A NEW SPECIES OF *LEUCADENDRON* FROM THE WESTERN LITTLE KAROO

This large distinctive *Leucadendron* was unknown in South African herbaria until specimens collected by Mr David Osborne of the Cape Dept of Nature Conservation, Ladismith, were submitted for identification in 1994. Prior to that it had been observed at several sites on Anysberg at the western end of the Little Karoo in the Western Cape by officers of the Cape Dept of Nature Conservation although the taxonomic status of these populations was uncertain.

Subsequent field studies have established that it is fairly widely dispersed at the western end of the Klein Swartberg and Little Karoo. It is here described as new and commemorates David Osborne, who made the first recorded herbarium collections of this species and whose thorough collecting for the Protea Atlas Project has greatly increased our knowledge of the Proteaceae in the Little Karoo region.

Leucadendron osbornei *Rourke* sp. nov.

Frutex erectus robustus ad 4 m altus, *Leucadendroni teretifolio* affine, sed statura grandiore, foliis glabris acerosoteretibus 15–28 mm longis, inflorescentiis masculinis 20–35 mm longis, et strobilis femineis maturis 30–40 mm longis differt.

TYPE.—Western Cape, 3320 (Montagu). Witteport, extreme western end of Klein Swartberg, (–BD), 9-11-1995, *J.P. Rourke 2110* (NBG, male specimen, holo.!, BOL, K, MO, NSW, PRE, S, iso.!).

Robust rigid shrub 1.5–4.0 m tall with a stout main trunk to 75 mm in diam. *Branches* stiffly erect, rigid, glabrous, 5–10 mm in diam. *Leaves* acicular terete, 15–28 × 1.5–2.0 mm, ascending, hard and cartilaginous, glabrous, slightly glaucescent, upper surface minutely canaliculate; slightly shorter in male plants. *Male inflorescences* densely clustered in groups of 8 to 16 on short (30–60 mm long) branchlets on flowering shoots. *Inflorescence* cylindric, 20–35 × 10 mm, pedunculate; peduncle 10 × 2 mm, sparsely sericeous, covered with tightly adpressed subulate bracts 2–3 mm long, glabrous, but margins ciliate. *Floral bracts* ovate, 1 × 1 mm, tightly clasping perianth, glabrous but margins ciliate. *Perianth* sessile, 5–6 mm long, straight, glabrous, bright yellow; perianth claws equally recurved at anthesis; tube cylindrical. *Anthers* 4; pollen powdery. *Style* filiform, 6 mm long, glabrous. *Pollen presenter* clavate-acute, 1 mm long. *Hypogynous scales* 2 mm long, projecting to top of tube. *Female inflorescences* free-standing, surrounded by a loose pseudowhorl of patent involucral leaves, greenish ivory to yellow at anthesis. *Flowering cone* ovoid-clavate, obtuse, 30–40 × 12–14 mm, shortly pedunculate; peduncle 10–15 × 10 mm. *Involucral bracts* dark brown, very narrowly lanceolate-acuminate to subulate, 8–12 × 1.5 mm, tightly adpressed to peduncle, glabrous but margins ciliate. *Floral bracts* broadly ovate, acute, 3 × 5 mm, glabrous. *Perianth* 3 mm long, laterally compressed; tube region 2 mm long, densely sericeous; claws and limbs recurved, glabrous. *Staminodes* generally 3, anterior staminode usually absent. *Style* glabrous, 5 mm long, slightly abaxially deflexed in upper half. *Ovary* ovoid to spherical, glabrous, 1 mm long. *Pollen presenter* minutely capitellate, inconspicuously bilobed with glandular hairs on the abaxial face. *Hypogynous scales* ovate-acute, 1 mm long. *Mature female cone* ovoid-acute, 35–60 × 25–30 mm, brown, becoming silvery grey with age. *Fruit* a flattened black samara, 70 × 50 mm, apically retuse (Figure 10).

FIGURE 10.—*Leucadendron osbornei:* A, young female cones and a mature fruiting cone; B, branches on an old female plant showing serotinous cones retained for up to eight years; C, David Osborne next to a mature female plant; D, densely clustered male inflorescences. B, C, & D taken at type locality, Witteport, Klein Swartberg.

Diagnostic characters

Apart from the obvious differences in the size and stature of the mature shrubs, *L. osbornei* is distinguished from *L. teretifolium* by its longer leaves, 15–28 mm long; longer male inflorescences, 20–35 mm long and by the much longer (35–60 mm long) mature female cones. In *L. nobile* the male inflorescences are produced more sparsely in smaller numbers. The male inflorescences in *L. nobile* (30–70 mm long) are very much larger than in *L. osbornei,* whereas the male flowers are loosely arranged in a lax spike and are pubescent basally in the tube region. The male flowers in *L. teretifolium* usually have a bright red spot at the apex of each bud but in both *L. osbornei* and *L. nobile* they are uniformly yellow (Table 4).

TABLE 4.—Differences in leaf and inflorescence dimensions between *L. osbornei* and related species

	Leaf length (mm)	Length of male inflorescence (mm)
L. nobile	41–58	30–70
L. osbornei	15–28	20–35
L. teretifolium	8–22	5–10

Key to species

1a Male inflorescences globose, 5–10 mm long; mature female cones up to 35 mm long . . . . . *teretifolium*

1b Male inflorescences cylindric, 20–90 mm long; mature female cones 30–90 mm long:

2a Male flowers completely glabrous; male inflorescences numerous, 20–35 mm long, clustered together on short branchlets; Western Cape, western Little Karoo . . . . *osbornei*

2b Male flowers minutely pubescent in tube region; male inflorescences solitary, 30–70 mm long, sparsely produced; Eastern Cape, Kouga, Baviaanskloof & Willowmore Mountains . . . . . *nobile*

Affinities

Leucadendron nobile Williams, *L. teretifolium* (Andr.) Williams and the species here described as *L. osbornei* Rourke form a well-defined group within *Leucadendron* subsection *Compressa,* characterised by their uniformly acicular glabrous leaves and glabrous cones.

The robust vegetative growth, large stature of the mature shrub and impressive size of the mature female cones in *L. osbornei* initially suggested an affinity with *L. nobile*, a species from the Humansdorp, Willowmore and Steytler-ville Districts of the Eastern Cape. However, in the morphology, arrangement and number of male inflorescences, *L. osbornei* is clearly more closely allied to *L. teretifolium* than to *L. nobile*. In both L. *teretifolium* and *L. osbornei* the male plants are covered with masses of male inflorescences on short branchlets borne at the ends of flowering shoots, and in both species the male flowers are completely glabrous and borne in tightly congested cylindric inflorescences. This is unlike *L. nobile* where the male inflorescences are relatively sparsely produced on the ends of long shoots.

At one locality, a site south of trig. beacon 66 on Matjiesgoedberg, *L. osbornei* and *L. teretifolium* occur sympatrically (2–3 m apart), with no evidence of hybridization. From observations made at this site, it appears that there is little or no overlap in their flowering periods. During a site visit on 5-11-1996, *L. teretifolium* was observed to be nearly past its flowering period while *L. osbornei* was still in bud, about two weeks from flowering.

Significantly, the male flowers in both species produce quite different odours which may attract different pollinators. The male flowers in *L. teretifolium* give off a sweet, slightly lemon-scented odour with faint sulphurous undertones while in *L. osbornei* they produce a smell reminiscent of fresh human semen. Prominent nectar droplets form at the base of the male flowers in *L.* osbornei which attract large numbers of *Diptera* during the day when the air temperature reaches about 25°C. I have not observed potential pollinators on *L. teretifolium*. Both Williams (1972) and Rebelo (1995) note that *L. teretifolium* produces showers of pollen when shaken, indicating that it is wind-pollinated.

Distribution and habitat

This species is restricted to mountains at the western end of the Little Karoo in the southwestern Cape at elevations between 700 and 1 500 m. Populations of *L. osbornei* occur on Elandsberg north of Sevenweeks Poort at its northeasterly limits; the western end of the Klein Swartberg at Wittepoort and Paardenfontein; the northeastern corner of Touwsberg; on Anysberg; on Matjiesgoedberg north of Anysberg at the western end of its range and on Rooiberg near the Floriskraal dam. *Leucadendron osbornei* occurs mainly in Dry Mountain Fynbos or in the ecotone between Dry Mountain Fynbos and Karroid Broken Veld (Acocks 1988) or between Dry Mountain Fynbos and Central Mountain Rhenosterveld (Moll *et al.* 1984). Most of the known localities are on Witteberg Quartzite and a few are on Table Mountain Sandstone (Figure 11).

These localities are generally extremely arid, receiving a mean annual rainfall of between 150 and 200 mm. *Merxmuellera arundinacea* and *Erica spectabilis* are commonly associated species.

In several populations many of the shrubs observed were between 3 and 4 m in height. The females are almost invariably slightly taller than the males. Vegetative growth in such habitats is slow, and attempts to count annual vegetative growth increments indicated that such specimens were in excess of 50 years old. *Leucadendron osbornei* is strongly serotinous, retaining unopened cones for up to seven and eight years (Figure 12). Flowering takes place from early to late November depending on site aspect.

Conservation status

The exact conservation status of this species is not clear as the known populations have not yet been adequately assessed. Most populations which I have observed consist of about 100 or fewer mature individuals. It is probably best described as naturally rare but under no obvious man-made threat at present. The Matjiesgoedberg and Anysberg stands are protected within the Anysberg Nature Reserve administered by the Cape Dept of Nature Conservation.

Specimens examined

WESTERN CAPE.—3320 (Montagu): Matjiesgoedberg, above Matjieskloof on South side below trig. beacon 66, (–BC), Nov., *Rourke 2114* (NBG); Anysberg, 3.8 km west of trig. beacon 66 on Farm Matjieskloof, (–BC), March 1994, *Osborne 94022302* (NBG); Wittepoort, western end of Klein Swartberg above Kromkloof, (–BD), March 1995, *Rourke 2071* (NBG); Rooiberg, Drielingskloof, westernmost part of peak on Laingsburg-Prince Albert road, 7-11-1994, *Osborne s.n.* (NBG). 3321 (Ladismith): Touwsberg, on Farm Basseur, (–CA), 23-9-1994, *A. September 94092301* (NBG); Elandsberg, on Ylandskloof 211, 0.8 km from spot height 1533, (–AD), 13-11-1995, *K. Mars 95111303* (NBG).

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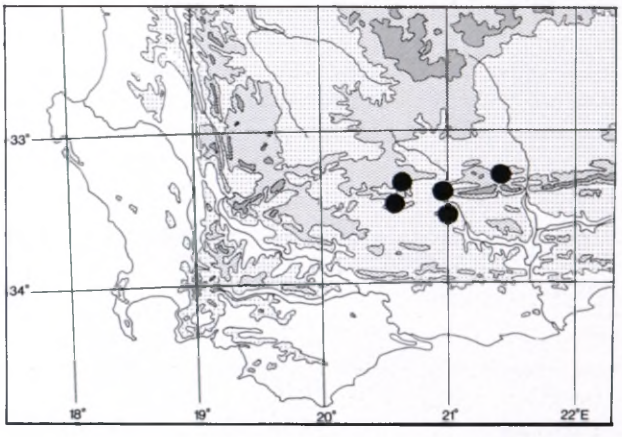

FIGURE 11.—Distribution of *L. osbornei.*

FIGURE 12.—*Leucadendron osbornei*. A, female inflorescences in flower, × 0.7; B, mature female cone, × 0.7; C, seed, × 2.3; D, section through leaf, × 5.4. E–G, female flower, × 5.4: E, in bud; F, open; G, gynoecium with hypogynous scales. H, shoot with male inflorescences, × 0.7. I–K, male flower, × 5.4: I, in bud; J, open; K, showing pollen presenter and hypogynous scales.

field excursions which enabled me to examine this species at various localities within its distribution range and to Dr Ion Williams who read and reviewed the manuscript.

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