



## Taxonomic notes on the genus *Stephania* (Menispermaceae) in southern Africa



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### ABSTRACT

A review of the genus *Stephania* in southern Africa is presented. *Stephania* is represented by one species (*Stephania abyssinica*) and two infraspecific taxa in this region. A key to the infraspecific taxa, the complete synonymy and the formal descriptions are given. Taxon accounts are supplemented with geographical distribution records, notes on the ecology and known traditional uses. The two varieties of *S. abyssinica* can easily be distinguished as the stems and leaves of *S. abyssinica* var. *abyssinica* are glabrous while those of *S. abyssinica* var. *tomentella* are pubescent. The correct author citation of the varietal name (var. *tomentella*) is also provided.

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### 1. Introduction

The Menispermaceae, commonly known as the Moonseed family, consists of approximately 70 genera and 450 species distributed mainly throughout the tropics (Wang et al., 2007; Meng et al., 2012). It is divided into five tribes (Kessler, 1993), with *Stephania* Lour. the only genus in the subtribe Stephaniinae Diels, tribe Menispermeae (Diels, 1910; Kessler, 1993; Meng et al., 2012). The Menispermeae differs from the other tribes in having non-ruminate endosperm, while *Stephania* is easily distinguished from other genera by having distinctly peltate leaves, a single carpel and minute bracts (Kessler, 1993; Leistner, 2000, 2005).

*Stephania* is a large genus of 30–60 species distributed in tropical and subtropical Asia, parts of Africa and Oceania (Meng et al., 2012). Its members are slender climbers with peltate and membranous leaves. The flowers are arranged in umbelliform cymes, which arise from axils or from old leafless stems (Semwal et al., 2010). *Stephania* was named after Christian Stephan (1757–1814), a director of the Forestry Institute at Petersburg and a professor in botany and chemistry in Moscow (Pooley, 1998). Species of *Stephania* are rich in alkaloids, flavonoids, lignans, steroids, terpenoids and coumarins and are widely used in

folk medicine to treat asthma, tuberculosis, dysentery and malaria (Semwal et al., 2010). Two species occur in the Flora Zambesiaca region (Troupin, 1960) and only one, *Stephania abyssinica*, in southern Africa (Klopper et al., 2006).

Although the southern African Menispermaceae was revised in an unpublished thesis by Botha (1975), there is no recent published information on the taxonomy of *Stephania* in southern Africa. The aim of this short paper is to revise the genus in southern Africa. A key to the infraspecific taxa is included, as well as a complete synonymy and formal descriptions. Taxon accounts are supplemented with geographical distribution records, notes on the ecology and known traditional uses. The correct author citation of the varietal name (var. *tomentella*) is also provided.

### 2. Materials and methods

Morphological data were gathered during field trips and from herbarium specimens. Specimens from the following herbaria were studied: BLFU, BM, BOL, BR, COI, GRA, K, LISC, LMU, NH, NBG, PRE, PRU, S, SRGH and ZULU (acronyms according to Holmgren et al., 1990). Distribution records and habitat information were obtained from herbarium specimens and observations made during field trips. Information on traditional and medicinal uses was gathered from herbarium labels and an extensive literature survey by De Wet and Van Wyk (2008).

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### 3. Taxonomy

#### 3.1. *Stephania*

Lour., Fl. Cochinch. 2: 608 (1790); Walp., Repert. Bot. Syst. 1: 96 (1842); Benth. in Benth. et. Hook f., Gen. Pl. 1: 37 (1862); Miers in Ann. Mag. Nat. Hist., 3, 18: 12 (1866); Oliv. in F.T.A. 1: 46 (1868); Miers, Contr. Bot. 3, 1: 210 (1871); Baill., Hist. Pl. 3: 42 (1872); Prantl in Engl. & Prantl, Nat. Pflanzenfam. 3, 2: 84 (1894); Diels in Engl., Pflanzenr. 46: 259 (1910); Troupin in F.T.E.A.: 20 (1956); in F. Z. 1: 69 (1960); in Mém. Acad. Roy. Sci. Outre-Mer, Cl. Sci. Nat. Méd 13: 237 (1962); Troupin & Gonç. in Flora de Moçambique 7: 24 (1973); Benv. in Webbia 29: 50 (1974); Kessler in Kubitzki et al., Fam. Gen. Vasc. Pl. 2: 415 (1993); Forman in *A Revised Handbook of the Flora of Ceylon*, 4: 304 (1995); Jordaan in *Strelitzia* 10: 358 (2000); Leistner, Seed Pl. S. Trop. Afr.: 265 (2005). Type species: *Stephania rotunda* Lour. [lecto. designated by Phillips. Gen. S. Afr. Flower. Pl. 335 (1951)].

*Clypea* Blume, Bijdr. Fl. Ned. Ind. 1: 26 (1825) *pro parte*.

*Stenaphia* A. Rich. Tent. Fl. Abyss. 1: 9 (1847). Type: *S. rotunda* Lour.

*Ileocarpus* Miers in Ann. Mag. Nat. Hist. ser. 2, 7: 40 (1851). Type: *I. schimperi* Miers.

*Homocnemia* Miers in Ann. Mag. Nat. Hist. ser. 2, 7: 40 (1851); Harvey in Harvey & Sonder, Flora Capensis 1: 10 (1860). Type: *H. meyeriana* Miers ex Harvey.

*Perichasma* Miers in Ann. Mag. Nat. Hist. ser. 3, 18: 22 (1866). Type: *P. laetifcata* Miers.

*Styphania* C. Muell. Walpers, Ann. Bot. Syst. 7: 66 (1868). Type: *S. rotunda* Lour.

Woody or herbaceous climbers. *Leaves* simple; petiolate; peltate, triangular, ovate or suborbicular; glabrous to pubescent; exstipulate. *Inflorescence* an umbelliform cyme or sometimes condensed to a disciform capitulum, often cauliflorous. *Flowers* unisexual, small and inconspicuous, dioecous. *Male flowers* with 6–8 sepals, in two whorls; 3–4 petals; stamens 2–6, arranged in a dish-shaped stalked synandrium, with the anthers forming a horizontal ring round the margin; thecae transversely dehiscent. *Female flowers* with 1–8 sepals; 2–4 petals; staminodes absent; carpel 1, style small, stigma slightly lobed or divided into 3–6 branches. *Fruit* a drupe; exocarp smooth, glabrous or hairy; endocarp bony, subovate and compressed or reniform, truncate at base, with 2–4 longitudinal rows of tubercles or  $\pm$  projecting prickles, or transverse ridges; condyle obovate, somewhat concave on either side with its septum often perforate. *Seed* horseshoe-shaped; endosperm not ruminant; embryo curved; cotyledons appressed.

#### 3.1.1. Diagnostic characters

*Stephania* can be distinguished from other genera of the Menispermaceae in southern Africa by its peltate leaves with the petiole inserted about 15 mm from the basal leaf margin, a condyle [an intrusion of the endocarp into the seed cavity (Wefferling et al., 2013)], which is obovate and a smooth unperforated septum with a conspicuous dorsal ridge. The single carpels and minute bracts, which do not enlarge in the fruit, are also of diagnostic value.

#### 3.2. *S. abyssinica*

(Dill. & A. Rich.) Walp., Repert. Bot. Syst. 1: 96 (1842); Oliv. in F.T.A. 1: 47 (1868); Diels in Engler, Pflanzenr. 46: 268, t. 89 (1910); Exell & Mendonça in Consp. Fl. Angol. 1, 1: 43 (1937); Troupin in F.T.E.A.: 22 (1956); in F. Z. 1: 170 (1960); in Mém. Acad. Roy. Sci. Outre-Mer, Cl. Sci. Nat. Méd 13: 246 (1962); Troupin & Gonçalves in Flora de Moçambique 7: 24 (1973); Benv. in Webbia 29: 55 (1974); Botha, S. Afr. J. Bot. 46, 1: 28 (1980). Type: Ethiopia, Adowa, *Quartin-Dillon & Petit s.n.* (P, holo.; K!, iso.).

*Clypea abyssinica* Dill. & Rich. in Ann. Sci. Nat., Sér. 2, Bot. 14: 263 (1840) Type as above.

#### 3.2.1. Phenology

*S. abyssinica* produces flowers from spring till early autumn (September to April).

#### 3.2.2. Key to the varieties of *S. abyssinica*

- 1a. Branchlets, petioles, abaxial sides of leaves, inflorescence and the sepals glabrous..... *S. abyssinica* var. *abyssinica*
- 1b. Branchlets, petioles, abaxial sides of leaves, inflorescence and part of the sepals densely pubescent to tomentose ..... *S. abyssinica* var. *tomentella*

#### 3.3. *S. abyssinica*

(Dill. & A. Rich.) Walp. var. *abyssinica*, Hutch. et Dalz., F.W.T.A. ed. 2, 1: 75 (1954); Troupin in F.T.E.A.: 22 (1956); in F. Z. 1: 171 (1960); in Mém. Acad. Roy. Sci. Outre-Mer, Cl. Sci. Nat. Méd 13: 247 (1962); Troupin & Gonçalves in Flora Moçambique 7: 25 (1973); Benv. in Webbia 29: 55 (1974). Type as above.

*Clypea abyssinica* Dill. & Rich. in Ann. Sci. Nat., Sér. 2, Bot. 14: 263 (1840).

*Cissampelos nymphaeaeifolia* R.Br. in Salt. Voy. Abyss. App.: 65 (1814), *nomen nudum*.

*Menispermum schimperi* Hochst., Steud., Nomencl. Bot. 2,2: 124 (1841), *nomen nudum*. *Ileocarpus schimperi* Miers in Ann. Mag. Nat. Hist. sér. 3, 14: 373 (1864), *nomen nudum*—Contr. Bot 3: 125, t. 113 (1871). Type: Ethiopia, Tigré, *Schimper 178* (BM, holo.; K!, G, iso.)

*Stephania laevigata* Miers in Ann. Mag. Nat. Hist. 3, 18: 16 (1866), *nomen nudum*—Contr. Bot. 3: 230 (1871). Type: Fernando Po, *Mann 629* (K!, holo.)

*Stephania fastosa* Miers in Ann. Mag. Nat. Hist. 3, 18: 16 (1866), *nomen nudum*—Contr. Bot. 3: 231 (1871). Type: Cameroon, *Mann 2169* (K! lecto., designated by Troupin, 1962).

*Stephania bullulata* Miers in Ann. Mag. Nat. Hist. 3, 18: 16 (1866) *nomen nudum* Type: Cameroon, *Mann 1242* (K!, holo.).

[*Stephania hernandiifolia* sensu Th. Dur. & Schinz., Consp. Fl. Afr. 1, 2: 48 (1898) non (Willd.) Walp.]

Twining liane, woody at base, stem covered with thin bark, prominent longitudinal ridges, branchlets glabrous. *Leaves* alternate, peltate; petiole up to 170 mm, glabrous, geniculate pulvinus, thickened at petiolar attachment; lamina ovate to broadly ovate, rarely suborbicular, 50–200 × 40–170 mm; apex obtuse or subacute; base rounded; venation palmate, 5-veined, veins more visible on abaxial side; margin entire; slightly lighter green colour on abaxial side; texture membranous or papery; glabrous. *Male inflorescence* 30–110 mm long; false compound umbels, axillary, solitary or clustered 2–4 together, 3–10 rays ending in umbel-like cymes, 15–40 mm long, glabrous; involucre of 3–5 caducous bracts, bracts linear or broad linear, 0.6–3 mm long. *Male flowers* sessile or pedicels up to 1.3 mm long; sepals 6(8), free, obovate to subobovate, 0.9–2.5 mm × 0.5–1.2 mm, purplish, base often violet; petals 3(4), broad oval to semi-circular, 0.3–1.2 × 0.6–1.2 mm, one main vein, which sometimes divide and terminate in a V-shape; synandrium 4–7-locular, 0.6–0.8 mm in diameter, 0.4–1.1 mm long. *Female inflorescence* similar to the male inflorescence. *Female flower* sessile or with pedicel; sepals 2–4, mostly 3, free, ovate or obovate, 1.2–2 × 0.5–1.5 mm, one undivided vein; petals 3, sometimes 2, free, ovate to obovate, 0.6–1.1 × 0.6–1.0 mm, main vein divided and terminate in 2 or 3 branches; carpel 1, glabrous, short style, 3 extended stigmas. *Fruit* a drupe; subspherical-flattened, 0.5–8 mm in diameter, glabrous, brightly orange when ripe; endocarp bony,

horseshoe-shaped; condyle obovate, septum smooth, unperforated, dorsal ridge conspicuous. Seed up to 8 mm long, endosperm not ruminate, embryo curved, cotyledons appressed (Figs. 1 and 2).

### 3.3.1. Distribution and habitat

*S. abyssinica* var. *abyssinica* occurs throughout tropical Africa (Klopper et al., 2006), Zimbabwe and Mozambique (Troupin, 1960) and the Limpopo, Mpumalanga and KwaZulu-Natal provinces of South Africa (Fig. 3). It is absent from Namibia and Botswana (Germishuizen and Meyer, 2003). *S. abyssinica* var. *abyssinica* grows in full sunlight and relative high humidity on the ground or over shrubs, mostly on the edges of forests and disturbed areas adjacent to roads.

### 3.3.2. Etymology and common names

The specific epithet, *abyssinica*, means Ethiopian (Glen, 2004). A literature search did not reveal any common names for this plant in English or Afrikaans, but as it is often used as a charm to find lost articles or to discover secrets (Pooley, 1998), it was decided by the authors to name it the “tale-telling” plant or “*verklikker plant*” (Afrikaans). It is known as “umbombo,” “umthambana,” “umthambane” and “umthombo” in Zulu (Doke and Vilakazi, 1972; Hutchings et al., 1996).

### 3.3.3. Traditional uses

A root decoction of *S. abyssinica* and *Momordica foetida* Schumach. is drunk by the Zulu people as a blood purifier to cure boils (Watt and Breyer-Brandwijk, 1962). It is also used as a charm to find lost items and to discover secrets (Pooley, 1998). The southern Sotho use it as a magic medicine to prevent a person from being struck by lightning which was sent by an enemy (De Wet and Van Wyk, 2008).

### 3.3.4. Additional specimens examined

South Africa. LIMPOPO. **2230 (Musina/Messina)**: Tate Vondo, marshy area (–CD), 4 Nov 1980, *Netshuingani* 1325 (PRE). **2329 (Polokwane/Pietersburg)**: Molepo Reserve near Pietersburg (Polokwane) (–CD), 1 May 1945, *Gerstner* 5337 (PRE); Mountain Home Farm, Pietersburg (Polokwane) (–CD), 18 Dec 1935, *Mogg* 13999 (PRE); Ebenezer dam, Tzaneen (–DD), 16 Feb 2001, *Van Wyk & De Wet* 4061 (ZULU); Modjadji, Pietersburg (Polokwane) (–DD), 1 Dec 1915, *Rogers* 18044 (PRE). **2330 (Tzaneen)**: Duiwelskloof (–CA), 17 Jan 1946, *Gerstner* 5877 (PRE), 22 Feb 1958, *Scheepers* 135 (PRU, PRE); Westfalia Estate, Duiwelskloof (–CA), 25 Feb 1958, *Scheepers* 149 (PRE); T-junction in Magoebaskloof, with Duiwelskloof road (–CC), 30 Sep 1971, *Botha* 63; 31 Jul 1974, *Botha* 874 (PRU); Woodbush

Forest Reserve (–CC), 13 Mar 1982, *Van Wyk* 5511 (PRU, PRE); 23 Dec 1928, *Hutchinson* 2281 (BOL, PRE); 1 Dec 1909, *Swierstra* sub *TRV* 7416 (PRE); Mountain Home Farm, Woodbush (–CC), 2 Jan 1945, *Mogg* 17426 (PRE); Merensky Dam (–CD), 5 Feb 1964, *Bos* 1258 (PRE).

MPUMALANGA. **2430 (Pilgrims Rest)**: Mariepskop (–DB), 11 Jan 1979, *Botha* 2442 (PRE); 1 Apr 1959, *Van der Schijff* 4635 (PRE, PRU); 1.6 km from Graskop, Kowynspass, 50 m from monument (–DD), 7 Oct 1971, *Jordaan* 105 (PRE).

KWAZULU-NATAL. **2831 (Nkandla)**: Eshowe (–DD), 1 Dec 1936, *Gerstner* 1905 (PRE); **2930 (Pietermaritzburg)**: Dargle Forestry, Lions River (–AC), 13 Oct 1964, *Moll* 1232 (PRE); Albert Falls (–AD), 5 Oct 1928, *Galpin* 9538 (PRE); Greytown (–BA), 21 Jan 1939, *Galpin* 14673 (NH, PRE); Groot Noodsberg (–BD), 31 Apr 1894, *Medley Wood* 5349 (PRE); Zwati, Ndwedwe region (–DB), 27 Jun 1967, *Strey* 7529 (NH, PRE).

EASTERN CAPE. **3129 (Port St. Johns)**: Port St. Johns (–DA), 14 Jan 1910, *Pegler* 1541 (PRE).

### 3.4. *S. abyssinica*

(Dill. & A. Rich.) Walp. var. *tomentella* Oliv. in *Trans. Linn. Soc. London* 2, 2: 328 (1887); *Hutch. & Dalz., F.W.T.A.* 2, 1: 75 (1954); Troupin in *F.T.E.A.*: 22 (1956); in *F. Z.* 1: 171 (1960); in *Mém. Acad. Roy. Sci. Outre-Mer, Cl. Sci. Nat. Méd* 13: 251 (1962); Troupin & Gonçalves in *Flora Moçambique* 7: 26 (1973); *Benv. in Webbia* 29: 55 (1974). Type: Tanzania, Kilimanjaro, *Johnston s.n.* (K!, holo.; BM!, iso.).

*Homocnemia meyeriana* Miers ex Harv. in *Harv. & Sond. Fl. Cap.* 1: 10 (1859); Miers in *Ann. Mag. Nat. Hist.* 3, 14: 373 (1864); in *Cont. Bot.* 3: 126 (1871). Type: South Africa, Pondoland, Omvamwubo, *Drége s.n.* (K!, holo.).

*Clypea meridiana* Miers, *Contr. Bot.* 3: 210 (1871). Type: South Africa, KwaZulu-Natal, *Gerrard* 1468 (K!, holo.; BM!, iso.).

*Stephania praelata* Miers in *Ann. Mag. Nat. Hist.* 3, 18: 16 (1866); Miers, *Contr. Bot.* 3: 230 (1871). Type: South Africa, Orange Free State, *Cooper* 904 (BM!, holo.; K, iso.).

*Stephania hernandiifolia* (Willd.) Walp. var. *pubescens* Szyszyl. in *Polyp. Thal. Rehm.* 102 (1888). Type: South Africa, Natal, Drankensberg, *Rehmann* 6895 (K!, Z, isosyn.).

*S. abyssinica* (Dill. & A. Rich.) Walp. var. *pilosa* Engl., *Pflanzenw. Ost-Afrikas* C: 181 (1895). Type: Tanzania, Moshi district, Kibosha, *Volkens* 1601 [B, holo.; BM, lecto., designated by Troupin: 252 (1962)].

*Cissampelos umbellata* E. Mey. ex Miers, *Ann. Mag. Nat. Hist.* 2, 7: 40 (1871). Type: South Africa, Cape Province, *Drége* 5210 (K).

[*Stephania hernandiifolia* sensu Burtt Davy & Pott, *Ann. Transv. Mus.* 3: 142 (1912); Burtt Davy & Bolton, *Check lists Trees Shrubs Brit. Emp.* 1: 66 (1935), non (Willd.) Walp.].

[*S. abyssinica* sensu Burtt Davy & Bolton, loc. cit.: 66 (1935), *pro parte quoad* Maitland 1221 et Snowden 892, non (Dill. & A. Rich.) Walp.].

[*Stephania discolor* sensu Pott, *Ann. Transv. Mus.*, 6, 4: 126 (19), non Spreng.].

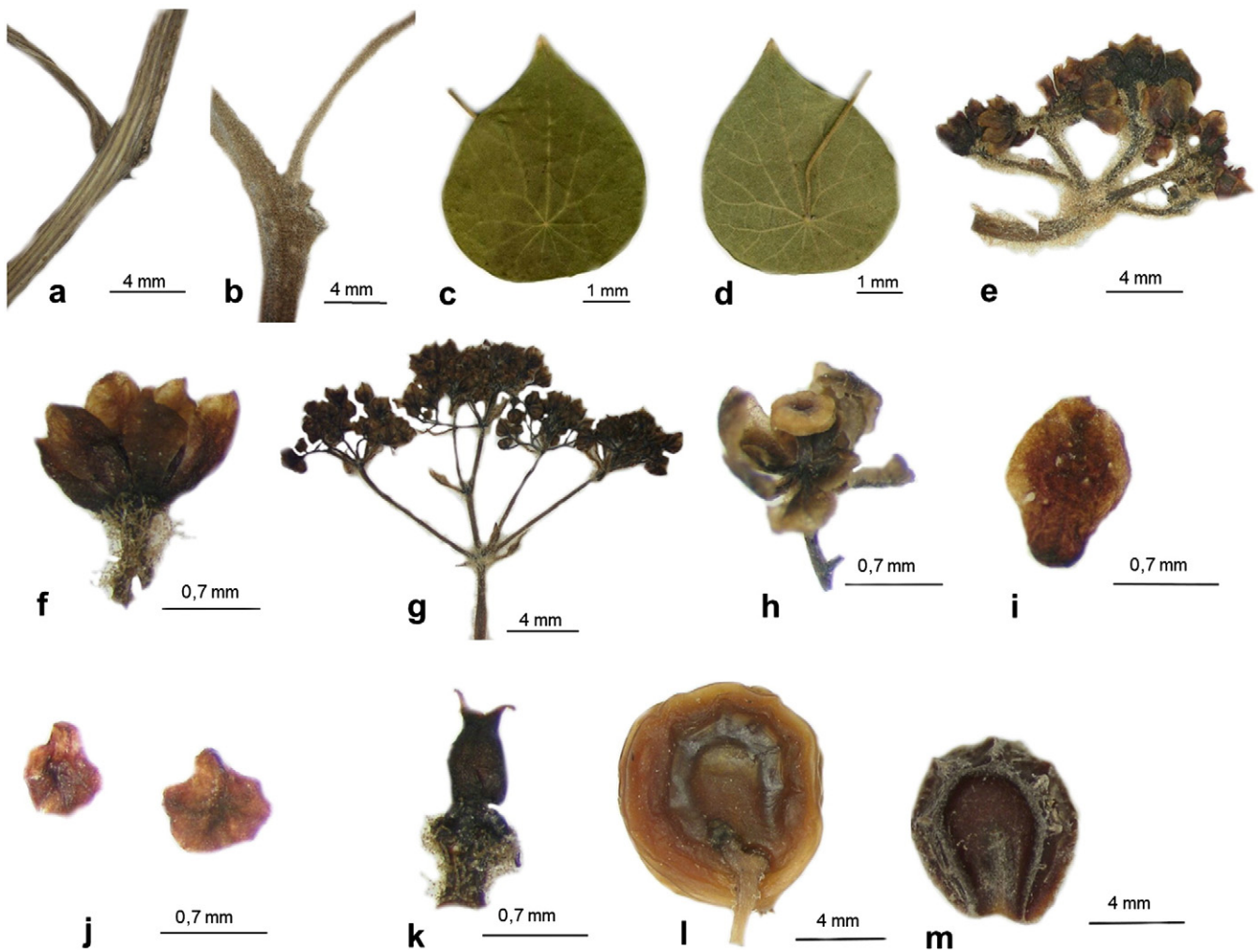
Description as for the species but with branchlets, petioles, abaxial sides of the leaves, the inflorescence and part of the sepals densely pubescent to tomentose (Fig. 2B, E, F, G, K).

### 3.4.1. Distribution and habitat

*S. abyssinica* var. *tomentella* is also distributed throughout tropical Africa (Klopper et al., 2006), Zimbabwe and Mozambique (Troupin, 1960) and the Mpumalanga, Free State, KwaZulu-Natal and Eastern Cape provinces of South Africa as well as Swaziland and Lesotho (Fig. 3). It does not occur in Namibia and Botswana (Germishuizen and Meyer, 2003). The two varieties have a sympatric distribution and



Fig. 1. Leaves and fruits of *Stephania abyssinica* var. *abyssinica* (Photo: B.-E. van Wyk).



**Fig. 2.** (a) Stem of *Stephania abyssinica* var. *abyssinica*, Van Wyk 4061; (b–m) *S. abyssinica* var. *tomentella*; (b) stem, Jacobs 1612; (c) adaxial and (d) abaxial side of the leaf, Roux 1851; (e) female inflorescence, Codd 6284; (f) female flower, Codd 6284; (g) male inflorescence, Compton 28460; (h) male flower, Van Wyk 4062; (i) sepals, Codd 6284; (j) petals, Codd 6284; (k) carpel, Codd 6284; (l) fruit, Roux 1815; (m) endocarp, Roux 1815. (Photos: H. de Wet).

the same habitat preferences. They also co-occur in several localities (Fig. 3).

#### 3.4.2. Etymology and common names

The varietal epithet, *tomentella* means densely short-haired (Glen, 2004) and refers to the plant being pubescent. It is commonly known as the “hairy tale-telling” plant or “harige verklikker plant” (Afrikaans) and is known by the same Zulu names as the typical variety.

#### 3.4.3. Traditional uses

In addition to having the same medicinal and traditional uses as *S. abyssinica* var. *abyssinica* (refer to Section 3.3.3.), the roots of *S. abyssinica* var. *tomentella* are reported to be used in enemas for children, while unspecified parts are sprinkled as protective charms (Gerstner, 1941; Doke and Vilakazi, 1972; Hutchings et al., 1996).

#### 3.4.4. Nomenclatural note

*S. abyssinica* var. *tomentella* Oliv. has been erroneously cited as *S. abyssinica* var. *tomentella* (Oliv.) Diels in Engler, Pflanzenr. 46: 270 (1910) in various publications for many years, with *S. hernandifolia* (Willd.) Walp. var. *tomentella* Oliv. in Trans. Linn. Soc. London 2, 2: 328 (1887) given as the basionym (Burt Davy, 1926; Troupin, 1956; Troupin, 1960; Botha, 1975; Troupin and Gonçalves, 1973; Germishuizen et al., 2006). When the publication of Oliver (Oliver,

1887) is consulted, it becomes clear that he did indeed publish the correct name combination *S. abyssinica* var. *tomentella* for the first time and not *S. hernandifolia* var. *tomentella*, as erroneously ascribed to him by Diels (1910). The author citation for the varietal epithet should therefore be corrected as given above.

#### 3.4.5. Additional specimens examined

South Africa. MPUMALANGA. **2430 (Pilgrims Rest)**: Ohrigstad Nature Reserve (–CC), 18 Nov 1970, Jacobsen 1199 (PRE); Mariepskop (–DB), 12 Jan 1964, Boss 1074 (PRE), 1 Dec 1959, Van der Schijff 4671 (PRE); Pilgrims Rest (–DB), 1 Dec 1914, Rogers 14338 (PRE); Graskop on road to Pilgrims Rest (–DB), 29 Dec 1963, Louw 3190 (PRU); Mt. Sheba Nature Reserve (–DC), 1 Jan 1976, Forrester & Gooyer 72 (PRE). **2529 (Witbank)**: Belfast district, ± 10 km WSW from Belfast. Langkloof farm (–DB), 30 Jan 1996, Burgoyne 3897 (PRE). **2530 (Lydenburg)**: Klipsteen, ca 19 km from Lydenburg on Dullstroom road (–AB), 10 Feb 1990, Taussig 26 (PRE); Gold Diggings, 40 km from Lydenburg (–AB), 4 Jan 1963, Van Vuuren 4 (PRE); Dullstroom. Halfgewonne farm, 500 m off Wanhoop road turnoff (–AC), 27 Nov 1980, Drews 178 (PRE); Long Tom Pass (–BA), 10 Feb 1986, Krynauw 1021 (PRE); Witklip Forest Reserve (–BB), 11 Feb 1984, Retief 1269 (PRE); Belfast (–CA), Leendertz 7921 (PRE); Machadadorp (–CB), 10 Nov 1932, Galpin 13233 (PRE); Godwane River Station (–DA), 1 Jan 1923, Davidson & Davidson 66 (PRE); Barberton area on R38, road

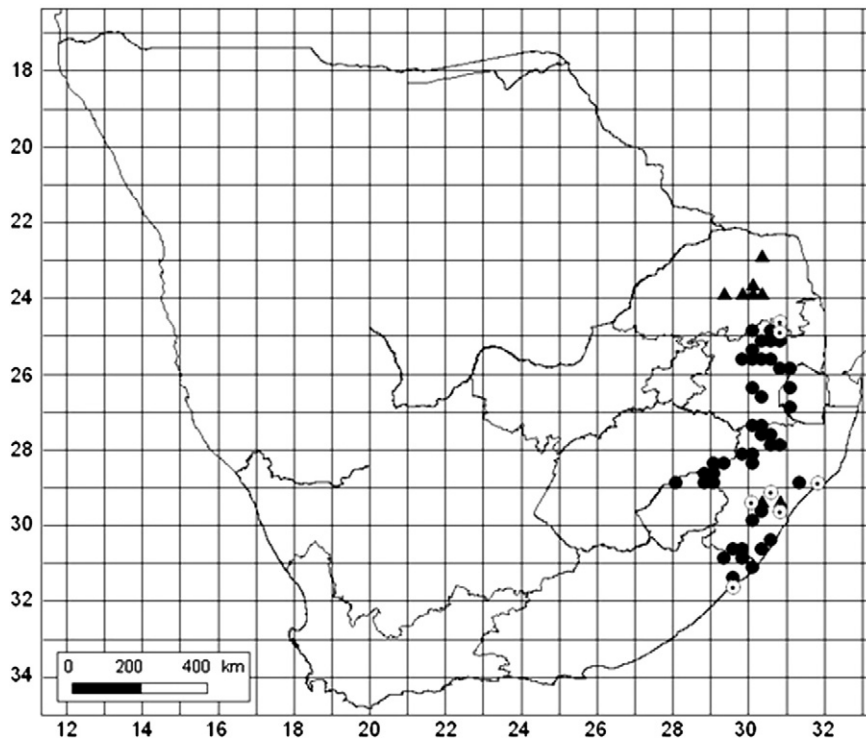


Fig. 3. Known distribution of *Stephania* in southern Africa. Triangles, *S. abyssinica* var. *abyssinica*; circles, *S. abyssinica* var. *tomentella*; white circles with dots indicate localities where the two varieties co-occur.

from Barbeton to Badplaas, 40 km to Badplaas (–DD), 25 Dec 2008, *Nkuna & Mabatha 2500* (PRE). **2629 (Bethal)**: Nootgedacht, Ermelo (–DB), *Henrici 1304* (PRE). **2531 (Komatipoort)**: Barberton distr. (–CC), 1 Feb 1906, *Thorncroft 637* (NH). **2630 (Carolina)**: Chrissiesmeer, Carolina (–AC), 5 Jan 1971, *Theron 2415* (PRE); Athole Experimental Farm (–CB), 22 Jan 1976, *Balsinhas 2959* (PRE).

**2828 (Bethlehem)**: National Park, Drakensberg (–DB), 1 Nov 1927, *Cliver 466* (NH); Tugela Valley, Mount-Aux-Sources (–DD), 15 Feb 1926, *Bayer & MacClean 58* (PRE). **2829 (Harrismith)**: Mountain slope E of Harrismith (–AC), 28 Sep 1963, *Van Zinderen-Bakker 2881* (BLFU); Van Rheenen (–AD), 7 Dec 1904, *Medley Wood 9638* (GRA, NH), 1 Dec 1912; *Medley Wood 12154* (NH, PRE).

KWAZULU-NATAL **2730 (Vryheid)**: 6 km SE of Groenvlei Post Office, Utrecht (–AC), 14 Dec 1950, *Codd & Deyer 6284* (PRE); Wakkerstroom, Nauwgevonden (–AC), 14 Dec 1992, *Smith 1457* (PRU), Donkerhoek, Utrecht (–AD), 21 Jan 1961, *Devenish 524* (NH, PRE); Tweeloof, Altemooi (–AD), 1 Dec 1926, *Thode A1139* (NH, PRE); Utrecht (–CB), 1 Dec 1915, *Wahl sub TRV 15378* (PRE); 13 km from Utrecht turnoff on Paulpietersburg-Vryheid road (–DA), 23 Oct 1983, *Germishuizen 2403* (PRE); 20 km from Utrecht turnoff on Paulpietersburg-Vryheid road (–DA), 23 Oct 1982, *Schrire 1344* (NH); 23 Oct 1982, *Buthlezi 250* (NH); Vryheid Nature Reserve (–DC), 23 Feb 1988, *Youthed 4* (NH); Babanango (–DD), 1 Jan 1932, *King 339* (PRE). **2829 (Harrismith)**: Biggars Mountain, One Tree Hill farm, One Tree Hill (–BB), 16 Mar 1996, *Prentice 54* (PRE); Oliviershoek Pass (–CA), 15 Jan 1886, *Medley Wood sub NH 2606* (NH); Sterkfontein Nature Reserve (–CA), 12 Dec 1994, *Du Preez 2881* (BLFU); Cathedral Peak, Bergville (–CC), 3 Dec 1952, *Killick 1814* (NH, PRE), 28 Oct 1984, *Scott & Smith 299* (NH); Farm Herons Valley (–CC), 22 Feb 1984, *Roux 1851* (PRE). **2830 (Dundee)**: Biggarsberg, 30 km N of Ladysmith (–AA), 3 May 1944, *Acocks 10447* (NH, PRE), 17 Feb 1955, *Pole Evans 4868* (PRE), 30 Apr. 1966, *Strey 6614* (NH, PRE); 15 Dec 1958, *Taylor 2298* (PRE); 40 km NE of Ladysmith (–AC), 19 Feb 1953, *Godfrey sub PRE 32094* (PRE). **2831 (Nkandla)**: Eshowe (–CD), 1 Jan 1937, *Gerstner 2672* (NH); Mtunzini (–DD), 18 May 1950, *Lawn 1550* (NH). **2930 (Pietermaritzburg)**: Lidgetton (–AC), 21 Jan 1920, *Mogg 6662* (PRE);

Greytown (–BA), 21 Jan 1939, *Galpin 14673* (NH, PRE); Worlds View, Pietermaritzburg (–CB), 1 Nov 1945, *Fisher 907* (NH); Table Mountain (–CB), 31 Mar 1948, *Killick 80* (PRE); Pietermaritzburg (–CB), 19 Nov 1967, *Ross 1728* (NH, PRE); Farm Keerom, Cottingham (–CC), 23 Mar 1969, *Strey 8417*; 5 Mar 1972, *Strey 10887* (NH, PRE); Zwati, Ndwedwe region (–DB), 27 Jun 1967, *Strey 7529* (NH, PRE). **3029 (Kokstad)**: Harding, Ngele Mountain, in Bangeni Forest above Farm Farben (–DA), 22 Nov 1994, *Abbott 6572* (NH); Harding (–DB), 1 Jan 1929, *Oliver 86* (NH); Emangweni (–DB), 1 Oct 1890, *Thode 9325* (GRA, NH). **3030 (Port Shepstone)**: Ifafa (–BC), 1 Apr 1884, *Medley Wood 2343* (NH); Dune bush, Port St. Johns (–CB), 1 Oct 1962, *Strey 4327* (NH); Allerton (–DA), 25 Dec 1919, *Mogg 6584* (PRE).

EASTERN CAPE. **3029 (Kokstad)**: Griqualand East, Clydesdale, on banks of Umzimkulu River (–CD), 1 Sep 1882, *Tyson 1300* (PRE); Bizane on road to Flagstaff, 32 km from Bizana (–DD), 8 Dec 1975, *Van Wyk & Venter 1347* (PRE). **3129 (Port St. Johns)**: Lusikisiki distr. Egosso Forest (–BC), 15 Apr 1976, *Van Wyk 1712* (PRU, PRE); Between Port St. Johns and Lusikisiki (–BC), 3 Dec 1928, *Hutchinson 1773* (BOL, PRE); Port St. Johns (–DA), 1 Feb 1896, *Bolus 8779* (BOL); 1 Jun 1970, *Guillarmod 6943* (GRA); 1 Jan 1921, *Schönland 4044, 4236* (GRA, PRE); Mt. Sullivan, river road forest edge (–DA), 1 Dec 1922, *Cloete 2177* (NH). **3130 (Port Edward)**: Kloof Forest (–AA), 29 Dec 1963, *Strey 4925* (NH).

Swaziland. **2631 (Mbabane)**: Black Mbuluzi Valley (–AC), 4 Nov 1958, *Compton 28252* (NBG, NH, PRE); Mbabane (–AC), 1 Dec 1905, *Bolus 11679* (BOL, GRA); 1 Jan 1914, *Rogers 11510* (GRA); Embabaan (–CC), 1 Jan 1905, *Burt-Davy 2895* (PRE); Palwane Valley (–CC), 18 Jan 1956, *Compton 25391* (NBG), 19 Dec 1958, *Compton 28459* (NBG, NH, PRE); Bobolo Forest (–CC), 1 Dec 1960, *Dlamini sub PRE 32093* (PRE).

Lesotho. **2828 (Bethlehem)**: Leribe (–CC), 1 Jan 1919, *Dieterlen 506* (NH, PRE).

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## References

- Botha, D.J., 1975. Taksonomiese studie van die Suid Afrikaanse verteenwoordigdes van die Menispermaceae. DSc Thesis. University of Pretoria, South Africa.
- Burt Davy, J., 1926. A Manual of the Flowering Plants and Ferns of the Transvaal with Swaziland, South Africa. Part 1. Pteridophyta to Bombacaceae. Longmans, Green & Co, Ltd, London.
- De Wet, H., Van Wyk, B.-E., 2008. 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 49. Verlag von Wilhelm Engelmann, Leipzig.
- Doke, C.M., Vilakazi, B.W., 1972. Zulu–English Dictionary, 2nd edn. Witwatersrand University Press, Johannesburg.
- Germishuizen, G., Meyer, N.L. (Eds.), 2003. Plants of southern Africa: An Annotated Checklist. Strelitzia 14. National Botanical Institute, Pretoria.
- Germishuizen, G., Meyer, N.L., Steenkamp, Y., Keith, M. (Eds.), 2006. A checklist of South African plants. Southern African Botanical Diversity Network Report No. 41. SABONET, Pretoria.
- Gerstner, J., 1941. A preliminary checklist of Zulu names of plants with short notes. Bantu Studies 15 (277–301), 369–383.
- Glen, H.F., 2004. Sappi, what's in a name? Jacana, Johannesburg.
- Holmgren, P.K., Holmgren, N.H., Barnett, L.C., 1990. Index Herbariorum. Part 1: The Herbaria of the World. New York Botanical Garden, New York.
- Hutchings, A., Scott, A.H., Lewis, L., Cunningham, A.B., 1996. Zulu medicinal plants. An inventory. University of Natal Press, Pietermaritzburg.
- 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. Springer-Verlag, Berlin, pp. 402–418.
- Klopper, R.R., Chatelain, C., Bänninger, V., Habashi, C., Steyn, H.M., De Wet, B.C., Arnold, T. H., Gautier, L., Smith, G.F., Spichiger, R., 2006. Checklist of the flowering plants of Sub-Saharan Africa. An index of accepted names and synonyms. South African Botanical Diversity Network Report No. 42. SABONET, Pretoria.
- Leistner, O.A. (Ed.), 2000. Seed plants of southern Africa: families and genera. Strelitzia 10. National Botanical Institute, Pretoria.
- Leistner, O.A., 2005. Seed plants of tropical southern Africa: families and genera. Southern African Botanical Diversity Network Report No. 26. SABONET, Pretoria.
- Meng, A., Zhang, Z., Li, J., Ronse De Craene, L., Wang, H., 2012. Floral development of *Stephania* (Menispermaceae): impact of organ reduction on symmetry. International Journal of Plant Sciences 173, 861–874.
- Oliver, D., 1887. The plants of the Kilimanjaro expedition 1884. The Transactions of the Linnean Society of London 2, 327–355.
- Pooley, E., 1998. A Field Guide to Wild Flowers: KwaZulu-Natal and the Eastern Region. Natal Flora Publication Trust, Durban.
- Semwal, D.K., Badoni, R., Semwal, R., Kothiyal, S.K., Singh, G.J.P., Rawat, U., 2010. The genus *Stephania* (Menispermaceae): chemical and pharmacological perspectives. Journal of Ethnopharmacology 132, 369–383.
- Troupin, G., 1956. Menispermaceae. In: Turrill, W.B., Milne-Redhead, E. (Eds.), Flora of Tropical East Africa. Crown Agents for Oversea Governments and Administrations, London, pp. 1–32.
- Troupin, G., 1960. Menispermaceae. In: Exell, A.W. (Ed.), Flora Zambesiaca 1. Crown Agents for Oversea Governments and Administrations, London, pp. 150–171.
- Troupin, G., 1962. Monographie des Menispermaceae africaines. Académie Royale des Sciences d'Outre-Mer, Classe des sciences naturelles et médicales mémoires 13, pp. 1–313.
- Troupin, G., Gonçalves, M.L., 1973. Menispermaceae. In: Fernandes, A. (Ed.), Flora de Moçambique 7. Junta de Investigações do Ultramar Centro de Botânica, Lisboa, pp. 1–27.
- Wang, W., Wang, H.-C., Chen, Z.-D., 2007. Phylogeny and morphological evolution of tribe Menispermeae (Menispermaceae) inferred from chloroplast and nuclear sequences. Perspectives on Plant Ecology, Evolution and Systematics 8, 141–154.
- Watt, J.M., Breyer-Brandwijk, M.G., 1962. The Medicinal and Poisonous Plants of Southern and Eastern Africa, 2nd edn. Livingstone, London.
- Wefferling, K.M., Hoot, S.B., Neves, S.S., 2013. Phylogeny and fruit evolution in Menispermaceae. American Journal of Botany 100, 883–905.