

# BORAGINACEAE

## A FIRST RECORD OF *ECHIUM SIMPLEX* IN SOUTH AFRICA

### INTRODUCTION

The Boraginaceae comprises  $\pm$  131 genera and 2 500 species of mainly annual or perennial herbs and shrubs, some trees and a few lianes (Brummitt 1992; Retief & Van Wyk 1997). The plants are widely distributed in tropical and especially subtropical and temperate regions, with major centres of diversity in the Mediterranean region and western parts of North America (Toelken 1986). In southern Africa the family is represented by 20 genera with 111 species, including 19 alien species regarded as naturalized in the flora of southern Africa (Retief 2003).

The genus *Echium* L. is one of the non-native genera of the Boraginaceae in southern Africa. Together with the seg-

regate genus *Pontechium* Böhle & Hilger, it is the northern hemisphere counterpart of the closely related genera *Lobostemon* Lehm. and *Echiostachys* Levyns, both endemic to the Cape Floristic Region of South Africa (Retief & Van Wyk 1997; Hilger & Böhle 2000; Van Wyk & Smith 2001). Phylogenetically *Echium* splits naturally into two distinct infrageneric groups or clades (Böhle *et al.* 1996; Hilger & Böhle 2000). The first group comprises  $\pm$  30 species of mainly herbaceous annuals to perennials. Geographically this group has a circummediterranean distribution, extending over most of Europe, reaching western Asia. The second group of 27 species is endemic to the Canary, Madeira and Cape Verde Archipelagos of the Macaronesian Islands. All but two of these island species are woody perennials and preferential outbreeders. Molecular data and geological evidence suggest that all the contemporary island dwellers are



FIGURE 12.—Terminal, many-flowered thyrse of *Echium simplex* kept as voucher specimen, Smith & Steyn 14 at PRE.

derived from herbaceous continental antecedents following a perhaps single founding colonization less than 20 million years ago (Böhle *et al.* 1996, but see Perez de Paz 1995 for evidence from palynology).

*ECHIUM* SPECIES IN SOUTHERN AFRICA

Two of the herbaceous continental European species of *Echium*, namely *E. plantagineum* L. and *E. vulgare* L., were previously discussed in detail (Retief & Van Wyk 1998). Both are naturalized in Western and Eastern Cape, eastern Free State, Lesotho, the high mountainous areas of KwaZulu-Natal and in Mpumalanga, where they mainly occur as annual weeds of roadsides and fallow fields. A member of the island group of species, *E. candicans* L.f.

(‘Pride of Madeira’), is widely grown as a garden ornamental in South Africa. Based on anecdotal evidence, it was somewhat doubtfully listed as a potential problem plant in the summer rainfall regions of South Africa (Wells *et al.* 1986). However, there is no evidence that this species has become naturalized in our region; its occurrence outside gardens is rare and accidental. The present paper deals with a fourth species, *Echium simplex* DC., another member of the group of island dwellers and recently reported from South Africa for the first time (Willis & Smith 2002).

*Echium simplex*, the ‘Pride of Tenerife’, is a rare endemic of the Canary Islands. With its basal rosette of silvery green leaves and massive, erect, up to 2 m tall inflorescence of several hundred pure white flowers, it is a most spectacular plant (Figures 12–14). In its native



FIGURE 13.—Population of *Echium simplex* thriving among coastal scrub near Hermanus in the southwestern Cape. Photograph: G.F. Smith.

country, it is a coastal cliff species of low altitudes (100–400 m), restricted to humid habitats on basalt cliffs of the Anaga Mountains in the northeastern region of the island Tenerife (Bramwell 1972; Böhle *et al.* 1996). In a taxonomic revision of the Macaronesian members of *Echium*, Bramwell (1972) classifies *E. simplex* together with *E. pininana* Webb & Berth. and *E. wildpretii* H.H.W.Pearson ex Hook.f. in section *Simplicia* (H.Christ ex Sprague & Hutch.) Bramwell. *E. simplex* has become naturalized in the flora of South Australia (Toelken 1986) where it thrives near Robe in the Mediterranean-like climate of the southeastern parts of the region. In 2001 the first author found a flourishing population of these alien plants in the veld among coastal scrub near the coastal town of Hermanus in the southwestern Cape, where the climate is also typically Mediterranean. This provenance is supported by a voucher specimen, *Smith & Steyn 14* (Figure 12) kept in the National Herbarium of South Africa (PRE). This strikingly beautiful plant was most probably introduced to South Africa as a garden ornamental. However, if indeed the case, this must have been an isolated event as we have no knowledge of the species being propagated by nurseries in the region and we have never observed it in a local garden.

In view of the ease with which species of *Echium* seem to overcome barriers to produce offspring freely and to sustain populations over many life cycles in the



FIGURE 14.—Apical part of inflorescence of *Echium simplex* with showy, pure white flowers. Photograph: G.F. Smith.

southern African veld, *Echium simplex* should be regarded as a likely candidate for naturalization (*sensu* Richardson *et al.* 2000) in the flora of the southwestern Cape. On the other hand, this apparent ease of establishment may favour the potential agronomical use of *E. simplex*, and perhaps other Macaronesian members of the genus in the Cape. Seeds of these island species are one of the richest sources of gamma-linolenic acid [GLA] found in nature so far. GLA is a commercially important seed oil for which there is a growing demand in the food, cosmetic and pharmaceutical industries (Horrobin 1992; Guil-Guerrero *et al.* 2000, 2001). A single plant of *E. simplex* produces several thousand propagules, with seed oil comprising 10.04% of seed weight and containing 19.28% GLA (Guil-Guerrero *et al.* 2000).

7118000–00065 *Echium simplex* DC., *Catalogus plantarum horti botanici monspeliensis*: 108 (1813); Bramwell: 75 (1972); Bramwell & Bramwell: 184, t. 228 (1974); Toelken: 1156 (1986). Type: '*E. simplex* DC. hab. in Insula Teneriffa ex Herb. *Broussonet*', fide Bramwell (1972: 75) [MPU, non vidi, fide Bramwell (1972)].

Unbranched, monocarpic rosette plant, lasting 4–5 years. *Stem* woody, short in vegetative state, lengthening to  $\pm 1$  m during flowering. *Leaves* somewhat leathery, spirally arranged, crowded at tip of stem in vegetative state, sessile, elliptic-lanceolate, 200–220 mm long, 40–45 mm wide

at mid-blade, both surfaces silvery green, densely covered with silky, short, unicellular, small-based, appressed trichomes, veins on lower surface prominent. *Inflorescence* a terminal, dense, cylindrical thyrse up to 600 mm long; lateral cymes in axils of leaf-like bracts, numerous, scorpioid, 1–5-fid, many-flowered, distinctly stalked; lateral peduncles 15–30 mm long, bracteate. *Flowers* sessile, actinomorphic, nectariferous, unscented, strongly protandrous. *Calyx* persistent, 5-partite, divided almost to base; lobes lanceolate,  $\pm 6$  mm long, acute, pubescent. *Corolla* white,  $\pm 10$  mm long, funnel-shaped, sparsely pubescent, 5-lobed; lobes equal, slightly spreading, rounded. *Stamens* silvery white, equal, strongly exerted, arising as single series at  $\pm 3$  mm from base of corolla tube; filaments glabrous, cylindrical,  $\pm 11$  mm long; anthers versatile, small,  $\pm 2$  mm long before dehiscence, splitting lengthwise; pollen silvery white. *Ovary* deeply 4-lobed; style simple, gynobasic, exerted beyond anthers; stigma bifid. *Fruit* a schizocarp consisting of four greyish brown nutlets; nutlets  $\pm 2.7 \times 2$  mm, tuberculate with tubercles varying in size, convex on dorsal side, keeled on ventral side,  $\pm$  triangular at base.

## ACKNOWLEDGEMENT

Dr David Bramwell of the Jardín Botánico Canario, Las Palmas, Gran Canaria, is thanked for positively identifying the South African specimens of *Echium simplex*.

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MS. received: 2003-10-31.