

RUBIACEAE

INFRASPECIFIC TAXA IN A SOUTHERN AFRICAN *PAVETTA* SPECIES

The genus *Pavetta* L. comprises \pm 400 species occurring in the Old World tropics (Bridson 2003) with 21 species in the summer rainfall areas of southern Africa (Retief & Leistner 2000). In 1929 Bremekamp revised the South African species of the genus *Pavetta*, followed by a monograph of the group in 1934. Several authors, e.g. Bridson (1978) and Kok & Grobbelaar (1984), maintained that Bremekamp not only recognized too many species but that some of the species delimitations were unsatisfactory. Subsequently several of his species were placed in synonymy by Bridson (1978) and Kok &

Grobbelaar (1984). Although these later treatments did help to make identifications easier, some taxa seem to be 'waste bins' in which too many names were dumped, e.g. *Pavetta zeyheri* Sond. Kok & Grobbelaar (1984) listed 10 names as synonyms under *P. zeyheri* including *P. microlancea* K.Schum., *P. middelburgensis* Bremek. and *P. lasiopeplus* K.Schum. Recently Bridson (2003) resurrected *P. lasiopeplus* and hinted that *P. microlancea* and *P. middelburgensis* may deserve recognition as distinct taxa. It seems that Coates Palgrave (2002) also upheld *P. lasiopeplus* as separate from *P. zeyheri*.

TABLE 1.—Comparison between the three subspecies of *Pavetta zeyheri*

| | subsp. <i>zeyheri</i> | subsp. <i>middelburgensis</i> | subsp. <i>microlancea</i> |
|------------------------|--|--|---|
| Life form | Shrub or small tree | Dwarf shrub | Shrub |
| Plant height (m) | (0.5)1–4 | Up to 0.5 | 0.3–0.8(–1.0) |
| Leaf | | | |
| length (mm) | (20.5)28.0–57.0(68.0) | 17–36 | (17.0)23.5–31.0(40.0) |
| width (mm) | (4.5)5.0–12.0(15.5) | 2.5–6.0 | 3.0–5.5(7.0) |
| shape | Narrowly obovate oblanceolate, narrowly elliptic | Narrowly obovate (oblanceolate) | Narrowly obovate/oblanceolate to narrowly elliptic |
| apex | Acute, rounded to obtuse | Acute | Acute |
| base | Cuneate, sessile | Cuneate, sessile | Cuneate, sessile |
| Domatia | Absent | Absent | Absent |
| Inflorescence branches | Apparent | Apparent | Suppressed |
| Calyx | | | |
| *tube length (mm) | 1.2–2.0 | 1.0–1.5 | 1.5–2.0 |
| lobe length (mm) | 0.5–2.0 | 0.5–1.2 | 1–2 |
| Corolla | | | |
| tube length (mm) | 7–14 | 7–14 | 6–10 |
| lobe length (mm) | 6.0–9.5 | 6–9 | 5.0–7.5 |
| lobe width (mm) | 2–3 | 2–3 | 1.5–2.5 |
| Style length (mm) | 18–33 | (17)21–29 | (14)21–23 |
| Anther length (mm) | 5.5–9.0 | 4.5–7.0 | 4–6 |
| Fruit diam. (mm) | 6–10 | 5–6 | 5–6 |
| Habitat | Rocky outcrops, hillsides, also on flats, on sandy soil. | Amongst outcrops of rocks and boulders, rocky sheets | Rocky slopes, loamy flats |
| Distribution | B, LIM, NW, G, M, FS. | M | M: probably extending into adjacent parts of Mozambique |

B, Botswana; LIM, Limpopo; NW, North-West; G, Gauteng; M, Mpumalanga; FS, Free State.

* Calyx tube = 'hypanthium' + limb-tube.

Bremekamp (1934) separated *P. zeyheri* from *P. middelburgensis* and *P. microlancea* on the grounds of the leaf shape and ratio of leaf length to width. He distinguished between *P. middelburgensis* and *P. microlancea* on the grounds of corolla and leaf length. The leaves of *P. microlancea* and *P. middelburgensis* are usually very small, but a study of material housed in PRE and PRU showed no clear discontinuity in size among the three taxa discussed in the present contribution (Table 1) and these differences are not reliable for distinguishing the three taxa. In all three species the corolla tube is hairy inside.

As the differences in leaf shape and size, and the morphology of the flowers show some integration, it is difficult to justify three separate species. However, because of the differences in growth form and the disjunct geographical distribution, *P. middelburgensis* and *P. microlancea* are formally reinstated as subspecies of *P. zeyheri* in the present contribution. *P. lasiopeplus* K.Schum. is upheld, following Bridson (2003). Bridson (2003) distinguishes between *P. zeyheri* and *P. lasiopeplus* *inter alia* on the grounds of the differences in the length of the calyx lobes: 0.5–1.5(–2.0) mm in *P. zeyheri* and 2–3 mm in *P. lasiopeplus* and inflorescence branches apparent in *P. zeyheri*, but suppressed in *P. lasiopeplus*. These were the only reliable characters found to distinguish between these two species in material studied at PRE. Silky hairs on the inflorescence bracts were observed in almost all the *P. zeyheri* specimens examined at PRE, yet Bridson (2003) maintained they are without silky hairs. The shape of the stipules varies too much to be used as a distinguishing character between these two species.

P. dissimilis Bremek., *P. pseudozeyheri* Bremek., *P. zeyheri* Sond. var. *brevituba* Bremek., *P. zeyheri* Sond. var. *pubescens* Bremek. and *P. zeyheri* Sond. var. *sonderi* Bremek. are all regarded as part of *P. zeyheri* subsp.

zeyheri, as the differences given by Bremekamp (1929, 1934) are only part of the variation range of this taxon.

***Pavetta zeyheri* Sond.**, Flora capensis 3: 21 (1865); Bremek.: 211 (1929); Bremek.: 183 (1934); Launert: 23 (1966); Kok & Grobbelaar: 187 (1984); Retief & P.P.J.Herman: 588 (1997); Coates Palgrave: 1123, 1124 (2002); Bridson: 582, 583 (2003); Retief: 837 (2003). Type: Transvaal [Gauteng], Vaal River, *Burke s.n.* (K, PRE, –photo.!, S!, TCD, –photo.!).

subsp. *zeyheri sens. str.*

Ixora zeyheri (Sond.) Kuntze: 287 (1891).

P. dissimilis Bremek.: 211 (1929); Bremek.: 183 (1934). Type: Middleberg, Gray 4188 (PRE!).

P. pseudozeyheri Bremek.: 211 (1929); Bremek.: 183 (1934). Type: Transvaal [North-West], Rustenburg, *Bremekamp 103* (PRE!).

P. zeyheri Sond. var. *brevituba* Bremek.: 212 (1929); Bremek.: 184 (1934). Type: Transvaal [Gauteng], Pretoria District, *Nelson s.n.* Transv. Mus.11710 (PRE!).

P. zeyheri Sond. var. *pubescens* Bremek.: 212 (1929); Bremek.: 184 (1934). Type: Transvaal [Gauteng], Pretoria, Premier Mine, *Pollak s.n.* PRE41394 (PRE!).

P. zeyheri Sond. var. *sonderi* Bremek.: 184 (1934). Type: Transvaal [Gauteng], Pretoria, Magalisberg [Magaliesberg], *Zeyher 768* (S!, PRE, photo.!).

P. zeyheri subsp. *zeyheri* is a shrub or small tree, usually single-stemmed, 1–4 m tall. Leaves narrowly obovate, oblanceolate to narrowly elliptic, (20.5)28.0–57.0 (68.0) × (4.5)5.0–12.0(15.5) mm. Inflorescence branches apparent; bracts with silky hairs on inside; calyx lobes 0.5–2.0 mm long. Grows mainly on rocky outcrops and

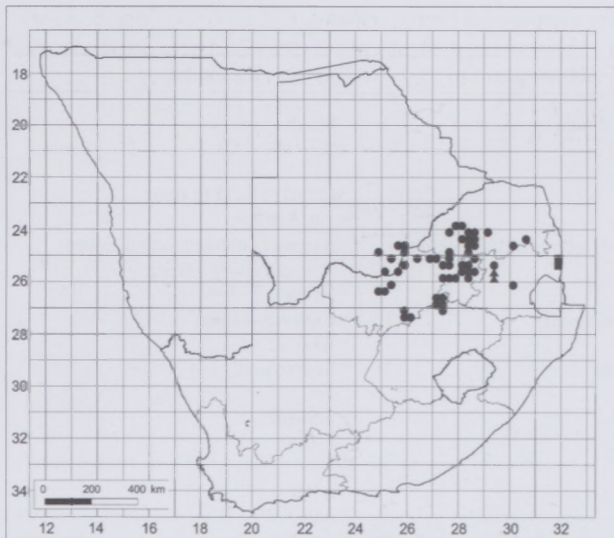


FIGURE 10.—Distribution of *P. zeyheri* subsp. *zeyheri*, ●; *P. zeyheri* subsp. *middelburgensis*, ▲; and *P. zeyheri* subsp. *microlancea*, ■, in southern Africa.

hillsides, but also on flats, often on sandy soil in Botswana, Limpopo, North-West, Gauteng, Mpumalanga and the Free State (Figure 10).

BOTSWANA.—2425 (Gaborone): Mmokolodi, 12 km S of Gaborone, (–DB), *Cole* 642 (PRE); Mokolodi Village, Mokolodi Reserve, 15 km S of Gaborone, (–DD), *Cole* 1154 (PRE).

LIMPOPO.—2427 (Thabazimbi): Waterberg Dist., Vaalwater, Farm Malmanies River, (–BA), *Hardy, Retief & Herman* 5301 (PRE, PRU). 2428 (Nylstroom): Waterberg Dist., 3 km W of Nylstroom–Vaalwater road, on road to Loubad, (–CB), *Reid* 460 (PRE).

NORTH-WEST.—2525 (Mafikeng): Botsalano Game Reserve, (–DA), *Phalatshe* 170 (PRE). 2527 (Rustenburg): 3 miles (4.8 km) S of Rustenburg on road to Rustenburg Kloof, (–BA), *De Winter* 7800 (PRE). 2625 (Delareyville): E of Madibogo, Madibogo Hills, (–AC), *Gubb KMG10737* (PRE). 2627 (Potchefstroom): Dassiesrant, (–CA), *Botha & Ubbink* 1819 (PRE). 2725 (Bloemhof): Leeuwfontein, 10 km W of Wolmaranstad, (–BB), *A.E. van Wyk* 758 (PRE).

GAUTENG.—2527 (Rustenburg): Hartebeestpoort Dam, Dr Brassy's Farm, (–DD), *Mogg* 34052 (PRE). 2528 (Pretoria): Fountains Valley, (–CA), *Repton* 98 (PRE); Lukasrand, below Post Office Tower,

(–CD), *Retief & Herman* 171 (PRE, PRU).

MPUMALANGA.—2529 (Witbank): Loskopdam Nature Reserve, (–AD), *Theron* 1094 (PRE, PRU). 2630 (Carolina): Carolina, (–AA), *Nicholson* PRE4312 (PRE).

FREE STATE.—2727 (Kroonstad): Vredefort Dist., (–AB), *Oliver* 277 (PRE).

subsp. *middelburgensis* (*Bremek.*) *P.P.J.Herman*, comb. et stat. nov.

P. middelburgensis *Bremek.* in *Annals of the Transvaal Museum* 13: 212 (1929); *Bremek.*: 184 (1934). Type: Mpumalanga, Middelburg, without exact locality, *Jenkins s.n. Transv. Mus.* 9828 (PRE, holo.!).

Pavetta zeyheri subsp. *middelburgensis* is a dwarf, compact shrub, almost bonsai-like, up to 0.5 m tall, growing wedged amongst outcrops of rocks and boulders or rocky sheets, confined to Middelburg area, Mpumalanga (Figures 10, 11). *Leaves* small, narrowly obovate or oblanceolate, 17–36 × 2.5–6.0 mm. *Inflorescence* branches apparent; bracts with silky hairs on inside; calyx lobes 0.5–1.2 mm long.

MPUMALANGA.—2529 (Witbank): Doornkop 273 J.S., 'Ghost Rocks' W of Eerstekamp, (–CB), *Du Plessis* 984 (PRE, PRU); Botsabelo, (–CD), *Codd & Dyer* 2869, *Fouche s.n. Transv. Mus.* 26971, *Herman* 1531, 1532 (PRE), *Schlechter* 3781 (PRE, PRU); kopie W of Middelburg, (–CD), *Brusse* 1932 (PRE); Witbank Nature Reserve, (–CD), *Smit* 1843 (PRU); Middelburg, without exact locality, *Thode* A1610 (PRE).

subsp. *microlancea* (*K.Schum.*) *P.P.J.Herman*, comb. et stat. nov.

P. microlancea *K.Schum.* in *Botanische Jahrbücher* 28: 80 (1899), *Bremek.*: 212 (1929); *Bremek.*: 184 (1934). Type: Mpumalanga, Komatipoort, without exact locality, *Schlechter* 11760 (B, holo.–PRE!).

Pavetta zeyheri subsp. *microlancea* is a small shrub, 0.3–0.8(–1.0) m tall, growing on rocky slopes or loamy flats in the Sabie, Komatipoort and Crocodile Bridge areas of Mpumalanga (Figure 10). *Leaves* vary from narrowly obovate or oblanceolate to narrowly elliptic, (17.0)



FIGURE 11.—Habit and habitat of *Pavetta zeyheri* subsp. *middelburgensis*.

23.5–31.0(–40.0) × 3.0–5.5(–7.0) mm. *Inflorescence* branches suppressed; bracts with silky hairs on inside; inflorescence few-flowered (mostly 4–6); calyx lobes 1–2 mm long.

Coates Palgrave (2002) referred to a large-leaved form of *P. zeyheri* which grows up to 3 m tall in the Sekhukhuleni area as probably *P. microlancea*, but it cannot be the same taxon as described above because of the differences in stature of the plants. The so-called Sekhukhuleni form of *P. zeyheri* is characterized by blue-green leaves and may well represent a separate species—it is listed as *Pavetta* sp. nov. (tree number 722.1) in Von Breitenbach *et al.* (2001). Bridson (2003) mentioned that *P. microlancea* differed from *P. zeyheri sens. str.*, apart from size, in having fewer-flowered, umbellate inflorescences subtended by bracts with silky hairs.

MPUMALANGA.—2531 (Komatiport): Kruger National Park, 10 miles S of Lower Sabie camp. (–BB), *Codd 6133* (PRE, KNP); Kruger National Park, Lower Sabie/Crocodile River Bridge, near Nthandanyathi waterhole, *Van Rooyen 4133* (PRU); between Komatiport and Letaba River, on the Selati railway. (–BD), *Rogers 12887* (PRE); 3 miles (4.8 km) N of Crocodile River Bridge, Kruger National Park, (–BD), *P. van Wyk 4735* (PRE, KNP).

CONSERVATION STATUS

Given the very restricted geographical distribution of both *P. zeyheri* subsp. *middelburgensis* and subsp. *microlancea*, these two taxa should probably be declared Vulnerable, the population restricted to an area of occupancy < 100 km² (VU D2) according to the 1994 IUCN Red List categories (Golding 2002).

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REFERENCES

- BREMEKAMP, C.E.B. 1929. A revision of the South African species of *Pavetta*. *Annals of the Transvaal Museum* 13: 182–213.
- BREMEKAMP, C.E.B. 1934. A monograph of the genus *Pavetta* L. *Repertorium specierum novarum regni vegetabilis* 37: 1–208.
- BRIDSON, D.M. 1978. Studies in *Pavetta* (Rubiaceae subfamily Cinchonoideae) for part two of *Flora of tropical East Africa: Rubiaceae*. *Kew Bulletin* 32: 609–652.
- BRIDSON, D.M. 2003. *Pavetta* L. *Flora zambesiaca* 5.3: 544–598.
- COATES PALGRAVE, M. 2002. *Keith Coates Palgrave Trees of southern Africa*, edn 3. Struik, Cape Town.
- GOLDING, J.S. (ed.). 2002. *Southern African plant Red Data Lists*. SABONET Report No. 14.
- KOK, P.D.F. & GROBBELAAR, N. 1984. Studies on *Pavetta* (Rubiaceae) II. Enumeration of species and synonymy. *South African Journal of Botany* 3: 185–187.
- KUNTZE, C.E.O. 1891. Rubiaceae. *Revisio generum plantarum* 1: 287. Charles Klincksieck, Paris.
- LAUNERT, E. 1966. Rubiaceae. *Prodromus einer Flora von Südwestafrika* 115: 1–27.
- RETIEF, E. 2003. Rubiaceae. In G. Germishuizen & N.L. Meyer, Plants of southern Africa: an annotated checklist. *Strelitzia* 14: 836, 837. National Botanical Institute, Pretoria.
- RETIEF, E. & HERMAN, P.P.J. 1997. Plants of the northern provinces of South Africa: keys and diagnostic characters. *Strelitzia* 6: 576–593.
- RETIEF, E. & LEISTNER, O.A. 2000. Rubiaceae. In O.A. Leistner, Seed plants of southern Africa: families and genera. *Strelitzia* 10: 476–495. National Botanical Institute, Pretoria.
- SCHUMANN, K. 1899. Rubiaceae africanae. *Botanische Jahrbücher* 28: 80, 81.
- SONDER, O.W. 1865. Rubiaceae. *Flora capensis* 3: 1–39. Hodges, Smith, Dublin.
- VON BREITENBACH, J., DE WINTER, B., POYNTON, R., VAN DEN BERG, E., VAN WYK, B. & VAN WYK, E. 2001. *Pocket list of southern African indigenous trees: including selected shrubs and woody climbers*, edn 4, 1st abridged impression. Briza Publications & Dendrological Foundation, Pretoria.

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