

## MESEMBRYANTHEMACEAE

*BRIANHUNTLEYA*, A NEW GENUS ENDEMIC TO THE WORCESTER-ROBERTSON KAROO, SOUTH AFRICA

### INTRODUCTION

A fundamental principle emerging from Aristotle's biological work, in about 335 BC, and upon which the earliest classification systems were built, is translated as 'the *species* is defined by the *genus* and the *difference*' (Greuter 2002). This Aristotelian logic is at the core of the Linnaean classification system and can be applied to any hierarchical system. The concept becomes more challenging in the case of genera containing single species, and, unlike early classification systems, most modern ones do contain high numbers of monotypic genera (Williams 1964). This has also been shown for Mesembryanthemaceae (Chesselet *et al.* 1995), and currently, 27 genera out of 124, including the one described here, are monotypic. It is one thing to lament monotypes, quite another to find a logical alternate home for, e.g., *Didymaotus* N.E.Br. When a species is sufficiently different from all others, it is necessary to create a new genus to accommodate the 'difference'.

A new monotypic genus, *Brianhuntleya* Chesselet, S.A.Hammer & I.Oliver is here described. It comprises a single species, *Brianhuntleya intrusa* (Kensit) Chesselet, S.A.Hammer & I.Oliver. Formerly placed in *Ruschia* Schwantes, it is removed from the genus on the basis of a unique suite of characters. The morphology, distribution, ecology and phylogenetic affinities of *Brianhuntleya* are discussed.

Our new genus is named in honour of Prof. Brian John Huntley, Chief Executive Officer of the National Botanical Institute, South Africa, since 1990. We feel that it is appropriate to name this genus *Brianhuntleya* in appreciation of his considerable contribution to the advancement of biodiversity research and conservation in southern Africa.

In recent years a number of new genera have been described in Mesembryanthemaceae, of which several pay tribute to botanists, notably *Ihlenfeldtia* H.E.K.Hart-

mann (Hartmann 1992); *Hartmanthus* S.A.Hammer (Hammer 1995a) and *Hammeria* Burgoyne (Burgoyne et al. 1998). Curiously, all three of these are bitypic.

A live plant in fruit (Chesselet & Oliver 485), collected near Worcester, on the road to Robertson, in December 2002, was brought to the Compton Herbarium at Kirstenbosch for identification. The singular combination of characteristics, particularly of the pedicel, calyx and fruit, precluded a suitable generic placement in the current system for mesembs. However, it was necessary to search for a species name, as Louisa Bolus had named most mesembs, and often more than once, during the years of intensive collecting and describing of new species in the first half of the 20th Century, and indeed the plant was finally identified as *Ruschia intrusa* (Kensit) L.Bolus. It is significant that we had trouble finding a 'Bolus name': it didn't occur to us that anyone would ever have placed this plant in *Ruschia*!

The following combination of features distinguishes *B. intrusa* from all other mesembs: 'intruse' calyx tube; unique, finely striate wax cover of the leaves; echinate, highly papillate seed; sigmoid, succulent pedicel that withers, allowing fruit to break off from the mother plant and disperse seed from the well-separated fruit; flat bowl-shaped capsule base enabling rain-splash dispersal in detached fruit (usually found in some multilocular fruit).

**Brianhuntleya** Chesselet, S.A.Hammer & I.Oliver, gen. nov. (Ruschieae Schwantes; Mesembryanthemaceae Fenzl). Type species: *B. intrusa* (Kensit) Chesselet, S.A.Hammer & I.Oliver.

Fruticulus perennis caespitosus repens, radice palari centrali radicibusque vadosis e nodis basalibus enatis; rami prostrati lignosi reliquis dessicatis parum priorum foliorum tectis. *Folia* trigona connata, basin versus rubicunda, carinata griseo-viridia, tegmine cereo crasso striato, pro parte in lamellas foliis crescendibus delabente, unum vel duo pares foliorum ad extremitates ramulorum brevium. *Flos* solitarius in pedicello longo crasso sigmoideo carnosus, fructu ubi maturo exarescenti desiccanti disrumpentique. *Pedicellus* ebracteatus, sed evolutio pedicelli florisque concurret cum productione paris foliorum quod primo bracteas simulare potest. *Calyx* truncatus, tubum formans, sepalis 5 subaequilongis, 3 membranaceis. *Petala* magenteo-purpurea, uniseriata, staminodia filamentosa nulla; staminum classes staturae tres, stamina basin versus papillata, apicibus roseis, conum centalem circum stigmata formantes, polline pallide flavo; styli subulati, longitudine mediocri. *Nectarium* cristatum annulare (holonectarium lophomorphum). *Fructus* capsula 5-locularis hydrochastica, basi crateriformi, supra elevata; valvae apertae horizontales, corpora claudentia magna, loculorum exitos obstantia, propter texturam spongiosam albida, membranae tegentes centrum fructus versus elevatae, liminibus claudentibus in superficie inferiora distali; dispersio seminum ope ejectionis per membranas tegentes carinae dilatantes divergentes, a laminis dilatantibus distinctae, brunneae, laceratae, in subulam desinentes; alae valvarum nullae. *Semina* rubiginosa, ± 1 mm longa, propter papillas longas echinata.

Perennial, tufted, creeping dwarf shrub with a central taproot and shallow roots arising from nodes at base of plant; branches prostrate, woody, covered with dried remains of previous leaf pairs. *Leaves* trigonous, fused, reddish at base, keeled, grey-green with thick, striate, wax cover that flakes off partially as leaves expand, one or two leaf pairs at ends of short shoots. *Flowers* solitary, borne on long, thick, sigmoid succulent pedicel that shrivels, dries out and breaks off when fruit is ripe. *Pedicel* without bracts, but development of pedicel and flower coincides with production of a leaf pair that in early stages may resemble bracts. *Calyx* truncate, forming a calyx tube, 5 sepals more or less of equal length, 3 membranous. *Petals* magenta-purple, in a single whorl; filamentous staminodes absent; three size classes of stamens, with papillate bases and pink tips, forming a central cone around stigmas; pollen pale yellow; styles subulate, of medium length. *Nectary* crested, annular (lophomorphous holonectary). *Fruit* 5-locular, hydrochastic capsule, base bowl-shaped and top raised; valves opening to horizontal position, closing bodies large, blocking exits of locules, whitish from spongy tissue, covering membranes raised towards centre of fruit, with closing ledges on distal undersurface; ejection dispersal through covering membranes; expanding keels diverging, distinct from expanding sheets, brown, lacerate, ending in an awn; valve wings absent. *Seeds* reddish, ± 1 mm long, echinate from long papillae.

The genus includes a single species:

**Brianhuntleya intrusa** (Kensit) Chesselet, S.A.Hammer & I.Oliver, comb. nov.

*Mesembryanthemum intrusum* Kensit in Bolus & Kensit in Transactions of the Royal Society of South Africa 1: 151 (1909). *Ruschia intrusa* (Kensit) L.Bolus: 220 (1950). Lectotype: Cape, hills near Robertson, July 1901, Marloth 4592 (BOL!).

#### *Emended species description*

Tufted plant, 70–100 mm high; branches decumbent, woody, old leaves persistent on plant. *Leaves* trigonous, 50–60 × 7–8 mm, grey-green, reddish at bases, waxy, keel indistinct; arising from between 2 pairs of young green leaves in axil of older pair. *Flowers* up to 35 mm diam., spreading; pedicel 30–50 mm long, succulent. *Sepals* 5, of subequal length, 3 membranous, up to 3 mm long; petals up to 17 × 1.5 mm, 1-seriate, pale rose-purple; nectary green, annular and crested; top of ovary raised, convex; stigmas 5, subulate, acuminate, 2 mm long; stamens in 3 rows, 2–4 mm long, pinkish at tips; anthers and pollen pallid. *Fruit* 5-locular, hydrochastic capsule, 7.5–9.0 mm diam., 4 mm deep, valves raised, 4 mm high; seed 1 mm long. *Flowers* open for a few hours in the afternoon. *Flowering time*: late May–June in cultivation and July in the wild. Figure 3.

*Etymology*: the specific epithet *intrusum*, from the Latin *intrusus*, is used in the botanical context to describe a form that appears pushed or thrust inwards. In this context Bolus used the term to describe the 'very peculiar truncate somewhat intruse calyx tube' characteristic of this species (Bolus & Kensit 1909).

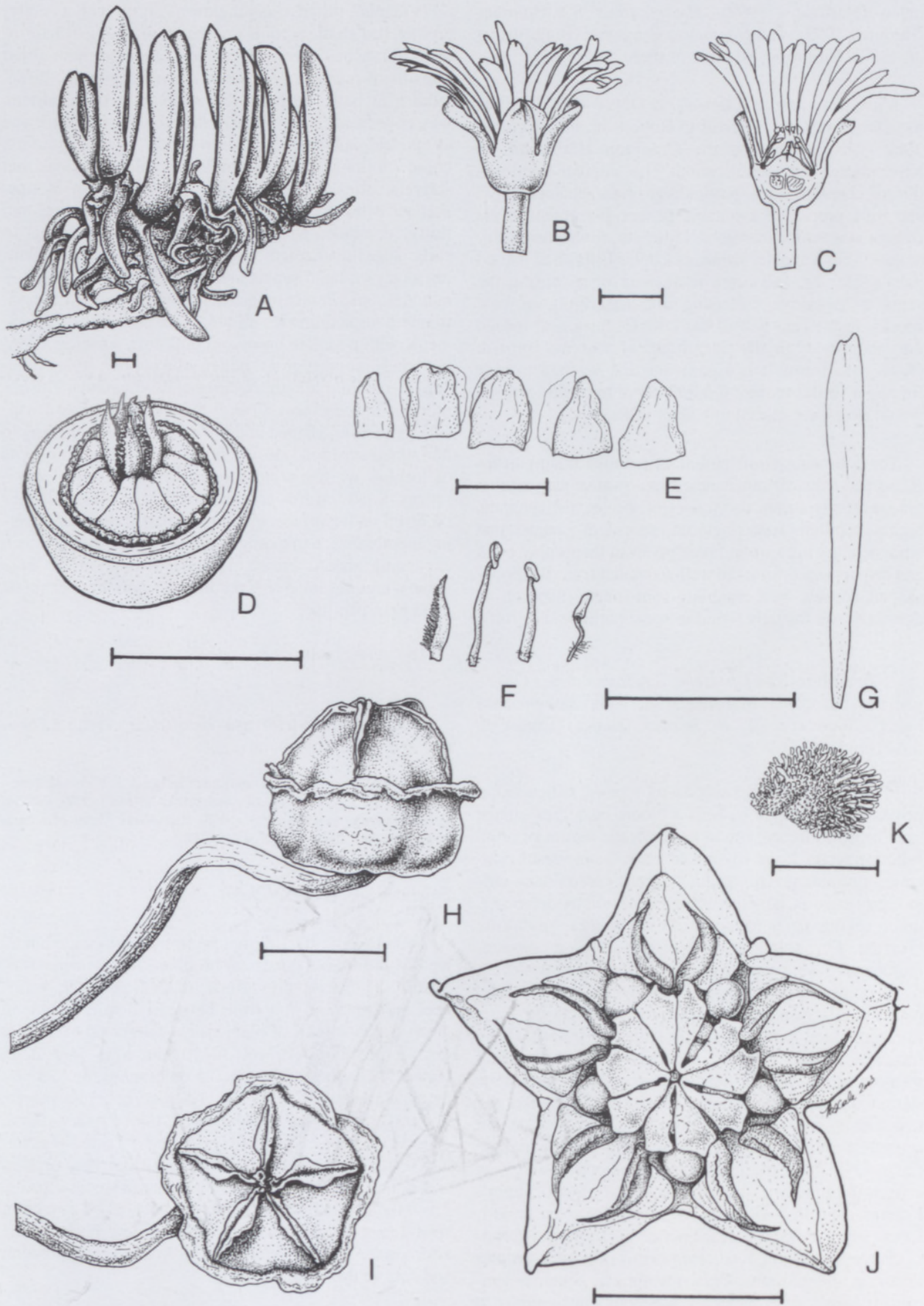


FIGURE 3.—Morphology of *Brianhuntleya intrusa*. A, habit, showing upright leaf pairs and creeping stems with accumulated dead leaves from previous growth; B, flower showing 'intruse' calyx; C, l/s flower; D, gynoeceum with ring-like beaded nectary; E, five subequal sepals; F, stigma and three size classes of stamens; G, petal from single whorl. H–J, fruit: H, side view showing flat base, raised valves and long, withered pedicel; I, top view; J, open fruit with large whitish closing bodies, covering membranes and expanding keels. K, echinate seed. Scale bars: A–J, 5 mm; K, 1 mm.

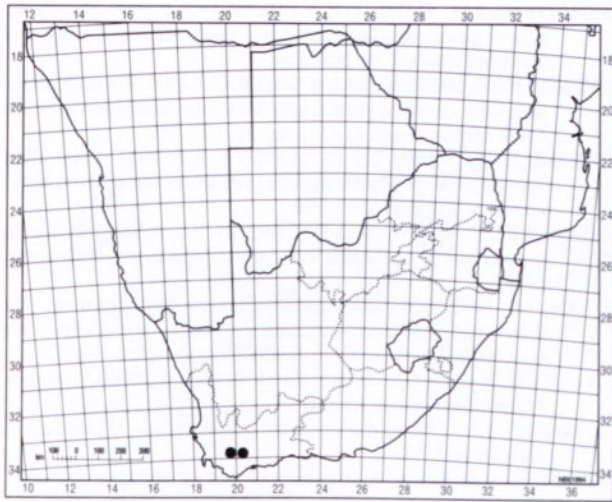


FIGURE 4.—Known geographical distribution of *Brianhuntleya intrusa*.

**Distribution and ecology:** the genus *Brianhuntleya* is endemic to the Worcester-Robertson Karoo, part of the Succulent Karoo Biome, from which 11 genera and 37 species of mesembs are known (Chesselet *et al.* in prep.). The monotypic genus *Stayneria* L.Bolus is the only other mesemb genus endemic to the Worcester-Robertson Karoo, where it is confined to Renosterveld in the Breede River Valley, from Worcester to McGregor.

*B. intrusa* is known from populations at Worcester, Robertson, Montagu, McGregor and Bonnievale, all in the Breede River Valley, where it is restricted to eroded Malmesbury Shale sometimes interspersed with small chunks of surface quartzite (Figure 4). Plants grow on low hills at altitudes ranging from 200–250 m, in full sun, with mixed succulent vegetation that includes *Ruschia caroli*, *Adromischus filicaulis*, *Poellnitzia rubriflora* and *Conophytum ficiforme*. Near Bonnievale it grows with *Acrodon purpureostylus*.

In horticulture *B. intrusa* is very resilient, not sensitive to over-watering, and it produces its splendid flowers at a time when most vygies are without flowers. It becomes quite luxuriant if well watered, forming a grey-green ground cover, reminiscent of some species of *Carpobrotus* N.E.Br. It is so undeservedly obscure in horticulture that a recent plant list noted that, until recently, no one had ever purchased it.

With only a few known populations, *B. intrusa* is already in a conservation programme at the Karoo Desert NBG. Live plants were collected in a salvage operation for *ex situ* and *in situ* conservation from a site of planned road works at the Gorees Hoogte Pass near Robertson. Once road works are complete, the area will be restored.

**Systematic affinities:** when Bolus (née Kensit) described *Mesembryanthemum intrusum* (Bolus & Kensit 1909), she suggested that the new species is affiliated to *M. divergens* Kensit, now *Antegibbaeum fissoides* (Haw.) Schwantes ex C.Weber from near Matjiesfontein, and to *M. brevipes* Schltr., now known as *Argyroderma fissum* (Haw.) L.Bolus, from the Knersvlakte. This latter association seems highly unlikely. However, both Klak *et al.* (2003) and Hartmann (2001a) follow Bolus's suggestion

that *B. intrusa* may be closely related to the monotypic *Antegibbaeum* Schwantes ex C.Weber. Echininate seeds, which are characteristic of *B. intrusa*, feature in a number of genera in Mesembryanthemaceae including *Acrodon* N.E.Br., *Antegibbaeum*, *Braunsia* Schwantes and *Namaquanthus* L.Bolus.

It may be deduced from a recent molecular study of relationships in the *Lampranthus* Group (Klak *et al.* 2003), that *B. intrusa* would resolve as a clade with *Hammeria*, *Antegibbaeum*, *Smicrostigma* N.E.Br., *Zeuktophyllum* N.E.Br., *Vlokia* S.A.Hammer and '*Braunsia*' *vanrensburgii* (L.Bolus) L.Bolus. Diagnostic features of the fruit, however, conflict significantly with the proposed grouping of the above genera by Klak *et al.* (2003).

One cannot rule out the possibility that *B. intrusa* may belong to the mysterious '*Calamophyllum*', a genus erected by Schwantes (1927) based on cultivated plants. Species included in *Calamophyllum* were originally described by Haworth in the 1790s under *Mesembryanthemum* and have not been definitely identified since. Problems of correct identification in this genus are not surprising, as descriptions are conflicting and distributions unknown (Jacobsen 1960; Herre 1971; Smith *et al.* 1998; Hartmann 2001b). Some features that may support this possibility include the grey-green leaves of  $\pm$  cylindrical shape, the long pedicel of *C. teretifolium* (Haw.) Schwantes, the leaves of *C. teretiusculum* (Haw.) Schwantes that may be impunctate (Hartmann 2001b), and the flowers seen in *Mesembs of the World* (Smith *et al.* 1998), as well as the illustration of the ovary with raised top and five stigmas shown in R. Darroll's illustration in Herre's (1971) *Genera of the Mesembryanthemaceae*.

*Brianhuntleya* grows sympatrically with *Acrodon purpureostylus* (L.Bolus) Burgoyne near Bonnievale, and it is remarkable how easily these plants can be confused with each other, both having similar grey-green leaves with reddish bases, creeping growth forms and detachable fruit. Nonetheless, *A. purpureostylus* is easily distinguished by its unwaxed leaves, *Acrodon*-type flowers (striate pink petals, stamens collected in a cone, plumose stigmas and pale pollen), and shiny orange, well-exposed stems reminiscent of species of *Jordaaniella* H.E.K.Hartmann. When Dehn (1992) revised the Ruschiinae, he annotated specimens of *Ruschia intrusa* as belonging to the genus *Acrodon* although this was later rejected. However, *B. intrusa* has pale pollen and echinate seed in common with species of *Acrodon*.

The transfer of *Ruschia purpureostyla* (L.Bolus) Bruyns to *Acrodon* (Burgoyne 1998) raised much controversy (Klak 2000; Hartmann 2001b). The lophomorphic holonectary of *A. purpureostylus*, shown to be a significant taxonomic character by Chesselet *et al.* (2002), precludes its inclusion in *Cerochlamys* N.E.Br, a genus with a lophomorphic meronectary, as suggested by Hartmann (2001b). The fruit of *A. purpureostylus* is similar to that of *B. intrusa* as it also has a withering pedicel and detaches from the mother plant, unlike the rather solid fruit with thick persistent pedicels of other species of *Acrodon* N.E.Br. The unusual fruit of *A. purpureostylus* either casts some doubt on its current generic placement or highlights strong selection for detachable fruit in their

mutual environment. The base is rounded and not flat as in *B. intrusa* and the covering membranes are not as raised or hardened, closing bodies are larger and spongier, the valves open to the upright position (as in other *Acrodon* and *Ruschia* species) and do not fold back to the horizontal position as in *B. intrusa*, thus excluding the possibility of these two species being congeneric.

A link to the *Leipoldtia* Group of Hartmann (1991) is suggested by *Brianhuntleya*'s unique fruit structure and overall resemblance to members of the genera *Cephalophyllum* N.E.Br. and *Cheiridopsis* N.E.Br. The floral resemblance may be more than superficial; it is remarkable how closely the flowers of *B. intrusa* resemble those of a typical 'showy' *Cephalophyllum* and how little they look like those of most *Ruschia* species (those being much smaller, and often bunched). In cultivation, *B. intrusa* crosses with *Cephalophyllum subulatoides* (Haw.) N.E.Br., a Little Karoo species, providing further support for its affinity to members of the *Leipoldtia* Group. The flat, bowl-shaped base is only known from genera such as *Cheiridopsis* and *Cephalophyllum*, however, these genera have multilocular fruits, whereas *Brianhuntleya* has a five-locular fruit. It is indeed a singular entity, and its placement has intrigued mesemb specialists for many years (Hammer 1995b; Hartmann 2001a; Klak *et al.* 2003).

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#### Other specimens examined

WESTERN CAPE.—3319 (Worcester): Langvele, (–DC), *Bryans* 9057 (BOL); Robertson, between McGregor and Bonnievale, (–DD), *Glen* 624 (BOL). 3320 (Montagu): Bonnievale, (–CC), *R.H. Compton* NBG1138/24 (BOL); *J. Lewis* NBG1975/33 (BOL).

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