Phytotaxa 336 (3): 293–298
http://www.mapress.com/j/pt/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

https://doi.org/10.11646/phytotaxa.336.3.8

Synopsis and lectotypification of *Distimake rhyncorhiza* (Dalzell) Simões & Staples (Convolvulaceae): a little known species from the Western Ghats (India)

ANA RITA SIMÕES[1] & SUSHANT MORE[2]
[1] *Instituto de Botânica (São Paulo), Av. Miguel Stéfano, 3687, Água Funda, CEP: 04301-902, São Paulo, SP, Brazil.*
[2] *Elphinstone College, 156 MG Road, Fort, Mumbai, Maharashtra, India.*
Author for correspondence: simoes.ana.convolv@gmail.com

Abstract

We present a synopsis of a rare and little-known species of *Distimake* from Western India: a complete morphological description based on recent collections is provided, and nomenclature and typification issues are resolved. The fruit and seeds are described for the first time. With new morphological evidence and a full characterization of *D. rhyncorhiza*, the present study corroborates its placement in *Distimake* and supports its identity as a distinct species. The conservation status is assessed as Endangered but its distribution range is not yet fully documented and this assessment might be reviewed if more collections are made.

Keywords: endemism, taxonomy, nomenclature

Introduction

Distimake rhyncorhiza (Dalzell) Simões & Staples is a little-known species, endemic to Western India. It was described as *Ipomoea rhyncorhiza* Dalzell in *Hooker's Journal of Botany and Kew Miscellany* (Dalzell 1851: 179), the Greek-based epithet referring to the tuberous roots shaped like "a beak". The species was well documented by British botanists in the late 19th century (Dalzell & Gibson, 1861: 167; Clarke, 1883: 214; Woodrow, 1898: 172; Talbot, 1902: 252), with special mention of the use of its tuberous roots and leaves as food by local people.

Hallier (1893: 552) transferred *Ipomoea rhyncorhiza* to the genus *Merremia*, as *Merremia rhynchorhiza* (Dalzell) Hall. f., on account of its deeply lobed leaves. A recent study of *Merremia senso lato.* (Simões & Staples, 2017: 575) then transferred this species to *Distimake* Raf., a monophyletic genus segregated from the polyphyletic *Merremia* (Simões & Staples, 2017: 571), as *Distimake rhynchorhizus* (Dalzell) Simões & Staples.

Distimake was separated from *Merremia s.l.* on molecular, morphological, palynological and geographical evidence. The main characters separating *Distimake* from *Merremia senso stricto* are the deeply lobed or compound leaves in *Distimake*, opposed to the entire or shallowly lobed leaves of *Merremia*, and the flat sepals, which are appressed to the corolla tube in *Distimake*, but are moderately convex, and not appressed to the corolla tube, in *Merremia*. *Distimake rhyncorhiza* conforms to *Distimake* (Simões & Staples, 2017: 571) in being a slender herb, with deeply 5- or 7-lobed leaves, the calyx appressed to the corolla tube and the corolla medium-sized, glabrous, funnelform and with spirally twisting anthers.

Distimake is a genus of 42 species (Simões & Staples 2017: 571, Petrongari et al. submitted), with greatest diversity in Tropical America and Africa (39 species); two species are endemic to Northern Australia, while *Distimake rhyncorhiza* is endemic to Western India. A thorough search of the botanical literature has revealed little information about this species. No information about pollen, fruit or seed morphology has been reported hitherto. Such characters are significant in the taxonomy of Convolvulaceae, and particularly the fruit, as this is necessary to confirm the placement of *D. rhyncorhiza* in *Distimake*.

Distimake rhyncorhiza is restricted to the Western Ghats in India, occurring, in particular, in the Maharashtra section known as the Sahyadri Hills, which are well known for their high level of endemism. This chain of mountains runs parallel to India's western coast, about 30 to 50 kilometers inland, and covers an area of about 160,000 km²; it

Accepted by John Wood: 29 Nov. 2017; published: 2 Feb. 2018

extends 1,600 kilometers from the country's southern tip, to Gujarat in the north, interrupted on ly by the 30 kilometer wide Palghat Gap. The Western Ghats are one of the world's "hottest" biodiversity hotspots with high levels of diversity and endemism amongst reptiles, amphibians, fresh water fishes and, especially, plants. 5,000 plant species are reported, of which 1,700 (34%) are endemic (C.E.P.F., 2016). *D. rhyncorhiza* has been reported to be Endangered (EN), although the criteria used to determine this status were not specified (Gaikwad et al. 2015: 8).

As all aspects of this species are so poorly known, a targeted effort has been ongoing to locate it in the field and in different herbaria. Recent fieldwork carried out by the second author on the Amboli Plateau (2016) and at Talkat (2017) has resulted in the collection of flowering and fruiting specimens.

The present paper aims to provide a more complete description of this little known species; resolve nomenclatural and typification problems; demonstrate its identity as a distinctive species; and assess its current generic placement in the light of new morphological evidence.

Material and Methods

The relevant historical and contemporary literature was reviewed and herbarium specimens were consulted at BLAT and, via online resources, at BR, K, JSTOR, S, UPS; Indian herbaria were contacted to help locate additional specimens (BARO, BSI, CAL, SUK). Flowering and fruiting specimens were collected, and the vouchers deposited at St. Xavier's (Blatter) Herbarium (BLAT). The Conservation status was calculated using GEOCAT (Bachman et al. 2011),

Taxonomic treatment

Distimake rhyncorhiza [rhyncorhizus] (Dalzell) Simões & Staples (2017: 575).

Ipomoea rhyncorhiza Dalzell (1851: 179); Dalzell & Gibson (1861: 167); Clarke (1883: 214); Woodrow (1898: 172); Talbot (1902: 252).

Merremia rhynchorhiza (Dalzell) Hallier f. (1893: 552); Cooke (1905: 239); Staples (2010: 500).

Type:—INDIA. 'in montibus Syhadree, prope Tulkut-ghat' [Talkat] *Dalzell* s.n. (Lectotype K000830864!, designated here; isolectotypes: K000830863!, K000830865 !, K001081776!).

Prostrate or trailing herb. *Roots* tuberous, the tuber sub-woody, moderately rostrate. *Stem* filiform, glabrous. *Leaves* cordate in outline, deeply 5–7-palmately lobed, the central lobe acuminate, the lateral lobes with an emarginate, shortly mucronate apex; lamina 4 × 5 cm; margins irregularly dissected; adaxial surface hispid with simple yellowish hairs, abaxial surface glabrous; petiole glabrous, 1–1.5 cm long. *Inflorescences* of axillary 1–2-flowered cymes; peduncles filiform, glabrous, 5–7 cm long, nearly as long as the leaves, about 4 times longer than the petioles; bracteoles lanceolate, c. 2mm long; pedicels filiform, glabrous, 0.3 cm long. *Sepals* 5, appressed to the corolla tube, glabrous, unequal, the 2 outer shorter, narrowly elliptic, 1.4 × 0.3 cm, apex shortly acuminate; inner sepals longer, narrowly elliptic, 2 × 0.3 cm, apex shortly acuminate. *Corolla* funnelform, bright (sulphur-)yellow, 3.5 – 4 cm long, glabrous. *Stamens* unequal in length, 2 short and 3 long, shortly pubescent at the base of the filaments, yellow; anthers white, spirally twisting at dehiscence; pollen not known. *Style* filiform, glabrous, white; stigma with 2 globose lobes. *Fruit* capsular, ellipsoid, 11 × 10 mm, glabrous, 4-valved; sepals strongly reflexed, accrescent in fruit, up to 2 × 0.5 mm; *seeds* 3 or 4, golden brown, trigonous, 5 mm long, glabrous (Fig. 1, Fig. 2).

Phenology:—Flowering and fruiting from July to October.

Distribution:—Western Ghats, particularly the southern part, in Maharashtra and Karnataka States. (Map 1). Also reported in the northern part of the Western Ghats, in Gujarat State (Ranal & Nagar, 2017), but no specimens were located to confirm these reports, although a photograph (Ranal & Nagar, 2017) appears to be of this species.

Habitat and ecology:—Geophyte (Gaikwad et al. 2015: 8), growing in rock crevices on lateritic plateaus; also found in open areas on hilly slopes or by the roadside; recorded altitude ranges between 50 and 1,000 m.

Uses: –The tuberous roots and leaves are eaten as vegetables by local people (Dalzell 1851: 179).

Vernacular name:—"Sada bhaji" [*sada* = plateau; *bhaji*= vegetable] (Marathi); "Nhavali" (Marathi).

Conservation status:—Endangered (EN), with a calculated area of occupancy of 20.000 km2, and extent of occurrence of 1,912.652 km2 in GEOCAT (Bachman et al. 2011).

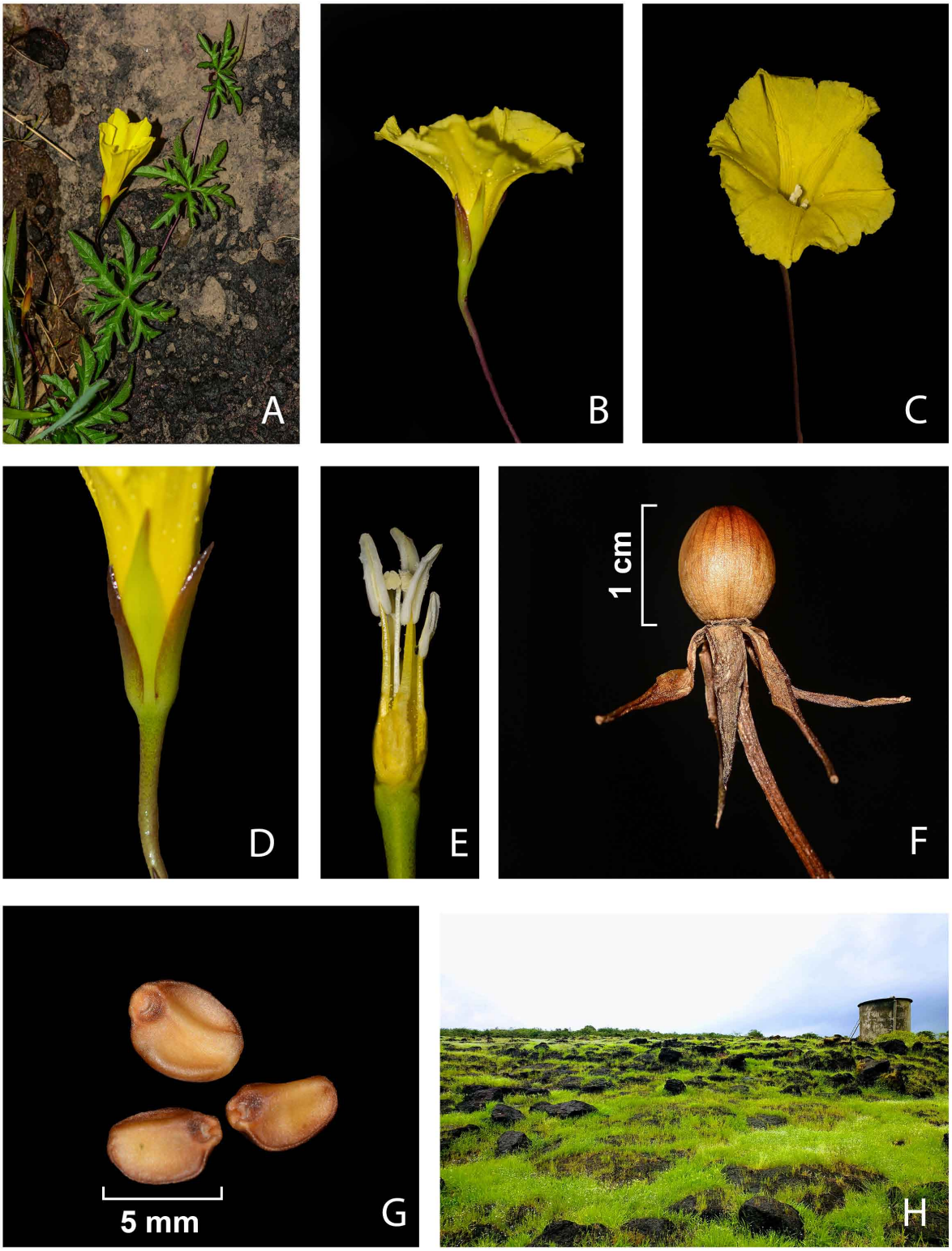


FIGURE 1. ***Distimake rhynchorhiza*** **(Dalzell) Simões & Staples. A**. Habit. **B.** Flower, side view. **C.** Corolla, upper view. **D.** Calyx. **E.** Gynoecium and androecium (voucher *ASSM 30*, BLAT) **F.** Fruit. **G.** Seeds (voucher *More* ASSM31 (BLAT); **H**. Amboli: habitat in an open rocky lateritic plateau; collection site of *More* ASSM30 (BLAT);. Photographs: © Sushant More, 2016 & 2017.

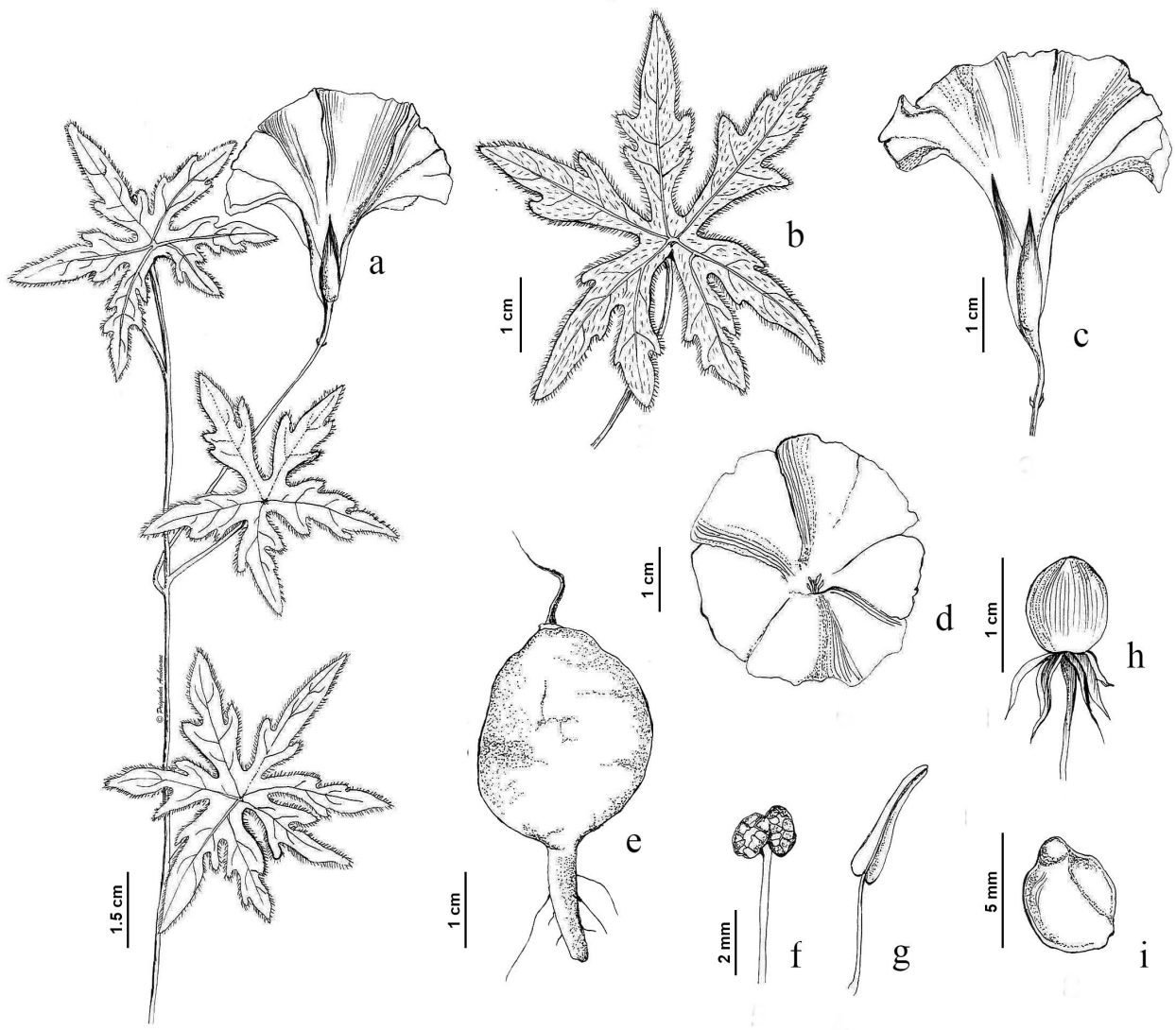


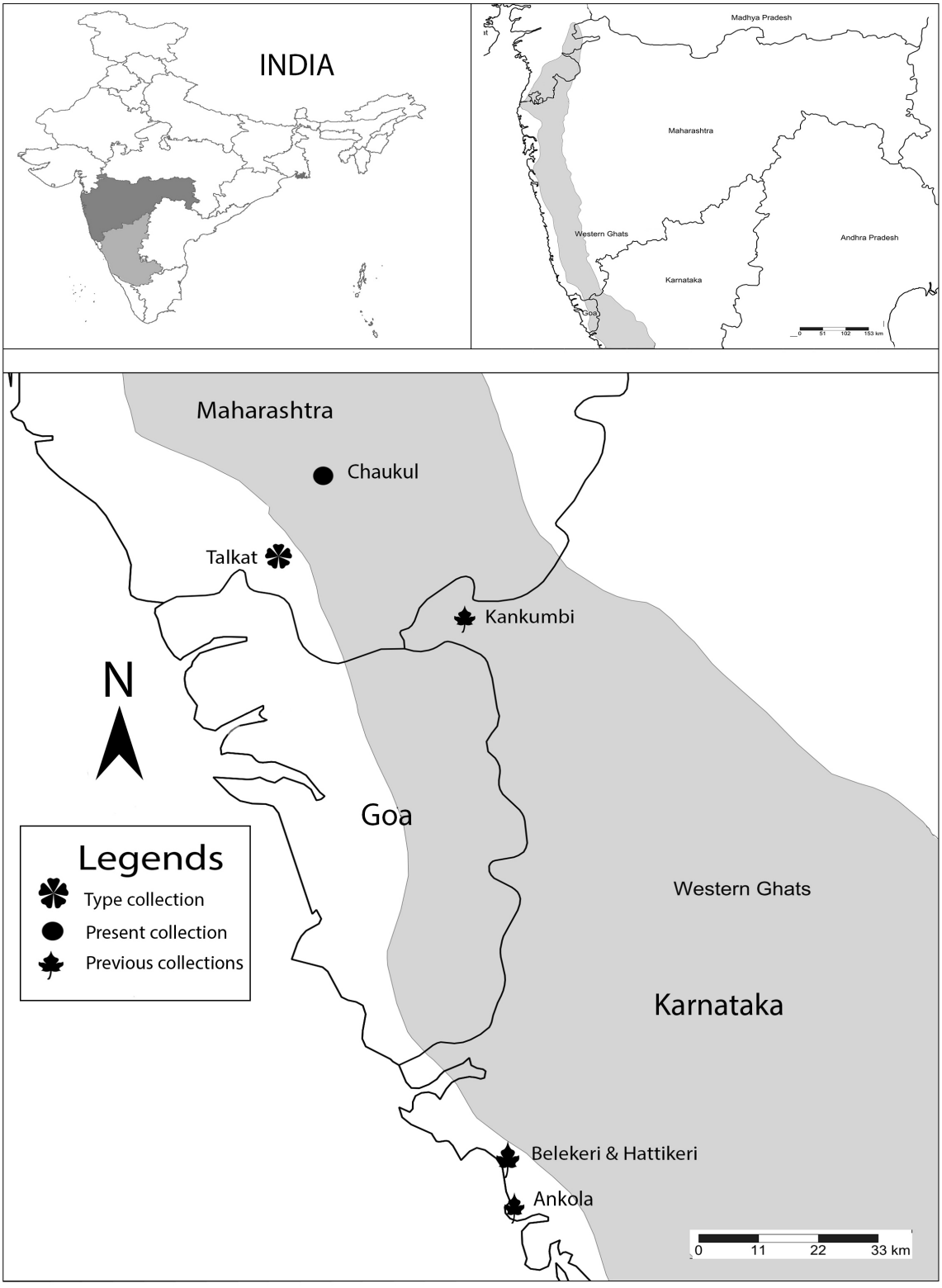
FIGURE 2. ***Distimake rhynchorhiza*** **(Dalzell) Simões & Staples. A.** Habit. **B.** Leaf. **C**. Flower, side view. **D**. Corolla, front view. **E.** Root. **F.** Stigma. **G.** Anther. **H**. Fruit. **I.** Seed. Drawn by Priyanka Ambavane.

Specimens seen:—INDIA. Maharashtra. Concan: Talkat, 'in montibus Syhadree, prope Tulkut-ghat'[Talkat], *Dalzell s.n.* (K!); ibid., 1 Oct. 2017, *More, S.* ASSM31 (BLAT!); "Malabar, Concan, etc., regio trop." *Stocks, Law & Co s.n.* (BR!, F, UPS, S). Ghat: Amboli, Chaukul, 16 Sept. 2016, *More, S.* ASSM30 (BLAT!); ibid., Sept. 1992, *Gawade, B.G.* 437 (BLAT!). Karnataka. Belgaum: Kankumbi, 17 Aug. 2008, *Shimpale* 3342 (NCK!); crevices of rocks at 1,000 m altitude, *SUK-SPG 1305* (SUK); Ankola, 30 July 1956, 1.5 miles out towards Kawar, *Kapadia, Z. J.* ZK2158 (BLAT!); ibid., *Kapadia, Z.J.* ZK2159 (BLAT!); ibid., *Kapadia, Z. J.* ZK2162 (BLAT!); ibid., *Kapadia, Z.J.* ZK2163 (BLAT!); ibid., *Kapadia, Z.J.* ZK2164 (BLAT!). North Kanara: Hattikeri, Oct. 1919, *Hallberg & McCann* 34405 (BLAT!); ibid., *Hallberg & McCann* 34422 (BLAT!); without locality, *Almeida* MRA2573 (BLAT!).

Typification:—The lectotype was selected because the sheet is annotated by Dalzell in his own handwriting and is the most complete specimen with flowers and, most crucially, the presence of the beak-shaped root that is characteristic of the species. We have also taken the opportunity to correct two orthographic mistakes related to the gender and spelling of the epithet: when making the combination in *Distimake* (Simões & Staples 2017: 571), the epithet was incorrectly changed to the masculine form and wrongly spelled 'rhynchorrhizus' (sic). The epithet is a noun used in apposition as treated by ICBN (Art. 60.8) so should not be modified.

Discussion:—The four-valved chartaceous capsule with enlarged, strongly reflexed fruiting sepals is characteristic of the genus *Distimake* so confirming the placement of *D. rhynchorhiza* in this genus. As no other similar species has been found anywhere in the genus and, given the high frequency of endemism in its area of occurrence, we are satisfied that this is a distinct species endemic to the Western Ghats. Although all the distinctive characters occur in other species in the genus, they never occur in the same unique combination. The bright yellow corolla is not common in the

genus, but a few species of *Distimake* from the Neotropics do have this colour. *D. rhynchorhiza* exhibits a specialized ecological preference for lateritic rock outcrops, which could explain its rarity and restricted distribution. It is probable that the species also occurs in Gujarat, although no voucher specimens confirm this. Efforts are needed to confirm its presence there with any consequent revision to the assessment of its conservation status.



MAP 1. Distribution of *Distimake rhyncorhiza* (Dalzell) Simões & Staples.

Acknowledgements

The authors would like to thank Miss. Priyanka Ambavane from the Indian Institute of Science for the ink illustrations; we are also grateful to Lakshimnarasimhan Pakshirajan of the Botanical Survey of India for coordinating efforts to locate specimens of this species, and to several curators and technicians from different herbaria for their assistance in searching their collections and providing information, namely Dr. Avishek Bhattacharjee (CAL), Dharmendra Shah (BARO), Dr. Rajendra Shinde (BLAT), Mr. Sameer Patil (BSI Pune); and Dr. Padamnabhi Nagar (BARO). We also thank Dr. Priti Patel of L.H. Hiranandani College (India), for help with the interpretation of the type locality, and Mr Mandar Sawnt and Mr Sanchit More for their assistance in the field. Also thanks are due to researchers at the Instituto de Botânica, São Paulo (Brazil), Dr. Tarciso Filgueiras and Dr. Jefferson Prado, for useful discussion on nomenclature and Greek etymology; and Dr. George Staples, Dr. Rosângela Simão-Bianchini and MSc Fernanda Petrongari for discussion and comments on the manuscript; also John Wood and the anonymous reviewers for useful suggestions. The first author would like to thank CAPES (Brazil) for funding her research work, Grant BJT 88881.067993/2014-01.

References

Bachman, S., Moat, J., Hill, A.W., de la Torre, J. & Scott, B. (2011) Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. *In:* Smith, V. & Penev, L. (Eds.) e-Infrastructures for data publishing in biodiversity science. *ZooKeys* 150: 117–126.
https://doi.org/10.3897/zookeys.150.2109

C.E.P.F. (2016) *Critical Ecosystem Partnership Fund, Conservation International.* Available from: http://www.cepf.net (accessed 25 September 2017)

Clarke, C.B. (1883) Convolvulaceae. *In:* Hooker, J.D. (Ed.) *Flora of British India 4*. L. Reeve & Co., London, 214 pp.

Cooke, T. (1905) Convolvulaceae. *In: The flora of the Presidency of Bombay 2*. London, Taylor Francis, 239 pp.

Dalzell, N.A. (1851) Contributions to the botany of Western India. *Hooker's Journal of Botany and Kew Garden Miscellany* 3: 179.

Dalzell, N.A. & Gibson, A. (1861) *The Bombay flora: or Short descriptions of all the indigenous plants hitherto discovered in or near the Bombay Presidency: together with a supplement of introduced and naturalized species: 167.* Bombay: Education Society's Press.
https://doi.org/10.5962/bhl.title.56346

Gaikwad, S., Gore, R., Garad, K., Gaikwad, S. & Mulani, R. (2015) Geophytes of northern Western Ghats (Sahyadri Ranges) of India: a checklist. *Check List* 11 (1): 1543.
https://doi.org/10.15560/11.1.1543

Hallier, H.J.G. (1893) Versuch einer naturlichen Gliederung der Convolvulaceen auf morphologischer und anatomischer Grundlage. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie*16 (4–5): 552.

Ranal, K.G. & Nagar, P.S. (2017) Diversity and distribution of endemic Angiosperms in Gujarat. *International Journal of Advanced Research* 5 (6): 751.

Petrongari, F., Simões, A.R. & Simão-Bianchini, R. (submitted) New combinations and lectotypfications in Distimake Raf. *Phytotaxa*.

Simões, A.R. & Staples, G.W. (2017) Dissolution of Convolvulaceae tribe Merremieae and a new classification of the constituent genera. *Botanical Journal of the Linnean Society* 183 (4): 561–586.
https://doi.org/10.1093/botlinnean/box007

Staples, G.W. (2010) A checklist of *Merremia* (Convolvulaceae) in Australasia and the Pacific. *Garden's Bulletin Singapore* 61(2): 500.

Talbot, W.A. (1902) *The trees, shrubs, and woody-climbers of the Bombay Presidency* [Syst. list trees Bombay], ed. 2. Government Central Press, Bombay, 252 pp.

Woodrow, G.M. (1898) The Flora of Western India, part V. *Journal of Bombay of Natural History Society* 12: 172.