* is generally resistant to pests and diseases (Notten 2002). Species like

A. africanus, capable of resprouting from thick, fleshy roots, have adapted to the frequent fires of the fynbos region of South Africa, often blooming profusely after fires. This adaptation is likely present in other species as well and can be a useful character in cultivation, as it will likely also protect plants against frost. Genes responsible for such traits may be useful in some areas, for example, those regions that have harsh winter conditions, when plants

FIGURE 3.—Collection of material for illustration of *Agapanthus coddii* at Welgevonden Game Reserve and the collection team: a, Issy van Zyl with a collection of inflorescences to be illustrated by the artist; b, artist assistant, Issy van Zyl, with Simon Bjaloane, a ranger from Welgevonden Game Reserve, explaining why the material is gathered; c, team members Simon Bjaloane (left) and Kobus van Zyl (right) carefully lifting the rhizomatous rootstocks, from which the voucher was made, to transport it to the artist's studio in a clay pot; d, team members Andre Burger (left, CEO of Welgevonden Game Reserve) and Peter de Smidt (right, vice CEO of Welgevonden Game Reserve) supporting the collection expedition. Photographs: a–d, G.I. de Smidt.

FIGURE 4.—The artist, Gail de Smidt: a, a thoroughly pleased Gail de Smidt with Andre Burger, after receiving the material to illustrate; b. Gail de Smidt at her studio, busy painting the depicted plate of *Agapanthus coddii*. Photographs: a, b, P. de Smidt.

die back, but resprout again when conditions favour aerial growth once more.

In their natural habitat, *Agapanthus* species are pollinated by long-proboscid flies, bees and sunbirds (Duncan 2021), with seed dispersal facilitated by wind. Observations of *Agapanthus coddii* in Kirstenbosch National Botanical Garden have confirmed bee pollination, with the open flowers providing suitable perches for these insects (Notten 2002).

The lack of biological or observational data for *Agapanthus coddii* underscores a broader gap in knowledge concerning many indigenous plant species in South Africa. This presents scope for research in especially the pollination and general biology of such taxa.

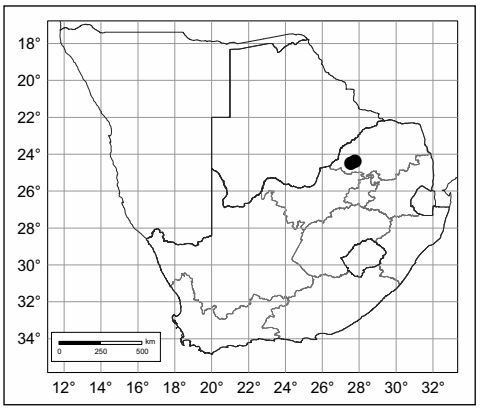

FIGURE 5.—Known distribution of *Agapanthus coddii* from BODATSA records at South African National Biodiversity Institute herbaria (NBG, NH, PRE).

Description (adapted from Leighton [1965] and Duncan [2021]).—Robust, deciduous summer-growing perennial, 0.8–1.3 m high. *Rootstock* a subterranean rhizome (often vertical in depicted plants), 30–60 × 18–25 mm, with perennial fleshy roots. *Pseudostem* strongly caulescent, 120–180 × 25–30 mm, purple or greenish-white flushed purple. *Leaves* upright, ± 10 per shoot, clearly caulescent, strap-shaped, broad, 50–450 × 30–50 mm, erect, with obtuse to rarely subacute apices, slightly narrowing towards base, bright green, not glaucous, not shiny. *Inflorescence* globose, 30–50-flowered, fairly dense, 0.6–1.5 m tall.

Spathe bracts ovate, 65–135 × 50 mm, green, flushed purple in bud, prominent early in anthesis. *Peduncle* up to 1 m tall, relatively stout. *Pedicels* stiff, spreading, 30–60 mm long. *Perianth* widely funnel-shaped; tube 8–12 mm long, deep blue at base; tepals 35–40 mm long, pale blue to mauve, with darker margins and central vein; spreading segments usually wide but never reflexing, with obtuse often emarginate apices; outer segments 9–11 mm broad, inner segments 10–13 mm broad. *Stamens* included, filaments 19–23 mm long, lower parts fused to the length of tube of tepals; pollen lilac. *Ovary* obovoid, light green. *Style* included, 17–21 mm long. *Capsule* broadly ellipsoid, 20–30 × 13–17 mm, apex truncate. *Seed* obovate, 5–7 × 4–5 mm, laterally compressed, black; wing 7–9 × 4–5 mm, black. Plate 2402.

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