



Euphorbia ohiva (Euphorbiaceae), a new species from Namibia and Angola

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Abstract

Euphorbia ohiva Swanepoel, a new species of woody *Euphorbia*, restricted to the Kaokoveld Centre of Endemism in northwestern Namibia and southwestern Angola, is described. Illustrations and a distribution map of the new species, as well as a table of comparative morphological features to distinguish it from *E. matabelensis* Pax, its putative closest relative, are supplied. Diagnostic characters for *E. ohiva* include a peeling bark with a coppery sheen, spineless branchlets, slender, linear or linear-oblongate leaves and cyathia that are bisexual or male with 3–7, widely spaced (non-contiguous) and unevenly sized involucre glands.

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1. Introduction

Currently three species of woody non-succulent *Euphorbia* L. are recognized in the *Flora of southern Africa* region, namely *Euphorbia guerichiana* Pax, *E. matabelensis* Pax and *E. spinosa* Pax. *E. guerichiana* (Carter and Leach, 2001) is confined to the arid western and northwestern semidesert and hot low-altitude parts, whereas *E. matabelensis* (Carter and Leach, 2001) and *E. spinosa* are found mainly in the more mesophytic northern and northeastern Savanne regions. All three species occur in Namibia (Craven, 1999; Germishuizen and Meyer, 2003; Curtis and Mannheimer, 2005). In this contribution a new species of woody *Euphorbia* from the Kaokoveld of northwestern Namibia and the adjacent arid parts of Angola is described.

In 2003, while doing fieldwork for the Namibian Tree Atlas Project (Curtis and Mannheimer, 2005) in the Sesfontein area of the Kaokoveld, the author encountered an unusual woody *Euphorbia* with conspicuous reddish brown flaking bark and linear leaves. Similar plants were subsequently found to be widespread in the western Kaokoveld and southwestern Angola and are here proposed as representing a distinct new species. A study of the *Euphorbia* holdings in PRE and WIND (herbarium abbreviations according to Holmgren et al., 1990) revealed

several collections of the new species, all filed under either *E. matabelensis* or *E. guerichiana*.

This study is based on an examination of herbarium specimens of woody *Euphorbia* in PRE, PRU and WIND. In addition, both *E. guerichiana* and the new species proposed herein, were studied in situ throughout the latter's range in Namibia and part of its range in Angola. Diagnostic features for *E. matabelensis* were obtained from field observations in Malawi, liquid-preserved flowering material from Zimbabwe, herbarium collections and the literature (Brown, 1913; White et al., 1941; Carter, 1985; Carter and Radcliffe-Smith, 1988; Carter and Leach, 2001; Coates Palgrave, 2002).

2. Taxonomy

2.1. Description

Euphorbia ohiva Swanepoel, sp. nov. Species habitu cum *E. matabelensi* Pax, optime congruens, cujus arborem parvam non-succulentam, corticem trunci aliquando cinereo-brunneum et decorticantem in frustris papyraceis, laminam folii interdum oblanceolatam habet. Differt a *E. matabelensi* diversa distributione geographica, cortice rubella, luteo vel viridi-fusco cum nitore cuprino, ramificantibus alternatibus; ramulis non-spinescentibus; lamina plerumque perangulata, lineari, lineari-oblanceolata, longitudine 3.3–62.0: latitudine 1; cyathiis involucre glandibus 3–7 non-contiguus, staturis variabilibus, duabus vel plus parvulis

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quam alias; bracteis fasciculatis bracteolisque florum masculorum glabris vel fimbriillis pilis sparsis; indumento generaliter brevissimo (usque ad 10×) necne denso.

TYPE.— Namibia, Kunene Region, Hartmann Valley, ridge above Kunene River, 470 m, 12-01-2006. *Swanepoel* 250 (WIND!, holo.; PRE!, iso.).

Shrub or small tree up to 5 m tall. *Trunk* single or multi-stemmed, up to 1 m long or branching just above ground level, up to 0.28 m diameter. *Bark* on trunk and branches reddish, yellowish, greenish or greyish brown with a coppery sheen, smooth, with horizontally elongated lenticels, on trunk transversely peeling in papery pieces, on branches transversely cracked around lenticels. *Branches and branchlets* not spine-tipped, glabrous; growth of previous season ashy grey, new growth cherry red, glabrous or puberulous; branches virgate, especially on shoots growing from damaged branches; branching alternate, rarely one or more stems 2–4-branched, especially in case of shoots sprouting from damaged branches; dwarf lateral branchlets often scarred. *Exudate* milky, copious, glutinous, rubber-like when dry. *Leaves* deciduous, simple, clustered on dwarf lateral branchlets, spirally on shoots, petiolate or subsessile; lamina linear or linear-oblongate, rarely oblanceolate or cultrate, when linear often slightly falcate, (10–)30–60(–85) × (1–)3–9(–17) mm; puberulous, glabrous or with few simple hairs both sides on lamina and/or on margin, especially towards lamina base, green, dries pale green, yellowish green, brown or dark brown in herbarium material, ratio of length versus width 3.3–62.0:1, when linear-oblongate or oblanceolate, widest between two thirds from base and apex, apex acute to obtuse, often mucronate, base cuneate; margin entire; midrib conspicuous, prominent abaxially, greenish white; lateral veins on broader leaves visible, obscure or not prominent adaxially; petiole puberulous, glabrous or with few simple hairs, up to 7 mm long; stipular gland each side at base of petiole, triangular to linear-triangular, 0.3–0.8 × 0.6–1.3 mm, reddish brown, often caducous. *Inflorescences* terminal or lateral towards apex of branches or dwarf

lateral branchlets, often on new growth, axillary, subtended by a pair of bracts; *cyathia* single or in clusters of 3–6, in monochasial or compound dichasial cymes, initial cyathium with short, stout peduncle, usually caducous; cyathia either bisexual or male, with majority usually bisexual, subtended by paired bracts. Peduncles and cyme branches bracteate, puberulous, pale green, often short and stout, 1–19 mm long, 0.6–2.0 mm diameter, often slightly flattened, especially in herbarium material; *bracts* leaf-like, with a reddish brown stipular gland at base on each side, oblanceolate, broadly elliptic or obovate, 3.2–6.2 × 1.4–2.8 mm, apex acute or truncate, abruptly acuminate at tip, base cuneate, margin entire or irregularly denticulate or finely serrated especially over apical part, yellowish green, puberulous especially adaxially, ciliate, often with a young axillary cyathium; stipular glands are linear-triangular, ±0.3 × 0.8 mm long, often thread-like, rarely branched and up to 2 mm long in axillary cyathia. *Cyathium* involucre with glands along rim alternating with lobes and flowers; involucre cup-shaped or funnel-shaped, view from below orbicular or obtusely pentagonal, puberulous on outside, glabrous within, 2.8–3.3 mm long, 4.6–7.0 mm diameter including glands, pale green; glands (3–)4–5(–7), coriaceous, distant, spreading, asymmetrically peltate, upper surface green or yellowish green, concave or flat, transversely elliptic, broadly ovate, hemispherical, reniform, cordate or suborbicular, 0.6–3.4 × 0.5–2.0 mm, one to three glands on any one involucre often much smaller than others, margins entire, occasionally irregularly crenate or rolled under, glabrous or puberulous abaxially especially towards base; lobes 5, erect, puberulous on outside, glabrous within, transversely rectangular, subquadrate or rounded, 1.1–1.8 × 0.4–0.7 mm, apex with 5–10 irregular fimbriellae up to 1 mm long, glabrous or puberulous, with short hair especially on margin and on outside. *Male flowers* 50–70 per cyathium, developing in 5–7 successions, arranged in 5 fascicles, each fascicle subtended by two bracts, 10–14 flowers per fascicle, each flower reduced to a single pedicellate stamen subtended by a bracteole; fascicular bracts fan-shaped, irregularly fimbriate–

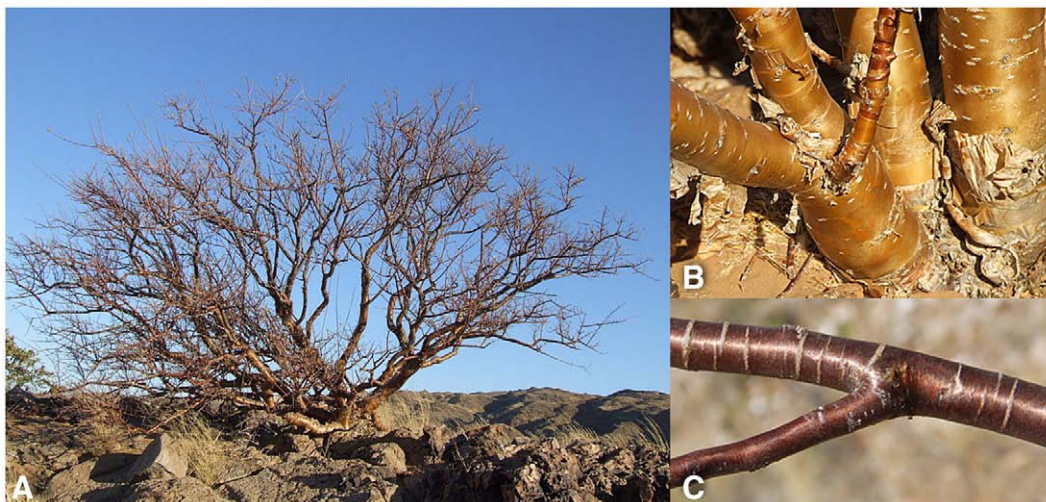


Fig. 1. *Euphorbia ohiva*. A, tree in its natural habitat, ±2 m tall. B, bark on trunk. C, bark on branches.

lacinate, widening towards apex, $2-3 \times 0.4-0.6$ mm, glabrous or with fimbriae sparsely hairy; floral bracteoles irregularly fimbriate-lacinate, not spreading towards apex, $2-3 \times 0.2$ mm, glabrous or with fimbriae sparsely hairy; apex of fascicular bracts and floral bracteoles equal to or barely exerted from involucre; pedicels glabrous or with few short hairs, yellowish green, when fully developed 2.0–2.5 mm long, 0.2 mm diameter;

stamens with filaments glabrous or with few short hairs, yellowish green, 1.3–1.8 mm long, 0.2 mm diameter; anthers exerted from the involucre; anther thecae subglobose or oblong-elliptic and reniform in lateral view, yellow, 0.2–0.5 mm long, longitudinally dehiscent, pollen bright yellow. *Female flowers* solitary within involucre and surrounded by male flowers, erect, shortly pedicellate; ovary three- or rarely four-locular, pale green,

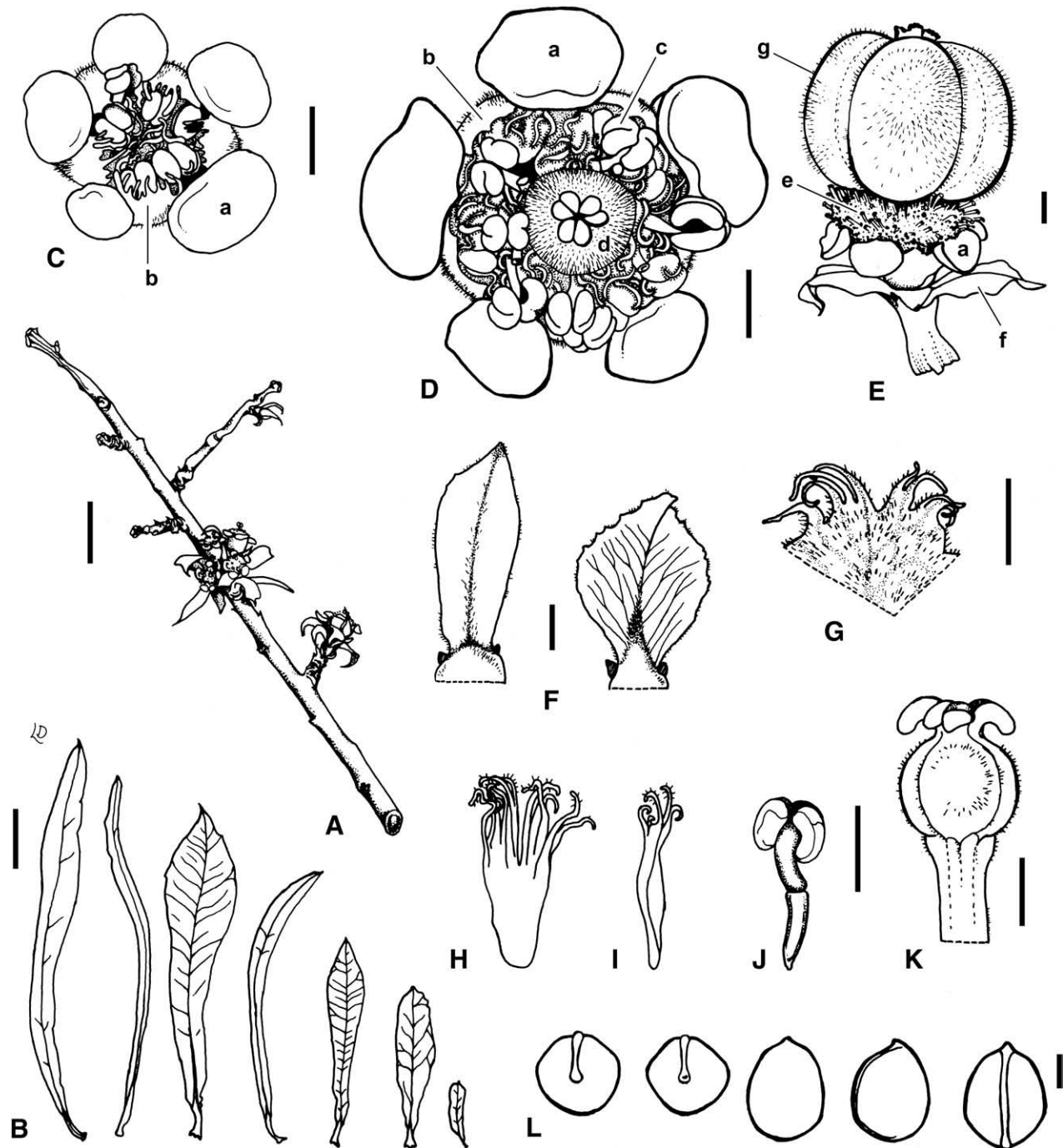


Fig. 2. *Euphorbia ohiva*. (A) Twig with cyathia; leaves not yet fully developed; (B) Mature leaves, showing variation in shape and size; (C) Male cyathium; (D) Bisexual cyathium; (E) Cyathium with almost mature capsule; (F) Bracts from different cyathia with stipular glands at base, showing variation in shape (abaxial view); (G) Involucral lobe; (H) Fascicular bract; (I) Bracteole; (J) Male flower; (K) Female flower; (L) Seed, various polar and lateral views. Vouchers: A, Swanepoel 242; B, Swanepoel 244, 246, 250, 253, 274; C, D, E, Swanepoel 250; F, Swanepoel 259; G–L, Swanepoel 250. Scale bar 10 mm (A and B), or 1 mm (C–L). (a=gland, b=involucre, c=stamens, d=ovary, e=fascicular bracts and floral bracteoles amongst remains of staminal pedicels, f=bract, g=capsule).

puberulous or subtomentose with hairs up to 0.05 mm long, obtusely trigonous or rarely obtusely quadrangular, 1.4–2.1 mm between the corners, 1.4–1.9 mm high, basal third to two thirds within the involucre; pedicel stout, shallowly ribbed, glabrous or with indumentum similar to that of ovary, 0.7–1.5 mm long, 0.7–1.0 mm diameter; perianth obconical, fleshy, shallowly ribbed, indumentum similar to that of ovary; female flower rudimentary in male cyathium; *ovule* ellipsoid, 0.6–0.7 mm long, suspended under a small, membranous to fleshy, triangular or three lobed hood, apices and/or margin often fimbriate; *styles* 3, rarely 4, 1.1–1.8 mm long, united into a stout, puberulous column for up to a third of their length or free almost from base, puberulous abaxially, glabrous on deeply grooved inner face,

spreading-recurved, apex entire or shortly to deeply bifid with the stigmas spreading or rarely much dilated; styles on fully developed flowers equal to or above anther theca. *Capsule* pale green, often reddish green at apex when fully developed, obtusely trigonous, erect, apex emarginate or truncate, base within remains of involucre or barely exerted and touching remains of stamens, base obtuse, emarginate or truncate, 4.5–7.6 mm between corners, 4.4–7.1 mm high, puberulous, borne on a stout, shallowly ribbed, glabrous or puberulous pedicel, 0.6–1.8 mm long, 0.9–1.6 mm diameter. *Seed* ovoid or globose, minutely apiculate, 2.8–3.4 mm long, 2.1–2.9 mm diameter, smooth, creamy yellow to pale brown with a pale, narrow, longitudinal line along one side (Figs. 1, 2).

Table 1
Prominent differences between *Euphorbia ohiva* and *E. matabelensis*

Character	<i>E. ohiva</i>	<i>E. matabelensis</i>
<i>Bark</i>	Reddish, greenish, yellowish or greyish brown; with coppery sheen	Light grey or greyish brown; without coppery sheen
<i>Branches and branchlets</i>		
Spinescence	Spineless	Spinescent
Branching	Alternate; rarely 2–4-branched from same node, especially on long shoots sprouting from damaged branches	Usually conspicuously 3-branched from same node; trichotomous branching particularly common in more arid parts of range (Carter, 1985)
<i>Leaves</i>		
Lamina (shape)	Linear or linear-oblongate, often falcate, rarely oblongate or cultrate	Obovate, oblongate or narrowly elliptic
Lamina (length versus width)	3.3–62.0:1	2.0–3.5:1
Lamina (margin when dry)	Not rolled under	Rolled under (at least in herbarium material)
Lamina (size)	Up to 85 × 17 mm	Up to 65 × 17 mm
Petiole (length)	Up to 7 mm long	Up to 5 mm long
<i>Inflorescences</i>	Cyathia solitary or in clusters of 3–6, in monochasial, dichasial or compound cymes	Cyathia solitary or in cymes in 3–7-branched umbels, with rays 0–2-forked
<i>Involucre glands</i>	3–7; distant; two or more much smaller than others	4 or 5; contiguous to sub-contiguous; similarly sized
<i>Hood of ovule</i>	Membranous to fleshy; triangular or 3-lobed, apices and/or margin often fimbriate	Fleshy; triangular, margin entire or sparsely dentate
<i>Capsule (pedicel)</i>	Up to 1.8 mm long	Up to 5 mm long
<i>Seed</i>		
Shape	Ovoid or globose	Globose
Colour	Uniform creamy yellow or pale brown	Brown, obscurely speckled
<i>Indumentum</i>		
Branches and branchlets	Young growth glabrous or puberulous, glabrescent	Young growth densely puberulous, glabrescent
Lamina	Puberulous, glabrous or with few short hair on both sides and/or on margin especially towards base	Pubescent abaxially when young, scarcely so adaxially, glabrescent or with scattered long hair, including margin
Involucre (on outside)	Puberulous	Puberulous or tomentose
Involucre lobes	Puberulous	Puberulous, tomentose or glabrous
Bracts (fascicular)	Fimbrillae glabrous or sparsely hairy	Fimbrillae sparsely hairy to conspicuously feathery
Bracteoles	Fimbrillae glabrous or sparsely hairy	Fimbrillae sparsely hairy to conspicuously feathery
Filaments	Glabrous or sparsely hairy	Glabrous
Ovary	Puberulous or subtomentose; hairs up to 0.05 mm long	Tomentose, hairs up to 0.5 mm long
Pedicel (female flower)	Glabrous or similar to that of ovary	Similar to that of ovary
Capsule	Puberulous	Sub-tomentose
<i>Distribution</i>	Confined to Kaokoveld Centre of Endemism (northwestern Namibia and southwestern Angola)	Widespread in sub-equatorial Africa except extreme southern part

2.2. Flowering time

E. ohiva produces cyathia throughout the year. Cyathia and capsules in various stages of development can usually be found on plants at any given time.

2.3. Diagnostic characters

E. ohiva with its usually slender, linear leaves and peeling bark with a coppery sheen is an attractive shrub or small tree. It is probably most closely related to *E. matabelensis*, from which it can instantly be distinguished by a lack of conspicuous trichotomous branching, the lack of a tapering spine at the tips of branchlets and in the much narrower, mainly linear leaves. Further differences are to be found in the bark, inflorescences, floral characters and indumentum. Some of the more important characters to differentiate *E. ohiva* from *E. matabelensis* are compared in Table 1. A key to the woody non-succulent southern African species of *Euphorbia* is supplied below.

The indumentum in *E. ohiva* generally is puberulous or sparsely hairy with the hair relatively short, only up to 0.05 mm long. In *E. matabelensis* the indumentum usually is much denser, puberulous to tomentose, with the hair much longer (up to 10×), often reaching a length of 0.5 mm.

E. ohiva can easily be mistaken for the sympatric, but not closely related, *E. guerichiana*, due to similarities in habit, bark and the occasionally slender leaves of the latter. However, *E. ohiva* is distinguishable from *E. guerichiana* by the uniform dark reddish brown colour of its stems when viewed from a distance and by its usually more rounded crown with branches almost touching the ground. In the Kaokoveld where *E. guerichiana* is sympatric with *E. ohiva*, the trunk and stems are pale yellowish brown or yellowish cream, contrasting with the irregular, reddish brown canopy and is a much taller, often slender tree, with an open trunk. Leaves of *E. guerichiana* are extremely variable in shape: suborbicular, elliptic, narrowly elliptic, linear-elliptic, lanceolate, linear-lanceolate, oblanceolate, obovate, oblong, obcordate or reniform instead of linear-oblanceolate or linear as in *E. ohiva*. When in flower, *E. guerichiana* is easily distinguishable from *E. ohiva* by the solitary borne cyathia with the ovary far exserted from the involucre on a relatively long, reflexed pedicel. Cyathia in *E. ohiva* usually are clustered or arranged in cymes, rarely solitary. Only the apical third of the ovary in *E. ohiva* is exserted from the involucre.

When without leaves, *E. ohiva* can also be mistaken for the sympatric *Commiphora virgata* Engl. (Burseraceae), due to similarities in habit and the bark that peels. Under these circumstances, *E. ohiva* is distinguishable from *C. virgata* by the latex/resin, which is copious, milky and non-aromatic in *E. ohiva*, compared to scanty, milky–watery (cloudy) and aromatic in *C. virgata*.

Euphorbia currorii (Brown, 1913) from Angola, currently considered a synonym of *E. matabelensis* (Carter and Leach, 2001), has been described by Brown as having only four involucre glands. Although *E. currorii* shares this feature of a reduced number of glands with some cyathia of *E. ohiva*,

it differs from the latter in several other aspects: the bark is grey, the branches are spine-tipped and the leaves are oblanceolate or narrowly elliptic and dry black, instead of green to dark green or brownish green as in *E. ohiva*. The ratio of length versus width of the lamina is 2.5–3.0:1, the cyathia are solitary to 2- or 3-clustered and the hairs on the involucre are curved, not straight.

2.4. Distribution and habitat

E. ohiva is widespread in the more arid, western parts of the Kaokoveld Centre of Endemism (Van Wyk and Smith, 2001), a biogeographical region in northwestern Namibia and southwestern Angola (Fig. 3). In Namibia it occurs from the Kunene River Valley in the north, in a narrow belt southwards to almost 21° S in the Doros Crater area. In southwestern Angola the species ranges from the Kunene River northwards to at least the vicinities of Moimba, Iona, Espinheira, Tambor and as far north as the Curoca River. It is found 40–150 km from the coast at altitudes of 250–950 m, where the annual rainfall is 100–250 mm (Mendelsohn et al., 2002). It is locally uncommon to rare and grows in isolated colonies on rocky substrate on hillsides, low ridges, valley floors and plains, in open shrub and woodland. *E. ohiva* does not appear to be limited to any specific geological formation but is found most often on basalt and dolomite.

2.5. Conservation status

E. ohiva is not threatened as it mainly occurs in remote, sparsely inhabited areas where the habitat is not subjected to large-scale destruction by humans at present.

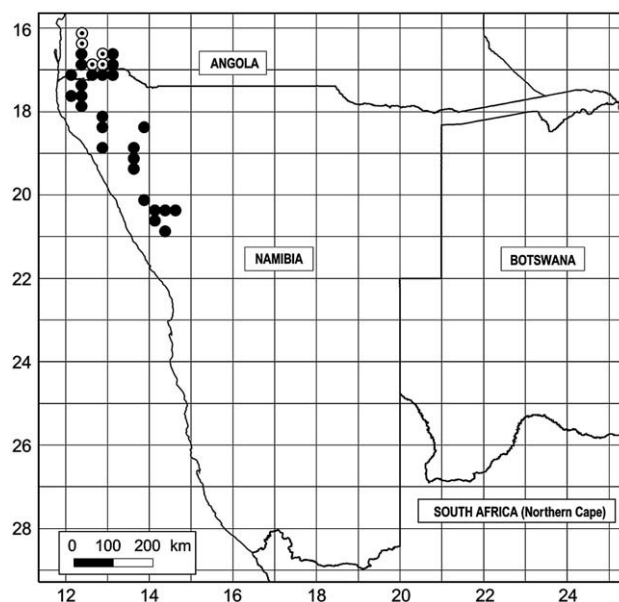


Fig. 3. Known distribution of *Euphorbia ohiva*. Solid circles indicate localities supported by herbarium specimens; open circles with small central dots depict sight records only.

2.6. Etymology

The specific epithet refers to the flaking, papery bark, which is utilized by the local Himba people (Ovahimba). Papery pieces of bark are made into a whistle, called “*ohiva*” in the vernacular Herero (Otjikerero). The whistle is used in herding cattle, goats, and sheep. I would like to propose the names whistle-bark euphorbia and *fluitbasmelkbos* as English and Afrikaans vernacular names, respectively.

2.7. Specimens examined

Angola, Namibe Province (for additional sight records only, see Fig. 3):

- 1612: 10 km from Espinheira on Iona road (–CB), *Swanepoel 277* (PRU); 20 km from Iona on Espinheira road (–CD), *Swanepoel 276* (PRU).
- 1613: Near Moimba on Oncócuá road (–CA), *Swanepoel 278* (PRU).

Namibia, Kunene Region:

- 1613 (Vila de Aviz): Kaokoveld, neck just W of Orokane (–CC), *Leistner, Steenkamp, Oliver & Vorster 249* (PRE).
- 1712 (Posto Velho): Ridge above Kunene River, Hartmann Valley (–AA), *Swanepoel 251* (WIND); Hartmann Mountains, 4 km WNW of Ombivango (–AD), *Swanepoel 246* (WIND); Otjimborombonga (–BA), *Swanepoel 256* (WIND); 27 km W of Epupa (–BB), *Bruyns 8014, 8015* (WIND); 27°00'41" S, 12°58'53" E (–BB), *Clarke & Bethune 53* (WIND); Orukawe Road (–BB), *Viljoen 587* (WIND); Hartmann Valley, W slopes of 1039 m high mountain, (–CA), *Swanepoel 275*; Hartmannstal, Kaokoveld (–CB), *Basson Bas1/195* (WIND); granite hill W side of Hartmanns Valley (–CB), *Jacobsen & Moss K258* (WIND), *Moss & Jacobsen K258* (PRE); 12 km WNW of Rooidrom (–CB), *Swanepoel 247* (WIND); 7 km west of Rooidrom (–CD), *Swanepoel 274* (WIND).
- 1713 (Swartbooisdrif): Baynes Mountains along Kunene W of Epupa (–AA), *Curtis & Aronson Cur1582* (WIND); 11 km W of Epupa Falls on track to Orokawe (–AA), *Swanepoel 245* (WIND).
- 1812 (Sanitatas): Schlucht bei Otjikongo (–BB), *Merxmüller & Giess 1441* (WIND); (–BD), *Owen-Smith & Malan 315* (WIND); Okandjondo region (–BD), *Wilke & Thiede 104379* (WIND); 18 km S of Puros (–DD), *Swanepoel 252* (WIND).
- 1813 (Opuwo): 20 miles W of Otjihu on road to Orupembe (–BD), *De Winter & Leistner 5682* (PRE); 18°58'20" S, 13°32'16" E (–DC), *Curtis, Aronson & Le Floch Cur1663* (WIND); 8 km SSE of Ozombari (–DC), *Swanepoel 258* (WIND).
- 1913 (Sesfontein): 15 km NNW of Sesfontein (–BA), *Swanepoel 242, 244, 248, 249* (WIND); Gomgurib Mountain, 12 km E of Sesfontein on road to Warmquelle (–BA), *Swanepoel 257* (WIND); 27 km S of Sesfontein (–BC), *Swanepoel 243* (WIND).

- 2013 (Unjab Mouth): Rooiplaat OU 710 (–BB), *Giess 8079* (PRE, WIND); Farm Wêreldsend OU 715 (–BB), *Schulze s.n.* (WIND).
- 2014 (Khorixas): Farm Vrede 719 (–AC), *Swanepoel 259* (WIND); Farm Bethanis OU 514 (–AD), *Hardy & De Winter 1461* (WIND); near Khorixas beside road (–BC), *Craven 662* (WIND); 5 km W of Petrified Forest along road C39 (–BC), *Swanepoel 253, 254, 255* (WIND); 10 km NW of Doros Crater (–CA), *Swanepoel 261* (WIND); hill N of Doros (–CD), *Craven & Craven 476* (WIND).

Key to the woody non-succulent southern African species of *Euphorbia*

- 1a Branchlets usually conspicuously 3-branched from same node (in whorls of 3); tips distinctly hardened into spines. Cyathia solitary or as cymes in 3–7-branched umbels, with rays 0–2-forked.....*E. matabelensis*
- 1b Branchlets usually alternate, rarely (*E. ohiva* only) 2–4-branched from same node, especially on long shoots sprouting from damaged branches; tips not distinctly hardened into spines:
 - 2a Bark olive-green, shiny, with a yellow-brown papery peel. Leaves with lamina 20–30 mm wide. Cyathia clustered along main branches, produced on reduced cushion-like spur-branchlets*E. espinosa*
 - 2b Bark in different shades of brown or cream-coloured, peeling on trunk in papery pieces. Leaves with lamina up to 17 mm wide, usually much narrower:
 - 3a Bark dark brown, pale yellowish brown or yellowish cream. Leaves obovate to oblanceolate; apex rounded. Cyathia solitary on distinct dwarf spur-branchlets; ovary far exerted from involucre on long reflexed pedicel.....*E. guerichiana*
 - 3b Bark reddish, yellowish, greenish or greyish brown with a distinct coppery sheen. Leaves linear or linear-oblanceolate, often falcate; apex acute to obtuse. Cyathia solitary or in clusters of 3–6, in monochasial, dichasial or compound cymes; ovary with only apical part exerted from involucre.....*E. ohiva*

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