



## *Putterlickia neglecta* (Celastraceae), a new species from southern Africa

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### Abstract

*Putterlickia neglecta*, a new species here described and illustrated, is known from South Africa (Mpumalanga and north-eastern KwaZulu-Natal), Swaziland and southern Mozambique. It is considered a near-endemic to the Maputaland Centre of Endemism. Plants grow as a shrub or small tree in savanna and thicket, or in the understory of inland, coastal and dune forests. Vegetatively it superficially resembles *P. verrucosa*, the species with which it has hitherto most often been confused. Both species have stems with prominently raised lenticels, but *P. neglecta* differs from *P. verrucosa* in having sessile to subsessile leaves with mostly entire, revolute leaf margins, flowers borne on pedicels 8–15 mm long, with petals up to 6 mm long and spreading or slightly recurved. *Putterlickia verrucosa* has leaves with distinct petioles, spinulose-denticulate margins, much smaller flowers borne on pedicels up to 4 mm long, with petals up to 2 mm long and erect or slightly spreading. The relatively large flowers of *P. neglecta* resemble those of *P. pyracantha*, but the latter differs in having stems with obscure or sunken lenticels, leaf margins entire or spinulose-denticulate and inflorescence axes as well as pedicels usually reddish. A comparative table to distinguish among the five currently recognized species of *Putterlickia* is provided.

**Key words:** Celastroideae, classification, evolution, *Gymnosporia*, Maputaland Centre of Endemism, lenticels, morphology, nomenclature, paraphyly, phylogeny, taxonomy

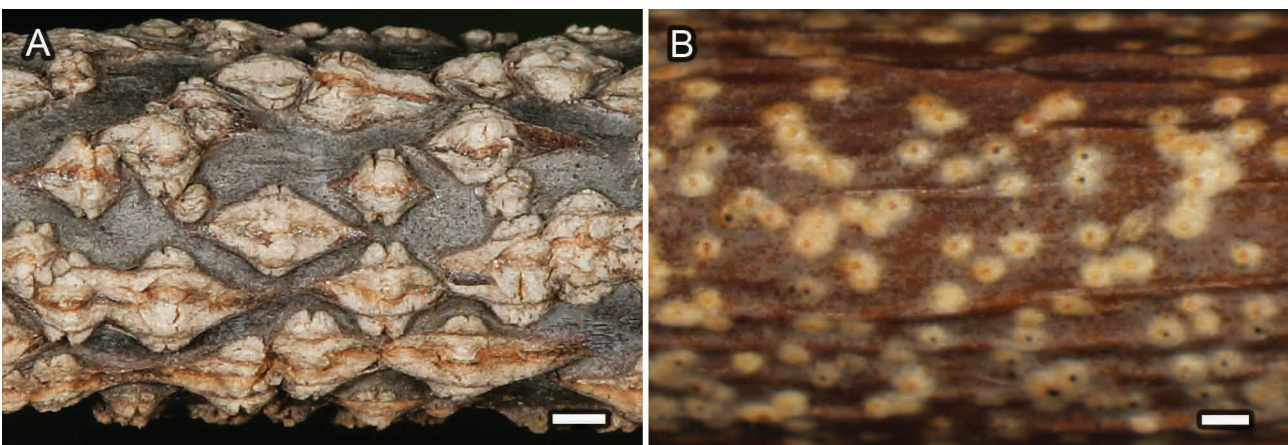
### Introduction

The genus *Putterlickia* Endlicher (1840: 1086), a distinctive monophyletic group (Simmons *et al.* 2008; McKenna *et al.* 2011) confined to southern Africa, has in recent years been treated as comprising four species (Jordaan & Van Wyk 1998: 322; Archer & Jordaan 2003: 360). It is distinguished from *Gymnosporia* (Wight & Arnott 1834: 159) Hooker (1862: 359, 365), its closest ally, by having bisexual flowers, (4–)6–10 ovules per locule, capsules longer than 10 mm, and the stems of most species covered by distinct lenticels which are wart-like, raised, elliptic in outline and usually transversely divided in the middle (Fig. 1A). *Gymnosporia* has the flowers mainly functionally unisexual, always with two ovules per locule, capsules shorter than 10 mm, and when lenticels are present on the stems, they are relatively small, pale-coloured circular dots, as in *G. nemorosa* (Ecklon & Zeyher 1834/35: 120) Szyszylowicz (1888: 35) (Fig. 1B). Anatomically the leaf blades of *Putterlickia* are quite different from those of *Gymnosporia* (Jordaan 1995). A possible anatomical distinction between the pericarp of *Putterlickia* and *Gymnosporia* has been reported by Savinov (2006), but this was based on a rather limited survey; sampling of more species is required to confirm the claimed distinction.

In phylogenetic trees derived from molecular studies, *Putterlickia* is apparently embedded within *Gymnosporia* (Simmons *et al.* 2008; McKenna *et al.* 2011). If this is confirmed by more extensive sampling of taxa and genes, then the recognition of *Putterlickia* would render *Gymnosporia* (as currently circumscribed) paraphyletic. To avoid a paraphyletic *Gymnosporia* (ca. 125 species), proponents of the phylogenetic school of classification have suggested that *Putterlickia* (five species) be subsumed in *Gymnosporia* (Simmons *et al.* 2008; McKenna *et al.* 2011). However, such a step would have major nomenclatural implications. Valid publication of the genus name *Putterlickia* (Endlicher 1840) predates that of *Gymnosporia* (Hooker 1862), a conserved name, though not explicitly so against *Putterlickia*. Consequently, *Putterlickia* will have priority as name for the combined genus. On the other hand, it has been convincingly argued that paraphyly is an evolutionary stage of monophyletic (s.l.) taxa that needs to be taken

into account for purposes of biological classification (e.g., Zander 2013; Brummitt 2014; Stuessy & Hörandl 2014). Therefore we prefer the evolutionary approach to classification (Mayr & Bock 2002), thus regarding it essential, when justified, for paraphyletic taxa to be accepted. *Putterlickia* and *Gymnosporia* are morphologically and anatomically distinct and their continued recognition at generic level not only better reflects evolutionary divergence, but is also more informative to end-users of plant names (Van Wyk 2007). Moreover, upholding both genera is in the interest of nomenclatural stability.

The first species of *Putterlickia* to be described was *Celastrus pyracanthus* Linnaeus (1753: 197), followed by *Celastrus verrucosus* Sonder (1860: 453). Szyszylowicz (1888) transferred these two species to the genus *Putterlickia*, established by Endlicher (1840) and named after Alois (Aloys) Putterlick (1810–1845), an Austrian physician and botanist (Stafleu & Cowan 1983). Davison (1927) and Robson (1966) in revising the Celastraceae for southern Africa, recognised only these two species, namely *P. pyracantha* (L.) Szyszylowicz (1888: 36) and *P. verrucosa* (E.Mey. ex Sond.) Szyszylowicz (1888: 36). Although the combination *P. pyracantha* is still sometimes attributed to (L.) Endl., it was first validly published by Szyszylowicz (Codd 1973). Subsequently, a third species, *P. retrospinosa* Van Wyk & Mostert (1987: 267) was added. Jordaan & Van Wyk (1998) recognised four species, the aforementioned three, plus an additional one when *Gymnosporia saxatilis* (Burchell 1824: 264) Davison (1927: 303) was transferred to *Putterlickia* (Jordaan in Jordaan & Van Wyk 1998: 328).



**FIGURE 1.** Young stem with lenticels. A. *Putterlickia neglecta*. B. *Gymnosporia nemorosa*. Scale bar: A = 1.0 mm, B = 0.25 mm. Photographs: A.E. van Wyk.

*Putterlickia verrucosa* and *P. retrospinosa* have stems with conspicuous wart-like lenticels (Fig. 1A), but in the case of *P. pyracantha* and *P. saxatilis* (Burch.) Jordaan in Jordaan & Van Wyk (1998: 328) the lenticels are slightly sunken and less prominent. All species of *Putterlickia* are armed with thorns, as is the case in most members of *Gymnosporia*. These are reflexed (used for climbing) in *P. retrospinosa*, but usually straight in all the other species. In herbarium specimens the differences between the *Putterlickia* species are not always clear, especially in the absence of flowers; the capsules and seed are very similar in size and morphology. At species level *Putterlickia* has diversified mainly in floral morphology, particularly the size of flowers and pedicel length, whereas *Gymnosporia* has diversified mainly in fruit, seed and aril characters.

Two of us (MJ & AEVW) were alerted to the possible existence of a fifth species of *Putterlickia* when conspicuous differences in floral size were noticed among different plants, all named *P. verrucosa*, in the Pretoria National Botanical Garden (Fig. 2). Subsequent field work by one of us (RGCB) confirmed that the populations hitherto assigned to *P. verrucosa* in north-eastern KwaZulu-Natal have much larger flowers (Fig. 2A) than those further south in the province, as well as extending into the Eastern Cape (Fig. 2B). A comparative study of these two floral morphs have revealed a number of additional morphological differences, all supporting the involvement of two different species. The purpose of the present paper is to describe this northern, large-flowered entity, as a distinct new species that we name *P. neglecta*. In addition to extensive field work covering the full range of *Putterlickia*, herbarium material of the genus has been studied in NH, PRE and PRU (acronyms according to Thiers 2015).

The photographs labelled *Putterlickia verrucosa* in Schmidt *et al.* (2002: 363) and Boon (2010: 315; flowering plant) represent *P. neglecta*. Van Wyk (1994: 247) treated our new species as a northern form of *P. pyracantha*, presumably because of the larger flowers and entire leaves. The photographs of *P. verrucosa* in Van Wyk & Van Wyk (2013: 141) are also of the new species.

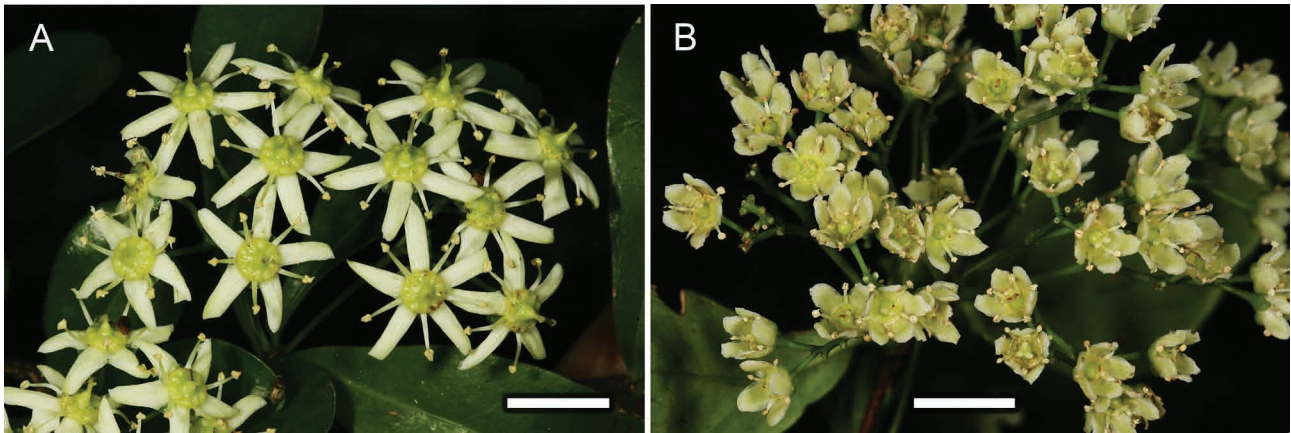


FIGURE 2. Flowers. A. *Putterlickia neglecta*. B. *Putterlickia verrucosa*. Scale bar = 4 mm. Photographs: A.E. van Wyk.

## Taxonomic treatment

*Putterlickia neglecta* Jordaan, R.G.C.Boon & A.E.van Wyk, *sp. nov.* (Figs. 1A, 2A & 3)

*Putterlickia neglecta* resembles *P. verrucosa*, but is easily distinguished from that species by the leaves being sessile to subsessile with leaf margin usually entire, rarely with scattered remnants of teeth (*vs.* leaves distinctively petiolate and margin spinulose-denticulate, up to 15 teeth on each side of midrib), pedicels 8–15 mm long (*vs.* shorter, up to 4 mm long), petals in freshly opened flowers markedly spreading to slightly recurved (*vs.*  $\pm$  erect or slightly spreading), up to 6 mm long (*vs.* 1–2 mm long). It is also similar to *P. pyracantha*, but differs in stems having prominently raised lenticels (*vs.* obscure, sunken lenticels), leaf apex nearly always emarginate (*vs.* acute, rounded or truncate to emarginate), leaf margins mostly entire (*vs.* entire or spinulose-denticulate) and inflorescence axes as well as pedicels greenish (*vs.* reddish).

**Type:**—SOUTH AFRICA. KwaZulu-Natal: Sibayi, 2732BC, 2 December 1994, *R.A.Lubbe 500* (holotype PRU78273!, isotype K!).

Evergreen straggling shrub or small tree up to 5 m tall, multi-stemmed, stems to 75 mm diameter at the base. *Branchlets* angular when young, becoming terete with age; young stems greyish purple, red-brown becoming grey, usually covered with conspicuous pale, raised, wart-like lenticels, sometimes with stem galls. *Thorns* axillary, up to 60(–110) mm long, straight, but occasionally slightly reflexed on old stems, usually covered with prominent lenticels, sometimes bearing leaves, flowers and fruit. *Brachyblasts* sometimes well-developed, up to 6 mm long. *Leaves* fasciculate, conspicuously discolourous, mid to dark dull green with a slight bluish tinge above, much paler green and tinged bluish below, bronze-red when young, subsessile; lamina obovate to oblanceolate, (6–)20–70  $\times$  6–30 mm, apex emarginate, base tapering into very short petiole or petiole absent, margin often entire, less frequently with sparse, scattered serrations, revolute, slightly undulate, midrib and reticulate venation prominently raised on both sides when dry. *Inflorescence* axillary, cymose, usually much longer than leaves; peduncle up to 25 mm long; pedicels 10–14 mm long. *Flowers* bisexual, 5-merous, white, cream to pale green,  $\pm$  10 mm in diam. *Sepals* green, triangular,  $\pm$  2 mm long. *Petals* widely spreading to somewhat recurved, oblong, 2–4(–6)  $\times$   $\pm$  2.5 mm, apex rounded, margin entire. *Disc* broad, round, green to pinkish red, margin crenate. *Stamens* free, slightly shorter than petals. *Ovary* 3-locular; ovules 6–12 per locule; style  $\pm$  1.75 mm long, stigma 3-lobed. *Fruit* a dry 3-valved capsule, dehiscing loculicidally to base; capsules cream to pink or red, obconic-triangular, smooth, 15–20(–32) mm long. *Seeds* oblong, cream, 6–10 mm long, completely enveloped by a well-developed, fleshy orange aril.

**Phenology:**—Flowers were recorded from October to March. Fruits are encountered on plants all year round.

**Etymology:**—The specific epithet refers to the fact that this species has for a long time been overlooked as a distinct species.

**Distribution and habitat:**—*Putterlickia neglecta* occurs in north-eastern KwaZulu-Natal, from False Bay Park along the coast northwards to Maputo (Mozambique) and inland through the Lowveld in north-eastern and central Swaziland (Loffler & Loffler 2005: 59) to Mpumalanga (few localities for this province represented as herbarium sheets, notably from Shabin Kop and Numbi in the Kruger National Park) and sight records from the Barberton Mountainlands Nature Reserve (iSpot 2015) and Malelane (Schmidt *et al.* 2002: 363) (Fig. 4). The species is therefore

considered a near-endemic to the Maputaland Centre of Endemism (Van Wyk & Smith 2001). It grows in mixed bushveld (savanna), inland, coastal and dune forests, thicket and riverine vegetation, often on sandy soil.



**FIGURE 3.** *Putterlickia neglecta*. A. Flowering branchlet; B. Flower; C. Dehiscent capsule showing seed; D. Seed completely enveloped by aril left; with aril removed right. E. Capsules; stem with lenticels and thorn. F. Stem with galls. Scale bar = 10 mm. A, B & F from Jordaan 4317, C from Lubbe 500 and D from Felton & Thornhill 61. Artist: Daleen Roodt.

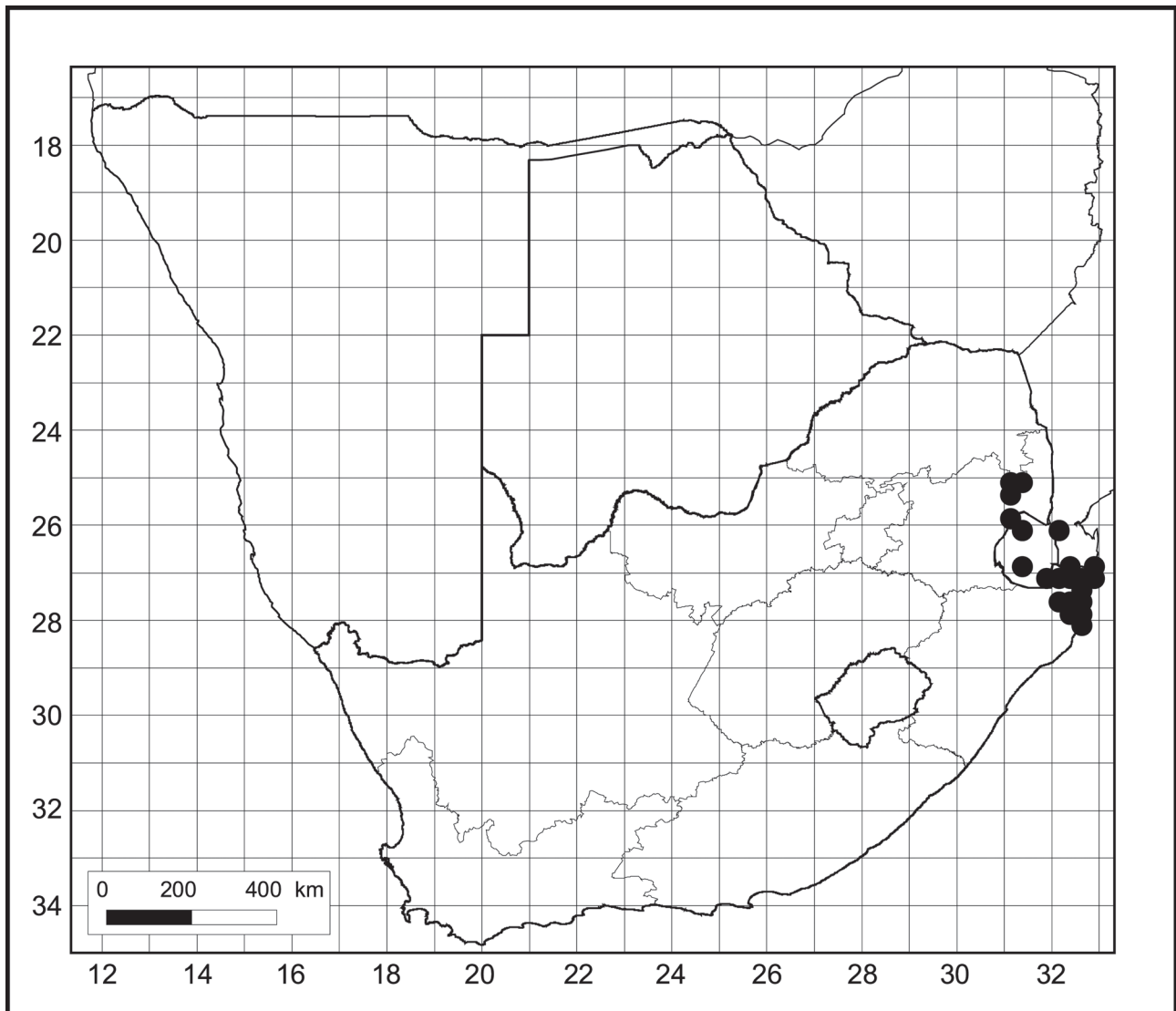


FIGURE 4. Map of southern Africa showing the known distribution of *Putterlickia neglecta*.

**Conservation:**—*Putterlickia neglecta* occurs within the Kruger National Park and a number of protected areas managed by Ezemvelo KZN Wildlife. For most of its range it occurs outside protected areas, but is still fairly common in South Africa and Swaziland where it is considered Least Concern (LC) (IUCN 2012). However, its status in southern Mozambique is unknown as it was last collected there in 1920.

**Common names:**—The proposed common names for this plant are northern false-spikethorn and *noordelike valspendoring* (Afrikaans).

**Notes:**—The more prominent geographical and morphological features to differentiate among the five species of *Putterlickia* are summarized in Table 1. Although *P. neglecta* is geographically more closely associated with *P. verrucosa*, its relatively large flowers with spreading petal are reminiscent of *P. pyracantha*, a species which occurs much further south. *Putterlickia pyracantha* occurs on littoral sand dunes in fynbos and scrub along the south-western Cape coast, from the Vredenburg-Saldanha area, to as far north-east at Tsitsa Falls in the Eastern Cape. *Putterlickia verrucosa* grows from East London to Port St Johns, is replaced by *P. retrospinosa* in the sandstone region of southern KwaZulu-Natal and Eastern Cape (Van Wyk & Smith 2001; Pondoland Centre of Endemism), and reappears from Port Shepstone further north along the coast to St Lucia, extending inland up the Umgeni, Tugela and Mhlatuze River Valleys. *Putterlickia neglecta* replaces *P. verrucosa* from St Lucia northwards, just entering the southern parts of the Kruger National Park, Mpumalanga (see “Distribution and habitat” above); it is the member of the genus with the most northerly distribution. *Putterlickia saxatilis* is an easily recognized species with an outlier distribution in the Northern Cape where it is endemic to the Griqualand West Centre of Endemism (Van Wyk & Smith 2001).

TABLE 1. Diagnostic characters for distinguishing among the species of *Putterlickia*.

Characters	<i>P. neglecta</i>	<i>P. verrucosa</i>	<i>P. retrospinosa</i>	<i>P. pyracantha</i>	<i>P. saxatilis</i>
<b>Distribution</b>	South Africa, (N KwaZulu-Natal, Mpumalanga), Swaziland, Mozambique	South Africa (Eastern Cape, KwaZulu-Natal)	South Africa (Eastern Cape, KwaZulu-Natal; confined to Pondoland Centre of Endemism)	South Africa (Western Cape, Eastern Cape)	South Africa (Northern Cape; confined to Griqualand West Centre of Endemism)
<b>Habit</b>	multi-stemmed shrub or small tree, up to 5 m high	single- or multi-stemmed shrub or small tree, up to 3 m high	climber	multi-stemmed shrub, up to 2 m high	multi-stemmed shrub, up to 1.5 m high
<b>Thorns</b>	straight, sometimes slightly reflexed	straight, sometimes slightly reflexed	always strongly reflexed	straight	straight
<b>Lenticels</b>	prominently raised	prominently raised	prominently raised	obscure; slightly sunken	obscure; slightly sunken
<b>Petiole length</b>	usually absent	1–4 mm	8–15 mm	1–4 mm	± 0.5 mm
<b>Leaf size</b>	(6–)20–70 × 6–30 mm	10–45(–60) × 6–25(–39) mm	(25–)80–120(–150) × 40–60(–70) mm	13–70 × 8–35 mm	4–20 × 2–3(–5) mm
<b>Leaf margin</b>	entire, sometimes with scattered remnants of teeth	spinulose-denticulate	entire	entire or spinulose-denticulate	entire
<b>Leaf apex</b>	emarginate	acute, rounded to emarginate	acute, apiculate, rounded to emarginate	acute, rounded, truncate to emarginate	rounded to subemarginate
<b>Inflorescence axes and pedicels: colour</b>	greenish	greenish	greenish	reddish	reddish
<b>Pedicel length</b>	8–15 mm	1–5 mm	3–5 mm	7–12 mm	5–7 mm
<b>Petal length</b>	3–4(–6) mm	1–2 mm	2–4 mm	4–5 mm	± 4 mm
<b>Petal orientation (in freshly opened flowers)</b>	strongly spreading to slightly recurved	± erect or slightly spreading	± erect or slightly spreading	strongly spreading to slightly recurved	strongly spreading to slightly recurved

**Additional collections (paratypes):**—MOZAMBIQUE. Maputo [Lourenço Marques], 18 Jan. 1920, *J. Borle 264* (PRE). SWAZILAND. Mlawula Nature Reserve, ravine below Blue Jay cottage, 16 Sep. 1987, *R.D. Alward 190* (PRE); E bank of Mkhondo/Assegai River, 30 Aug. 1978, *J. Prior 200* (PRE); 20 km S of Sidvokodvo towards Grand Valley, 11 Apr. 1976, *E.J. van Jaarsveld 1189* (PRE); 1 km to the S of the Komati River, *A. de Castro & M. Brits 362* (PRE). SOUTH AFRICA. Mpumalanga: Kruger National Park, Shabin Kop, near Pretorius Kop, 10 May 1950, *L.E. Codd 6063* (PRE), 19 Aug. 1952, *H.P. van der Schijff 663* (PRE); Numbi, 15 Jan. 1954, *H.P. van der Schijff 3440* (PRE); Lekasi Bantu Town, 20 May 1974, *J.P. Nel 384* (PRE). KwaZulu-Natal: Lake Sibayi, 10 Mar. 1977, *A. Balsinhas 3190* (PRE), 13 Apr. 1966, *E.J. Moll 3174* (PRE), 14 June 1996, *Felton & Thornhill 61* (PRU), 15 Nov. 1995, *R.A. Lubbe 734* (PRU); Ingwavuma District, slopes facing Lake Nhlange, 9 Nov. 1958, *K.L. Tinley 382* (NH, PRE); Ingwavuma District, 27°14'S 32°46'E, 4 Jan. 1987, *M.C. Ward 1826* (PRE); Gunamanini Pan, Pongola flood plain, 20 June 1972, *J. Stephen 821* (PRE); Mavilo Hill, Pongola floodplain, 4 Nov. 1969, *E.J. Moll 4267* (NH, PRE); Mkuzi Game Reserve, Mpilo, 19 May 1984, *P.S. Goodman 1157* (NH); near Mkuze Game Reserve, slopes of Lebombo range, 20 Nov. 1979, *A. Balsinhas 3067* (PRE); ± 5 km from Makani's Pont on road to Ndumu, 10 Feb. 1979, *A.E. van Wyk 2504* (PRE, PRU); road from Bhangazi Lake to beach to Sodwana Bay, 18 May 1985, *M. Jordaan 512* (NH, PRE); Sodwana Bay, 26 Mar. 1965, *J. Vahrmeijer 648* (PRE), 27 Nov. 1967, *R.G. Strey & E.J. Moll 3953* (NH); between Sodwana Bay and Lake Sibayi, on the road to Driftsand Beach, 25 Apr. 1984, *C.N. Buthelezi 458* (NH); Near Manzengwenya Inspection Quarters, 29 Nov. 1969, *E.J. Moll 4851* (NH); Manzengwenya Plantation, 10 Dec. 1964, *J. Vahrmeijer & H.R. Tölken 242* (NH); Ubombo, 11 Nov. 1984, *G. Nichols & R. Wise 815* (NH); Dune forest 6 km N of Cape Vidal, 10 Nov. 1985, *K. MacDevette 356* (NH); Mpangazi Lake, 9 Jan. 1964, *R.G. Strey 5035* (NH); Sileza Forest, 27°05'S 32°36'E, 14 Feb. 1986, *M.C. Ward 1361* (NH); Eastern Shores of Lake Sibayi, 23 Feb. 1971, *E.J. Moll 5210* (NH), 27°23'S 32°42'E, 22 Nov. 1988, *M.C. Ward 2402* (NH); Sibaya [Sibayi], 28 Nov. 1967, *R.G. Strey & E.J. Moll 3984* (NH); False Bay Park, January 1982, *D. Lawson 156* (NH), 9 July 1961, *C.J. Ward 3663* (NH), 28 June 1971, *C.J. Ward 7121* (NH, PRE); 29 Nov. 1965, *E.J. Moll 2828* (PRE); False Bay Park, 27°57'58.85"S 32°22'45.08"E, 12 Jan. 2014, *R. Boon 59* (NH); False Bay Park, 27°58'32.52"S 32°21'49.28"E, 30 Apr. 2014, *R. Boon 64* (NH).

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