

Flowering Plants of Africa

Volume 63

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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.

A list of available back issues is given in the current *Publications Catalogue* of the Institute and on the website www.sanbi.org. Copies of this serial and of the *Catalogue* are obtainable from the SANBI Bookshop, South African National Biodiversity Institute, Private Bag X101, Pretoria, 0001 South Africa.

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

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with assistance of

G.S. Condy

Volume 63



Pretoria
2013

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PLATE 2281 *Eulophia ensata*

Eulophia ensata

Orchidaceae

South Africa, Swaziland, Mozambique

Eulophia ensata Lindl. in *The Botanical Register* 14: t.1147 (1828); Rolfe: 44 (1912–1913); Hall: 201 (1965); Stewart *et al.*: 249 (1982); La Croix & Cribb: 505 (1998); Hall: 393 (1999).

Eulophia ensata was described in 1828 by the English botanist John Lindley [1799–1865] in *The Botanical Register*, a horticultural magazine with descriptions and hand-coloured engravings of plants and shrubs cultivated in British gardens, which later became *Edwards's Botanical Register*. The plate accompanying Lindley's text was executed by the British artist M. Hart from a plant said to have been collected in the 'Cape of Good Hope', received from the famous Sloane Street Nursery of Mr Tate in London, where rare and unusual imported plants were cultivated and introduced. Lindley was under the erroneous impression that it had originally been collected by Mr George Don, a member of the Horticultural Society of London, in Sierra Leone, and also stated it to be very difficult to grow and liable to rot (Lindley 1828). In his taxonomic revision of the South African species of *Eulophia* R.Br. ex Lindl., A.V. Hall (1965) designated Hart's colour plate as the lectotype, as no pressed material exists of the specimen upon which the plate is based. Apart from that plate, the only other published paintings of this species are those of Harry Bolus, painted in February 1893 and illustrated on plate 26 of his *Icones Orchidearum Austro-africanorum Extratropicarum* (Bolus 1911) and the present one by Gillian Condy. The specific name *ensata* is descriptive of the sword-shaped leaves, which are straight and heavily pleated.

The German botanist C.E.O. Kuntze (1891) transferred all the species referred at that time to *Eulophia* to the earlier genus *Graphorchis* Thouars (= *Graphorkis* Thouars) in the second volume of his *Revisio Generum Plantarum*, including *E. ensata*, which became *G. ensata* (Lindl.) Kuntze. *Eulophia* R.Br. ex Lindl. was later conserved against *Graphorchis* (Summerhayes & Hall 1962), but unfortunately Hall's revision (1965) omitted *Graphorchis ensata* from the synonymy of *Eulophia ensata*. According to Hall (1965) the name *E. oblonga* Rolfe (Rolfe 1910) was based on a mixed gathering, including the flower of *E. ensata* and the vegetative parts of *E. ovalis* Lindl. subsp. *ovalis*, thus it was rejected as a synonym in his revision.

The genus *Eulophia* has enjoyed fairly wide coverage in *Flowering Plants of Africa* (including the two name changes this publication has undergone since its inception in 1921) and the present contribution is the 25th species to be included in this series.

Eulophia has about 250 species distributed mainly in the tropics of central Africa. Forty-two species are found in southern Africa and it is also represented in India,

PLATE 2281.—1, plant with leaves, cauline sheaths and lower portion of peduncle, × 1; 2, inflorescence, × 1; 3, single flower, × 1; 4, unripe capsule, × 1; 5, habitat sketch. Voucher specimen: Condy 239 in National Herbarium, Pretoria. Artist: Gillian Condy.

Southeast Asia and Central America. Its members are mainly deciduous, summer-growing plants but the genus also has evergreen and deciduous winter-growing species. It occurs in all provinces of South Africa, with major centres of diversity in KwaZulu-Natal and Mpumalanga, and is also found in all other southern African countries, i.e. Botswana, Lesotho, Namibia and Swaziland (Hall 1965, 1999). *Eulophia ensata* occurs in the eastern and northeastern parts of the summer rainfall subregion (Figure 1). Its distribution stretches in an arc from the southern Eastern Cape to northern Limpopo in South Africa and it

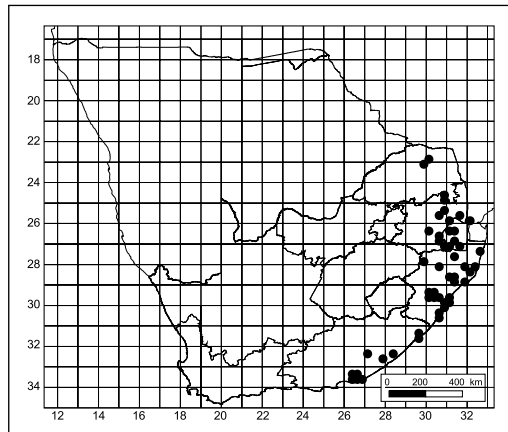


FIGURE 1.—Known distribution of *Eulophia ensata*.

also occurs in western and northern Swaziland, and there is a single record (*Gomes e Sousa 139* in K) from Namaacha in southern Mozambique (La Croix & Cribb 1998). In the Eastern Cape and KwaZulu-Natal, it occurs mainly in coastal areas, extending to high rainfall mountainous areas in Mpumalanga and Limpopo; it is most frequently encountered in central and eastern KwaZulu-Natal and Mpumalanga (Hall 1999). The plant is rare to locally frequent, occurring in small populations of up to 25 plants in podzol, sandy loam and lateritic soils. Its habitat is open grassland and road reserve grassland in full sun, grassy places in coastal bushveld, often near large boulders, and in moderate shade in pure bushveld and, surprisingly, in Limpopo it also occurs in *Eucalyptus* plantations (Hall 1965). The species has a long flowering period from October to February, with a peak in January (Hall 1965). The specimen illustrated here (*Condy 239* in PRE) was collected at the Florence Guest Farm in the historic hamlet of Chrissiesmeer, also known as 'New-Scotland', in central Mpumalanga, where it was found in a clump comprising at least 15 plants in road reserve grassland (Figure 2).

The infrageneric taxonomy of *Eulophia* is problematic as many of the species are variable and comprise aggregates of forms that are difficult to subdivide and assign taxonomic status. A modern phylogeny for the genus is lacking, but in a similarity dendrogram of the South African eulophias, based on 93 morphological characters amongst 36 species, Hall (1965) found that *E. ensata* was placed adjacent to *E. leontoglossa* Rchb.f., a deciduous, summer-growing species with nodding, yellow or rarely pink flowers in short, dense, capitate racemes. *Eulophia leontoglossa* differs mainly in the side lobes of the lip that are not broadened as in *E. ensata*, and in its shorter middle lobe and much shorter peduncle. The distribution of *E. leontoglossa* overlaps that of *E. ensata* in eastern Mpumalanga and parts of KwaZulu-Natal, but the former has a more inland distribution in eastern and northeastern South Africa, extending to eastern North-West, and it has a longer flowering period from August to March, with a peak in December (Hall 1965). *Eulophia ensata* is frequently confused with *E. welwitschii* (Rchb.f.) Rolfe, another yellow-flowered species with a similar capitate

raceme which occurs mainly in the northeastern summer rainfall zone of southern Africa and into tropical Africa. The latter differs from *E. ensata* in its larger, light yellow flowers, with the crests usually absent in the upper half of the middle lobe, and with the side lobes, distal crest papillae and basal parts of the middle lobe marked with dark reddish purple, and it has a stouter gynostemium (Hall 1965).

Eulophia ensata is a tall and slender, clump-forming geophyte. The rootstock comprises a chain of up to eight persistent, subterranean pseudobulbs joined by short cylindrical stems, the roots developing from the base of the leaf shoot where it is attached to the pseudobulb (Du Plessis & Duncan 1989). The three to four sword-shaped, heavily pleated leaves are supported by two clasping, cauline sheaths, and the flower-bearing stem which develops next to the leaf shoot has three to five prominent light brown, papery sheaths. The dense flower head of 6–30 bright yellow blooms appears at more or less the same level as the leaf tips and lasts for about two weeks. The peduncle remains attached to the pseudobulb for several months after flowering and the minute, dust-like seeds are wind-dispersed from obovoid, suberect capsules. According to Pooley (1998) an infusion of the pseudobulbs is used to treat infant ailments and as a love charm.

The life cycle of *Eulophia ensata* commences with vegetative growth in October following late spring rains, and flower buds may appear shortly afterwards, or at any time up until February. The leaves remain green until late April or early May, after which they desiccate and the plant enters a winter dormant period of about five



FIGURE 2.—*Eulophia ensata* in habitat, Chrissiesmeer. Photograph: Gillian Condy.

months. Little is known of the pollination biology of *Eulophia* but it has recently been established that *E. ensata* and *E. welwitschii* are pollinated by flower chafer beetles (Cetoniinae: Scarabaeidae). None of the *Eulophia* species provide any reward to pollinators and it would appear that the basis of attraction of beetles to the unscented flowers of *E. ensata* and *E. welwitschii* relies on the similarity in general shape and colour of the inflorescence to sympatric members of the family Asteraceae, which provide rewards of food and rendezvous platforms (Peter & Johnson 2009).

Eulophia is probably the most adaptable southern African orchid genus to cultivation, particularly those members that are evergreen. For example, the evergreen *E. horsfallii* (Batem.) Summerh., a robust, southern and tropical African plant of swampy terrain, has become naturalised in several perennially moist, lower parts of Kirstenbosch National Botanical Garden, from seeds originally wind-dispersed from mature plants in the bulb nursery (Duncan 2000). Similarly, seedlings of the xerophytic, evergreen *E. petersii* (Rchb.f.) Rchb.f. have appeared in a seasonally dry and exposed part of the nursery bulb collection, from seeds dispersed from mature plants in the succulent nursery. Many deciduous eulophias are also of easy culture, provided the appropriate dry dormant period is strictly enforced. Members of the latter group are generally best grown as container subjects that can be moved to the most appropriate position during the active growth and dormancy periods. The deciduous, summer-growing *E. ensata* has been in continuous cultivation at Kirstenbosch for almost 30 years. It performs well in 250 mm and 300 mm plastic pots, in a well drained medium recommended for eulophias which comprises equal parts of coarse river sand, silica sand and well-rotted acid compost (Du Plessis & Duncan 1989). The pseudobulbs are planted in spring at a depth of 20–30 mm, and given an initial drench of water. Once the leaf shoots appear, a weekly drench is applied throughout the summer months until late autumn when the leaves turn brown, and the plants are kept completely dry in winter. *Eulophia ensata* needs a sunny aspect and it is advisable to place a stake into the pot when planting takes place, as the inflorescences tend to flop over in strong wind. Ideally, the rootstocks of *E. ensata* need to be lifted and replanted into new soil approximately every three years to stimulate flowering, and they require protection from winter frosts and frozen ground.

The reason that most orchids cannot easily be raised from seed sown under non-sterile conditions is that the seedlings are dependent for survival on a symbiotic association with a specific fungus. In addition, further requirements for germination of viable seeds such as sufficient moisture, optimum temperature and light levels have to be met. The fungus penetrates the roots of the orchid seedling and through the exchange of nutrients, nutritional benefit is obtained by the seedling, and in some instances, by the fungus as well. It is especially during seed germination and subsequent growth of the seedling that the orchid's dependence on its associated fungus is greatest. Growing and propagating these species from seed requires knowledge of the mycorrhizal associations, which these orchids form, and is dependent on laboratory research at the institutional level. Generally, two methods are used for germinating seeds of the deciduous terrestrials, the symbiotic and asymbiotic methods, both of which are complicated procedures beyond the capabil-

ity of the home gardener, and take place *in vitro*, under sterile conditions (Du Plessis & Duncan 1989; Crous & Duncan 2006). Fortunately, the rootstock of *E. ensata* sometimes forms branches, and these can be separated during the winter dormant period and should be replanted immediately into dry medium. Each branch has to be separated with a growing point, i.e. with the youngest pseudobulb attached. As far as is known, old, persistent pseudobulbs are not viable if separated and replanted (Du Plessis & Duncan 1989).

In the Kirstenbosch Bulb Nursery, two major pests affect *E. ensata*, western flower thrips and red spider mites. Thrips infest the developing flower buds in early summer, causing severe deformation, and red spider mites infest upper and lower leaf surfaces in late summer, causing them to desiccate and turn brown, and the plants to enter dormancy prematurely.

Description.—Deciduous, summer-growing terrestrial geophyte 0.30–1.04 m high. *Rootstock* subterranean, persistent, moniliform, sometimes branch-forming, consisting of up to 8 pseudobulbs; pseudobulbs more or less oblongoid, 45–70 × 30–50 mm, horizontally elongate. *Leaves* 3–4, ensiform, 0.3–1.0 × 0.07–0.15 m, acuminate, erect to suberect, light green, heavily plicate, partially to fully developed at flowering; cauline sheaths 2, 130–225 mm long, clasping. *Inflorescence* a dense, capitate raceme; peduncle erect, 0.3–1.0 m high, slender to stout with 3–5 internodes, light green, arising laterally to leaf-bearing axis; sheaths 3–5, prominent, 90–110 mm long, erect, light brown, papery, clasping, uppermost sheath slightly exceeding internode; bracts linear to narrowly lanceolate, 10–15 × 1–2 mm, light brown; pedicels suberect, 2–3 mm long, light green. *Flowers* narrowly campanulate, 6–30, suberect to erect, unscented; sepals, petals and lip bright yellow; median and lateral sepals narrowly oblong to narrowly elliptic, 13.2–25.2 mm long, apices acute; petals narrowly oblong to narrowly elliptic-oblong, 12–20 mm long, apices obtuse to acute; lip 3-lobed, apex obtuse, crests consisting of 2 broad ridges in basal half, passing into dense filiform yellow or orange papillae on midlobe, extending to near apex, side lobes of lip sub-oblong, broadening near base, with a rounded, slightly spreading free distal portion 3–4 × 3–4 mm; mentum 2–3 mm long; spur cylindrical, slender, 4–7 mm long. *Gynostemium* slender, 6–8 mm long; anther cap shortly rostrate. *Capsule* obovoid, 25 × 12 mm, suberect. Chromosome number: n=27 (Hall 1965). Plate 2281.

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