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Research note

Taxonomic notes on the genus *Albertisia* (Menispermaceae) in South Africa and Mozambique

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ABSTRACT

A review of the taxonomy of the genus *Albertisia* in South Africa and Mozambique is presented. The genus is represented in this region by a single endemic species, *A. delagoensis*. Nomenclature, generic and species description, geographic distribution and habitat information of *A. delagoensis* are provided, accompanied by photographic images of vegetative and reproductive characters. A key to the 13 African species is presented, showing that a combination of leaf morphological characters (rather than single diagnostic characters) is required to identify the species. These include the petiole length and venation pattern, lamina shape (including the base and apex), lamina dimensions and pubescence.

1. Introduction

Albertisia Becc. (Menispermaceae) belongs to subfamily Pachygonoideae tribe Pachygoneae Miers ex Hook.f. & Thomson (1872) but was formerly included in tribe Triclisiae Diels (Diels, 1910; Forman, 1975). The absence of endosperm, which may represent a derived character state (Kessler, 1993), distinguishes this tribe from the other four tribes of Menispermaceae (viz. Anomospermeae, Tinosporeae, Fibraureae and Menispermeae). *Albertisia* comprises 20 species: seven in South-East Asia and 13 in Africa, only one of which extends into southern Africa. *Albertisia delagoensis* is endemic to South Africa and Mozambique and whilst it is widely distributed in Mozambique, it is restricted in South Africa to the extreme northern parts of KwaZulu-Natal. The species was formerly known as *Epinetrum delagoensis* (N.E. Br.) Diels (1910) and was only recently transferred to the genus *Albertisia* by Forman (1975). The genus is named in honour of L.M. D'Albertis (Van Steenis, 1948), an Italian zoologist and ethnographer from Voltri, near Genoa, Italy. He accompanied Beccari on his first expedition (1871–1874) to Indonesia and New Guinea and most of his botanical specimens from several later expeditions went to Beccari at FI. Although the morphology and anatomy have been studied by Botha (1975) as part of an unpublished thesis, and the pollen morphology by Ferguson (1975), there is no recent published information on the taxonomy of this species.

A. delagoensis is medicinally used as an anthelmintic, antimicrobial and antipyretic plant. It is also used to treat dysmennorhoea, various stomach, back and chest problems and to enhance sexual performance in men (De Wet and Van Wyk, 2007).

The aim of this short paper is to present a revision of the genus *Albertisia* in southern Africa, including its nomenclature, typification and geographical distribution, as well as a formal description, accompanied by photographic images of salient morphological characters and a key to the African species.

2. Materials and methods

Morphological data was gathered from field studies and herbarium specimens. The following herbaria were visited and their collections studied (abbreviated according to Holmgren et al., 1990): BLFU, BM, BOL, GRA, JRAU, K, NBG, NH, PRE, PRU, PUC, S, UPS and ZULU.

A key to the African species of *Albertisia* was compiled based on leaf morphology, using diagnostic character states described in the literature, as well as a study of herbarium specimens. The other 12 African *Albertisia* species are listed here, together with the voucher specimens studied for each of them: *A. apiculata* (Troupin) Forman (*Soloman 6006*, K); *A. capituliflora* (Diels) Forman (*Zenker 3948*, K); *A. cordifolia* (Mangenot & J. Miége) Forman (*Guillaumet 1630*, K); *A. cuneata* (Keay) Forman (*Bernhaut 7204*, K); *A. exelliana* (Troupin)

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Forman (*Malaissse 13524*, K); *A. ferruginea* (Diels) Forman (*Scott Elliot 5751*, K); *A. glabra* (Diels ex Troupin) Forman (*Mildhead 7830*, K; *Jongkind 8370*, K); *A. mangenotii* (Guillaumet & Debray) Forman (*Guillaumet 1193*, K); *A. porcata* Breteler (*Breteler, Jongkind and Wieringa 10000*, WAG); *A. scandens* (Mangenot & J. Miége) Forman (*Boughey 942*, K); *A. villosa* (Excell) Forman (*Leonard 1132*, K; *Carlier 342*, K); *A. undulata* (Hiern) Forman (*Welwitsch 477*, K; *Meyers 205*, K).

3. Taxonomic treatment

3.1. Albertisia

Becc. in Malesia1, 2: 161 (1877); Prantl in Engl. and Prantl, Nat. Pflanzenfam. 3: 89 (1894); Forman in Kew Bull. 30: 82 (1975); Kessler in Fam. & Gen. Vasc. Pl. (ed. K.Kubitzki) 2: 408 (1993); Jordaan in Leistner, Seed plants of southern Africa: families and genera: 357 (2000). Type species: *Albertisia papuana* Becc.

Epinetrum Hiern, Cat. Afr. Pl. 1: 21 (1896); Diels in Engl., Pflanzenr. IV, 94: 95 (1910); Troupin in Fl. Trop. E. Africa: 4 (1956); Troupin in Fl. Zambes. 1: 151 (1960); Troupin in Académie Royale des Sciences dÓutre-Mer, Classe des Sciences Naturelles et Médicales mémoires 13: 28 (1962); Troupin and Gonçalves in Flora de Moçambique 7: 3 (1973); Botha, 'n Taksonomiese studie van die Suid-Afrikaanse verteenwoordigers van die Menispermaceae: 52 (1975). Type species: *Epinetrum undulatum* Hiern.

Suffrutescent shrubs or mostly lianes, often grey-pubescent. *Branchlets* with prominent discoid petiolar scars. *Stipules* absent. *Leaves* simple, alternate, broadly elliptic to oblong, with petioles conspicuously swollen at both ends. *Male inflorescences* axillary, ramiform, cymules, solitary or two together, subsessile or pendunculate. *Male flowers* with 6 to 12 sepals, outer 6 to 9 in 1 or 2 whorls, free, bract-like, inner 3 sepals connate into a coralliform tube; petals 3, 6 or absent, minute, fleshy; stamens 15 to 30, fused into a stalked conical synandrium, anthers with transverse dehiscence. *Female inflorescence* mostly reduced to a solitary flower. *Female flowers* with sepals and petals as in male flower; staminodes 6; carpels 4 to 12, hairy. *Drupe* ellipsoid and tomentulose, endocarp crustaceous or thinly woody, slightly wrinkled, condyle absent. *Seed* without endosperm; embryo straight; cotyledons very thick.

The genus differs from related genera in that the inner sepals are connate into a fleshy coralliform tube and that the synandria are stalked [synandrium type 4 of Jacques and Bertolino (2008), which is shared only with the Asian genus *Pycnarrhena* Miers ex J.D.Hooker & Thomson]. In southern Africa, the single species, *A. delagoensis*, is easily recognized even when not in flower or fruit by the gregarious distribution pattern (plants always occur in large groups, never as single individuals), woody habit, scandent but often non-climbing branches and palmate leaf venation. The branches may scramble into trees but the twigs are usually non-twining and conspicuously pubescent. When in flower, it can be identified by the stamens that are connate into a 15–30-locular, conical, stipitate synandrium.

Since reproductive material is often not available in the field (or even many herbarium sheets), the following leaf key may be useful for identifying the 13 African species. Troupin (1962) provided a comprehensive key based on leaf morphology and the pubescence of the sepals (external face of inner whorl glabrous or hairy) which included 11 of the 13 African *Epinetrum* species (now *Albertisia*). None of the leaf characters in our key are on their own sufficiently unique to allow any of the species to be recognized, but each species has a unique combination of character states relating to the petiole length, venation pattern, lamina shape (including the base and apex), lamina dimensions and pubescence. In some leads, only the main diagnostic character is given in the second part of the lead. This means that the omitted characters states are present in other combinations in the species that follow.

3.2. Key to the African species of Albertisia based on leaf morphology

1a Leaves (and stems) pilose or pubescent; leaf venation palmate or pinnate:
- 2a Petioles up to 25 mm long:
  - 3a Leaf venation palmate (lowermost side veins more prominent than upper ones); lamina elliptic to broadly oblong, base cuneate-truncate, apex mucronulate-retuse, 40–90 × 20–50 mm ……*A. delagoensis*
  - 3b Leaf venation pinnate:
    - 4a Lamina oblong-lanceolate, base rounded-subcordate, apex acuminate, 50–160 × 25–55 mm ……*A. scandens*
    - 4b Lamina elliptic or ovate-elliptic:
      - 5a Lamina elliptic, base rounded-obtuse, apex obtuse to bluntly acuminate, 35–70 × 25–45 mm …… *A. exelliana*
      - 5b Lamina ovate-elliptic, base obtuse, apex acuminate, 30–90 × 15–45 mm …… ……*A. undulata*
- 2b Petioles 30–120 mm long:
  - 6a Leaf venation pinnate; lamina ovate, base cordate, apex acuminate, 170–260 × 100–150 mm …… *A. porcata*
  - 6b Leaf venation palmate:
    - 7a Lamina densely pubescent:
      - 8a Leaf apex acuminate, base deeply cordate, lamina elliptic, up to 180 × 70 mm ..... ……*A. ferruginea*
      - 8b Leaf apex long-acumunate, base cordate, lamina ovate, 90–200 × 60–180 mm ..... …… *A. villosa*
    - 7b Lamina pubescent along the veins only:
      - 9a Leaf base truncate, apex acuminate, lamina ovoid-deltoid, up to 70 × 40 mm … ..... *A. mangenotii*
      - 9b Leaf base cordate:
        - 10a Leaf apex acuminate, lamina elliptic-obovate, 150–250 × 55–130 mm …… ……*A. capituliflora*
        - 10b Leaf apex acute, lamina ovate-elliptic, 80–150 × 50–80 mm ……*A. cordifolia*

1b Leaves (and stems) glabrous; leaf venation pinnate:
- 11a Petiole 60–110 mm long; leaf base attenuate, apex long acuminate, mucronate; lamina ovate-elliptic, 45–90 mm × 20–45 mm …… .....*A cuneata*
- 11b Petiole <40 mm long:
  - 12a Leaf base cuneate, apex acuminate, lamina elliptic, 70–110 × 35–55 mm; petiole 10–30 mm long …… *A. glabra*
  - 12b Leaf base obtuse, apex round and abruptly apiculate (the tip 10 mm long), lamina elliptic-obovate, 40–90 × 30–50 mm, petiole 10–15 mm long …..*A. apiculata*

Fig. 1. *Albertisia delagoensis*. (a–g) male flower: (a) male flower, (b) bracts, adaxial and abaxial view, (c) first whorl of sepals, adaxial and abaxial view, (d) second whorl of sepals, adaxial and abaxial view, (e) inner sepal, adaxial and abaxial view, (f) stalked synandrium with 18 horizontally dehiscent anther locules above the petals, (g) petal, abaxial view (note the inflexed base); (h-m) female flower: (h) female flower, (i) outer sepal, adaxial view, (j) inner sepal, adaxial view, (k) petal, adaxial view, (l) gynoecium, (m) carpel; (n, o) stem: (n) node of young stem, (o) stem bearing prominent discoid petiole scar; (p) seed; (q) fruit; (r–u) leaf variation: (r) elliptic leaf shape with mucronulate apex, (s) broadly oblong leaf shape with retuse apex, (t–u) oblong leaf shape. Vouchers: (a–g, o, s) *Retief 818* (PRE); (h–m) *Gerstner 6858* (PRE); (n) *Mauve & Verdo 9* (PRE); (p–q) *Mogg 3011* (PRE); (r) *Mogg 27201* (PRE). Scale bars: (a–e, h–j, l) = 1 mm; (f–g, k, m) = 0.7 mm; (n–q) = 4 mm; (r) = 10 mm.

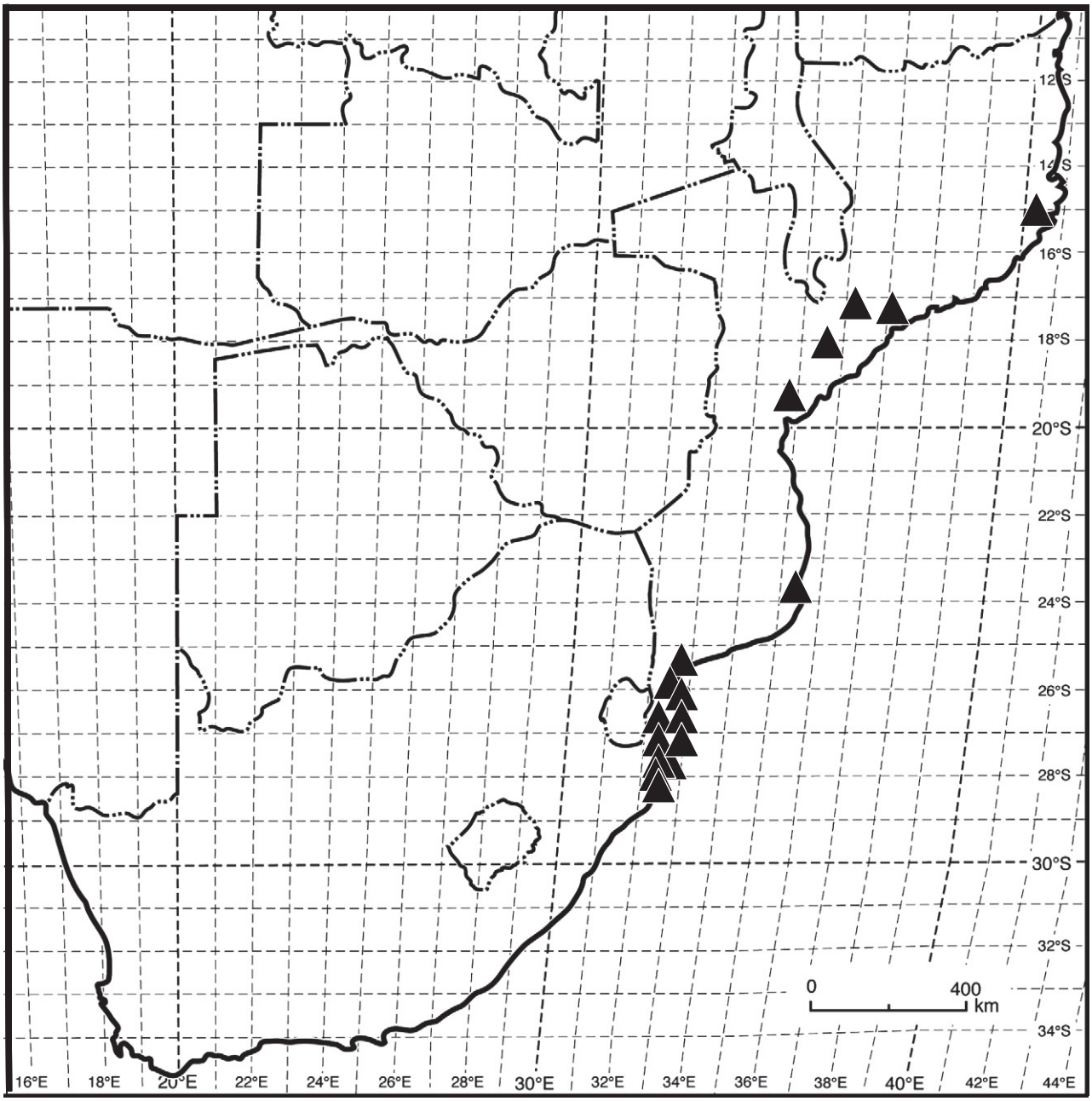

Fig. 2. Geographical distribution of *Albertisia delagoensis*.

3.3. *Albertisia delagoensis*

(N.E.Br.) Forman in Kew Bull. 30: 82 (1975); Botha in S. Afr. J. Bot. 46, 1: 24 (1980). *Synclisia delagoensis* N.E.Br. in Kew Bull.: 196 (1892). *Epinetrum delagoense* (N.E.Br.) Diels in Engl., Das Pflanzenr. IV, 94: 96 (1910); Troupin in Académie Royale des Sciences d'Outre-Mer, Classe des Sciences Naturelles et Médicales mémoires 13: 37 (1962); Botha, 'n Taksonomiese studie van die Suid-Afrikaanse verteenwoordigers van die Menispermaceae: 52 (1975). Type: Mozambique. Maputo (2532): 'Delagoa Bay' [Maputo], 1886, *Bolus 7632* (K, hol.!; BOL!, NBG!, NH!, PRE!, iso.).

Junodia triplinervia Pax in Engl., Bot. Jahrb. Syst. 28: 22 (1901). *Anisocycla triplinervia* (Pax) Diels in Engl, Das Pflanzenr. IV, 94:93 (1910). Type: Mozambique. Maputo (2532): 'Delagoa Bay' [Maputo], 1890, *Junod 464* (B, holo. – image!; BR, G, K!, P, iso.).

Rhizomatous gregarious shrublets, scandent shrublets or lianes, up to 2 m high. *Stems* green and densely pubescent when young, becoming woody and glabrous with age, bearing discoid leaf scars. *Leaves* alternate; dark green on adaxial side, greyish on abaxial side, coriaceous, both sides slightly hairy, veins densely pubescent on both sides, with whitish colour; lamina elliptic to broadly oblong, up to 40–90×20–50 mm, apex obtuse to rounded, retuse or mucronulate, base cuneate when elliptic, truncate when oblong, margin entire; venation palmate, with 3 to 5 prominent veins from base; midrib, lateral veins and teriary reticulate venation sunken above, prominently raised below; petiole up to 25 mm long, densely pubescent. *Male flowers* in 1 to 3-flowered axillary cymules; pedicel 2.0–3.5 mm long; bracts linear to lanceolate, 0.6 mm long, densely pubescent on abaxial side; sepals lanceolate or ovate, 9 (or 6), in 3 (or 2) whorls, slightly fleshy, abaxially densely pubescent, those of the outer two whorls free, those of innermost whorl fused

halfway up; sepals of outer whorl small, 0.7×0.4 mm, those of middle whorl larger, 1.1×0.4 mm and those of inner whorl largest, 3×1.4 mm; petals 6, in 2 whorls, free, fleshy, much smaller than sepals, 0.5×0.9 mm, transversely oblong-reniform, inflexed at the base, abaxially pilose, adaxially glabrous; synandrium stalked, up to 5.5 mm long, 18–24-locular in 6–8 vertical rows, extrorse, anthers horizontally dehiscent. *Female flowers* axillary and solitary; pedicel 1.5–3.5 mm long; bracts, sepals and petals as in male flower; carpels 5(6), free, 1.8 mm long, woolly; style extended and undivided. *Fruit* sessile, ellipsoid drupes, radiating from margin of a swollen carpophore, on peduncle 4–5 mm long, brightly orange when ripe, pubescent, 22×15 mm; endocarp not horseshoe-shaped, parchment-like, wrinkled; condyle absent. *Seed* obovoid-oblong, 8–11×4–5 mm. *Flowering time* July to September. Fig. 1.

3.3.1. Diagnostic characters

Albertisia delagoensis differs from other species in the shrubby habit with generally non-twining branchlets, the densely pubescent stems with discoid leaf scars (Fig. 1n, o), the elliptic to broadly oblong leaves and the palmate (not pinnate) leaf venation with the lowermost side veins more prominent than upper ones (Fig. 1r–u). It also differs from all other species in the petals (of male and female flowers) that are markedly inflexed at their bases (Fig. 1f, g). The external faces of the inner sepals are densely tomentose (Fig. 1d, e) and neither glabrous, nor pubescent, as in all other species.

3.3.2. Distribution and habitat

A. delagoensis is endemic to Mozambique and South Africa and is locally common at several localities (Fig. 2). It is widely distributed in the coastal areas in Mozambique but in South Africa is limited to the north-eastern parts of KwaZulu-Natal, which include the following vegetation types: Tembe sandy bushveld, Maputaland wooded grassland and Maputaland coastal belt (Mucina et al., 2005). It grows in well-drained sandy soil, in open grassy fields or in open spaces between trees.

3.3.3. Additional specimens examined

South Africa. KWAZULU-NATAL: **2632 (Bela Vista):** Ndumu Hill, Ndumu Game Reserve (−CD), *Pooley 529* (K, NH), *Tinley 989* (K); Tembe Elephant Park (−CD), *Van Wyk & De Wet 4075* (ZULU), *Ward 1006* (NH); Apiesdraai (−DD), *Botha 66* (PRE), *315* (PRE), *898* (PRE, PUC); Kwangwanase, Sihangwane next to road (−DD), *Van Greuning 620* (NH, PRE); Kosi Bay (−DD), *Botha 315* (BLFU, PUC), *Venter 1153* (ZULU). **2732 (Ubombo):** Sihangwana (−AB), *Botha 3510* (PUC), *Retief 818* (PRE), Otobotini, near Pont on Maputa road (−AB), *Vahrmeÿer & Tölken 989* (K, NH, PRE); Phelandaba, 20 km SW from Manguzi (−BA), *Botha 3501* (PUC); Kwazibi, in old field near *Eucalyptus* wood plots (−BB), *Felton & Thornbill 350* (PRE); Manzengwenya, near inspection quarters (−BB), *Moll 4863* (K, NH, PRE); Mbazwane, along road to Sibaya, 15 km west of Sibaya (−BC), *Van Wyk 1410* (PRE); Sibaya Lake (−BC), *Botha & Van Wyk 1202* (PUC), *Venter 6551*, *6562*, *6563*, *6564* (ZULU); False Bay Park, Western boundary near main gate (−CD), *Gerstner 4753* (K, PRE), *6858* (PRE), *Ward 7140* (NH, PRE); Sodwana Bay National Park (−DA), *Ward 3499* (K, NH, PRE); Makatini flats, *Gerstner 3690* (NH, PRE); Tongoland (−DA), *Vahrmeÿer & Tölken 260* (PRE). **2832 (Mtubatuba):** 10 km from Hluhluwe, between Hluhluwe and False Bay (−AB), *Moll 2817* (K, PRE); Hlabisa (−AB), *Gerstner 6859* (PRE); St. Lucia (−AD), *Lansdell s.n.* (NH).

Mozambique. **1540 (Nampula):** Nacala (−AB), *Torre & Paiva 12124* (PRE), *11642* (K). **1736 (Zambézia):** Macuze, 1.8 km from Namacurra (−AC), *Grandvaux Barbosa & Carvalho 3884* (K). **1737 (Zambézia):** Maganja da Costa (−CC), *Grandvaux Barbosa & Carvalho 4214* (K). **1835 (Zambézia):** Mopeia (−BA), *Torre & Correia 16725* (LISC, LMA). **1934 (Beira):** Dondo (−BD), *Cecil 261* (K). **2335 (Inhambane):** Maxixe (−CD), *Mendonça 18* (BM, LMU); Régulo Vilalo, 23 km from Naburi (−CD), *Grandvaux Barbosa & Carvalho 4331* (K). **2532 (Maputo):** Marracuene, Ricatla (−DA), *Junod 182* (LISC, LMA), Maputo [Lourenço Marques] (−DC), *Pimenta s.n.* (LISC), *Grandvaux-Barbosa 7730* (PRE), *Mendonça 824* (BM), *Moss 7004* (K), *Torre s.n.* (BM), Maputo [Lourenço Marques], Kadodo, Polane flats (−DC), *Hornby 824* (K); Maputo [Lourenço Marques], Vila Luiza (−DC), *Grandvaux Barbosa & De Lemos 7961* (K); 3 km from Maputo on the Ingwavuma road (−DC), *Botha 903* (PUC); Inhaca Island, Nkhoka (Ronga) (−DC), *Mogg* 26992 (K), *27201*(K), *27401* (K), *28395* (JRAU, K), *30116* (K, PRE), *Mauve & Verdo 9* (K, PRE); Reserva de Caca de Maputo, at viewpoint near "Vale dos Elephantes" (−DC), *Jansen & De Koning & De Wilde 7* (K). **2632 (Bela Vista):** Bela Vista (−BC), *Grandvaux Barbosa & De Lemos 7802* (K), *Torre 2112* (BM); entre Zitunde ea Ponta do Ouro (−DD), *Mendonça 2899* (BM).

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References

Botha, D.J., 1975. 'n Taksonomiese studie van die Suid-Afrikaanse verteenwoordigers van die Menispermaceae. DSc Thesis, University of Pretoria, South Africa.
De Wet, H., Van Wyk, B.-E., 2007. An ethnobotanical survey of southern African Menispermaceae. South African Journal of Botany 74, 2–9.
Diels, L., 1910. Menispermaceae. In: Engler, A. (Ed.), Das Pflanzenreich, IV, 94. Verlag von Wilhelm Engelmann, Leipzig, pp. 1–345.
Ferguson, I.K., 1975. Pollen morphology of the tribe Triclisieae of the Menispermaceae in relation to its taxonomy. Kew Bulletin 30, 49–75.
Forman, L.L., 1975. The tribe Triclisiea Diels in Asia, the Pacific and Australia. Kew Bulletin 30, 77–100.
Holmgren, P.K., Holmgren, N.H., Barnett, L.C. (Eds.), 1990. Index Herbariorum, Part 1: the Herbaria of the World, 8th ed. : Regnum vegetabile, vol. 120.
Jacques, F.M.B., Bertolino, P., 2008. Molecular and morphological phylogeny of Menispermaceae (Ranunculales). Plant Systematics and Evolution 274, 83–97.
Kessler, P.J.A., 1993. Menispermaceae. In: Kubitzki, K., Rohwer, J.G., Bittrich, V. (Eds.), The families and genera of vascular plants. : Flowering plants - Dicotyledons., vol. 2. Springer-Verlag, Berlin, pp. 402–418.
Mucina, I., Rutherford, M.C., Powrie, L.W. (Eds.), 2005. Vegetation map of South Africa, Lesotho and Swaziland, 1:1,000,000 scale sheet maps. South African National Biodiversity Institue, Pretoria, ISBN 1-919976-22-1.
Troupin, G., 1962. Monographie des Menispermaceae africaines. Académie Royale des Sciences d'Outre-Mer, Classe des sciences naturelles et médicales mémoires 13, 1–313.
Van Steenis, C.G.G.J., 1948. Malesiana, series 1, vol. 4. part 1.