Available online at www.sciencedirect.com

ScienceDirect

South African Journal of Botany 77 (2011) 415–424

SOUTH AFRICAN JOURNAL OF BOTANY

www.elsevier.com/locate/sajb

New species and combinations in the African Restionaceae

H.P. Linder

Institute of Systematic Botany, University of Zurich, Zollikerstrasse 107, CH-8008 Zurich, Switzerland

Received 13 January 2010; received in revised form 28 June 2010; accepted 19 October 2010

Abstract

Eight new species of the African Restionaceae (Restionoideae) are described, viz.: *Cannomois anfracta*, *Cannomois arenicola*, *Cannomois grandis*, *Nevillea vlokii*, *Thamnochortus kammanassiae*, *Willdenowia pilleata*, *Restio uniflorus* and *Restio mkambatiae.* A key to the species of *Cannomois* is provided, as well as a table comparing the characters of the three species in *Nevillea*. For all new species, notes on the affinities of the species and their habitats are provided. Two new combinations, *Cannomois primosii* (Pillans) H.P. Linder and *Cannomois robusta* (Kunth) H. P. Linder, are made.

Keywords: Cape Floristic Region; Restionaceae; Restionoideae; South Africa; Taxonomy

1. Introduction

Restionaceae are widespread in the Southern Hemisphere, with a main concentration of species in southern Africa (358 species) and Australia (ca. 170 species), and with only one species in Southeast Asia and in South America (Briggs, 2001; Linder et al., 1998; Meney and Pate, 1999). All African species form a clade (Briggs, et al., 2000), and all are classified in the subfamily Restionoideae (Briggs and Linder, 2009). Restionaceae is one of the major components of the Cape flora (Goldblatt and Manning, 2000) and one of the largest Cape clades (Linder, 2003). With some 300 species in the Cape Floristic Region (Goldblatt, 1978), the family is locally species rich. It is a major ecological component of the fynbos vegetation (Rebelo et al., 2006; Taylor, 1978), where it appears to be analogous to Poaceae.

The family has been studied taxonomically for over 200 years, and there have been several regional monographic accounts (Linder, 2001; Masters, 1878; Masters, 1897; Pillans, 1928; Thunberg, 1788; Thunberg, 1813). The number of species recognized has increased steadily over the years, resulting from on-going fieldwork in the Cape and adjacent regions, and there is no reason to think that we have discovered all species. New species may result from the recognition that variable species can be sensibly divided or from the discovery in the field of species not collected before.

The taxonomy of the African Restionaceae is regularly updated and available in the Intkey format, either on a CD available from the Bolus Herbarium, or as a free download from my website at http://www.systbot.uzh.ch/Bestimmungsschluessel/Restionaceae.html. However, new species cannot be formally published online. The primary purpose of this paper is to formally publish these new species. The generic classification used follows Linder (1984) for the Willdenowieae and Linder and Hardy (2010) for the Restioneae.

2. Methods

Descriptions have been compiled from field observations and from the collections in the Bolus Herbarium, the Compton Herbarium, and any other Herbaria that I have had the opportunity to study. These descriptions were encoded in the Delta format, and descriptions printed using the tonat directive. Full descriptions, explanations of the morphology, illustrations of the species and characters, and an interactive key are available at http://www.systbot.uzh.ch/Bestimmungsschluessel/Restionaceae.html.

I am employing quite a narrow species concept. This makes it easier to store and retrieve information about these taxa. It is easier to do this, and then to synonymize the species as needed

E-mail address: peter.linder@systbot.uzh.ch.

0254-6299/$ - see front matter © 2010 SAAB. Published by Elsevier B.V. All rights reserved.
doi:10.1016/j.sajb.2010.10.008

when more information becomes available, than to start with very broad species concepts and then to split the species up when more information becomes available.

3. *Cannomois*

Cannomois is a very distinctive genus, readily recognized by the large black woody nuts, which are laterally somewhat compressed, and by a small white elaoisome. In addition, the female spikelets generally have 1–3 fertile flowers, compared to the more usual single flower in the Willdenowieae. Most of the species in the genus are readily distinguished, but there are two species complexes that have been confused.

The *Cannomois parviflora* complex includes much variation, and Linder (1985) recognized just one highly variable species, *C. parviflora* (Thunb.) Pillans. Since then, several segregates have been recognized. The first is a large plant found along the arid margins of the Cold Bokkeveld and Cedarberg (from Karoopoort to Klipfonteinrand), which was separated as *Cannomois taylori* (Linder, 1990). This name had to be synonymized, as the species had already been described as *Cannomois schlechteri* Masters (1900). The second is a peculiar species with a long, slender nut, that is found on the arid lower slopes of the mountains around the upper Breede River (from the Bosjesveld Mountains to the bases of the Hex River Mountains). This had been described by Masters (1900) as *Cannomois spicatum*. Two further species are separated here: *Cannomois anfracta*, a tufted species from the upper Olifantsriver at Keerom, and *Cannomois arenicola*, a species with a long rhizome from the western coast Sandveld. However, this still leaves substantial variation within *C. parviflora*. From the Piketberg, I know a somewhat aberrant tufted population (*Linder 7075*, BOL), that I have not been able to place properly yet: it may be *C. anfracta* (but has acuminate male bracts), or *C. parviflora* (but is tufted without spreading rhizomes), or a new species. This leaves *C. parviflora* defined as the common clumped (with spreading rhizomes) species from the sandstone mountains. The degree of development of the rhizome is variable. It would make a good project to analyze the genetic differentiation, as this is a nice case of eco-geographical differentiation.

The second complex involved *Cannomois virgata* (Rottb.) Steudel, which was taken to include all plants with richly branching culms (Linder, 1985; Pillans, 1928). Three species are readily recognized within this complex. Most distinctive is the new *Cannomois grandis*, a massive plant from the southern mountains, where it may form large bamboo-like stands. More widespread on drier, colluvial soils in the mountains is *Cannomois robusta*, originally described as a species of *Thamnochortus* by Kunth (1841). The third species is the large clonal *C. virgata*, the only species in the complex to resprout after fire. This rarely makes fertile nuts, probably only in the first years after fire.

The genus really needs a critical revision, but this may take some time to complete. Hence, the publication here of the more obvious new species. As there have been so many changes in the genus since the last key was published in 1985, I also provide a key to assist in placing the species.

Key to the species of *Cannomois*

1a. Culms much branched, plants often more than 1.5 m tall:
  2a. Plants with spreading rhizomes, forming extensive stands, much wider than tall; nuts broadly elliptical in side view, 9–12 × 5–7 mm. …..... *C. virgata*
  2b. Plants tufted, much taller than wide:
    3a. Tussocks more than 2 m tall; female spikelets ovate; nuts broadly elliptical in side view, 11–16 × 7–9 mm …..... *C. grandis*
    3b. Tussocks to 1.5 m tall; female spikelets slender, spindle-shaped; nuts narrowly oblong in side view, 9–13 × 3.8–5.2 mm..... *C. robusta*
1b. Culms simple or very rarely branched (*C. spicata*), plants usually less than 1.5 m tall:
  4a. Perianth > 1/5 of nut length, usually more than 1/2 of nut length, usually more than 2 mm long:
    5a. Plants tufted; culms occasionally branched; nuts slender cylindrical, 9.5–10.5 × 3.1–3.9 mm …..... *C. spicata*
    5b. Plants with spreading rhizomes; culms never branched; nuts oblong in side view, 7.3–10.3 mm long:
      6a. Plants to 1 m tall; female bracts long-acuminate and extended into an awn..... *C. aristata*
      6b. Plants more than 1 m tall; female bracts acute to acuminate, but without an awn..... *C. schlechteri*
  4b. Perianth < 1/5 of nut length, generally less than 2.3 mm long:
    7a. Plants tufted with short rhizomes; nuts 5.5–6.2 mm long..... *C. anfracta*
    7b. Plants clumped or spreading, with spreading rhizomes; nuts 6.3–11 mm long:
      8a. Male inflorescence 70–200 mm long; spathes shiny dark brown, obscuring the spikelets; from the southern Cape..... *C. scirpoides*
      8b. Male inflorescence 20–70 mm long; spathes dully brown, not obscuring the spikelets; from the southwest Cape:
        9a. Culms widely spaced on a long rhizome; male flowers 2.2–2.6 mm long; nuts elliptical in side view, 7.2–9 × 3.7–5.8 mm..... *C. arenicola*
        9b. Culms closely spaced on a rhizome; male flowers 1.5–2 mm long; nuts oblong in side view, 6.3–8.5 × 3–3.4 mm..... *C. parviflora*

3.1. *Cannomois anfracta*

C. anfracta H.P. Linder, *sp. nov.,* a *C. parviflorae* habitui caespitosi, bracteis masculis quadratis obtusis flores aequalibus, nucibus 5.5 – 6.2 mm longis differt.

Type: South Africa, Western Cape, 3219 (Wuppertal): Clanwilliam Division, sandy slope 1/2 mile north of Keerom (-CC), 25 November 1938, *Pillans* 8735 ♀ (BOL, holo.), ♂ (BOL, lecto.).

Plants tufted, without spreading rhizomes or stolons, 0.6–0.8 m tall. Fertile culms unbranched, smooth or finely rugulose, green or olivaceous, diameter at apex 1–1.5 mm. Sheaths closely convoluted, acute, 20–45 mm long; reddish brown, greenish towards the base and striate towards the apex, eventually all

turning grey-brown; apical margins like the rest of the body; sheath-mucro penicillate, straight and erect, 3.5–6 mm long. Male inflorescence 45–75 × 10–20 mm, with 50–100 paniculate spikelets; spathes chartaceous, taller than spikelets, caducous; spikelets ovate or obovate, at least some curved, rounded, 2.5–3.5 × 2.5–3 mm, with 10–20 flowers; bracts equalling flowers, 1.5 mm long, square or obovate, rounded or obtuse, chartaceous, bract upper margin membranous, golden-brown. Male flower 1–1.5 mm long; tepals all the same length, oblong, chartaceous, glabrous; outer tepals more rigid than inner tepals, outer lateral tepals somewhat conduplicate; anthers 1 mm long, exserted from the flowers; pistillode absent. Female inflorescence 30–60 × 5–10 mm, with 2–10 spikelets, linear; spathes shorter to as long as the spikelets, persistent, chartaceous; spikelets single-flowered, sessile, elliptical, acute, 12–16 mm long, with 4–7 sterile bracts; bracts taller than flowers, 10–12 mm long, ovate or orbicular, acute or acuminate (very obscurely so), bony, apical margin like rest of bract, awn minute or absent. Female flower with a fleshy pedicel; tepals 0.5–1 mm long, membranous, glabrous and smooth, truncate or rounded or obtuse; staminodes absent; styles 2, plumose, white, free to base; ovary unilocular, indehiscent. Nut 5.5–6.2 × 3–3.3 mm, black, smooth, hard, woody, laterally somewhat compressed; perianth persistent, membranous, less than 1/5 of nut length; elaiosome white, 1.5–2.5 mm long.

3.1.1. Distribution, habitat and flowering time

This species is restricted to the southern end of the Olifantsriver Valley, between Warmbaths and Groot Winterhoek. In this region, it occurs on the lower slopes of the mountains.

The altitudinal range of *C. anfracta* is between 450 and 600 m. It appears to be restricted to soils derived from sandstone. In this region, it is locally common on well-drained soils, both on sandy plains and rocky slopes, and is absent from seepages and wet places, and from rock ledges. It can form quite extensive local populations. Flowering from September to October, seed release occurs a year later, after the year's flowers have started flowering.

3.1.2. Etymology

anfractus (Latin) = turn, referring to the locality of the species, "Keerom", meaning "turn around" in Afrikaans.

3.1.3. Taxonomic notes

C. anfracta is part of the *C. parviflora* complex. At Grootfontein at the top end of the Olifantsriver Valley (near Keerom), both species co-occur, and can be readily identified in the field. *C. anfracta* has short rhizomes or even none (consequently, the plants are tufted, the basal diameter is much less than the plant height). Typical *C. parviflora* has long spreading rhizomes, and consequently, the plants are clumped, often as wide as long. A second difference lies in the male bracts: *C. anfracta* has obtuse to acute male bracts, more or less as tall as the male flowers, whereas *C. parviflora* has acuminate male bracts which are taller than the flowers. There are also differences in the nuts. Although the shapes are the same, the nuts in *C. anfracta* are 5.5–6.2 mm long, thus shorter than the 6.3–8.5 mm long nuts of *C. parviflora.* Finally, although both species flower in spring, they do not flower at the same time: *C. parviflora* flowers earlier than *C. anfracta*. The two occur intermingled: there can be no doubt that they are separate species.

3.1.4. Additional specimens

3219 (Wuppertal): Porterville Mountains, farm Grootfontein at head of Citrusdal valley (-CC), 420 m, 25.09.1999, Linder 6957 (BOL).

3319 (Worcester): Ceres: Visgat, upper Olifants River Valley (-AA), 26.12.1946, Esterhuysen 13407 (BOL); Porterville, Kliphuis River (-AA) 01.03.1987, Linder 4012 (BOL).

3.2. Cannomois arenicola

C. arenicola H.P. Linder sp. nov., a *C. parviflorae* rhizomatibus longis crassis extendentibus, nucibus 7.2–9 mm longis, floribus masculis 2.2–2.6 mm longis statim dignoscenda.

Type: South Africa, Western Cape, 3318 (Cape Town): Hopefield, Waterboerskraal, 33°02′S, 18°26′04E (-AB), Linder 7071♀, ♂ (holo, BOL.; K, MO, NSW, Z, iso.).

Plants clumped or forming long lines of culms, 0.5–1 m tall. Fertile culms evenly and widely spaced on a spreading, simple or sparsely branched rhizome; culms unbranched, smooth or finely rugulose, green or olivaceous, diameter at apex 0.8–1.5 mm. Sheaths closely convoluted, 15–25 mm long, acute, brown with golden speckling, eventually turning grey, apical margins like the rest of the body; mucro penicillate, straight and erect, 1.5–4 mm long. Male inflorescence 30–70 × 8–20 mm, paniculate, with 21–100 spikelets; spathes caducous, taller than spikelets, chartaceous or cartilaginous; male spikelets elliptical, ovate or orbicular, rounded, 3–4.5 × 2.5–4 mm, with 20–30 flowers; bracts shorter than to as tall as flowers, 2.5–3.2 mm long, ovate, acute or acuminate, chartaceous, bract upper margin like body of bract or membranous, awn minute or absent. Male flower 2.2–2.6 mm long; tepals all same size, chartaceous, oblong, glabrous; outer whorl more rigid than inner whorl, outer lateral tepals conduplicate; anthers 1.8–2 mm long, exserted from the flowers; pistillode absent. Female inflorescence 15–70 × 10–15 mm, with 1–5 spikelets; spathes longer than, but not obscuring, the spikelets, persistent, chartaceous or cartilaginous; spikelets sessile, elliptical, acute, 15–20 mm long, with 1 flower and 5–8 sterile bracts; bracts taller than flowers, 10–12 mm long, ovate, acute, bony. Female flower with a fleshy pedicel; tepals 1–2 mm long, truncate, membranous, glabrous and smooth; staminodes absent; styles 2, plumose, white, bases free; ovary unilocular, indehiscent. Nut 7.2–9 × 3.7–5.8, hard, woody, black, smooth, laterally compressed; perianth persistent, membranous, less than 1/5 of nut length; elaiosome white, 1–2 mm long.

3.2.1. Distribution, habitat and flowering time

This species is restricted to the southern portion of the Sandveld, and is found widespread between the Berg River and the Atlantic Ocean, restricted to the sandy plains. The altitude ranges from sea level to 200 m. Most collections are from sand, but it remains possible that it is also found on sand over a sandstone bedrock. The species has never been recorded from soils derived from granites or shales, even though these are

common in the region. It also seems to be absent from areas underlain by limestone. It is a common element in the Sandveld vegetation, and can locally dominate the vegetation, although it can also in places be a rather minor component. It is restricted to well-drained sandy soils, absent from damp hollows and seepage areas. It is also associated with the more acid sands, and absent from coastal dunes. Flowering occurs from July to September, seed release occurs a year later only after flowering of the flowers produced the next season has started.

3.2.2. Etymology

arenos (Greek)=sand, + *cola* (Latin)=dweller in, referring to the Sandveld habitat of the species.

3.2.3. Taxonomic notes

C. arenicola is close to typical *C. parviflora* from the sandstone mountains, with which it shares the possession of a well developed rhizome and a perianth that is much shorter than the nut. However, it differs in several ways. Most obviously, the culms are spaced much further apart on the rhizomes, these are also longer and less branched than in *C. parviflora*, consequently the plants form lines, spreading through the vegetation. By contrast, typical *C. parviflora* plants are clumped. Secondly, the male flower and anthers are larger, the flowers being more than 2 mm long. Finally, the nut is somewhat longer (although in length there is a substantial overlap), and much plumper (i.e. more elliptical in side view, rather than oblong). The female inflorescence also has fewer spikelets per culm. Single shoots can be difficult to determine to species, but whole plants are easily determined. This species is the sandy plain equivalent of *C. parviflora*, and the two species do not co-occur.

3.2.4. Additional specimens

3318 (Cape Town): Waterboerskraal (-AB), 50 m, 25.08.1997, Linder 6792 (BOL); Hopefield (-AB), 01.09.1905, Bolus 12906 (BOL); Malmesbury, Riverlands Nature Reserve (-BC), 105 m, 11.12.2006, Strobl 43 (BOL); Malmesbury, Mamre Reserve (-CB), 200 m, 19.03.2002, Linder 7467 (BOL); near Groenekloof, on sand dunes (-CB), Bolus 4240 (BOL); near Mamre in sand amongst low bush (-CB), 03.06.1975, Esterhuysen 33873 (BOL); Kraaifontein, vacant plot, abundant (-DC), 02.06.1966, Esterhuysen 31551 (BOL); Kraaifontein in sand along old road to Paarl (-DC), 22.06.1966, Esterhuysen 31559 (BOL); Stellenbosch: Bottelary "Bellevue" (-DD), 18.08.1976, Esterhuysen 34341 (BOL).

3319 (Worcester): Wellington, Bartholomeus Klip (-AC), 100 m, 18.12.1999, Linder 7002 (BOL).

3418 (Simonstown): Stellenbosch, west base of Sir Lowrys Pass common near road (-BB), 16.05.1964, Esterhuysen 30698 (BOL).

3.3. Cannomois grandis

C. grandis H.P. Linder, sp. nov., a *C. virgata* habitui caespitosis, culmis 2 m longorum, a *C. robusta* perianthio nucem aequanti, spiculis femineis ovatis, ab ambobus nucibus late ellipticis (7–9×11–16 mm) recedit.

Type: South Africa, Western Cape, 3322 (Oudtshoorn): western end of the Kammanassie (-DA), 6 November 1995, Linder 6124 (BOL, holo.).

Plants tufted, 2–5 m tall, basal diameter 0.3–1.5 m. Fertile culms evenly spaced on spreading, unbranched or sparsely branched rhizomes; clusters of sterile branches at the nodes present while flowering, distinctly hollow, smooth or finely rugulose, green or olivaceous, diameter 12–20 mm at base, 1.8–3.2 mm at apex. Sheaths closely convoluted, 10–90 mm long, acuminate to obtuse, brown, soon decaying, apical margins like the rest of the body; mucro penicillate, straight and erect, 4–10 mm long. Male inflorescence 80–500×30–150 mm, with up to 500 paniculate spikelets; spathes caducous, taller than spikelets, coriaceous or cartilaginous; male spikelets oblong or ovate or elliptical, obtuse or acute, 5–12×3–6 mm, with 15–30 flowers; bracts as tall as or taller than flowers, 2–3.5 mm long, ovate, obtuse or acute or acuminate, chartaceous or cartilaginous. Male flower 2–2.5 mm long; tepals all similar, membranous, glabrous; outer lateral tepals conduplicate; anthers 1–2 mm long, exserted from the flowers. Female inflorescence with 1 spikelet; spathes shorter than the spikelets, persistent, bony or coriaceous; spikelet oblong or elliptical or ovate, acute, 15–40 mm long, with 1–2 flowers, with 6–12 sterile bracts; bracts taller than flowers, 10–28 mm long, oblong or ovate, acute or acuminate, bony or coriaceous. Female flower with a fleshy pedicel; tepals oblong, rounded, 9.8–15.3 mm long, membranous, glabrous and smooth; staminodes absent; styles 2, plumose, white, bases free; ovary unilocular, indehiscent. Nut 11–16×7–9, elliptical or obovate, laterally compresssed, hard, woody, black to brown, smooth; perianth persistent, membranous, as tall as nut and wrapped around it; elaiosome white, 0.2–1.1 mm long.

3.3.1. Distribution, habitat and flowering time

C. grandis is found in the mountains from Tulbagh in the west to the Kammanassie in the east, but is absent from the Cape Peninsula. It has been recorded from the Great and Little Swartberg, from the Langeberg, Riviersonderend, and the mountains from Caledon to Tulbagh. Its occurrence is often quite patchy.

This species is restricted to mountains, where it is found between 300 and 1300 m. It has only been seen on soils derived from sandstone. It is most common along stream margins and in seeps, mostly on deeper soils and almost never from rocky habitats, often from gorges or deep valleys. It appears to occupy slightly wetter places than *C. robusta*. Occasionally, it forms large stands or thickets (Great Swartberg), sometimes a bambusoid fringe to forest patches (Langeberg), or isolated clumps. The plants are killed by fire, and populations are re-established from seed. It is possible that the occurrence of large stands might be determined by the local fire history. It flowers from October to December, and ripe seed has been observed between March and November. However, it is not yet clear whether the seed needs a post-ripening period on the plants.

3.3.2. Etymology

grandis (Latin)=large, tall, full grown. Refers to the large growth form.

3.3.3. Taxonomic notes

C. grandis is a very distinct species, due to its huge stature and branching culms. It is the largest growing species of Restionaceae. The large, swollen female spikelets, and the plump nuts are characteristic. This species was previously included under *C. virgata*, and it is currently in the horticultural trade under this name. However, *C. virgata* is a short, mat-forming species that resprouts after fire. The third branching species is *C. robusta*: this is more easily confused with *C. grandis* in the field, as it is also a large, tufted plant that has to re-establish from seed after fire. *C. robusta* differs from *C. grandis* by the slender, spindle-shaped spikelet, cylindrical nut, and the perianth which is shorter than the nut (Table 1).

It is much more difficult to determine herbarium material to species, especially if these lack female spikelets or nuts. This, as well as the striking shared characteristic of branching culms, explains why all three species were so long combined under one name. It also makes the assignment of types to species difficult: I have used a default of leaving the names with *C. virgata* unless there is clear evidence that the types belong to one of the other two species.

C. virgata rarely produces ripe seed in the field, the plants persist vegetatively. Seed production seems to occur mostly in the first years after fire. Most of the material that is available in the trade under *C. virgata* is *C. grandis*, while *C. robusta* seems to be less commonly sold. Fortunately, the nuts of *C. robusta* and *C. grandis* are quite distinct.

3.3.4. Additional specimens

3319 (Worcester): Tulbagh, Winterhoek Mountain slopes (-AA), Bolus 7486 (BOL); Wellington, Bainskloof, Baviaans-kloof, sandy wash (-CA), 23.03.1991, Linder 5223 (BOL); Franschoek, 1 km. below top of pass, on east side (-CC), 06.10.2000, Caddick and Alletson 386 (BOL); Wemmershoek Mountains, Winterberg stream (-CC), 3000–4000′, 26.12.1943, Esterhuysen 9664 (BOL).

3321 (Ladismith): Langeberg, Sleeping Beauty (-CC), 600 m, 11.03.2000, Caddick 360 (BOL); Riversdale, Garcia's Pass "in declivibus saxosis" (-CC), 1500′, 15.10.1904, Bolus 11411 (BOL); Bolus 11410 (BOL); Garcia's Pass ravines (-CC), Galpin 4823 (BOL); Langebergen, mountain slopes (-CD), Schlechter 1973 (BOL); Cloetesberg, south slopes above Bergkloof (-DD), 26.06.1987, Linder 4139 (BOL).

3322 (Outshoorn): Kammanassie, west end (-DA), 06.11.1995, Linder 6124 (BOL).

3.4. Cannomois robusta

C. robusta (Kunth) H.P. Linder, comb. nov., basionym: *Thamnochortus robustus* Kunth, Enum. Pl. 3: 436 (1841). Type: 3319 (Worcester): Du Toits Kloof (-CA), Drège 1606 (B lecto [Linder, Bothalia 15: 482 (1985)], B BM K MEL MO P PRC).

This species was listed as *Cannomois saundersiae* by H.P. Linder in the online key to the African Restionaceae. This unpublished name has to be abandoned, as the species was previously described by Kunth.

3.5. Cannomois primosii

C. primosii (Pillans) H.P. Linder, comb. nov., basionym: *Cannomois scirpoides* (Kunth) Masters var. *primosii* Pillans in Trans. R. Soc. S. Afr. 16: 419 (1928). Type: 3319 (Worcester): between Villiersdorp and Fransch Hoek (-CC), Bolus 7485 (BOL, holo.).

A rather distinctive species, allied to *Cannomois congesta* from the southwestern mountains. Its distinctive features are the milky white tepals, which are somewhat shorter than half the length of the nut. The plants also have large male spikelets with acuminate bracts, and a tussocked growth form.

4. *Nevillea*

The small genus *Nevillea* includes only three species. This genus is remarkable due to the enormous sexual differentiation between male and female inflorescences. Furthermore, within the Willdenowieae, it is the only genus with dehiscent, bilocular ovaries. The three species are allopatric, two are quite localized.

4.1. Nevillea vlokii

N. vlokii H.P. Linder, sp. nov., differt a *N. obtussissima* (Steud.) H.P. Linder et *N. singularis* Esterhuysen habitui caespitoso, floribus masculis 2.5–3 mm longis, spathis grandibus, acutis, spiculas superans.

Type: South Africa, Western Cape, 3321 (Ladismith): Langeberg at Kortefontein (-CC), 586 m, 11 February 2005, Linder 7858 (Z, holo.).

Plants tufted, 0.5–1 m tall. Fertile culms borne on short, spreading, unbranched or sparsely branched rhizomes; culms unbranched, smooth, olivaceous, diameter at base 1.7–2.8 mm,

Table 1
Comparison of the characters in the *C. virgata* complex.

Character	*C. virgata*	*C. robusta*	*C. grandis*
Habit	Mat-forming	Tufted	Tufted
Plant size	1–1.5 m	1.5–2 m	2–5 m
Female spikelet	Broadly ovate, rounded	Slender spindle-shaped	Broadly ovate, rounded
Nut dimensions	5–7 × 9–12 mm	7–9 × 11–16 mm	3.8–5.2 × 7–9 mm
Nut shape	Broadly elliptical	Cylindrical	Broadly elliptical
Perianth height	= nut	< nut	= nut
Fire biology	Resprouter	Reseeder	Reseeder

1.4–2 mm at apex. Sheaths closely convoluted, acute or obtuse or rounded, 20–30 mm long, apical margins narrowly membranous; mucro awl- or needle-shaped, straight and erect, 3.5–6 mm long. Male inflorescence 20–25 × 15–25 mm, with 2–10 paniculate spikelets; spathes persistent or caducous, taller than spikelets, cartilaginous, awned; spikelets elliptical or ovate, rounded or obtuse or acute, 8–11 × 3.5–5 mm, with 10–20 flowers; bracts as tall as or taller than flowers, 2.5–4 mm long, square, truncate or rounded, coriaceous or cartilaginous, bract upper margin like body of bract, bract awn minute or absent. Male flower 2.5–3 mm long; tepals all same size, oblong, glabrous; outer whorl cartilaginous or membranous, laterals conduplicate; inner whorl membranous; anthers 1.3–1.5 mm long, exserted from the flowers. Female inflorescence 20–50 × 8–20 mm, linear, with 2–10 spikelets; spathes longer than and obscuring the spikelets, persistent, cartilaginous; spikelets sessile, elliptical, acute, 9–18 mm long, with 2–4 flowers and 2 sterile bracts; bracts taller than flowers, 5–8 mm long, square or ovate, obtuse or acute, coriaceous or cartilaginous, apical margin like rest of bract or somewhat darker, awn minute or absent or less than half as long as the bract body. Female flower 5.5–6 mm long, without a fleshy pedicel; tepals chartaceous or cartilaginous, glabrous and smooth, apices acuminate; outer lateral tepals conduplicate or keeled or winged, wings entire, narrower than body, 5–6 mm long; inner tepals ovate, 3–5 mm long; staminodes absent; styles 2, feathery, red, bases free; ovary unilocular. Fruit unknown.

4.1.1. Distribution, habitat and flowering time

This new species is a Langeberg endemic, found between the Grootberg and the Gouritz River Gorge. This contrasts with the other two species in the genus: *N. singularis* is known only from Kanonkop in the Riviersonderend Mountains at Genadendal, and *N. obtussissima* in the mountains between Tulbagh and Kleinmond.

All collections of *N. vlokii* are from sandy or loamy soils derived from sandstone, and range in altitude from 450 to 750 m. Most collections indicate seepages (although one is from well-drained soils), some even indicate permanently wet habitats. It seems that the species might need some seepage. It is sometimes locally dominant or at least common. Current information is that the species, as the other two in the genus, resprouts from the rhizome after fire. The species flowers from November to February.

4.1.2. Etymology

This species is named for Jan Vlok**,** botanist and environmental consultant in the southern Cape, first based at Saasveld, then in De Rust and Oudtshoorn. He has a superb knowledge of the flora and vegetation of the region, and discovered very many new species, including this new *Nevillea*.

4.1.3. Taxonomic notes

The differences between the new *N. vlokii* and the other two species of *Nevillea* are summarized in Table 2. The most important differences lie in the habit of the plants, the smaller male flowers, and the relatively larger spathes. The clearly allopatric replacement of these three species is rather unusual in the African Restionaceae.

4.1.4. Additional specimens

3321 (Ladismith): Langeberg, Bergfontein, south side of Perdeberg Nek, along Witblitzpadjie (-DC), 12-12-1990, McDonald 2045 (NBG); Eastern Langeberg, nek on trail, 3 km west of Doodkisberg between Bergfontein and Karoo (-DC), 33°56′S, 21°32′E, 750 m, 29-4-2006, Helme 3917 (NBG); Langeberg, Bergfontein, Koksposberg (-DC), 439 m, 1-11-1990, McDonald 2009 (NBG); Eastern Langeberg, 1 km north of Koksposberg, above path, 33°57′S, 21°33′E (-DC), 650 m, 29-4-2006, Helme 3916 (NBG); Eastern Langeberg, 3 km north of Doodkisberg, 33°56′S, 21°32′E (-DC), 650 m, 29-4-2006, Helme 3915 (NBG).

5. Thamnochortus

A genus readily distinguished by the pendulous male spikelets, the female flowers with a single style exserted from behind the long bracts, the female spikelets with numerous flowers. Furthermore, the fruit is a small nut enclosed in a persistent female perianth, the whole constitutes a wind-dispersed diaspore. Such diaspores are rare in Restionoideae, are found in *Staberoha*, and in two species of *Restio* subgen. *Simplicaulos*. Although the species in *Thamnochortus* can be readily identified, there are no clear-cut groups.

Table 2
Comparison of the three species in *Nevillea*.

Character	*N. obtussissima*	*N. singularis*	*N. vlokii*
Habit	Clumped	Mat-forming	Tufted
Plant height	0.8–1.5 m	0.2–0.6 m	0.5–1 m
Culms	Hollow	Hollow	Solid or with small hollow
Male spathes	Smaller or as tall as spikelets	Smaller or as tall as spikelets	Overtopping spikelets
Male flowers	3.2–4 mm	5–6 mm	2.5–3 mm
Anthers	1.5–2.5 mm	2–3 mm	1.3–1.5 mm
Female spathes	Obscuring spikelet	Not obscuring spikelet	Obscuring spikelet
Female tepals	Acute	Acute	Acuminate
Flowering	Feb.-Mar.	Aug.-Sep.	Nov.-Feb.
Distribution	SW mts	Riviersonderend	Langeberg

5.1. Thamnochortus kammanassiae

T. kammanassiae H.P. Linder, *sp. nov.,* a *T. guthrieae* Pillans floribus femineis orbicularis latitudine bractearum floralium differt.

Type: South Africa, Western Cape, 3322 (Oudtshoorn): Kammanassie, at watershed of Vermaaksrivier (-DA), 6 November 1995, Linder 6129 (BOL, holo.).

Plants forming compact tufts, 0.5–1 m tall; rhizome very short with culms aggregated at base or looping up with clusters of culms on the uploops. Fertile culms unbranched, smooth, olivaceous, diameter at apex 0.7–1.1 mm. Sheaths closely convoluted, 40–70 mm long, reddish-brown, apical margins broadly chartaceous and soon decaying. Male inflorescence 50–70 × 30–50 mm, paniculate, with 11–20 spikelets; spathes persistent, shorter than spikelets, chartaceous, upper margins lacerated and largely decayed at anthesis; spikelets pendulous on flexible pedicels, oblong or elliptical, apex rounded, 10–16 × 4–6 mm, with 20–30 flowers, pedicels as long as or longer than spikelets, flattened; bracts oblong or ovate, acute, taller than flowers, 5–10 mm long, with broad membranous-hyaline margins and chartaceous brown central part. Male flower 4–4.5 mm long; tepals all same length, linear to oblong, glabrous, outer lateral tepals conduplicate; anthers 1.5–1.8 mm long, included in the flowers. Female inflorescence racemose, 25–60 × 10–20 mm, with 1–5 spikelets; spathes shorter to as long as the spikelets, persistent, chartaceous; spikelets oblong or obtriangular, apex truncate or rounded, 20–35 mm long, with 15–25 flowers, with 0 sterile bracts; bracts at least twice as long as flowers, 13–28 mm long, oblong or ovate, acute, chartaceous. Female flower 4.5–7 mm long, without a fleshy pedicel; tepals cartilaginous, glabrous and smooth, at least as tall as nut, wrapped around it and obscuring the surface, apices acute, inner whorl shorter than outer; outer lateral tepals wings entire, decurrent with flower stipe, wider than tepal body, exserted past bracts, 4.5–6.5 mm long; odd outer tepal oblong, 4–6 mm long; inner tepals oblong, 3–4 mm long. Staminodes absent; style 1, plumose, white; ovary with 1 locule, indehiscent. Nut 3 × 1.7 mm, oblong, elliptical in cross section, black, smooth; perianth persistent, winged, enclosing nut; diaspore oblong, narrower than long; elaiosome absent.

5.1.1. Distribution, habitat and flowering time

T. kammanassiae is known only from the watershed region between the Vermaaks and Huis Rivers, at the western base of the Kammanassie Mountains in the Western Cape.

It is found at an altitude of about 1000 m, where it grows in sandy soil derived from sandstones. Although the soils are well drained, the vicinity to streamlines suggests some groundwater availability. The species flowers in June.

5.1.2. Etymology

The name refers to its currently know locality, the Kammanassie (reputed to mean “Mountain of Water” in San). This is latinized to Kammanassia, then used as the genetive, so “kammanassiae”, meaning “of the Kammanassie”.

5.1.3. Taxonomic notes

T. kammanassiae is probably most closely related to *T. guthrieae*, with which it shares large flowers (for *Thamnochortus*), relatively few female spikelets, and the combination of large oblong–obovate female spikelets with chartaceous bracts. However, it differs by the larger, wider, more or less orbicular flowers, in which the tepals are exserted next to the floral bracts, and by the absence of sterile branches at the nodes of older, mature culms. This new species is also found far to the east of the nearest currently known populations of *T. guthrieae* from the Langeberg at Garcias Pass.

5.1.4. Additional specimens

3322 (Oudtshoorn): Kammanassie, Wildebeesvlakte (-DA), 22-6-1979, Bond 1714 (BOL, K, Z).

6. *Willdenowia*

Willdenowia is a fairly heterogenous genus, containing several distinctive elements. In its current configuration, the genus is readily recognized by the male inflorescences and the sheaths. The male flowers are not aggregated into compact spikelets, but the tepals and bracts are linear and membranous, and the whole paniculate inflorescence consists of a chaotic tangle of perianth parts, bracts and anthers. This sort of inflorescence is also found in *Ceratocaryum*. The sheaths have a very distinctive upper margin which readily decays, leaving on the fertile culms only the truncated lower 2/3 of the sheaths. Molecular phylogenetic analyses of the Restionoideae indicate that the genus may not be monophyletic (Eldenäs and Linder, 2000), but no robust phylogenetic hypothesis for the group is yet available. Consequently, the new species are placed in this genus, despite the possibility that there might be generic realignments.

6.1. Willdenowia pilleata

W. pilleata H.P. Linder, sp. nov., differt a *W. incurvato* (Thunb.) H.P. Linder stylopodia quadrilobo nucem aequantes, statura 0.3–0.4 m longi.

Type: South Africa, Western Cape, 3419 (Caledon): Bredasdorp, at turnoff to Springfield along road to Brandfontein, 34°44′ S, 19°55′E (-DB), 21 March 1996, Linder 6562 (Z, holo.; BOL, K, MO, NBG, NSW, S, iso.).

Plants tufted or tangled, 0.3–0.4 m tall, compact. Fertile culms branching, striate, olivaceous, 0.3–0.4 m tall, diameter at apex 0.5–0.7 mm. Sheaths loosely convoluted, 12–20 mm long, brown, upper 1/3 in color and texture abruptly different from the base, and soon decaying. Male inflorescence 13–22 × 4–6 mm; spathes caducous, taller than spikelets, cartilaginous; flowers not aggregated into spikelets; bracts taller than flowers, 8–12 mm long, linear, acute, lax, chartaceous or membranous. Male flower 3–4 mm long; tepals all the same, chartaceous or membranous, linear, glabrous; anthers 1.6–2.1 mm long; pistillode absent. Female inflorescence with 1 spikelet; spathes shorter than the spikelet, persistent, coriaceous; spikelet obovate, apex rounded, 15–20 mm long, with 1 flower

and 4–6 sterile bracts; bracts taller than flowers, 10–15 mm long, oblong, acuminate, cartilaginous. Female flower without a fleshy pedicel; tepals all the same, oblong, truncate to rounded, membranous, glabrous and smooth; outer whorl 1.5–2 mm long; inner whorl 1–1.5 mm long; staminodes absent; styles 2, plumose, seated on a stylopodium; ovary unilocular, indehiscent. Nut 4–5×3–3.5 mm, oblong, in transect rounded, brown, pitted, cap four-lobed, or with two large lobes and two incisions, almost as tall as the nut itself; perianth persistent, membranous, shorter than nut; elaiosome absent.

6.1.1. Distribution, habitat and flowering time

Recorded from the Bredasdorp plains, from the eastern base of the Soetanysberg. Here the species is found on deep, sandy soils, at an altitude of 10–20 m. It occurs near a streamline and a shallow lake, most likely the water table is quite shallow. The species flowers from February to March.

6.1.2. Etymology

Pilleata (Latin)=a felt hat, referring to the cap on the nut.

6.1.3. Taxonomic notes

W. pilleata is related to the widespread and common species *W. incurvata* by the striate culms, nuts without an elaiosome, and the sessile styles. *W. incurvata* ranges from Cape Town and Worcester to Namaqualand, and is one of the most common species on sandy soils. It seems to be a good traveler, as even isolated sand-patches (such as at Keerom at the top of the Olifantsriver Valley) have small populations of this species. *W. pilleata* clearly fits into this complex, and may be regarded as a geographical form of this widespread species. However, the morphological differences are striking. Firstly, there are habit differences, with the new species being much smaller than the widespread *W. incurvata*, and also lacking the rhizome so typical of the common species. Secondly, the male flowers of the new species are longer (3–4 mm instead of 2–2.5 mm). Finally, the nut is smaller (3–3.5×4–5 mm instead of 5–6×7–9 mm), and has a massive four-lobed cap. *W. incurvata* flowers in winter (April to June) while the new species flowers in summer (February to March). These differences are too big to include within one species, hence the new species status.

7. *Restio*

The genus *Restio* includes maybe half of the species in Restionoideae, and has always been difficult to delimit. The current delimitation (Linder and Hardy, 2010) is wide, and includes the genera *Calopsis* and *Ischyrolepis* as delimited by Linder (1984). The evidence for the monophyly of this huge genus *Restio* is weak, but then also the evidence against its monophyly is equally weak (Hardy et al., 2008). In order to establish more robust monophyletic groups, and at the same time minimize the nomenclatural chaos, nine subgenera were erected. These also provide for some structure within this large genus, and make it easier to place and remember species. Our new species is in the subgenus *Simplicaulos* H.P. Linder & C.R. Hardy.

7.1. Restio uniflorus

Restio uniflorus H.P. Linder, sp. nov., a *R. confuso* Pillans et *R. miser* Kunth culmis parce ramosis, vaginis 6–10 mm longorum, mucronibus 1–2 mm longorum, floribus masculis 2.5–2.7 mm longorum, bracteis femineis quadratis recedit.

Type: South Africa, Western Cape, 3321 (Ladismith): Great Swartberg, along road to Die Hel (-BD), 24 October 2008, Linder 7909 (Z, holo.; BOL, K, MO, NBG, NSW, iso.).

Plants clumped or tangled, 0.15–0.4 m tall, compact, without spreading rhizomes or stolons. Fertile culms branching, finely rugulose, olivaceous, 0.15–0.4 m tall, diameter at apex 0.2–0.5 mm. Sheaths closely convoluted, 6–10 mm long, reddish-brown, acute or obtuse; mucro penicillate, straight and erect, 1–2 mm long; apical sheath margins narrowly membranous. Male inflorescence 10–140×3–10 mm, sparsely paniculate, with 2–10 spikelets; spathes persistent, like the floral bracts, chartaceous or cartilaginous, margins soon decaying; spikelets elliptical or obovate, apex rounded or obtuse or acute, 4–6×1.5–2 mm, with 3–4 flowers; bracts as tall as flowers, 2–3 mm long, oblong or elliptical or ovate, rounded or obtuse, chartaceous or cartilaginous, bract upper margin membranous, thinner texture than the body, at anthesis somewhat decayed and exposing the flowers. Male flower 2.5–2.7 mm long, glabrous; outer tepals cartilaginous, conduplicate; inner tepals membranous, oblong, shorter than outer tepals; anthers 0.8–1 mm long, exserted from the flowers; pistillode present. Female inflorescence 4–100×4–10 mm, sparsely paniculate or racemose, with up to 5 spikelets; spathes like floral bracts, persistent, chartaceous or cartilaginous; spikelet obovate or obtriangular, apex truncate, 4–5 mm long, with 1 flower and 4–7 sterile bracts; bracts shorter than flowers, 1.5–2.5 mm long, square, rounded, chartaceous or cartilaginous, apical margin membranous. Female flower 3–3.5 mm long; tepals 2–3.5 mm long, cartilaginous, glabrous and smooth, inner and outer whorls the same length or inner whorl shorter than outer; staminodes present; styles 3, feathery, bases free; ovary with 3 dehiscent locules. Seed not known.

7.1.1. Distribution, habitat and flowering time

Known only from the Great Swartberg, between Kariegaberg and Tierberg, where it occurs along the plateau on the inland side of the main summit ridge, at an altitude of ca. 1400 m. The species is found in marshes with *Anthochortus ecklonii* Nees, and can be locally dominant. The type locality is a permanently wet marsh, and the species grows with its roots in water. Flowering occurs in early spring, seed release is in November.

7.1.2. Etymology

uni (Latin)=one; *florus* (Latin)=flowers, referring to the single-flowered spikelets.

7.1.3. Taxonomic notes

R. uniflorus has many similarities to the *R. miser–R. confusus* group. They have more or less simple culms, few-flowered spikelets, glabrous tepals, and in the female spikelets, the bracts are shorter than the flowers. They also occur in

similar wet habitats, in seepages and in marshy areas. However, there are a number of morphological differences. The most striking is the branching of the culms, associated with a very lax inflorescence, where the spikelets are spread over much of the culms. As a result, it is not possible to establish whether the culms are sparsely branching, or whether the inflorescences have few major branches from near the base. The second difference is in the female spikelets: in *R. uniflorus* these are always, and very clearly, single-flowered. By contrast, in the other two species, there are usually two or more flowers, or at least some reduced flowers. Finally, there are minor differences in the lengths of the sheaths, the degree of development of the sheath mucro, the length of the male flowers. Overall, this new Swartberg endemic species is clearly distinct, but equally clearly related to *R. miser* and *R. confusus*.

7.2. Restio mkambatiae

R. mkambatiae H.P. Linder, sp. nov., a *R. zuluensis* H.P. Linder rhizomatibus nullis differt.

Type: South Africa, Eastern Cape, 3129 (Port St. Johns): Mkambati Nature Reserve (-BD), 16 November 2004, Helme 3200 (BOL, holo.; Z, K, iso.).

Plants stoloniferous, mat-forming, 0.4–0.6 m tall. Fertile culms sparingly branched, finely rugulose, olivaceous, 0.4–0.6 m long, diameter at apex 0.3–0.5 mm. Sheaths closely convoluted, 6–11 mm long, olivaceous, rounded, with a narrow membranous margin; mucro penicillate, straight and erect, 2–4 mm long. Male inflorescence with 1(–2) spikelet (s), spathes persistent, like the floral bracts, cartilaginous; male spikelets sessile, elliptical or obovate, truncate, 10–15 × 3–6 mm, with 3–4 flowers; bracts more than twice as tall as flowers, 6–12 mm long, oblong, acute or acuminate, cartilaginous, concolorous, golden-brown, bract upper margin like body of bract, bract awn minute or absent. Male flower 3–4 mm long, glabrous; outer tepals cartilaginous, conduplicate; inner tepals membranous, oblong, shorter than outer whorl; anthers 1.3–2 mm long, exserted from the flowers; pistillode present. Female inflorescence with 1 spikelet; spathes like floral bracts, persistent, coriaceous; spikelet oblong or obovate, truncate or rounded, 12–20 mm long, 3–6 flowers and 0 sterile bracts; bracts at least twice as long as flowers, 8–13 mm long, oblong, acute or acuminate, cartilaginous, apical margin like rest of bract, awn minute or absent. Female flower 3–4 mm long, without a fleshy pedicel; tepals cartilaginous; outer tepals 3–4 mm long, laterals conduplicate; inner tepals oblong, 2.5–3.5 mm long; staminodes present; styles 3, feathery, white, bases free; ovary bilocular, dehiscent. Seed unknown.

7.2.1. Distribution, habitat and flowering time

R. mkambatiae is one of the few species of Restionaceae that is found outside the Western Cape. It is known from the northeast border of the Eastern Cape, from the Mkambati Nature Reserve, where it has been collected from below Horseshoe Falls and along the Daka River.

This species is found over sandstone bedrock, in marshy grassland adjacent to streams, in permanently wet areas and in seepage zones, at an altitude 60–80 m. The habitat is burnt regularly, and the plants apparently coppice from the base after fire. Flowering occurs in November.

7.2.2. Etymology

The specific epithet “mkambatiae” refers to Mkambati on the Pondoland “Wild Coast”, where the species was first located.

7.2.3. Taxonomic notes

Our new species is very similar in general to *R. zuluensis*: the spikelet structure is the same, the sheaths look identical, and the culms are a similar dimension and color. The most striking difference is in the underground parts: *R. zuluensis* has a very well developed rhizome (which is very unusual in the genus *Restio*), while *R. mkambatiae* spreads with stolons. These are culms that initially spread horizontally from the rooted basal node of the plant. There are also differences in the texture of the spathes and bracts of male and female inflorescences. In *R. zuluensis* these are papery, while in *R. mkambatiae* they are cartilaginous or coriaceous.

These two species are the only restios that occur along the eastern seaboard of southern Africa, although there are several more Restionaceae in the Drakensberg. Both species are found in marshy areas. *R. mkambatiae* is found on the sandstone outcrops of Pondoland and southern Kwa-Zulu Natal, which are characterized by several other Cape flora elements (van Wyk, 1989; van Wyk, 1990). *Restio zuluensis* appears not to be in a community with Cape links, and also does not occur on sandstones.

It remains possible that these two taxa could be regarded as two geographical subspecies. Since both are known from a very small area, but are geographically widely separated, it would be excellent to obtain material from intervening areas.

7.2.4. Additional specimens

3129 (Port St Johns): Mkambati NR, 1.5 km NW of the main camp, west of road near spot height 115, 31°18′S, 29°57′E (-BD), 5-3-2007, Helme 4591 (Z); Mkambati NR, marshy area 1 km northwest of main camp, along road to Gure Gure, 16-11-2004, Helme 3212 (Z); Mkambati NR, Mkambati River south bank, just below Horseshoe Falls, 60 m, 15-11-2004, Helme 3215 (Z); Mkambati NR, Mkambati River, just below Horseshoe Falls, 15-11-2004, Helme 3214 (Z).

3130 (Port Edward): Mkambati NR, Lukemboni River, south of Mtentu River, 31°18′S, 30°00′E, 180 m (-AA), 5-3-2007, Helme 3215 (Z).

Acknowledgements

I thank Western Cape Nature Conservation for permission to collect material, Wendy and Anthony Hitchcock and Rod and Rachel Saunders for company on fieldtrips, Claid Mujaju who assisted with the analyses of the *C. virgata* species complex, Nick Helme and Jan Vlok for the endless supply of peculiar specimens, which are always a pleasure to look at. Terry Trinder-Smith and the Bolus Herbarium provided logistic support in Cape Town. The study was funded by SNF 31-66594-01 and NGS 7289-02.

References

Briggs, B.G., 2001. The restiads invade the north: the diaspora of the Restionaceae. In: Metcalfe, I., Smith, J.M.B., Morwood, M., Davidson, I. (Eds.), Faunal and floral migrations and evolution in SE Asia–Australasia. Balkema, Lisse, pp. 237–241.

Briggs, B.G., Linder, H.P., 2009. A new subfamilial and tribal classification of Restionaceae (Poales). Telopea 12, 333–345.

Briggs, B.G., Marchant, A.D., Gilmore, S., Porter, C.L., 2000. A molecular phylogeny of Restionaceae and allies. In: Wilson, K.L., Morrison, D.A. (Eds.), Systematics and evolution of monocots. : Proceedings of the Second International Conference on the Comparative Biology of the Monocots, Sydney, September 1998, 1. CSIRO, Melbourne, pp. 661–671.

Eldenäs, P., Linder, H.P., 2000. Congruence and complementarity of morphological and *trn*L-F sequence, and the phylogeny of the African Restionaceae. Syst. Bot. 25, 692–707.

Goldblatt, P., 1978. An analysis of the flora of Southern Africa: its characteristics, relationships, and origins. Ann. Mo. Bot. Gard. 65, 369–436.

Goldblatt, P., Manning, J.C., 2000. Cape Plants. A conspectus of the Cape flora of South Africa, National Botanical Institute, Pretoria.

Hardy, C.R., Moline, P.M., Linder, H.P., 2008. A phylogeny for the African Restionaceae, and new perspectives on morphology's role in generating complete species-level phylogenies for large clades. Int. J. Plant Sci. 169, 377–390.

Kunth, C.S., 1841. Enumeratio Plantarum. Cotta, Stuttgart & Tuebingen.

Linder, H.P., 1984. A phylogenetic classification of the genera of the African Restionaceae. Bothalia 15, 11–76.

Linder, H.P., 1985. Conspectus of the African species of Restionaceae. Bothalia 15, 387–503.

Linder, H.P., 1990. New species of African Restionaceae. S. Afr. J. Bot. 56, 450–457.

Linder, H.P., 2001. The African Restionaceae. Contributions from the Bolus Herbarium, Cape Town.

Linder, H.P., 2003. The radiation of the Cape flora, southern Africa. Biol. Rev. 78, 597–638.

Linder, H.P., Hardy, C.R., 2010. A generic classification of the Restioneae (Restionaceae), southern Africa. Bothalia 40, 1–35.

Linder, H.P., Briggs, B.G., Johnson, L.A.S., 1998. Restionaceae. In: Kubitzki, K. (Ed.), The families and genera of vascular plants. IV Flowering plants. Monocotyledons. Springer Verlag, Berlin, pp. 425–445.

Masters, M.T., 1878. Restiaceae. In: De Candolle, A., De Candolle, C. (Eds.), Monographiae Phanerogamarum. Masson, Paris, pp. 218–398.

Masters, M.T., 1897. Restiaceae. In: Dyer, W.T. (Ed.), Flora Capensis. Reeve, London, pp. 59–149.

Masters, M.T., 1900. Restionaceae novae capensis herbarii Berolinensis, imprimis Schlechterianae. Botanische Jahrbücher für Systematik 29. Beiblatt 66, 1–20.

Meney, K.A., Pate, J.S., 1999. Australian rushes: biology, identification and conservation of Restionaceae and allied families. University of Western Australia, Nedlands.

Pillans, N.S., 1928. The African genera and species of Restionaceae. Trans. R. Soc. SA 16, 207–440.

Rebelo, A.G., Boucher, C., Helme, N.A., Mucina, L., Rutherford, M.C., 2006. Fynbos biome. In: Mucina, L., Rutherford, M.C. (Eds.), The Vegetation of South Africa, Lesotho and Swaziland, South African National Biodiversity Institute, Pretoria, pp. 53–219.

Taylor, H.C., 1978. Capensis. In: Werger, M.J.A. (Ed.), Biogeography and ecology of southern Africa. Junk, The Hague, pp. 171–229.

Thunberg, C.P., 1788. Dissertatione de Restione. Gottingen, Dieterich.

Thunberg, C.P., 1813. Flora Capensis. Edman, Uppsala.

Van Wyk, A.E., 1989. Floristics of the Natal/Pondoland sandstone forests. In: Geldenhuys, C.J. (Ed.), Biogeography of the mixed evergreen forests of southern Africa, pp. 145–157. chtr. 9.

Van Wyk, A.E., 1990. A new species of *Leucadendron* (Proteaceae) from Pondoland, with a discussion of its biogeography. S. Afr. J. Bot. 56, 458–466.

Edited by TJ Edwards