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Commiphora buruxa (Burseraceae), a new species from southern Namibia

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Abstract

Commiphora buruxa Swanepoel, described here as a new species, is known only from the Gariep Centre of Endemism, southwestern Namibia. It appears to be most closely related to *C. cervifolia* Van der Walt. Diagnostic morphological characters of *C. buruxa* include a viscous, cream-coloured exudate, variably simple to trifoliolate leaves, and a putamen covered by a small cupular pseudo-aril. Illustrations of the plant and a distribution map are provided. The species is known from less than 20 plants.

Keywords: Burseraceae; *Commiphora*; Gariep Centre; New species; Southern Africa; Taxonomy

1. Introduction

At present thirty-eight described species of *Commiphora* Jacq. are known from the *Flora of southern Africa* region, no less than thirty of which occur in Namibia (Craven, 1999; Germishuizen and Meyer, 2003; Swanepoel, 2005, 2006, 2007, 2008). Five of these species are endemic or near-endemic to the Gariep Centre of Endemism, a biogeographical region along the lower Orange River Valley in southern Namibia and adjacent Northern Cape, South Africa (Curtis and Mannheimer, 2005; Van Wyk and Smith, 2001). In this contribution, a rare, new species of *Commiphora* from the Gariep Centre is described.

During a botanical expedition to the remote Haib River Gorge in southwestern Namibia in March 2004, the author encountered an unfamiliar *Commiphora* with smooth bark, resembling *C. cervifolia* Van der Walt (Van der Walt, 1971) but with exudate (resin) that does not squirt if a twig is damaged. Only one plant, with male flowers, was found near the confluence of the Haib and Orange rivers. On subsequent visits to the Haib River, additional male and female plants were found near the mouth and also further upstream. Morphological and molecular evidence subsequently confirmed that they represent an undescribed species of *Commiphora*. In November 2006, during a botanical expedition to the Huns Mountains about 100 km further to the north–northwest, another population of the same species was found on the lower slopes of these mountains, growing in a valley leading to the Konkiep River. Apparently no other collections of the new species exist, as no herbarium specimens could be found in either PRE or WIND.

The new species was at first thought to be of hybrid origin, with *C. cervifolia* and *C. namaensis* Schinz as putative parents (Van der Walt, 1971). These two species are the only other species of *Commiphora* growing in the immediate vicinity of the known localities of the new species. The new species shares similarities in habit, bark, and in the aroma of the latex with *C. cervifolia* whereas the cream-coloured, glutinous and non-squirting latex is similar in appearance to that of *C. namaensis*. However, a molecular study of the three species with the nuclear ribosomal external transcribed spacer (ETS) as marker revealed that the new species has only one type of ETS, thus suggesting that the new species is most probably not of hybrid origin. A paper in which the potential hybrid status of the new species is discussed in more detail is currently in preparation (Weeks, pers. comm.). Live material of the new species was studied in the field, and morphological characters in the following description are based

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on mature leaves, fresh flowering material and ripe fruit. Diagnostic features for *C. cervifolia* were determined through examination of live plants in the field in southwestern Namibia. Additional information for *C. cervifolia* was sourced from the literature (Steyn, 2003; Van der Walt, 1971, 1973, 1986; Van der Walt and Van der Schijff, 1973).

2. Description

Commiphora buruxa Swanepoel sp. nov., *Commiphorae cervifoliae* Van der Walt proxima, dioicia, succosa, fruticosa arbore, resina similiter aromatica, aliquis trifoliolatis, foliolis lateralibus cultratis. Sed resina pro ratione exigua, viscida et cremea, foliis simplicibus, trifoliolatis vel intermediis; foliis apicalibus obdeltatis, foliis lateralibus obovatis cultratisve; putamine arillodio differt.

Type: — Namibia, Karas Region, Haib River Gorge, 28 km ENE of Noordoewer, 370 m asl (2817DB), 3 February 2004, *Swanepoel 282* (WIND, holo.; PRE, iso.).

Dioecious, shrub-like tree up to 2.5 m tall, 1–3(–6) m diam. *Trunk*: simple and short, up to 0.3 m long, 0.2 m diam., or branching repeatedly above ground level, appearing succulent. *Bark*: pale, cream-coloured to creamy brown or creamy grey with dark patches, smooth, sometimes peeling in flat pieces near ground level. *Branches and branchlets*: glabrous with few small lenticels; young growth glabrous; dwarf lateral branchlets scarred. *Exudate*: relatively scanty, aromatic, cream-coloured, viscous, drying to form a hard, pale yellow, translucent resin. *Leaves*: variously simple to trifoliolate on same tree, clustered on branches and on dwarf lateral branchlets but spirally on actively elongating shoots, petiolate, glabrous, green; lamina of simple leaves suborbicular, oblate, ovate or tri-lobed, obtuse or truncate, base cuneate, 4–6 × 4–8 mm, irregularly coarsely dentate or dentate–serrate in distal half with 3–7 serrations each side, rarely entire; terminal leaflets of trifoliolate leaves sessile, cuneate or narrowly obovate, obtuse or truncate or subacute, base cuneate, 3–7 × 2–5 mm long, margin dentate or dentate–serrate in distal half with 1–5, often coarse serrations on each side, rarely entire, lateral leaflets narrowly obovate or cultrate (unequally strap-shaped with one margin slightly convex), acute, base cuneate, 2–6 × 1–3 mm long, margin sparsely crenate or dentate–serrate with 1–3 teeth on each side, rarely entire; midrib on both sides not or slightly visible, not or slightly raised towards lamina base; petiole glabrous, occasionally with few short glandular hair adaxially at base, grooved in basal half, 1–6 mm long, reniform or triangular in transverse section with 1 or 3 vascular bundles, sectional dimensions 0.5–0.8 × 0.4–0.6 mm. *Inflorescences*: flowers axillary and solitary or in reduced, simple or dichasial cymes, peduncle up to 1 mm long, glabrous. *Flowers*: precocious or appearing with the leaves, unisexual, perigynous, sessile or shortly pedicellate; pedicel up to 0.5 mm long, glabrous. *Bracts and bracteoles*: narrowly triangular or narrowly ovate, acute, glandular, 0.6–0.8 × 0.2–0.3 mm. *Calyx*: yellowish green, often with few short glandular hairs on margin of lobes, otherwise glabrous, lobes triangular to ovate, acute to obtuse. *Petals*: narrowly elliptic, oblanceolate or oblong–oblanceolate, yellow, glabrous or with few short glandular hairs abaxially. *Disc*: cylindrical with 4 distinct lobes, adnate to hypanthium, not very fleshy. *Male flowers*: 3.8–5.9 mm long, calyx 2.0–3.1 mm long, calyx lobes 1.1–1.4 mm long, petals 2.9–4.0 × 1.0–1.3 mm, spreading recurved but minute tip inflexed; disc with two vertical folds towards apex of lobes, disc lobes bifid or obscurely bifid at apex; stamens 8, filaments semiterete, flattened and broadened at base, 4 long stamens with filaments 1.7–2.7 mm long, inserted on apex of disc lobes, 4 short stamens with filaments 0.8–2.0 mm long, inserted on disc margin between lobes, anthers 0.7–1.0 mm long, all equal; gynoecium rudimentary. *Female flowers*: 3.9–4.6 mm long, calyx 2.0–2.5 mm long, calyx lobes 1.3–1.8 mm long, petals 2.8–3.1 × 1.1–1.2 mm, semi-spreading towards top but minute tip inflexed; disc thin, lobes bifid at apex; staminodes 8, alternately long and short; ovary half inferior, style relatively short, sutures deeply grooved, stigma obscurely 4-lobed; pistil with stigma below top of flower, 2.0–2.5 × 0.8–1.0 mm. *Fruit*: a drupe, subglobose, ellipsoid or ovoid, slightly apiculate, flattened, asymmetrical, suture rectilinear, often curved over apical part towards sterile locule, 7.8–17.6 × 7.2–11.0 × 5.7–9.6 mm; pericarp 2-valved; exocarp glabrous, not glutinous, reddish brown when ripe; mesocarp not very fleshy; putamen slightly flattened, asymmetrical, slightly rugose, ovoid, ellipsoid or oblong–ellipsoid, with one fertile and one sterile locule; 7.7–11.2 × 6.4–7.6 × 4.0–6.1 mm; fertile locule convex, hemispherical to convex in apical view; sterile locule convex, obtusely triangular to convex in apical view; suture rectilinear; angle between locules at apex 40–95°; pseudo-aril orange, thin, cupular, covering less than 15% of putamen, with small triangular or convex facial lobe on sterile locule, commissural arms absent; apical pits small (Figs. 1 and 2).

2.1. Flowering time

Commiphora buruxa flowers from September to December and the fruit ripens from November to February.

2.2. Diagnostic characters

Commiphora buruxa is probably most closely related to *C. cervifolia*, with which it shares a similar habit, non-peeling

Fig. 1. *Commiphora buruxa* in its natural habitat, 1.8 m tall.

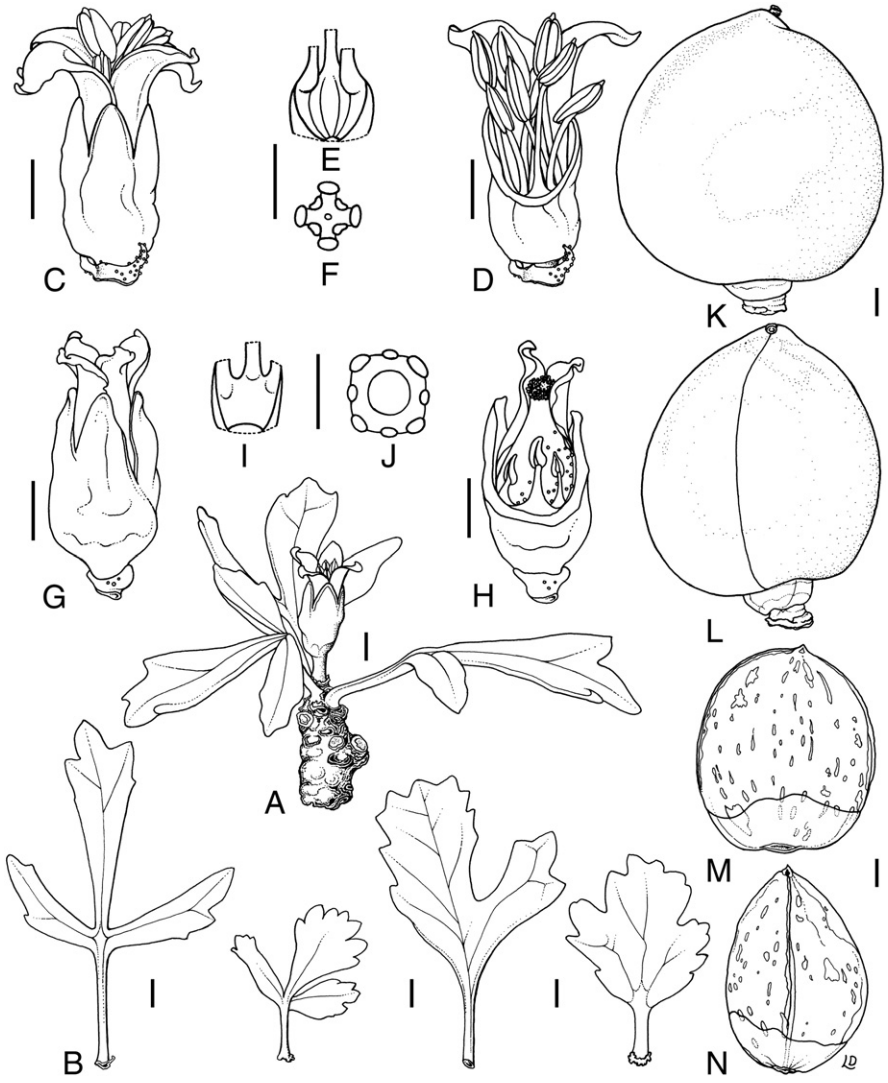

Fig. 2. *Commiphora buruxa*. Leaves, flowers, fruit and seed. (A) Dwarf lateral branchlet with leaves and male flower. (B) Leaves from same tree showing simple, trifoliolate and intermediate states. (C–F) Male flower; (D) with calyx and corolla partly removed, showing stamens; (E) disc as seen from the inside; (F) disc as seen from above (schematic). (G–J) Female flower; (H) with calyx and corolla partly removed, showing pistil and rudimentary stamens; (I) disc as seen from the inside; (J) disc as seen from above (schematic). (K and L) Fruit; (K) lateral view; (L) sutural view. (M and N) Putamen with basal pseudo-aril; (M) sterile locule; (N) sutural view, sterile locule left, fertile locule right. Scale bars, 1 mm. Artist: Lesley Deysel. Vouchers: leaves, female flowers, fruit and seed from *Swanepoel 282*, male flowers from *Swanepoel 283*.

bark, occasionally trifoliolate leaves, and the aroma of the latex. Molecular evidence from the nuclear ribosomal external transcribed spacer (ETS) and the chloroplast *psb*A–*trn*H intergenic spacer suggest that this species is placed in a well-supported clade of Namibian endemic *Commiphora* species, including *C. cervifolia*, but is inconclusive as to its closest relative (Weeks, pers. comm.). *C. buruxa* differs from *C. cervifolia* in several features of the bark, exudate, leaves, flowers, fruit and indumentum (Table 1). In *C. buruxa*, the bark is cream-coloured to creamy brown or creamy grey, and the exudate is relatively scanty, viscous and cream-coloured whereas in *C. cervifolia* the bark is greyish green to yellowish brown with dark patches and the exudate is copious, watery and colourless, and squirts upon damaging the branchlets.

Leaves in *C. buruxa* are glabrous and variously simple to trifoliolate on the same tree, with the terminal leaflets in trifoliolate leaves cuneate or narrowly obovate and the lateral leaflets narrowly obovate or cultrate. The margin is sparsely dentate, crenate or dentate–serrate, rarely entire. The leaves of *C. cervifolia* are invariably trifoliolate, with all leaflets cultrate, mostly irregularly lobed and entire, and the lamina is sparsely glandular.

In *C. buruxa* the fruit is often larger (up to 17.6 mm long) than in *C. cervifolia* (up to 11 mm long) and subglobose, ovoid or ellipsoid whereas in *C. cervifolia* it is ellipsoid only. There are also differences in the putamens of the two species, with the putamen in *C. buruxa* being ovoid, ellipsoid or oblong–ellipsoid, slightly rugose with a small cupular pseudo-aril versus

Table 1
Comparative table of the more prominent differences between *Commiphora buruxa* and *C. cervifolia*.

Character	*C. buruxa*	*C. cervifolia*
Bark (on trunk)	Cream-coloured to creamy brown or creamy grey	Greyish-green to yellowish-brown
Exudate (resin)	Cream-coloured, viscous, scanty	Colourless, watery-glutinous, squirting upon branches being damaged
Leaves	Variably simple to trifoliolate, glabrous	Trifoliolate, sparsely glandular
Lamina shape (terminal leaflets)	Cuneate or narrowly obovate	Cultrate, mostly irregularly lobed
Lamina shape (lateral leaflets)	Narrowly obovate or cultrate	Cultrate, mostly irregularly lobed
Lamina margin	Sparsely dentate, crenate or dentate–serrate, rarely entire	Entire (excluding lobing)
Petiole		
Shape in t/s	Reniform or triangular	Cordate
Number of vascular bundles	1 or 3	1–4
Calyx (size)	2.0–3.1 mm long	1.7–2.2 mm long
Petal (size)	2.8–4.0 mm long	2.0–3.0 mm long
Ovary (indumentum)	Glabrous	Sparsely glandular
Fruit (shape)	Subglobose, ovoid or ellipsoid	Ellipsoid
Fruit (size)	7.8–17.6 × 7.2–11.0 mm	11 × 10 mm
Putamen (shape)	Ovoid, ellipsoid or oblong–ellipsoid	Ellipsoid
Putamen (surface)	Slightly rugose	Smooth
Pseudo-aril	Cupular, covering less than 15% of putamen	Absent

consistently ellipsoid in *C. cervifolia*, the pseudo-aril is lacking, and the putamen is smooth.

2.3. Distribution and habitat

Commiphora buruxa is presently known from only two localities, both situated in the Gariep Centre of Plant Endemism (Van Wyk and Smith, 2001) in the southwestern-most part of Namibia. The type locality is in the mountainous area to the east of Noordoewer along the Haib River and the only other known locality is in the eastern parts of the Huns Mountains, ±110 km from the type locality (Fig. 3). Both these localities are about 120 km from the Atlantic coast and receive mean annual rainfall of less than 50 mm, mainly in summer. These areas are extremely hot and arid with an average maximum temperature during the hottest months at more than 36 °C (Mendelsohn et al., 2002).

Commiphora buruxa is rare, with less than 20 plants known (two plants only from the Huns Mountains) and is sympatric with *C. cervifolia* and *C. namaensis*. Plants occur on mountain slopes and level areas, often wedged among rocks, at altitudes of 200–500 m, on rocky substrate derived from gneisses and granites of the Vioolsdrif Granite Suite and the Haib Group of the Namaqua Metamorphic Complex (Mendelsohn et al., 2002).

2.4. Conservation status

Although very few plants of *C. buruxa* are known, it is not under any immediate threat as the plants are located in remote, sparsely populated areas. Future mining activities, however, may pose a serious threat as extensive exploration for uranium is currently being undertaken from Noordoewer up to Warmbad. Moreover, a large deposit of copper ore is known from the Haib River Gorge, which, should it be mined, would definitely threaten the future existence of *C. buruxa* as the bulk of the known plants occurs in the vicinity of this deposit.

2.5. Etymology

The specific epithet is derived from the local Khoekhoegowab (Khoekhoe or Nama) word "*buruxa*", meaning "surprising", "amazing" or "astounding", alluding to the fact that this species has escaped discovery until now. In Khoekhoegowab, the letter "x" is pronounced as in the English lo*ch*, or the "g" in Afrikaans (Haacke and Eiseb, 2002). I would like to propose the names "wonder corkwood" and *wonderkanniedood* as English and Afrikaans vernacular names, respectively.

2.6. Other specimens examined

Namibia, Karas Region:

- 2717 (Chamaites): lower eastern slopes of Huns Mountains, 21 km ENE of Ai-Ais Hot Springs (–CD), *Swanepoel 285* (WIND).
- 2817 (Vioolsdrif): Haib River Gorge, 26 km ENE of Noordoewer (–DB), *Swanepoel 283* (WIND); Haib River Gorge, 28 km ENE of Noordoewer (–DB), *Swanepoel 284* (WIND); upper reaches of Haib River Gorge, 24 km NE of Noordoewer (–DB), *Swanepoel 286* (WIND) ; Haibmond, 28 km E of Noordoewer (–DD), *Swanepoel 280* (WIND); Haib River Gorge, mountains on western side of river (–DD), *Swanepoel 281* (WIND).

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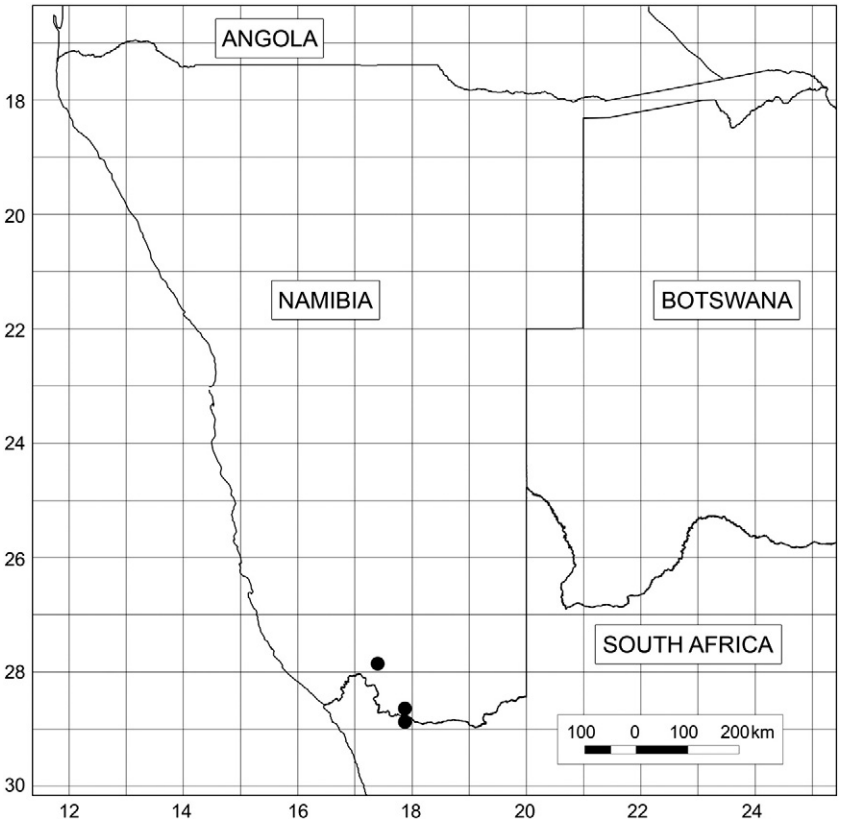

Fig. 3. Known distribution of *Commiphora buruxa*.

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