

Flowering Plants of Africa

Volume 63

June 2013



Flowering Plants of Africa

Since its inception in 1921, this serial, modelled on the former *Curtis's Botanical Magazine*, has published well over 2 000 colour plates of African plants prepared by some 80 artists.

The object of the serial is to convey to the reader the beauty and variety of form of the African flora, to stimulate an interest in the study, conservation and cultivation of African plants and to advance the science of botany as well as botanical art.

The illustrations are mostly prepared by artists on the staff of the South African National Biodiversity Institute, but we welcome other contributions of suitable artistic and scientific merit. Please see *Guide for authors and artists* on page 145.

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History of this series

(note Afrikaans translation and changes in title)

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Cover illustration: *Erica verticillata* (Plate 2296)

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Flowering Plants of Africa

A magazine containing colour plates with descriptions of
flowering plants of Africa and neighbouring islands

Edited by

A. Grobler

with assistance of

G.S. Condy

Volume 63



Pretoria
2013

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Crotalaria agatiflora subsp. *agatiflora*

Leguminosae

East and northeast Africa

Crotalaria agatiflora Schweinf. subsp. *agatiflora*, Schweinfurth: 13 (1892); Taubert: 206 (1895); Baker: 315 (1914); Brenan: 414 (1949); Polhill: 205 (1968). Polhill: 72-74 (1982).

Crotalaria L. is a large genus in the Leguminosae family with approximately 690 species (Lewis *et al.* 2005; Le Roux & Van Wyk 2012). The genus is distributed in the tropical and subtropical areas of the world with the majority of species found in Africa and Madagascar (Polhill 1968; Polhill 1982; Lewis *et al.* 2005). Polhill (1968) studied the genus extensively after Milne-Redhead (1961) and recognised 432 species for the African continent. About 54 indigenous species are found in southern Africa (Nkonki & Swelankomo 2003) of which four are exotic species and declared invasive alien species or weeds (Germishuizen *et al.* 2006). Other species in the genus are also known to occur in India, America and China (Lewis *et al.* 2005; Le Roux *et al.* 2011). The genus shows a remarkable diversity in its morphology, which greatly facilitates the differentiation of individual species, but variation between the species is of a markedly reticulate nature precluding any simple division of the genus into sections (Polhill 1968). *Crotalaria agatiflora* has five subspecies and subsp. *agatiflora* differs from the other four by its bracteoles which are less than 2.0(–3.5) mm long and its ovate-elliptic leaflets that are less than twice as long as broad, usually glabrous beneath. There are various common names for *C. agatiflora* subsp. *agatiflora* including bird flower, canary bird bush, rattlebox, Queensland bird flower and *voëltjebos*. The common name, rattlebox, is derived from the fact that the seeds become loose in the pod as they mature and rattle when the pod is shaken.

The plant illustrated here is indigenous to tropical East Africa and northeast Africa (Tanzania and Kenya). In southern Africa it occurs in Namibia, South Africa (Gauteng, North West, Limpopo, Mpumalanga, KwaZulu-Natal and the Western and Eastern Cape) and has become naturalised in Australia (Queensland), New Zealand and South America. Distribution of *Crotalaria agatiflora* subsp. *agatiflora* in Africa, based on the PRE Computerised Information System (PRECIS), Southern African Plant Invaders Atlas (SAPIA 2011) and Global Biodiversity Information Facility (GBIF 2013) databases, is presented in Figure 1. Canary bird bush was first introduced into South Africa as an ornamental plant. The earliest known record in the Pretoria National Herbarium is from the Johannesburg Railway Horticulture Garden dated 1921 in the Johannesburg area. According to SAPIA, the earliest record of its establishment in the wild is from the Rustenburg and Brits area in North West. It has escaped from cultivation into natural areas and has been recorded in conservation areas and reserves in Pretoria such as the Colbyn conservancy area, and Faerie Glen, Groenkloof and Wonderboom Nature Reserves (Henderson & Musil 1987; SAPIA 2011).

PLATE 2287.—1, flowering stem × 1. Voucher specimen: *Condy 251* in National Herbarium, Pretoria.
2, fruiting branch × 1. Voucher specimen: *Condy 253* in National Herbarium, Pretoria. Artist: Gillian Condy.



PLATE 2287 *Crotalaria agatiflora* subsp. *agatiflora*

Crotalaria species are widely used in Chinese traditional medicine to treat several types of internal cancers. In the United States of America some species, such as *C. pumila*, are used to treat yellow fever and skin rashes. In the Siaya area, Kenya, the roots are used as a remedy for gastrointestinal discomfort (Kokwaro & Johns 1998). *Crotalaria agatiflora* subsp. *agatiflora* is used as a medicinal plant in several African countries for the treatment of bacterial infections and cancer (Le Roux *et al.* 2011). In Ecuador *C. agatiflora* subsp. *agatiflora* is also traditionally used as a decoction to treat cancer. The above ground parts of *C. agatiflora* subsp. *agatiflora* are used in its native range to treat otitis media, a bacterial infection of ears, as well as for treatment of sexually transmitted diseases (Le Roux *et al.* 2011). In India other species of *Crotalaria* has similar uses, where it is used to treat eczema and the leaves are placed on cuts or wounds to aid the healing process. Sharma *et al.* (1967) found that *C. agatiflora* subsp. *agatiflora* relieves spasms in dogs, found to be a good relaxant, and lowered blood pressure during treatment.

A few *Crotalaria* species are consumed by humans in some parts of the world, however, many species are known to be toxic to humans and livestock. Examples include (but are not limited to) *C. oridicola*, *C. barkae*, *C. berteroana* and *C. retusa*. Toxicity has been proven in the genus *Crotalaria* to be due to the presence of pyrrolizidine alkaloids in plants and seeds (Pilbeam & Bell 1979). All plant parts of *C. agatiflora* subsp. *agatiflora* have been reported not to be toxic or poisonous.

In South Africa *Crotalaria agatiflora* subsp. *agatiflora*, is a declared category 1a species according to the National Environmental Management: Biodiversity Act (2004) and listed as a proposed invader in the Conservation of Agricultural Resources Act (1983). This species was previously misidentified as *C. agatiflora* subsp. *imperialis* (Macdonald *et al.* 2003). It grows in watercourses in Grassland and Savanna biomes; potentially invasive in forest margins and also occupies cleared grassy areas in South Africa. In some parts of the world where it has been introduced, it is regarded as an agricultural, environmental and garden weed. For example in Australia it is regarded as a minor environmental weed that has escaped cultivation and invading grasslands and areas with sandy soils (Cooperative Research Center for Australian Weed Management 2013). This is also the case in South Africa where the species has escaped cultivation and has established itself in the wild. According to herbarium material in the National Herbarium, Pretoria, *C. agatiflora* subsp. *agatiflora* is frequently collected along roads and railways, near rivers, gardens and natural habitats. Ecological data was compiled from herbarium specimens (collected from

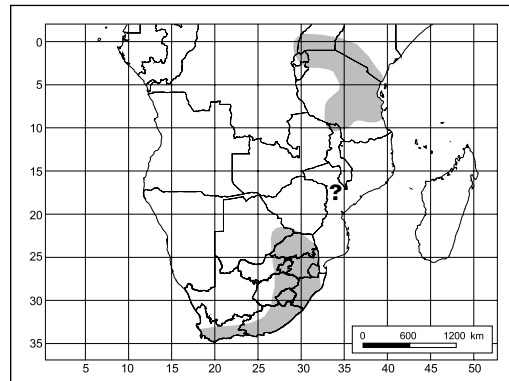


FIGURE 1.—Distribution range of *Crotalaria agatiflora* subsp. *agatiflora* based on herbarium records in the National Herbarium, Pretoria, and SAPIA and GBIF databases. The question mark (?) indicates regions of possible occurrence where records were not found.

1921–2011) and SAPIA records. Sixty-five percent were recorded near road sides, five percent along rivers, 10 percent in natural areas (including nature reserves) and 18 percent in urban areas including gardens.

Crotalaria agatiflora subsp. *agatiflora* reproduces and spreads exclusively by seeds. The average number of pods produced per plant is 50 and number of seeds per pod is 28. Seeds germinate in early summer.

Although no studies have focused on its effects on natural ecosystems, canary bird bush may affect the ecology of invaded areas in several ways for example through the enhancement of nitrogen levels in the soil. The species threatens watercourses in Grassland and Savanna biomes where it has been introduced. Furthermore, it has the potential to invade forest margins and often occupies cleared grassy areas and disturbed sites.

Description—Perennial woody herb, 0.3–2 m high, usually much branched, glabrous. *Leaves* 3-foliolate; leaflets ovate-elliptic, 25–90 × 10–35 mm, glabrous to densely hairy; petioles 30–120 mm long, mostly longer than leaflets. *Stipules* linear and caducous or absent, 4–12 mm long. *Racemes* stoutly pedunculate, many-flowered; flowers 40–50 mm long; bracts linear to attenuate-lanceolate, up to 16–20(–24) × 1–6(–9) mm; bracteoles filiform, 0.5–3.5 mm long. *Calyx* 18–30 mm long, with upper and lateral lobes joined almost to tips on either side, ± twice as long as tube; pedicels about 15 mm long, glabrous-glaucous or villose. *Standard* ovate, lemon-yellow to greenish yellow, sometimes medially pubescent outside; wings half to two-thirds as long as keel; keel broadly rounded, with a relatively short, projecting, often greenish or purplish beak, 11–55 mm long. *Pod* oblong-clavate, narrowed to a 15–25 mm long stipe, ± 75–100 mm long, glabrous. *Seeds* tumid, 6–7(–9) mm long, ± smooth. *Flowering time*: January–December in South Africa. Plate 2287.

REFERENCES

- BAKER, E.G. 1914. The African species of *Crotalaria*. *Journal of the Linnean Society (Botany)* 42: 241–425.
- BRENAN, M.A. 1949. *Checklist of the Forest Trees and Shrubs of the British Empire* No. 5. Tanganyika Territory Part II. Forest Institute, Oxford.
- CONSERVATION OF AGRICULTURAL RESOURCES ACT. 1983. Department Of Agriculture, Forestry and Fisheries. South Africa
- COOPERATIVE RESEARCH CENTER FOR AUSTRALIAN WEED MANAGEMENT. 2013. Canary bird bush: *Crotalaria agatiflora*. University of Queensland. Available at: http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Crotalaria_agatiflora.htm. Accessed: 15 January 2013.
- GERMISHUIZEN, G., MEYER, N.L., STEENKAMP, Y. & KEITH, M. (eds). 2006. *A checklist of South African plants*. Southern African Botanical Diversity Network Report No. 41. SABONET, Pretoria.
- GLOBAL BIODIVERSITY INFORMATION FACILITY. 2013. Available at: <http://data.gbif.org/species/7067713/>. Accessed: 14 January 2013.
- HENDERSON, L. & MUSIL, K.J. 1987. *Plant Invaders of the Transvaal*. Department of Agriculture and Water Supply, Pretoria.
- KOKWARO, J.O. & JOHNS, T. 1998. *Luo Biological Dictionary*. East African Publishers, Nairobi.
- LEWIS, G.B., SCHRIRE, B., MACKINDER, B. & LOCK, M. (eds). 2005. *Legumes of the World*. Royal Botanical Gardens, Kew.

- LE ROUX, K., HUSSEIN, A.A. & LALL, N. 2011. In vitro chemo-preventative activity of *Crotalaria agatiflora* subspecies *agatiflora* Schweinf. *Journal of Ethnopharmacology* 138,3: 748–55.
- LE ROUX, M.M. & VAN WYK, B-E. 2012. The systematic value of flower structure in *Crotalaria* and related genera of the tribe Crotalarieae (Fabaceae). *Flora* 207: 414–426.
- MACDONALD, I.A.W., REASER, J.K., BRIGHT, C., NEVILLE, L.E., HOWARD, G.W., MURPHY S.J. & PRESTON, G. (eds). 2003. *Invasive alien species in southern Africa: national reports & directory of resources*. Global Invasive Species Programme, Cape Town.
- MILNE-REDHEAD, E. 1961. Miscellaneous notes on African species of *Crotalaria* L. *Kew Bulletin* 15: 157–167.
- NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT. 2004. Department of Environmental Affairs and Tourism, South Africa.
- NKONKI, T. & SWELANKOMO, N. 2003. *Crotalaria*. In G. Germishuizen & N.L. Meyer (eds), *Plants of southern Africa: an annotated checklist*. *Strelitzia* 14: 500. National Botanical Institute, Pretoria.
- PILBEAM, D.J. & BELL, E.A. 1979. Free amino acids in *Crotalaria* seeds. *Phytochemistry* 18: 973–985.
- POLHILL, R.M. 1968. Miscellaneous notes on African species of *Crotalaria* L. *Kew Bulletin* 22: 169–348.
- POLHILL, R.M. 1982. *Crotalaria in Africa and Madagascar*. A.A. Balkema, Rotterdam.
- SCHWEINFURTH, G. 1892. In Höhnel, Zum Rudolph-See und Stephanie-See, Anhang: 13.
- SHARMA, M.L., SINGH, G.B., GHATAK, B.J. 1967. Pharmacological investigations on *Crotalaria agatiflora* Scwienf. *Indian Journal of Experimental Biology* 5: 149–150.
- SOUTH AFRICAN PLANTS INVADERS ATLAS (SAPIA) DATABASE. 2011. ARC—Plant Protection Research Institute, Pretoria.
- TAUBERT, P.H.W. 1895. In A. Engler, *Pflanzenwelt Ost-Afrikas und der Nachbargebiete*: 206.

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PLATE 2293 *Plumbago wissii*

Plumbago wissii

Plumbaginaceae

Namibia

Plumbago wissii Friedrich, Senckenbergiana Biologica 38: 417–419 (1957).

The genus *Plumbago* L. consists of about 24 species and has a worldwide distribution, occurring from warm-temperate to subtropical and tropical regions of the world (Kubitzki 1993). It is the largest of the four genera comprising subfamily Plumbaginoideae (Lledó 1998, 2001). *Plumbago wissii* Friedrich is endemic to the upper slopes of the Brandberg Mountain massif in northwestern Namibia. One of the rarest members of the genus, it has attractive pale to dark violet-purple or maroon (rarely cream) flowers that are heterostylous.

Plumbago wissii is one of six species of *Plumbago* indigenous to southern Africa. It is a rare and poorly-known species. It grows very easily from soft tip cuttings as well as from seed. The plants adapt well to the dry Mediterranean-type climate in summer at Kirstenbosch and prove to be extremely hardy without showing signs of stress during periods of drought. *Plumbago wissii* plants are rather floriferous and flowers throughout summer. The plants can be pruned back hard when they become untidy, as they simply re-sprout.

Plumbago wissii thrives surprisingly well in Fynbos gardens (Van Jaarsveld 2010). A number of other southern African *Plumbago* species have been taken up in ornamental horticulture. One of them, *P. auriculata* (= *P. capenses*), is a dense, scandent shrub 2–3 m tall from mainly the Eastern Cape in South Africa and is extensively cultivated for its attractive blue or white flowers. *Plumbago auriculata* seems to be a worthwhile horticultural introduction with a number of cultivars. The white-flowered *P. zeylanica* (closely related to *P. auriculata*) is a smaller scrambling shrub from savanna regions in the northern regions of southern Africa (Kaokoveld in Namibia, and Limpopo and other northern provinces in South Africa). The remaining three *Plumbago* species occurring in southern Africa are from the arid southern and western parts of the subcontinent forming a related group based on their floral features. *Plumbago tristis* is a dwarf shrublet in Succulent Karoo vegetation of the Western Cape in South Africa. *Plumbago hunsbergensis*, only known from the Hunsberg and recently named (Van Jaarsveld & Thomas 2011), is the closest related to *P. wissii*. *Plumbago pearsonii* is an erect shrub up to 1 m tall, with much broader, obovate, silvery-green leaves and occurs in arid savanna in central Namibia.

Plumbago wissii is a rare endemic of the upper slopes of the Brandberg (northwestern Namibia; Figure 1) where it forms part of a type of sclerophyllous vegetation

PLATE 2293.—1, mature branch showing short side branches, × 1; 2, flowering branch, × 1; 3, cross section of leaf, × 2; 4, leaf viewed from below, × 2; 5, cross section through young stem, × 1; 6, side view of calyx, × 3; 7, side view of corolla showing the tube, lobes, gynoecium and androecium × 2.5. Voucher specimen: Van Jaarsveld 17973 in Compton Herbarium, Cape Town. Artist: Marieta Visagie.

(related to the Renosterveld of the Western and Northern Cape provinces of South Africa). The species occurs among granite boulders on rocky ground in full sun and is quite common in this habitat (Figure 2). It is an untidy, spreading shrub, up to about 1 m tall (rarely up to 1.5 m) with distinctly ribbed stems, linear leaves and a raceme containing the tubular, violet-purple flowers.

At 2 579 m the Brandberg is the highest mountain in Namibia. An isolated, more or less circular, granite inselberg (ancient volcano) of about 23 × 25 km, it lies more or less 70 km from the Namibian coast. Biologically the Brandberg is probably the best studied mountain in Namibia (Craven & Craven 2000). The mountain massif is surrounded by the Namib Desert with an average rainfall of about 100 mm per annum. Floristically the arid lower slopes is typical of the northern Namib, with among the taller woody plants species such as *Acacia montis-usti*, *Sterculia africana* and various members of the genus *Commiphora*. Also present in this zone is *Aloe dichotoma*, a tree aloe with its main centre of abundance further south towards the Northern Cape. The upper slopes of the mountain, however, receive considerably more rain (more than 200 mm per annum) and carry a unique vegetation studied by, amongst others, Nordenstam (1974) and Craven & Craven (2000). The floristic checklist by Craven & Craven (2000) records 480 taxa of which nine are strictly endemic to the mountain, including *Plumbago wissii*. Phytogeographically the mountain is considered part of the Kaokoveld Centre of Endemism (Van Wyk & Smith 2001).

The specific epithet of *Plumbago wissii* honours Mr Hans-Joachim Wiss [1903–1991], Windhoek farmer and naturalist. He was a member of the South West Africa Scientific Society from 1955–1974 and served as president of the Society from 1960–1961. Wiss was the first person to collect specimens of the species during an archaeological expedition to the upper Brandberg in 1955 (Gunn & Codd 1981). Wiss found his plants on the highest peak, Königstein (above 2 000 m), where it was growing together with *Eriocephalus pinnatus*, *Olea europaea* subsp. *africana*, *Euryops multifidus* and *Euphorbia monteiroi*.

In April 2003 *Plumbago wissii* was collected by one of us (EJV) on Königstein while searching for cliff-dwelling succulents on the Brandberg. Plants were recorded at Lion's Cave and several other sites, from north of Orabes Wand to Königstein. They were growing among *Codon schenkii*, *Dianthus namaensis*, *Antizoma miersiana* and *Tetradenia riparia*. The kobasboom (*Cyphostemma currorii*), with its striking shape resembling a dwarf baobab, is a prominent feature in the area.

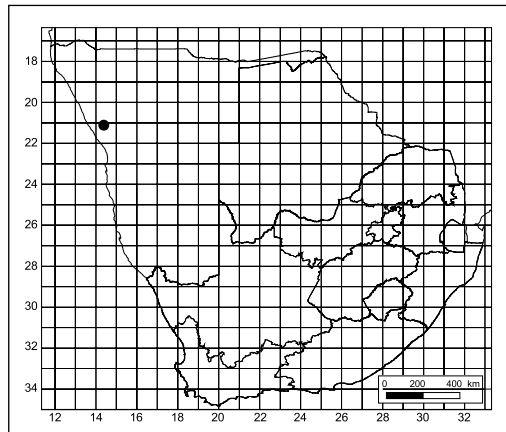


FIGURE 1.—Known distribution of *Plumbago wissii* in Namibia.

Semi-hardwood cuttings from several individuals were rooted at Kirstenbosch. Seeds sown in spring germinated within three weeks. The plants grew rapidly, already flowering in January 2004. They produced strong lateral branches, which soon became spreading—featured in the accompanying plate. The fruits are typical of the genus *Plumbago*. They are retained in the glandular-hairy calyx becoming detached and adhering to roaming animals, which seem to be the main dispersal agents. The thin, long-tubed flowers suggest a bee pollinator with a long proboscis. The flower colour varies from pale violet-purple (Red Group 55D, Royal Horticultural Society Colour Chart) to dark violet-purple and maroon (Red Group 55B) but cream-coloured flowers were also observed. The flowers become darker with age. During the course of examining flowering individuals, it was noted that in most plants the stigma was shorter than the stamens (thrum flowers). However, the stigmas of a few individuals protruded at the mouth, overtopping the stamens (pin flowers). Known as heterostyly, this is the first record of its occurrence in *P. wissii*. Heterostyly of the distylous type (Ganders 1979) has previously been reported in some of the other species of *Plumbago* and is widespread in subfamily Plumbagoideae (Dahlgren 1918; Kubitzki 1993; Lledó 1998).



FIGURE 2.—*Plumbago wissii* in habitat on the Brandberg.

We are grateful to Holger Kolberg of the Ministry of Environment and Tourism in Namibia for plant collecting permits.

Description.—Spreading multi-stemmed stoloniferous shrub usually about 1 m tall, occasionally up to 1.5 m; vegetative parts sub-glabrescent. *Stolons* horizontal with erect aerial branches. *Branches* woody at the base, distinctly ribbed (up to seven ribs), purplish; young branches green, up to 3 mm in diameter; internodes 10–25 mm apart. *Leaves* ascending, spreading and curving upwards, alternate, sessile, linear-oblongate to linear, (40–)50–80(–95) × 1–4 mm, slightly fleshy; apex acute, apiculate, base attenuate; surface with slightly raised reticulate veins, sparsely beset with glandular hairs at first, becoming glabrescent; margin entire to obscurely sinuate, partially amplexicaul at the base. *Inflorescence* a terminal raceme (80–)150–330 mm long, sometimes with 2 shorter side branches from the base forming a loose panicle; all parts glandular-hairy. *Flowers* heterostylic and alternately arranged, 40 mm apart at base but becoming denser towards apex (8–12 mm apart);

pedicels 1 mm long. *Bracts* leaf-like and gradually becoming smaller; floral bracts triangular acuminate, 7–10 × 2 mm, glandular-pilose, amplexicaul at base. *Calyx* green, 5-lobed, tubular, 6.0–7.0 × 2.5 mm, densely glandular-hairy; lobes linear-lanceolate, hyaline between ribs but free for up to 2.5 mm. *Corolla* violet to rarely cream, open during the day, 13–14 mm in diameter when fully opened, with slender pale maroon-coloured tube (17–)23–25 × 1 mm, midribs whitish; lobes obovate, (5–)8 × 3(–5) mm, apices obtuse, apiculate. *Stamens* 22–24 mm long in thrum flowers, 22 mm long in pin flowers; filaments white; anthers black, oblong, 1.5 mm long, pollen cream-coloured. *Ovary* greenish, ovate, 2 × 1 mm; style 15 mm long in thrum flowers, 24 mm long in pin flowers, 5-lobed, lobes 1 mm long, papillose. *Fruit* membranaceous, circumscissile capsule. *Flowering time*: January to July. Plate 2293.

REFERENCES

- CRAVEN, P. & CRAVEN, D. 2000. The flora of the Brandberg, Namibia. *Cimbebasia Memoir* 9: 49–67.
- DAHLGREN, K.V.O. 1918. Heterostylie innerhalb der Gattung *Plumbago*. *Svensk Botanik Tidskrift* 12: 362–372.
- FRIEDRICH, H.-C. 1957. *Plumbago wissii*, n. sp. (Dicot., Plumbaginaceae), ein charakteristischer Strauch der höchsten Gipfel des Brandberges in Südwestafrika. *Senckenbergiana Biologica* 38: 417–419.
- GANDERS, F.R. 1979. The biology of heterostyly. *New Zealand Journal of Botany* 17: 607–635.
- GUNN, M. & CODD, L.E. 1981. *Botanical exploration of southern Africa*. Balkema, Cape Town.
- KUBITZKI, K. 1993. Plumbaginaceae. In K. Kubitzki, J.G. Rohwer & V. Bittrich (eds), *The Families and Genera of Vascular Plants. II. Flowering Plants: Dicotyledons, Magnoliid, Hamamelid and Caryophyllid Families*: 523–530. Springer, Berlin.
- LLEDÓ, M.D., CRESPO, M.B., FAY, M.F. & CHASE, M.W. 1998. Systematics of Plumbaginaceae based upon cladistic analysis of *rbcl* sequence data. *Systematic Botany* 23: 21–29.
- LLEDÓ, M.D., CRESPO, M.B., FAY, M.F. & CHASE, M.W. 2005. Molecular phylogenetics of *Limonium* and related genera (Plumbaginaceae): Biogeographical and systematic implications. *American Journal of Botany* 92: 1189–1198.
- NORDENSTAM, B. 1974. The flora of the Brandberg. *Dinteria* 11: 3–67.
- VAN JAARSVELD, E.J. 2010. *Waterwise gardening in South Africa and Namibia*. Struik, Cape Town.
- VAN JAARSVELD, E.J. & THOMAS, V. 2011. *Flowering Plants of Africa* 62: 88–93.
- VAN WYK, A.E. & SMITH, G.F. 2001. *Regions of floristic endemism in southern Africa: a review with emphasis on succulents*. Umdaus Press, Hatfield (Pretoria).

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