

Notes on African plants

VARIOUS AUTHORS

PROTEACEAE

A NEW *LEUCADENDRON* (PROTEACEAE) FROM WESTERN CAPE, SOUTH AFRICA

The discovery of a large new species of *Leucadendron* R.Br., strikingly different from its congeners in growth habit, brings to 85 the number of *Leucadendron* species currently known, thus making it the largest genus of Proteaceae in southern Africa. Discovered by Dr Tony Rebelo on the final annual field outing of the Protea Atlas Project in March 2001, this remarkable species is here described as *L. immoderatum* on account of its extraordinary growth habit.

***Leucadendron immoderatum* Rourke, sp. nov.**, species distinctissima propter habitum dimorphum et folia dimorpha: acicularia in ramis vegetativis, obovata apicem versus in ramis reproductivis. Inflorescentiae gemmis masculinis et femineis intra involucrium conico-acutam inclusis. Bractae involucrales lanceolato-acutae vel lineari-acuminatae, per anthesin cadentes.

TYPE.—Western Cape, 3319 (Worcester): Riviersonderend Mountains, Olifantsberg, north side between Doring and Witte Rivers, on a saddle facing northwest, (–CD), 12-11-2001, J.P. Rourke 2224 (NBG, female specimen, holotype, PRE, K, MO, iso.).

Robust, erect shrub up to 2 m tall with a single main stem branching just above ground level; growth habit and leaves dimorphic. *Basal vegetative branches* highly divaricate with acicular terete leaves, forming a dense mat up to 2 m diam; up to 0.7 m tall, from which emerge 5–14 stout, woody, reproductive branches, bare when mature except for flat, obovate leaves at apex of each shoot. *Basal branches* 3–5 mm diam., covered with prominent, closely arranged leaf scars. *Basal leaves* acicular-terete, 10–20 × 1.0–1.5 mm, densely ascending to slightly incurved, upper surface canaliculate, initially sparsely sericeous, soon glabrous becoming slightly glaucous, apex mucronate. *Reproductive branches* stout, erect, straight, 8–15 mm diam., elongating up to 0.7–1.0 m, initially with broadly linear leaves, 15 × 5 mm, soon caducous, leaving branches bare. *Upper leaves* flat, oblanceolate to obovate, 25–55 × 10–20 mm, glabrous, apices rounded, minutely uncinata. *Male capitula* in groups of 3–6 on short shoots towards apex of reproductive branches. *Bud stage* enclosed in a conic-acute involucre of ovate-acute bracts, 5–25 × 5–7 mm, glabrous, margins ciliate; caducous at anthesis. *Inflorescence* broadly cylindric, 25 × 20 mm, minutely pedunculate. *Floral bracts* broadly ovate, acute 1 × 1 mm, glabrous, margins ciliate. *Perianth* glabrous, straight, 5–6 mm long, pale yellow; perianth claws equally recurved at anthesis. *Anthers* ± 3 mm long. *Style* filiform, straight, 5–6 mm long, glabrous. *Pollen presenter* clavate, ± 3 mm long. *Hypogynous scales* linear-obtuse, 1 mm long.

Female capitula solitary or up to 3 on short branchlets at apex of reproductive shoot surrounded by a loose pseudowhorl of erect, greenish yellow/ivory leaves. *Bud stage* enclosed in a conic-acute involucre of lanceolate-acute to linear-acuminate bracts, 5–12 × 3–40 mm, glabrous but margins densely ciliate-sericeous; caducous at anthesis. *Inflorescence* cylindric, sessile, 40–50 × 10 mm. *Floral bracts* very broadly ovate-acute, 5 × 6 mm, horizontally patent, projecting, cartilaginous, glabrous, but apex minutely ciliate. *Perianth* 4–15 mm long, zygomorphic, laterally compressed; lateral perianth claws densely sericeous, adaxial and abaxial claws sparsely sericeous to glabrous. *Staminodes* 3; anterior staminode absent. *Style* straight ± 4 mm long, patent, partially clasped by sterile anterior perianth limb. *Pollen presenter* oblong-clavate, terminal, adaxial surface glandular. *Ovary* ovoid-compressed, 1 mm long, sharply differentiated from style base, glabrous. *Hypogynous scales* lanceolate-obtuse, 1 mm long, carinose. *Mature cone* 30–40 × 60–90 mm, prominently ridged. *Fruit* a rounded, flattened, black, samara, 8 × 10 mm, apically retuse. Figures 1–3.

Diagnostic characters: this species is unique in the genus on account of the conic-acute, 40–55 mm long involucre that completely enclose both male and female inflorescences in their bud stages giving the inflorescence buds the appearance of small species of *Protea* or certain species of *Pteronia* (Asteraceae). These involucral bracts are rapidly caducous at anthesis, linear-lanceolate and up to 45 mm long in female inflorescences, ovate-acute and up to 7 mm long in male inflorescences. (*L. microcephalum* also has large involucral bracts but these only partially enclose the inflorescences and persist into the post-pollination phase).

Leucadendron immoderatum is further distinguished by its dimorphic growth habit and dimorphic foliage with a few stout, erect, reproductive branches bearing broadly obovate leaves around the capitula, developing from a dense, highly dichotomous basal growth, producing acicular-terete leaves.

Affinities: morphological evidence, especially seed, cone and leaf characters suggest that *L. immoderatum* is best accommodated in *Leucadendron* sect. *Alatosperma* subsect. *Compressa*. This subsection contains a number of species with predominantly acicular-terete leaves that have a tendency to become flattened and broader (very narrowly oblanceolate) around the inflorescence in some species (Williams 1972). *Leucadendron comosum* (Thunb.) R.Br. subsp. *comosum* may be the most closely allied species but the leaf dimorphism is very much more pronounced in *L. immoderatum*. The extreme dimorphic

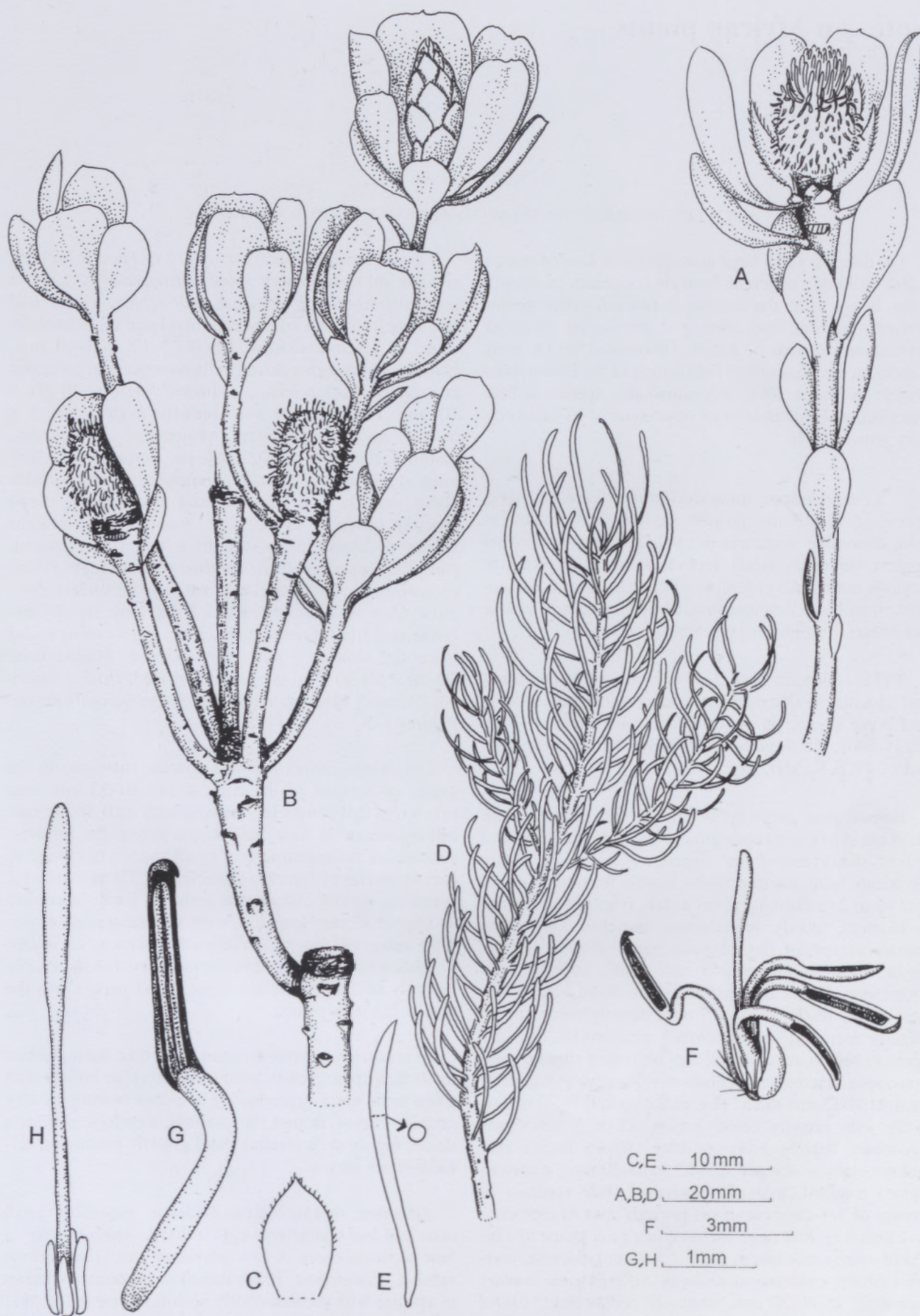


FIGURE 1.— Male inflorescences of *Leucadendron immoderatum*, Rourke 2224. A, fully open; B, previous year's inflorescences and inflorescence bud enclosed in involucre; C, basal involucral bract; D, juvenile foliage; E, single juvenile acicular leaf; F, male flower and subtending floral bract; G, single perianth segment and anther; H, style, pollen presenter and hypogynous scales. Artist: I.M. Oliver.



FIGURE 2.—Female inflorescences of *Leucadendron immoderatum*, Rourke 2224. A, complete branch system showing basal juvenile foliage, reproductive branch with long growth increments and terminal obovate leaves; B, flowering female cone with remnants of involucral bracts; C, obovate upper leaf; D, involucral bract; E, unopened female flower and subtending floral bract (cone scale); F, open female flower; G, gynoecium with hypogynous scales; H, mature female cone, I, mature fruit. Artist: I.M. Oliver.

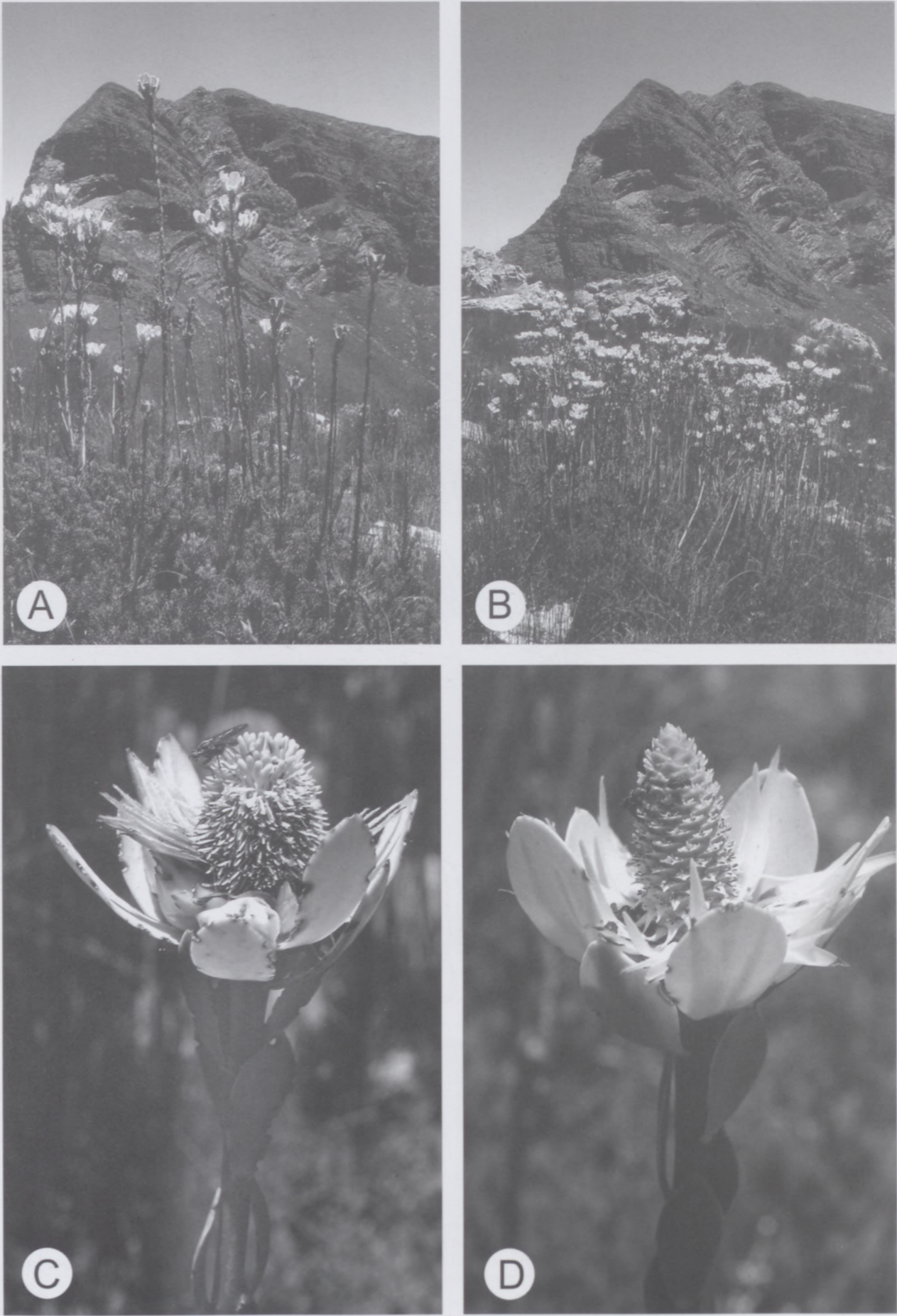


FIGURE 3.—*Leucadendron immoderatum* Rourke. A, female and B, male plants in the type locality. The peak in the background, unnamed on modern maps, is immediately adjacent to and west of Olifantsberg. C, male inflorescence; D, female inflorescence. Note the remnant acuminate involucral bracts abscissing at the base of each inflorescence.

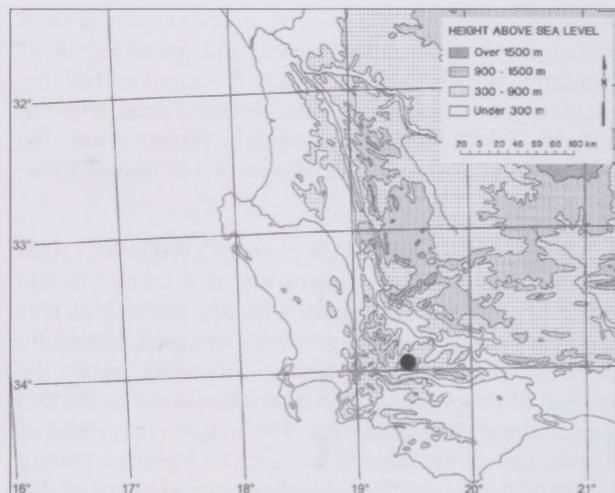


FIGURE 4.—Distribution of *Leucadendron immoderatum* Rourke.

growth habit of *L. immoderatum*, in which the adult shrub is sharply differentiated into vegetative and reproductive branch systems, represents a unique apomorphy within this lineage.

Distribution: *Leucadendron immoderatum* is known from a single population growing in mesic mountain fynbos at about 1 300 m on the upper north slopes of Olifantsberg in the Riviersonderend Mountains on a north-west-facing saddle between the Doring and Witte Rivers (Figure 4). When the type material was collected, only 16 mature adult plants were observed at this site. These flowering specimens had escaped a burn that had occurred approximately three years earlier. The original population must have been considerably larger as some 30 seedlings were observed in the area. This species is clearly an exceptionally narrow endemic in common with several other narrow proteaceous endemics from the same area, like *Serruria williamsii* and *Sorocephalus alopecurus*.

Biology: *Leucadendron immoderatum* is a serotinous, non-lignotuberous seed regenerator. Seedling development in the post-fire phase appears to be slow, eventually resulting in the development of a dense, highly divaricate mat-like shrub, ± 0.7 m tall and up to 2 m in diameter, consisting of several main branches bearing numerous slender axillary branchlets covered with slightly glaucous, acicular-terete leaves.

After persisting for several years in this juvenile non-reproductive phase, a number of stout, erect, unbranched, abruptly emergent shoots are produced from the main

basal branches, bearing a graduated series of acicular to linear-oblong to oblanceolate leaves. These 1 m long reproductive shoots consist of up to three annual growth increments, some increments elongating by over 500 mm in one year. This is in marked contrast to the very short annual growth increments on the basal sterile branchlets. Male or female cones surrounded by broadly obovate leaves terminate these heavy, woody stems. Thereafter annual growth slows dramatically but is continued by a number of very short (80–100 mm long) axillary branches arising below the terminal cones.

Flowering occurs in early summer, peaking between the first and third weeks of November. Large numbers of small, unidentified Diptera and Coleoptera as well as large scarab beetles (*Trichostetha* sp.) were observed on both male and female inflorescences, apparently effecting cross-pollination.

Conservation status: unless additional populations are discovered, *L. immoderatum* must rank among the rarest species in the genus. With under 20 adult plants and fewer than 50 seedlings seen at the time of making the type collection, it is clearly a naturally rare, very local endemic, but currently not threatened by any obvious human activities due to its isolated, somewhat inaccessible montane habitat. As a slow maturing species, too frequent fires seem to be the only immediate threat to its survival.

Other specimen examined

WESTERN CAPE.—3319 (Worcester): northwest side of Olifantsberg, ENE of saddle between Doring and Witte Rivers, (–CD), 22-3-2001, A.G. Rebelo Y1032106 (NBG, PRE).

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REFERENCE

WILLIAMS, I.J.M. 1972. A revision of the genus *Leucadendron* (Proteaceae). *Contributions from the Bolus Herbarium* No. 3.

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