

## New species and taxonomic changes within *Pentaschistis* (Danthonioideae, Poaceae) from Western Cape, South Africa

C.A. GALLEY\* and H.P. LINDER\*

**Keywords:** Cape Floristic Region, Danthonioideae, fynbos, new species, *Pentaschistis* (Nees) Stapf, Poaceae, South Africa

### ABSTRACT

Three new species of *Pentaschistis* (Nees) Stapf are described from the Cape Floristic Region, *P. trifida*, *P. clavata* and *P. horrida*. The former has been collected from inland ranges of the Cape Fold Belt, from the Cederberg to the Groot Swartberg, the last two each from single sites in the Koue Bokkeveld: *P. clavata* on the wetter western border, and *P. horrida* on the Baviaansberg. *Pentaschistis juncifolia* Stapf is re-instated, a species from the coastal plains (Hardeveld) between Bredasdorp and Riversdale, which had been included in *P. eriostoma* (Nees) Stapf.

### INTRODUCTION

The remarkable field work of Ms Esterhuysen resulted in the description of many new species of *Pentaschistis* (Nees) Stapf (Linder & Ellis 1990), but ongoing field-work and taxonomic research on the grasses of the Cape Floristic Region (CFR) (Goldblatt 1978) is resulting in the occasional discovery of new grass species.

*Pentaschistis* comprises 66 recognized species and is the most species-rich grass genus in the CFR (Linder 1989; Goldblatt & Manning 2000). Most species are endemic to or centred in this region. Additionally there are eleven species in the Drakensberg region, seven species in the tropical east African mountains from Malawi to Ethiopia, one species on Mt Cameroon, three species in Madagascar, one endemic species in the Imatong Mountains, Sudan, and one endemic species on St Paul and Amsterdam Islands in the South Indian Ocean. A few of the more drought-tolerant species occur in the drier northwest of South Africa in the Greater Cape Floristic Region (Jürgens 1991).

Despite the recent revision of the genus (Linder & Ellis 1990), there are still a number of taxonomic problems remaining. Some species show enormous variation over habitat and geographical range, such as the *Pentaschistis pictigluma* complex in eastern Africa (Phillips 1994), and the *P. pallida* complex in the CFR. There have also been a steady rate of discovery and descriptions of new species in the genus over the past 15 years (Phillips 1986; Linder & Ellis 1990; Phillips 1995). Here we describe a further three new species. *Pentaschistis trifida* was found by the first author on a recent collecting trip; *P. clavata* was found by the late Mr Hugh Taylor and recognized as new by Mrs Lyn Fish of PRE. *P. horrida* had already been recognized as distinctive by Dr Roger Ellis and the second author (Linder & Ellis 1990), but they included it under *P. rigidissima*. After extensive field work we were convinced that it is indeed a distinct species, for the reasons given below. We also resurrect *Pentaschistis juncifolia* Stapf to species level following observation of differences in ecology and habit between this taxon and *P. eriostoma* (Nees) Stapf.

***Pentaschistis trifida*** C.A. Galley, sp. nov., *P. trisetae* (Thunb.) Stapf similis sed differt spiculis unifloris, glandibus ellipticis, dimensionibus spiculorum multo parvioribus: gluma inferiore 4.5–5.5 mm (non 15–18 mm) longa, lemma 2.4–4.8 mm (non 6–8 mm) longa, arista lemmatis 18–24 mm (non 25–35 mm) longa, glumis omnino parce puberulis, lemmatibus inter venas dense villosis, paleis glabris, et ramis floriferis trifurcatis.

**TYPE.**—Western Cape, 3319 (Ceres): Baviaansberg, north of the Hex River Mountains, 1 050 m, 33°12' 14.6"S, 19°37'04.5" E, (–BA), 11 Nov. 2004, C.A. Galley 577 (ZH, holo.; BOL, K, NBG, PRE).

Perennial; single or few stems. *Culms* 80–200 mm tall; nodes glabrous; basal sheaths white shiny, persistent; prophylls truncate, often bilobed, keels remaining parallel to apex; innovation buds intravaginal. *Glands* multicellular, elliptical, linear, common on inflorescence branches. *Leaves* basal; sheaths red-purple, sparsely puberulous; sheath mouth glabrous; blades puberulous; ligules 0.25 mm long fringe of hairs; blades 20–50 × 0.5–1 mm, rolled; apex acute; margins scaberulous; old blades persisting, entire. *Inflorescence* widely paniculate, 50–75 × 40–60 mm, open, trichotomously branched, with 15–35 spikelets; pedicels mostly erect, longer or shorter than spikelets; inflorescence branches longer than spikelets, glabrous; nodes glabrous. *Spikelets* 1-flowered. *Lower glume* 4.5–5.5 mm long, longer than floret, acute, 1-veined, puberulous, pale yellow with purplish base and green tip; margins same texture as body of glume. *Upper glume* similar to lower glume but slightly shorter. *Lemma* 2.4–2.8 mm long, hairs villous, scattered on back of lemma between veins, veins 5; apex lobed, lobes acute, 0.5 mm long, lobe setae 6–8 mm long; lemma awn geniculate, 18–24 mm long, column twisted, 5.5 mm long; veins 5. *Palea* linear to lorate, 3 × 0.4 mm, acute, as long as lemma, keels parallel, glabrous. *Callus* up to 0.8 mm long, densely hairy with short hairs at base and long hairs at top. *Anthers* 0.9–1.2 mm long. *Ovary* stalked, turbinate; styles two. *Flowering time*: late October to early November. Figure 1A–H.

**Etymology:** the specific epithet *trifida* is named after the unique trichotomous branching pattern in parts of the inflorescence; in the rest of the genus the branches are paired.

\* Institute of Systematic Botany, University of Zurich, Zollikerstrasse 107, CH-8008 Zurich, Switzerland.  
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FIGURE 1.—*Pentaschistis trifida*, Galley 577: A, whole plant; B, glume pair; C, floret showing long callus; D, inflorescence stem showing glands; E, lemma; F, palea with callus; G, anther; H, caryopsis. *Pentaschistis clavata*, Galley 567: I, whole plant; J, spikelet showing clavate hairs; K, leaf showing tubercle-based hairs; L, lemma; M, palea; N, anther; O, ovary and styles. Scale bars: A, I, 10 mm; B, F–H, J–O, 1 mm; C, E, 0.7 mm; D, 0.5 mm. Artist: Claire Linder-Smith.



TABLE 1.—Comparison between *Pentaschistis trifida* and other species

	<i>P. trifida</i>	<i>P. trisetata</i>	<i>P. caulescens</i>	<i>P. pusilla</i>	<i>P. clavata</i>
Life form	perennial	annual	perennial	perennial	perennial
Habit	caespitose	n/a	tangled	forming mats	cushion
Leaves	highly reduced	not highly reduced	not highly reduced	not highly reduced	not highly reduced
Inflorescence size	50–75 × 40–60 mm	70–100 × 30–90 mm	30–50 × 20–40 mm	20 × 15 mm	20–35 × 15–35 mm
Florets per spikelet	one	two	two	one	one
Lemma					
awn	present	present	present	absent	absent
length	2.4–4.8 mm	6–8 mm	3 mm	1.5–3.0 mm	2.3 mm
Glume					
length	4.5–5.5 mm	15–18 mm	8–12 mm	2.5–3.0 mm	2.2–2.5 mm
indumentum	sparsely puberulous all over	tuberculate hairs along margins	glabrous	glabrous	glabrous

**Diagnostic characteristics:** *Pentaschistis trifida* resembles *P. trisetata* (Thunb.) Stapf by having reduced leaves and a long lemma awn in relation to the spikelet. It resembles *P. pusilla* (Nees) H.P.Linder and *P. clavata* (described here) by the single floret per spikelet, and *P. caulescens* H.P.Linder, as both species occupy disturbed habitats and have reduced leaves with red/purple leaf sheaths. However, it can be easily distinguished from these four species by the characteristics shown in Table 1. Unique to this new species is the elongated callus, the trifurcating inflorescence branches and the elliptically shaped linear-type glands on the inflorescence branches (Figure 1D), which contrast clearly with the purple branches.

**Distribution and habitat:** this species was collected from a shaded disturbed (pathside) habitat of deep, sandy soil derived from Table Mountain sandstone in a fairly arid area on the eastern side of the Baviaansberg (Figure 2). Although this is perhaps a more opportunistic habitat typical of an annual species [e.g. *P. airoides* (Nees) Stapf subsp. *airoides* habitat] this plant is a perennial; the highly reduced leaves suggest that the water requirement of this species is, however, probably low. Although locally common, this was the only population found in the vicinity.

***Pentaschistis clavata*** C.A.Galley, sp. nov., ab *P. pusilla* (Nees) H.P.Linder differt pilis clavatis lemmatis, lamina foliorum setosa, involuta.

TYPE.—Western Cape, 3219 (Wuppertal): Koue Bokkeveld Mountains south of Hexberg, on the Farm De Boom, 1 212 m, 32°44'32.1"S, 19°11'35.2"E, (–BA),

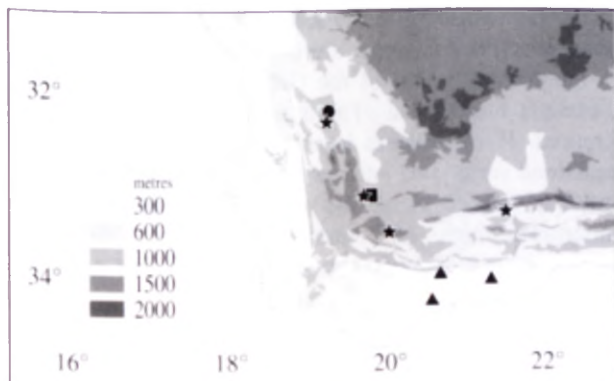


FIGURE 2.—Distribution of *Pentaschistis clavata*, ●, *P. horrida*, ★, *P. trifida*, ■, and *P. juncifolia*, ▲.

7 Nov. 2004, C.A. Galley 567 (ZH, holo.; BOL, E, G, K, MO, NBG, NSW, NY, PRE, S, UPS, W).

Plants perennial, forming neat, rounded cushions, up to 100 mm in diam. *Multicellular glands* absent. *Culms* 80–200 mm tall; nodes puberulous; basal sheaths white shiny, persistent; prophylls truncate, often bilobed, keels remaining parallel to apex; innovation buds intravaginal. *Leaves* cauline; sheaths glabrous or with sparse, 2 mm long tubercle-based hairs; sheath mouth with a ring of 2 mm long, stiff bristles; ligules 0.2 mm long fringes of hair; blades 40–50 × 1 mm, expanded at base, with sparse, scattered 2 mm long tubercle-based bristles; apex keeled, acute; margins smooth; old blades persisting, entire. *Inflorescence* widely paniculate, 20–35 × 15–35 mm, open, with 10–20 spikelets; pedicels mostly erect, longer than spikelets; inflorescence branches longer than spikelets, puberulous; nodes villous with long erect hairs. *Spikelets* 1-flowered, 2.5 mm long. *Lower glume* 2.0–2.5 mm long, as long as or shorter than floret, acute, 1-veined, straw-coloured with purplish base; margins same texture as body of glumes, glabrous. *Upper glume* similar to lower glume, but somewhat shorter and narrower. *Lemma* 2.2–2.5 mm long, clavate hairs scattered between veins on back, veins 7, not anastomosing, apex finely tridentate. *Palea* linear to lorate, truncate, 2.2 × 0.5 mm, glabrous or with few clavate hairs found between the keels, as long as lemma; keels parallel, glabrous. *Lodicules* without microhairs or bristles; obtriangular, 3-veined. *Anthers* 1.6–1.9 mm long. *Ovary* stalked, turbinate; styles two. *Flowering time*: November and December. Figure 11–O.

**Etymology:** the species epithet *clavata* is named after the clavate lemma hairs.

**Diagnostic characteristics:** *Pentaschistis clavata* resembles *P. pusilla* in the single-flowered spikelet. This is generally a rare feature in the Danthonioidae, and within *Pentaschistis* is only found in two species, *P. pusilla* (Linder & Ellis 1990) and *P. trifida* described in this paper. *P. clavata* has a finely tridentate lemma apex, similar to that of *P. pusilla*, and in addition the generally soft, orthophyllous leaves and weakly perennial habit are reminiscent of that found in *P. pusilla*. However, there are several convincing differences (Table 2). The new species has scattered, stout, clavate hairs on the lemma back, the only known case of clavate hairs in *Pentaschistis*. Clavate hairs occur in several other genera of the Danthonioidae, such as *Karroochloa* (Conert



TABLE 2.—Comparison between *Pentastichis clavata* and *P. pusilla*

	<i>P. clavata</i>	<i>P. pusilla</i>
Leaf		
indumentum	with scattered bristles	glabrous
insertion	on aerial shoots	basal
Inflorescence indumentum	nodes villous	glabrous
Lemma indumentum (abaxial)	scattered, stout clavate hairs	fine tapering hairs (some collections from eastern range almost glabrous)

& Türpe 1969), *Schismus* (Conert & Türpe 1974) and *Tribolium* (Linder & Davidse 1997), but these genera are all rather distantly related to *Pentastichis*.

**Distribution and habitat:** this new species is known from a single locality above De Boom in the Koue Bokkeveld, at an altitude of 1 270 m (Figure 2). The species was first collected by Mr Hugh Taylor in 1989, describing the habitat as 'streambank in moist soil with moss'. Further investigations in 1998 and 2005 showed that the species is quite common in the area, occurring on damp sand derived from Table Mountain sandstone as well as streambanks in wet moss. The habitat therefore differs slightly from that of *P. pusilla*. It is possible that the species is much more widespread—these mountains are still poorly explored, and more populations may be found in similar habitats.

#### Other specimen examined

WESTERN CAPE.—3219 (Wuppertal): south of Hexberg, Koue Bokkeveld Mountains, 1 270 m, (–CC), H.C. Taylor 12095 (PRE).

***Pentastichis horrida*** C.A.Galley, sp. nov., *P. rigidissimae* Pilger ex H.P. Linder similis sed differt longitudine majore culmorum et foliorum, ramificatione caulium, indumento superficiei foliorum et dimensione majore antherarum, 2.1–2.8 mm (non 1.4–1.8 mm).

TYPE.—Western Cape, 3319 (Ceres): Baviaansberg, north of the Hex River Mountains, 1 900 m, (–BA), 26 Oct. 1997, H.P. Linder 6799 (ZH, holo.; BOL, E, G, K, MO, NBG, NSW, PRE).

Perennial, caespitose or mat-forming; older plants forming 'fairy rings' (with the centre of the ring dying), up to several metres diam. *Multicellular glands* absent. *Culms* 150–400 mm tall; nodes glabrous; basal sheaths white shiny, persistent; prophylls truncate, often bilobed, upper margin ciliate or bristly, keels remaining parallel to apex, scaberulous or dentate, extended into 20 mm long awns; innovation buds intravaginal. *Leaves* cauline; sheaths glabrous; sheath mouth glabrous; ligules 0.5–1.0 mm long fringe of hairs; blades 150–200 × 1 mm, rolled, rigid, with sparse, villous hairs at base of blade; apex pungent; margins smooth; old blades persisting, entire. *Inflorescence* widely paniculate, 70–90 × 25–50 mm, open at anthesis (soon closing again), with 30–60 spikelets; pedicels mostly patent, shorter than spikelets; inflorescence branches as long as or longer than spikelets, scaberulous; nodes sparsely hairy, puberulous to villous. *Spikelets* 2-flowered, 7.5 mm long. *Lower glume* 6.5–7.5 mm long, longer than florets, acute to acuminate,

1-veined, pale green; margins scaberulous, same texture as body of glumes; upper glume similar to lower glume. *Lemma* 2.25–3.0 mm long, with scattered hairs on the back; veins 7, anastomosing near apex; lemma lobes acute, 1.1 mm long, shorter than the lemma body; lemma awn geniculate, 8 mm long, column twisted, 3 mm long thus as long as lemma lobe setae. *Palea* linear to loriate, 3.5 × 0.5 mm, apex rounded to acute or bi-lobed, longer than lemma, glabrous; keels parallel, glabrous. *Lodicules* without microhairs or bristles, obtriangular, 3-veined. *Anthers* 2.1–2.8 mm long. *Ovary* stalked, turbinate; styles two. *Flowering time*: October to November. Figure 3.

**Etymology:** the species epithet *horrida* is named after the prickly, pungent leaves.

**Diagnostic characteristics:** the linear inflorescence, pungent leaves and cushion habit associate this species with *Pentastichis rigidissima* Pilg. ex H.P.Linder. Specimens of *P. horrida* were previously included within this species and were considered as one extreme of a continuous gradient of size and spinescent variation (Linder & Ellis 1990). There are several differences that separate these species, including their growth form (Table 3). Although both species may form 'cushions' the plant base differs. The new species forms cushions that expand in size over time by means of a branching culm system; this effectively moves the living part of the plant outwards from the cushion centre, which eventually dies, so that a whole plant forms a 'fairy ring'. *P. rigidissima*, by contrast, always forms small tufts, rather like a shaving brush, and never forms rings. They have been found in sympatry at several localities, and the morphological and habit differences were consistently maintained. Lastly, phylogenetic analysis of chloroplast data places these two species in different clades (unpubl. data). *P. horrida* is sister to *P. rosea*.

**Distribution and habitat:** *Pentastichis horrida* has been collected from the inland ranges of the Cape Fold Belt, from the Cederberg to the Great Swartberg (Figure 2). All populations occur in soils derived from sandstone. These areas are not only dry, but have a more continental climate with severe frost in winter and fierce heat and a long dry period in summer. The plants grow in soil in open vegetation, sometimes on open plains (such as on the summit of the Rooihooft Pass over the Waboomsberg, and on the summit plateau of Wolfberg in the Cederberg), and sometimes on steep slopes (such as on the Baviaansberg in the Koue Bokkeveld). *P. rigidissima* by contrast is found more towards the coastal areas on the coastal ranges of the Cape Fold Belt, where the climate is more mesic. There are also microhabitat differences. *P. rigidissima* is restricted to crevices in the sandstone rocks and boulders, often in shady, cool and protected places along the sides of boulders or even underneath them. In contrast, *P. horrida* is found in open areas, or at most between boulders, but never in crevices.

#### Other specimens examined

WESTERN CAPE.—3219 (Wuppertal): central Cederberg, Sleeppad Hut to Sneekop, 1 500–1 900 m (–AC), H.P. Linder 4464 (BOL); Bokkeveld, Tafelberg 5500' (1 676m), (–CD), Esterhuysen





FIGURE 3.—*Pentaschistis horrida*, Linder 6799: A, plant base and lower plant; B, upper plant and inflorescence; C, glume pair; D, florets; E, lemma showing setae and awn; F, palea with callus; G, ovary and styles. Scale bars: A, B, 10 mm; C-G, 1 mm. Artist: Claire Linder-Smith.

TABLE 3.—Comparison between *Pentaschistis horrida* and *P. rigidissima*

	<i>P. horrida</i>	<i>P. rigidissima</i>
Culm length	270–400 mm	150–200 mm
Leaf		
length	150–300 mm	up to 100 mm
indumentum	sparsely villous at base of leaves on upper surface	glabrous
Anther length	2.1–2.8 mm	1.4–1.8 mm

3931 (BOL). 3319 (Worcester): top of Rooihooft Pass, 1 234 m, 33°36'12"S, 19°51'02" E, (–BD), *C.A. Galley 374* (BOL, ZH). 3320 (Montagu): south of Matroosberg station, 3800' (1158m), (–BD), *Acocks 19088* (BOL). 3321 (Ladismith): Towerkop, 1750 m 33°27'42"S, 21°13'01" E, (–AC), *Linder Hardy & Moline L7410* (BOL); Towerkop, Swartberg, (–AC), *Esterhuysen 26744* (BOL); Sewe Weeks Poort, 2 000 m, (–AD), *Linder 5486* (BOL); Montagu to Matroosberg, 3700' (1 128m), *MRL 370* (BOL); Swartberg Pass, (–BD), *Barker 999* (BOL); Great Swartberg, 1 800 m (–BD), *Linder 4571* (BOL). 3322 (Prince Albert): Zwartbergen, 4000' (1 219m), (–AC), *Bolus 11673* (BOL). 3323 (Uniondale): Kouga Mountains, 5500' (1 676m), (–DA), *Esterhuysen 27974* (BOL).

### *Pentaschistis juncifolia*

*Pentaschistis juncifolia* was originally described by Stapf in *Flora capensis* (1899), and is distinct from *P. eriostoma* (Nees) Stapf based on the absence of densely woolly or villous leaf sheaths. Linder & Ellis (1990) sank this species into *P. eriostoma* on the basis of similar spikelets and inflorescences, regarding it as a local form of the very variable *P. eriostoma*. After recent fieldwork, however, we are now convinced that these taxa are indeed distinct, and that *P. juncifolia* should be recognized as a separate species. The most striking difference between the two taxa is the absence of a woolly indumentum at the leaf sheath mouth in *P. juncifolia*. Aside from this, *P. juncifolia* can be recognized as distinct from *P. eriostoma* in the field as it forms much more neatly defined tussocks and has a much paler inflorescence. The habitats of the two taxa differ, with *P. eriostoma* occurring on shales and sandstones and *P. juncifolia* associated with eroded silcrete surfaces on the coastal plains between Bredasdorp and Riversdale. They were observed in sympatry near a silcrete outcrop (Verkykerskop) along the road from Malgas to Heidelberg (34°13'25" S, 20°43'14" E) and were both abundant, maintaining morphological and habitat distinctions. This morphological and ecological evidence is backed up by phylogenetic analysis of chloroplast data where *P. eriostoma* and *P. juncifolia* are separate on the cladogram and *P. juncifolia* is sister to a large clade that includes *P. eriostoma* (Galley & Linder in review). *P. juncifolia* has been collected in flower in early October.

### Specimens examined

WESTERN CAPE.—3420 (Bredasdorp): Swellendam Division, Buffelsjachtsrivier, 1000–2000 ft (305–610 m), *Zeyher 4545* (K!); road from De Hoop to Malahas, 141 m, 34°21'44"S, 20°28'45" E, (–AD), 7 Oct. 2003, *C.A. Galley 341* (BOL, ZH). 3421 (Riversdale): hills near Zoetmelksrivier, *Burchell 6761* (K!); hills near Zoetmelksrivier, *Burchell 6750* (K, lectotype!).

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## Notes on African plants

VARIOUS AUTHORS

### MESEMBRYANTHEMACEAE

#### THE IDENTITY OF *RUSCHIA PROMONTORII*

##### INTRODUCTION

The entity *Ruschia promontorii*, a Red Listed plant endemic to the Cape Peninsula, was first described by H.M.L. Bolus (1929). Type material (*Rohland NBG1543/20*) was illustrated by Mary Page (unpublished plate, BOL). Much later, Hartmann (1998b) placed this taxon in synonymy under *Amphibolia hutchinsonii*, and upon discovering an earlier homonym, Hartmann (2001) placed *A. hutchinsonii* as a synonym of *Amphibolia laevis*.

Desmet (2000) mentions this taxon as belonging to *Antimima*, namely *A. promontorii* ('*promontoni*' and '*promontori*') noting differences in distribution ranges of *Amphibolia laevis* and this taxon. However, no formal transfer was undertaken.

Initially I believed this taxon to be an *Acrodon*, but upon closer examination concluded that certain features mentioned below exclude it from that genus.

##### DISTRIBUTION AND ECOLOGY

This decumbent, mat-forming mesemb is found only on the Cape Peninsula where it grows on the slopes of Chapman's Peak, Cape Point and a few other localities (Figure 1). The plant colonizes steep, rocky scree slopes often devoid of plant cover, with little competition from other plants, but well above the salt spray of the ocean.

The lithology comprises sediments of the Cape Supergroup, with sandstones of the Peninsula Formation (up to 1 550 m thick) underlain by characteristic reddish sandstone and shale of the Graafwater Formation. Granites of the Cape Peninsula Pluton intrude the pre-Cape rocks in places (SACS 1980).

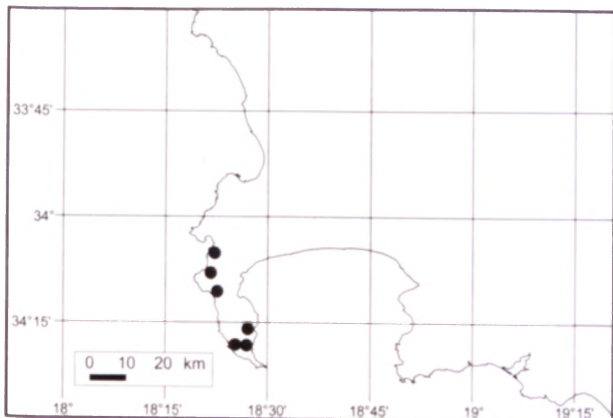


FIGURE 1.—Distribution of *Ruschia promontorii*.

##### RELATIONSHIPS

The creeping, mat-forming habit (Figure 2A) and triquetrous leaves of *Ruschia promontorii* (Figure 2B) exclude it from *Amphibolia*, where it was placed by Hartmann (1996, 2001) under the synonymy of *Amphibolia laevis*. The latter is shrubby with decumbent branches and club-shaped leaves with rounded tips (Hartmann 1996). Rectangular valve wings, a character always present in capsules of *Amphibolia*, are absent in *R. promontorii*. The type of *R. promontorii*, however, lacks fruit, which has possibly led to the erroneous placement of *R. promontorii* in the genus *Amphibolia*.

*Ruschia promontorii* was first thought to belong to the genus *Acrodon* because of its mat-forming habit,

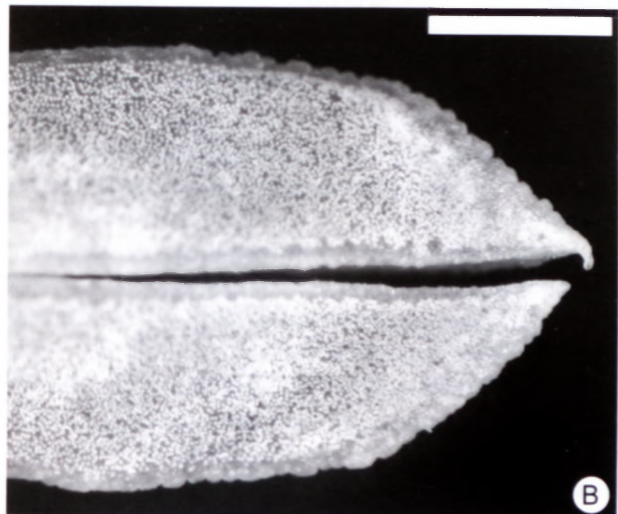
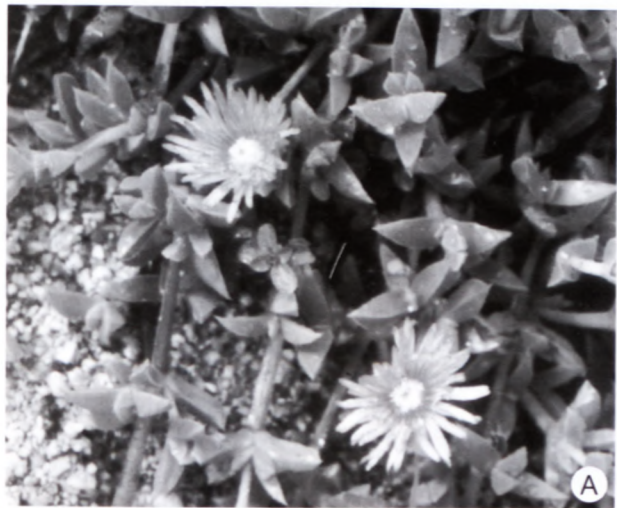


FIGURE 2.—*Ruschia promontorii*. A, creeping, mat-forming habit, Burgoyne 6703; B, leaves with a smooth epidermis and epidermal thickening at margin. Scale bar: B, 5 mm.





FIGURE 3.—Flowers of *Ruschia promontorii*, Burgoyne 6703, showing filamentous staminodes gathered into a cone and petals with a darker central stripe.

triquetrous leaves, bract and flower characters (Figure 3) and white pollen (Table 1). However, its seeds lack baculae (Figure 4A) and microbaculae (Figure 4B) preventing its transfer to *Acrodon* in which baculae and microbaculae are always present (Glen 1986). Although seed char-

acters are of limited taxonomic importance, it has been found that the presence of baculae and microbaculae is constant within the genus *Acrodon* (Glen 1986).

Comparisons between the capsule morphology (Figure 5A–D) of *Ruschia sarmentosa* the type of the subgenus *Sarmentosae*, *R. promontorii*, *Acrodon* and *Amphibolia* are given in Table 1.

*Ruschia promontorii* shares more characters with *R. sarmentosa* than with any other taxon. The creeping, sarmentose habit and presence of similar closing bodies and absence of valve wings in the capsule are characters shared with the subgenus *Sarmentosae* as a whole. Closing devices present on the distal ends of the covering membranes are present in both *R. promontorii* and *R. sarmentosa*.

Differences between these two species (Table 1) include habitat preference, with *Ruschia sarmentosa* growing in flat sandy areas close to the sea. The flowers of *R. sarmentosa* are borne in cymes of three, whereas those of *R. promontorii* are mainly single or in cymes of three, the central one maturing while the other two mostly abort. Leaves of *R. sarmentosa* are longer (30–45 mm long) and are clustered at the nodes, and the side branches stand upright at the long internodes, whereas

TABLE 1.—Comparison between *Ruschia sarmentosa* (subgenus *Sarmentosae*), *R. promontorii*, *Acrodon* and *Amphibolia* based on selected characters

Character	<i>Ruschia sarmentosa</i> (subgenus <i>Sarmentosae</i> )	<i>R. promontorii</i>	<i>Acrodon</i>	<i>Amphibolia</i>
Habitat	diverse, flat sandy areas close to sea	scree slopes of Cape Peninsula	diverse	coastal lowlands along West Coast
Habit	sarmentose, creeping	mat-forming, creeping	mat-forming, creeping	shrubby with decumbent branches
Internodes	light- or dark-coloured	light-coloured, sometimes red	light- or dark-coloured	light-coloured
Leaves	triquetrous or rounded	triquetrous with sharp tip	triquetrous	club-shaped with rounded tip
teeth on leaf margin	absent	absent	present	absent
Floral bracts	small; bracteoles also present	large; bracteoles absent	large; bracteoles absent	small; bracteoles absent
Flowers	in cymes	single/cymes of 3, central one maturing while others mostly abort	single	single, giving appearance of one-sided panicle
petals	pink, striped or solid colours	pale pink with darker central stripe	pale pink with darker central stripe	various shades of pink with complex markings at tip and base
filamentous staminodes	collected into central cone	collected into central cone	collected into central cone	leaning inwards
pollen	white or yellow	white	white	unknown
Capsule				
morphology	woody, dark brown	woody, dark brown	woody, dark brown	woody, white to grey
hygrochasty	closing again once open	closing again once open	closing again once open	not closing again once open
valves	remaining half open	remaining half open	remaining half open	opening fully
closing bodies	large or small	large	large	small
covering membranes	thin, translucent, with closing devices	thin, translucent, with closing devices	thin, translucent, with no closing devices	thin, translucent, with closing devices
valve wings	absent	absent	absent	rectangular, present
Seed				
colour	dark brown	dark brown	dark brown	pale brown
surface	baculae or microbaculae absent	baculae or microbaculae absent	baculae with microbaculae present	baculae or microbaculae absent



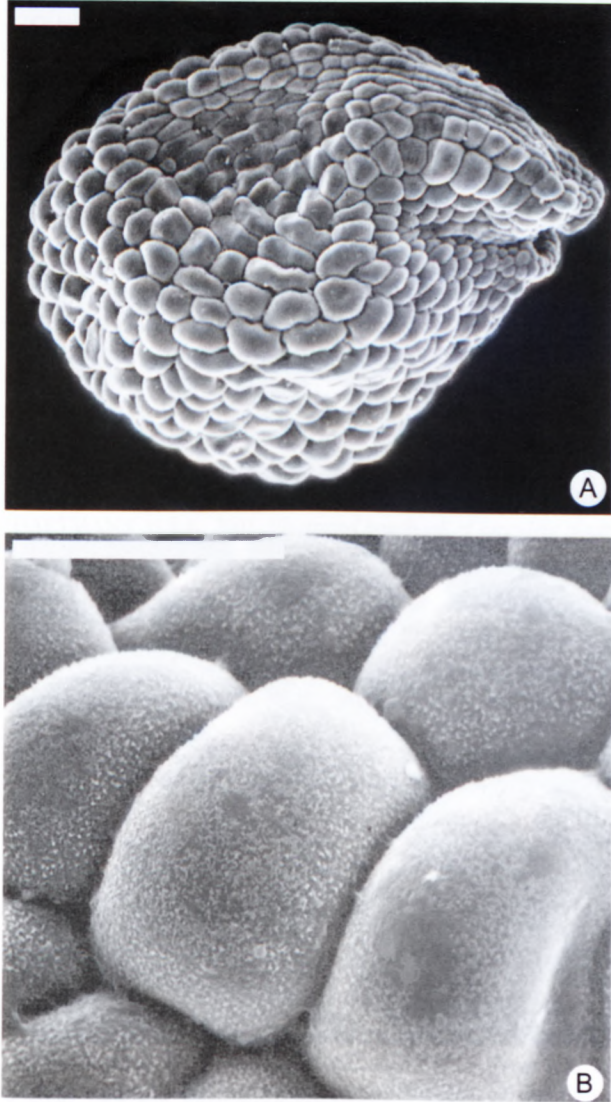


FIGURE 4.—Seeds of *Ruschia promontorii*. A, no baculae, *Burgoyne* 6703; B, wax platelets on surface. Scale bars: A, 100  $\mu$ m; B, 10  $\mu$ m.

in *R. promontorii* the shorter leaves (18–35 mm long) are usually borne one pair per node. Internodes are much shorter and side branches are mostly decumbent.

Herbarium specimens of the two species are easy to distinguish, as once pressed and dried, the leaves of *Ruschia promontorii* are pale grey resulting from a prominent wax covering, whereas those of *R. sarmentosa* remain dark green.

As previously mentioned, Desmet (2000) noted that this taxon was better placed in *Antimima*. However, this species does not belong to the genus *Antimima*, as the criteria for inclusion to that genus, such as capsules opening fully, and large closing bodies completely blocking the distal ends of locules (Hartmann 1998a), are not met. Capsules of *Ruschia promontorii* never open fully (Figure 5A), the closing bodies being hook-shaped and not large, therefore excluding it from the genus *Antimima*.

It is interesting to note that the origin of the type material of *Ruschia sarmentosa* described by Haworth (1812) is from 'Nova Hollandia', a term used to describe the Australian continent at that time. Salm Dyck (1840)

states: '*M. sarmentosum* was sent to the good Haworth in the year 1806 by Mr Donn and it was said to have arisen from Australian seeds. *M. simile* arose at Kew in 1819, most certainly from Cape seed; from which [fact] doubt remains in my mind as to which homeland *M. sarmentosum* is to be attributed to. It is not possible to separate these two plants, as is clear from the description' (translated from Latin by H.F. Glen).

The description by Haworth and an unpublished plate done by J. Duncanson at Kew (numbered 127), dated April 1826, predates the publication of Salm-Dyck (1840) by 14 years and therefore would have been material seen by Haworth, thus constituting the earliest type. The holotype of *Ruschia sarmentosa*, therefore, is the unpublished plate by J. Duncanson at Kew (numbered 127, dated April 1826) and not that of Salm-Dyck 1840: §17 f 3.

#### CONSERVATION STATUS

This Red List species is restricted to the Cape Peninsula. It was first known only from the Cape of Good Hope Nature Reserve (Smuts 1994) growing on cliffs below the Cape Point lighthouse. Later its distribution was extended from the lighthouse to further along the False Bay coast also growing in rocky cliff situations. Listed as endangered, using the old IUCN categories (Hilton Taylor 1996), it has now been found growing on the slopes of Chapman's Peak. This species has recently been placed under further threat as the slopes of Chapman's Peak Drive have been cleared of loose material to make it safer for motorists. It is not known how many plants of *Ruschia promontorii* have been affected by this activity, but as *R. promontorii* tends to grow on scree slopes which are naturally disturbed due to rock turnover, more niches may have been created for these plants resulting from the clearing of loose rock. The situation should be monitored to observe the effect this activity has had on the plant population.

The current Red List status of this species using the latest criteria (IUCN 2001) is Endangered, B1 ab (I, II, III, IV & V) +2ab (I, II, III, IV) (Klak & Victor 2001) as it has an area of occupancy of less than 1 km<sup>2</sup>, while the extent of occurrence is less than 100 km<sup>2</sup>.

Pressure from developers to build more homes along the coast where this species grows is a constant threat to the habitat. Only a few highly fragmented populations exist, but plants are healthy and produce numerous flowers that are pollinated, often producing an abundance of seed. Consecutive years of low rainfall may affect the number of flowers and seed produced. Fires have ravaged the area over the last few years but it is not known whether this has influenced the population in any way. All populations visited showed a healthy demography with juvenile, mature and older plants present.



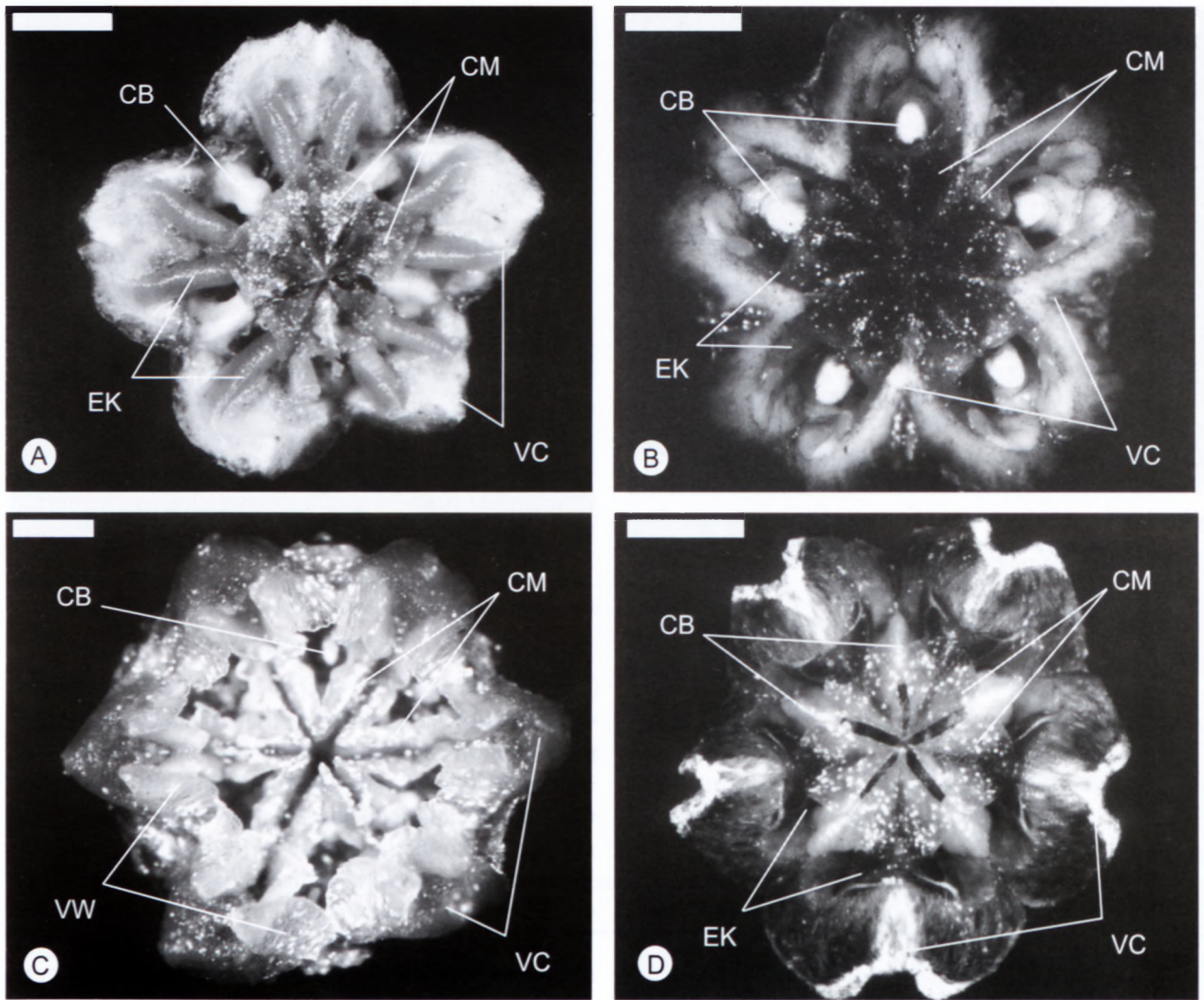


FIGURE 5.—Fruit. A, *Ruschia promontorii*, Burgoyne 6703; B, *R. sarmentosa*, Burgoyne 6702; C, *Amphibolia hutchinsonii*, Burgoyne, Smith & Van Wyk 8160; D, *Acrodon purpureostylus*, Burgoyne 6730. Scale bars: 10 mm. CB, closing bodies; CM, covering membranes; EK, expanding keels; VC, valve covers; VW, valve wings.

#### CONCLUSION

*Ruschia promontorii* is better placed in the genus *Ruschia* on the basis of the characters shared with *R. sarmentosa* (subgenus *Sarmentosae*). However, it shares a number of characters with *Acrodon*.

#### TAXONOMY

***Ruschia promontorii* L. Bolus**, Notes on Mesembrianthemum and allied genera 2: 121 (1929).

*Mesembryanthemum pansifolium* N.E.Br. (manuscript name)

*Antimima promontorii* Desmet 64 (2000), nom. illeg. as 'promontoni' and 'promontori'.

#### Specimens examined

##### *Ruschia promontorii*

WESTERN CAPE.—3418 (Simon's Town): Simon's Town, (–AB), Burgoyne 6703, 7475 (PRE), Van Jaarsveld 3163, 3172 (PRE); Simon's Town, (–AD), Van Jaarsveld 3954, 12905 (PRE).

##### *Ruschia sarmentosa*

WESTERN CAPE.—3318 (Cape Town): Bellville, (–DC), Hilton-Taylor 4989 (PRE). 3418 (Simon's Town): Simon's Town, (–AB),

Burgoyne 6702 (PRE); Simon's Town, (–AD), Van Jaarsveld 3633, 12921 (PRE).

##### *Amphibolia laevis*

WESTERN CAPE.—3017 (Hondekliipbaai): Hondekliipbaai, (–AD), Burgoyne 7542 (PRE), Burgoyne, Smith & Van Wyk 8160, (PRE). 3117 (Lepelfontein): Baievlei, (–BD), Van Rooyen 2231, (PRE). 3118 (Vanrhynsdorp): Doringbaai, (–CC), Boucher, 4049 (PRE). 3218 (Clanwilliam): Lambert's Bay, (–AB), O'Callaghan, Van Wyk & Morley 140 (PRE); Velddrif, (–CC), Marloth 7961 (PRE), Van Jaarsveld 5685 (PRE). 3318 (Cape Town): Cape Town, (–CD), Van Jaarsveld 3942 (PRE).

##### *Acrodon purpureostylus*

WESTERN CAPE.—3320 (Montagu): Montagu, (–CC), Burgoyne 6730 (PRE).

#### ACKNOWLEDGEMENTS

The curator of Bolus Herbarium is thanked for the opportunity to study specimens at the Herbarium and for the use of colour plates. Western Cape Nature Conservation and Annelise le Roux in particular are thanked for issuing permits to collect *Ruschia promontorii* at short notice. Hugh Glen is thanked for translation



of the Latin. Dick Brummit, Kew, is thanked for tracing the N.E. Brown manuscript names.

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P.M. BURGOYNE\*

\* National Herbarium, South African National Biodiversity Institute, Private Bag X101, 0001 Pretoria.  
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### 'FORSYTH (FL. 1835)': A PHANTOM BOTANICAL COLLECTOR AT THE CAPE OF GOOD HOPE EXPLAINED

At the instigation of Dr Peter Goldblatt, I have attempted to establish the veracity of the inclusion of a collector named Forsyth by Gunn & Codd (1981: 157) in their roster of botanical exploration of southern Africa. This individual was credited as follows: 'Collected at the Cape 1835; also in Indonesia and Mascarenes Is.'. Those authors cited Hedge & Lamond (1970) as their source. In the index to collectors in the herbarium of the Royal Botanic Garden, Edinburgh, Hedge & Lamond (1970) noted that the Forsyth specimens were not dated and that they were included in the herbarium of Archibald Menzies.

Among African specimens associated with this Forsyth are the type specimens of *Ferraria macrochlamys* (Baker) Goldblatt & J.C.Manning (Goldblatt & Manning 2004) and *Babiana spiralis* Baker (Goldblatt & Manning 2005: 72). Both species are endemic to Namaqualand, but no collector named Forsyth is known to have visited Namaqualand before 1835.

Concerning the first taxon, Baker (1876: 338) noted that he had seen only one specimen 'without a note of its special locality', and gave the collection data in the following form: '*C. B. Spei*. Forsyth in Herb. Bentham!'. Regarding the second taxon, Baker (1892: 183) reported that he had described it 'from specimens in the herbarium of Forsyth', adding later (Baker 1896) that the two specimens 'without locality ... [were] in the Forsyth's herbarium, purchased by Mr. Bentham in 1835.'

Forsyth is not an unfamiliar name in British horticulture—*Forsythia* (Oleaceae) was named by Vahl to honour William Forsyth (1737–1804), a distinguished Scottish horticulturist and one of the founders of the (Royal) Horticultural Society of London. His son, also named William (1772–1835), was a nurseryman in

London throughout his life. Desmond & Ellwood (1994) list several others with this surname, but none of these individuals is recorded as having been a plant collector at the Cape of Good Hope. There is no entry for Forsyth in Lanjouw & Stafleu (1957).

The date 1835 and Baker's allusion to specimens from Forsyth's herbarium purchased by Bentham in 1835 provided the clues to unravelling this enigma.

The younger William Forsyth, who died on 28 July 1835, 'had an excellent horticultural library' (Desmond & Ellwood 1994: 257) which was sold by auction by Sotheby in London during November 1835 (Sotheby 1835; Chalmers-Hunt 1976). An annotated copy of the catalogue of the sale (Sotheby 1835) survives in the Botany Library, The Natural History Museum, London, and indicates that 2 597 lots were auctioned including this, the penultimate, one: '2596. A very extensive and well-arranged *hortus siccus* contained in ten cases, forming a range, with five mahogany doors'. William Pamplin, publisher, bookseller and dealer in botanical specimens, who annotated the catalogue, noted that it was sold for £17 6s. 6d.

George Bentham's manuscript diary, which survives in the Archives of the Royal Botanic Gardens, Kew, confirms that Bentham attended this auction, buying a few books as well as Forsyth's entire herbarium:

18 November 1835: '... to Sotheby's sale rooms to the auction of Forsyth's books, but got there too late for today's sale ...'.

20 November 1835: '... to Forsyth's sale where bid for several books but they all went too dear ...'.

21 November 1835: '... then for the whole afternoon to Forsyth's sale where bought Vahl's works & two or three others also. [and] the herbarium which appears to contain a large quantity of W. Indian plants for which I gave 16½ guineas'.