

Abrus kaokoensis (Leguminosae-Papilionoideae-Abreae), a new species from Namibia

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Abstract

Abrus kaokoensis Swanepoel & H.Kolberg, a woody subshrub, is described as a new species. It is only known from the vicinity of the Kunene River and the Baynes Mountains in the Kaokoveld Centre of Endemism, Namibia. Its range is likely to extend into the botanically poorly explored adjacent mountainous parts of southwestern Angola. Illustrations of the species and a distribution map are provided. Probably most closely related to *A. schimperi* Baker, diagnostic characters of the new species include a suffrutescent habit and terminal elongated racemes with flowers clustered on appressed cushion-like reduced branchlets. A comparative table with diagnostic morphological characters to distinguish between the new species and *A. schimperi* is provided.

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1. Introduction

Hitherto the climber, *Abrus precatorius* L. subsp. *africanus* Verdc., was the only known member of this genus recorded for Namibia. It is widespread in sub-Saharan Africa and in Namibia is known from the central, northern and northeastern parts (Craven, 1999; Germishuizen and Meyer, 2003). In this contribution, a rare new species of *Abrus* is described from the Kaokoveld in northwestern Namibia. During a number of botanical expeditions to the region between 2005 and 2010, the authors independently encountered an unusual species of *Abrus* that grows as a subshrub near Swartbooisdrif (H. Kolberg) and in the Baynes Mountains (W. Swanepoel). These plants are here proposed as a distinct new species. The *Abrus* holdings in WIND revealed only one earlier collection of the new species (*Bethune s.n.*), filed under *A. precatorius* subsp. *africanus*. A

specimen from the Kaokoveld in PRE, *Merxmüller & Giess 30490*, labelled *Abrus cf. laevigatus*, also belongs to the new species.

2. Materials and methods

Live plants of the new species were studied in the field. Morphological characters in the following description were determined from live material, fresh flowers and mature fruits. For *Abrus schimperi* Baker (Verdcourt, 1971) diagnostic features were sourced from literature (Harder, 2007; Verdcourt, 1970, 1971).

3. Taxonomy

3.1. Description

Abrus kaokoensis Swanepoel & H.Kolberg, sp. nov., similis *A. schimperi* Baker ligno fruticulo, sed planta parvula (0.3 usque ad 1.0 m altam), plerumque minoribus paribus oppositis

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foliolis (4–8); apice folioli acuto, raro rotundo, basi obtuso, subcordato, saepe obliquo; inflorescentiis plerumque brevioribus (20–120 mm), calyce infundibulari lobatoque, corolla numquam lutea vel cremea; leguminibus gracilibus non-tuberculatis, seminibus elipsoidalibus sive obovoideis, dimensionis longissimis $\pm 30^\circ$ ad axem longam leguminis dispositis differt.

TYPE — Namibia, Kunene Region, stony southern slopes of Kunene River Valley, 1 km NNE of Sodalite Mine on track to Kunene River, 850 m a.s.l., 11-03-2010. *Swanepoel & Kolberg* 288 (WIND, holo.; PRE, iso.).

Woody suffrutex, multi-stemmed, 0.3–1.0 m tall. *Stems* numerous arising from a woody rootstock, ascending and virgate, lenticels often prominent. *Bark* smooth, sometimes longitudinally fissured; on young stems reddish brown, appressed pubescent with indumentum white; on older stems grey or brown, glabrous. *Leaves* alternate and distichous, rarely opposite or 2- or 3-clustered, (4)5–7(8)-jugate; rachis 12–39 mm long including 2–9 mm long petiole, shallowly grooved adaxially, projecting 1.0–3.5 mm beyond terminal pinna pair, appressed pubescent; pinnae (3–)7–14(–16) \times (2–)4–7(–8) mm, dimensions usually distally increasing, oblong, obovate-oblong, elliptic or narrowly obovate, acute, rarely rounded, mucronulate, base obtuse or subcordate, often oblique, venation prominent, particularly midrib abaxially, slightly discoloured, green adaxially, darker green abaxially (in herbarium material paler abaxially), appressed pubescent abaxially with hairs \pm oriented towards apex, glabrous adaxially; petiolules 0.7–0.9 mm long, appressed pubescent; stipules 3.4–4.7 mm long, narrowly lanceolate, densely appressed pubescent; stipels 0.2–0.7 mm long, appressed pubescent; indumentum white, 0.2–0.4 mm long. *Inflorescence* terminal or rarely lateral, elongated, racemose, usually also sessile in upper axils, appressed pubescent; rachis 20–120 mm long excluding very short peduncle; flowers clustered on appressed cushion-like reduced branchlets often arranged unilaterally on rachis; reduced branchlets subtended by an often caducous, appressed pubescent stipule up to 2.2 mm long with 3–5 unequal subulate lobes, centre lobe longest; pedicels 1.6–1.8 mm long; bracts and bracteoles 0.4–0.6 \times 1.2–1.8 mm, narrowly lanceolate, somewhat cucullate, appressed pubescent abaxially; indumentum white. *Calyx* 3.9–4.8 mm long, infundibular with 5 deltoid-acuminate lobes, upper pair united except for apical part, appressed pubescent on outside surface. *Corolla* blue, violet, mauve or pink-purple, glabrous, 10–17 mm long; standard ovate, 9–15 \times 6–11 mm, often with 2 small deltoid teeth towards base, retuse, claw broad, $\pm 2.4 \times 1.7$ mm; wings narrowly falcate to cultrate, 6–13 \times 2–3 mm, claw 2.5–3.4 mm long; keel petals falcate, 8–16 \times 3–4 mm, each with a pocket interlocking with wings, claw 3–4 mm long. *Stamens* 9, joined into a sheath split at apex, ± 9 mm long, ± 1 mm diam., white, glabrous; 5 longer stamens with free part of filaments 2.8–4.1 mm long, anthers ± 1 mm long; 4 shorter stamens with free part of filaments 2.1–3.3 mm long, anthers ± 0.8 mm long. *Ovary* subsessile, ± 8 mm long, appressed pubescent abaxially, indumentum white; style terete, white, glabrous, ± 7.5 mm long, upcurved, projecting well beyond anthers; stigma capitate with irregular fimbriellae.

Pods oblong, rarely narrowly obovate, smooth, appressed pubescent, indumentum white, some hairs with rufous base, suburgid, \pm septate, valves thin, woody, springing into spirals upon dehiscence, 2–6-seeded, acute with beak usually hooked, base cuneate-obtuse, khaki to yellow brown when dry, 28–47 \times 9–15 mm. *Seeds* ellipsoid or obovoid, compressed, dull, dark brown or black, irregularly mottled olive-green or rarely yellow-green, minutely shagreened, arranged in pod with longest dimension $\pm 30^\circ$ to long axis of pod; hilum small, eccentric, exarillate, but with funicle remnant (Fig. 1).

3.2. Phenology

Abrus kaokoensis was found flowering in March, following good rains.

3.3. Diagnostic characters

Abrus kaokoensis is probably most closely related to *A. schimperi* as both species are shrubs (not lianes) with terminal elongated inflorescences with woody pods and compressed seeds. It differs from *A. schimperi* in habit, as well as in characters of the leaves, inflorescences, flowers, pods and seed. *A. kaokoensis* is a subshrub, reaching a maximum height of 1 m, whereas *A. schimperi* is usually a much taller shrub, with a maximum height of about 3.6 m.

The leaves in *A. kaokoensis* are 4–8-jugate with the leaflets oblong, ovate-oblong, elliptic or narrowly obovate. In *A. schimperi* the leaves are 7–34-jugate and the leaflet shape is oblong or oblong-elliptic. The leaflet apex in *A. kaokoensis* is acute, rarely rounded and the base obtuse or subcordate and often oblique, whereas in *A. schimperi* the apex is always rounded and the base rounded to subacute. The leaflets differ furthermore in that they are usually much smaller in *A. kaokoensis*, only up to 16 \times 8 mm, whereas in *A. schimperi* they reach double the size, up to 33 \times 15 mm.

Differences in the floral characters include the inflorescences, which in *A. schimperi* can be much longer than in *A. kaokoensis*. The infundibular, lobed calyx in *A. kaokoensis* is considerably larger than the obconic, truncate or undulate calyx in *A. schimperi*. The corolla in *A. kaokoensis* is uniform in colour whereas the wings in *A. schimperi* usually are darker than the standard. Apart from the different shades of blue, mauve, violet or purple which the corollas of both taxa share, the corolla in *A. schimperi* may also be cream or yellow coloured.

In *A. kaokoensis* the pods are markedly smaller and thinner than in *A. schimperi* and lack the small tubercles that cover the surface of the latter. The seeds of the two taxa also differ; the usually larger, olive or yellow-green mottled seeds of *A. kaokoensis* are ellipsoid or obovoid in shape and the long axis is arranged at ± 30 degrees to the long axis of the pod. Seeds of *A. schimperi* are rounded-oblong or rhombic, brown with dark brown mottling and arranged with the long axis at right angles to the long axis of the pod.

Some of the more prominent morphological features to differentiate *A. kaokoensis* from *A. schimperi* are compared in Table 1.

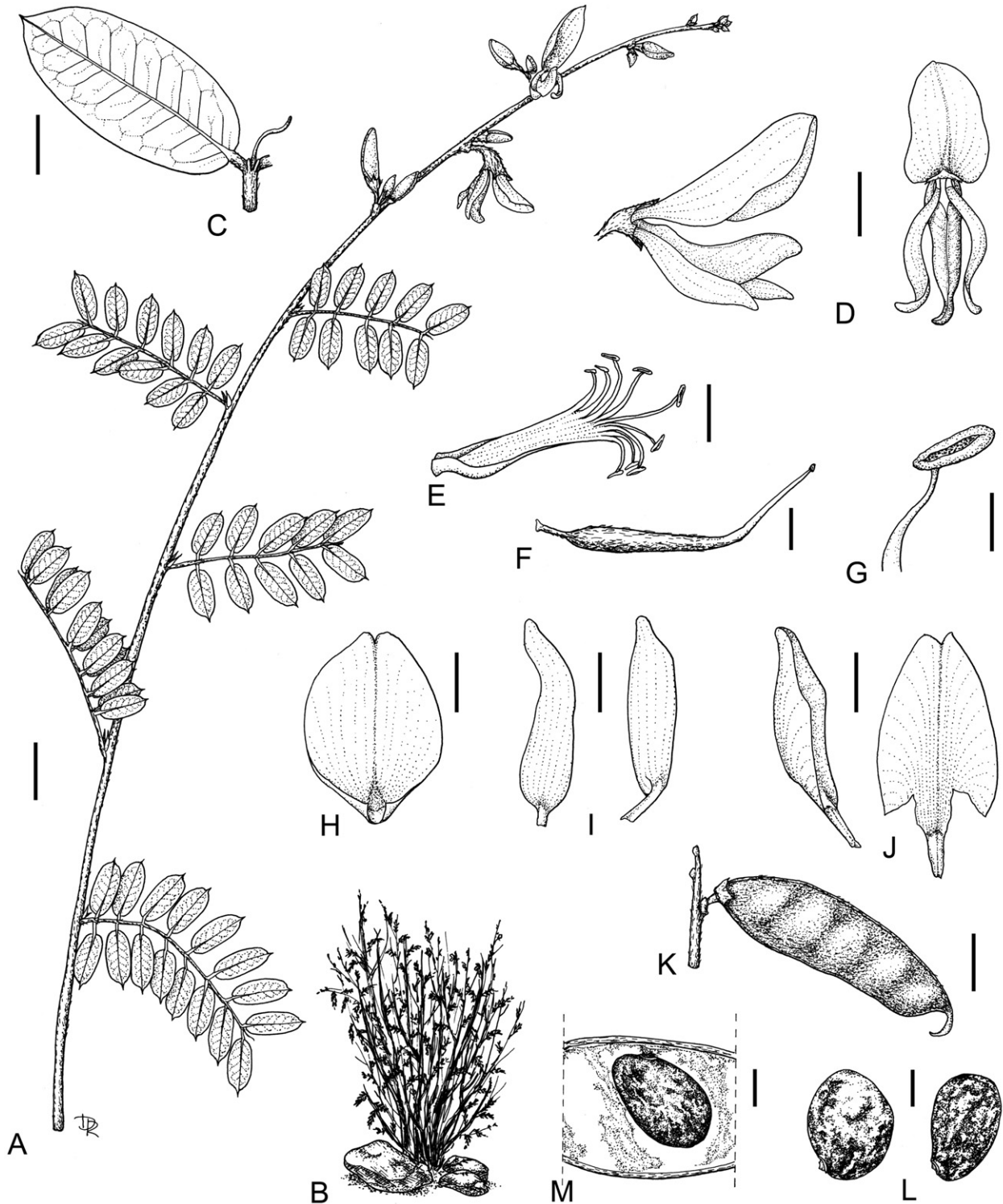


Fig. 1. *Abrus kaokoensis*. (A) flowering branchlet; (B) habit; a woody subshrub up to 1 m tall; (C) leaf apex, showing one leaflet; (D) flower, lateral and front view; (E) anther Sheath spread out; (F) Gynoecium; (G) anther with free part of filament; (H) standard petal; (I) wing petal, shape varies from falcate to cultrate; (J) keel petal, lateral and opened out; (K) pod; (L) seed; (M) portion of pod, with surface cut away to show seed orientation. Vouchers: A–J, *Swanepoel & Kolberg 288* (herbarium); K–M, *Swanepoel 287* (herbarium). Scale bars: 10 mm (A, K), 5 mm (D, H–J), 3 mm (E), 2 mm (C, F, L, M), 0.5 mm (G). Artist: Daleen Roodt.

3.4. Distribution and habitat

Abrus kaokoensis is known only from three localities (Fig. 2); one population each in the Baynes Mountains, the

Epupa area and a few sub-populations to the west of Swartbooisdrif in the northern part of the Kaokoveld Centre of Endemism (Van Wyk and Smith, 2001), Kunene Region, Namibia. In the Baynes Mountains it occurs 125 km from the

Table 1
Diagnostic differences between *Abrus kaokoensis* and *A. schimperi*.

Character	<i>A. kaokoensis</i>	<i>A. schimperi</i>
Habit	Subshrub, 0.3–1.0 m tall	Shrub, 0.9–3.6 m tall
Leaves		
Leaflet pairs	4–8	7–9 (subsp. <i>africanus</i>) 10–17 (subsp. <i>oblongus</i>) 14–34 (subsp. <i>schimperi</i>)
Leaflet shape	Oblong, ovate-oblong, elliptic or narrowly obovate	Oblong–elliptic or oblong
Leaflet size	3.0–16.0 × 2.0–8.0 mm	5.0–33.0 × 4.5–15.0 mm
Leaflet apex	Acute, rarely rounded	Rounded
Leaflet base	Obtuse, subcordate, often oblique	Rounded to subacute
Inflorescences (length)	20–120 mm	20–80 mm (subsp. <i>oblongus</i>) 130–260 mm (subsp. <i>africanus</i>) 130–300 mm (subsp. <i>schimperi</i>)
Flowers		
Calyx (shape)	Infundibular	Obconic
Calyx (size)	3.9–4.8 mm long	3.0 mm long
Calyx (margin)	Lobed; lobes deltoid-acuminate	Truncate or undulate
Corolla (colour)	Uniform; blue, violet, mauve or pink–purple	Wings usually darker than standard; cream, yellow or blue and mauve to purple or light violet
Pods		
Size	28–47 × 9–15 mm	52–79 × 7–13 mm
Valves	Thin; surface smooth (non-tuberculate)	Thick; surface usually markedly tuberculate, sometimes velutinous
Seed		
Shape	Ellipsoid or obovoid	Rounded-oblong or rhombic
Size	5.7–12.5 × 4.3–5.3 × 3.4–3.6 mm	5.0–7.5 × 5.0–6.0 × 2.0–3.0 mm
Colour	Dark brown or black, mottled olive green or yellow–green	Brown with darker brown mottling
Arrangement in pod	With longest dimension ±30 degrees to long axis of pod	With longest dimension at right angles to long axis of pod
Indumentum (colour)	White	Golden or grey
Distribution	Kaokoveld, northwestern Namibia	Southern Africa (Zambia, Malawi, Mozambique, Zimbabwe), Eastern, Central and North-Eastern Africa

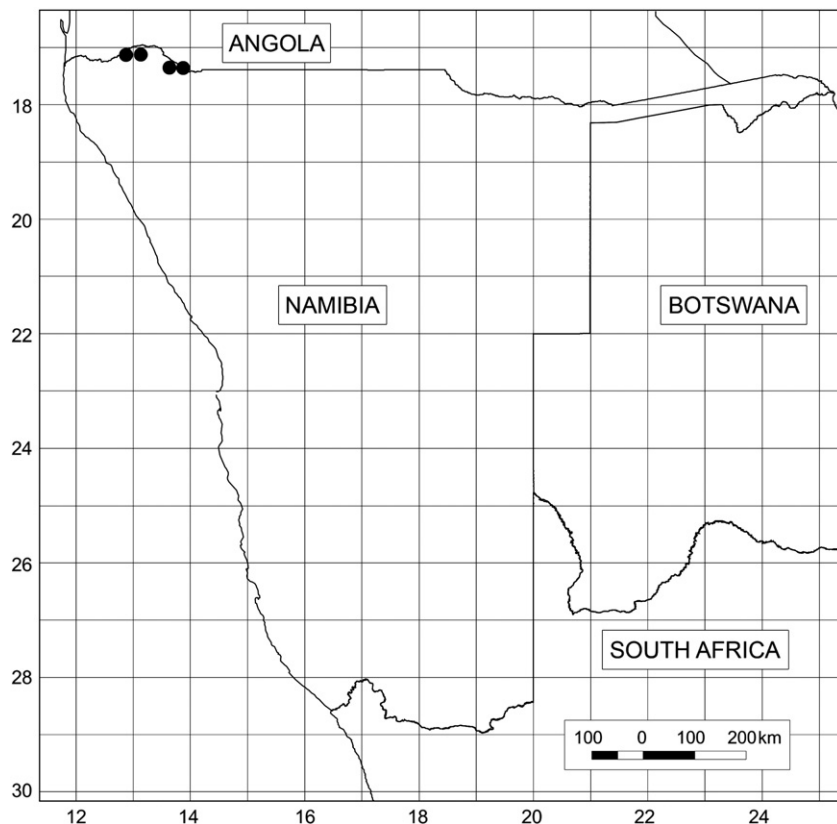


Fig. 2. Known distribution of *Abrus kaokoensis*.

coast near Otjipemba, on the slopes of a river valley. The Epupa population is 37 km to the ENE of the Baynes population, ± 8 km SSW of Epupa Falls. The population near Swartbooisdrif is 55–64 km further to the southeast, in the vicinity of Sodalite Mine and the Zebra Mountains near the Kunene River. Average annual rainfall varies from ± 200 mm in the Baynes Mountains to ± 300 mm at Swartbooisdrif (Mendelsohn et al., 2002). *A. kaokoensis* is locally uncommon to rare and grows on stony soil and amongst rocks in small isolated communities of about 40 plants each in full sun and in partially shaded areas. It occurs at altitudes of 725–890 m. Associated woody species include *Catophractes alexandri* D. Don, *Colophospermum mopane* (Kirk ex Benth) J. Léonard, *Combretum imberbe* Wawra, *Commiphora multijuga* (Hiern) K. Schum., *Corchorus angolensis* Exell & Mendonça, *Croton menyhartii* Pax, *Rhigozum virgatum* Merxm. & A. Schreib. and *Terminalia prunioides* M.A. Lawson.

It seems likely that *A. kaokoensis* may also be found to occur in the adjacent botanically poorly explored mountainous parts of southwestern Angola. It may also prove to be more widespread in Namibia, in the rather inaccessible mountainous area bordering the Kunene River.

3.5. Conservation status

Although uncommon to rare and known from three localities only, *Abrus kaokoensis* is not threatened at present. Despite the plants in the Epupa and Swartbooisdrif areas being browsed by livestock, they otherwise seem healthy as with the Baynes Mountains population which is in an unpopulated area. Of concern, however, is the fact that very few flowers and pods were observed in the field. In addition very few young plants were seen and no seedlings at all. An investigation during March 2010, revealed that the flowers are wholly consumed by a species of blister beetle (Coleoptera-Meloidae) as soon as they are fully developed; to such an extent that only very few flowers survive to produce fruit and seed. In a population of about 40 plants in an area of 50×15 m, only the remains of 10 pods were found. Whether these pods produced any viable seed could not be established.

3.6. Etymology

The specific epithet refers to the Kaokoveld in northwestern Namibia, a region forming part of the Kaokoveld Centre of Endemism (Van Wyk and Smith, 2001). This biogeographically well-defined region extends into southwestern Angola.

3.7. Additional specimens examined

Namibia, Kunene Region:

- 1712 (Posto Velho): Baynes Mountains, 15 km NNW of Otjipemba, lower slopes of river valley (–BB), Swanepoel 287 (WIND).
- 1713 (Posto Velho): Kunene, Namibia, riverine woodland (–AA), Bethune s.n. (WIND); 12 km west of Swartbooisdrift on track to Epupa (–BC), Kolberg & Tholkes HK2204, HK2610 (WIND); 16 km west of Swartbooisdrift on track to Epupa (–BC), Kolberg, Craven & Tholkes HK1511 (WIND); 1 km NNE from Sodalite Mine on track to Kunene River (–BD), Kolberg & Tholkes HK2484 (WIND); 1 km NNE of Sodalite Mine on track to Kunene River (–BD), Swanepoel & Kolberg 288 (WIND, PRE).

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