

A new species, *Oxygyne myanmarensis* (Thismiaceae), from Myanmar: bridging the disjunct distribution between Africa and Japan

NOBUYUKI TANAKA^{1,4*}, CHIT SOE PAING^{2,5} & MU MU AUNG^{3,6}

¹Department of Botany, National Museum of Nature and Science, 4-1-1 Amakubo, Tsukuba, Ibaraki, 305-0005 Japan

²Chit Win Sein Farm, corner of Saw San Si Phoe Street and Sein Si Mya Street, Ward No.(6), Hpa-an, Kayin State, Myanmar

³Forest Research Institute, Forest Department, Ministry of Natural Resources and Environmental Conservation, Yezin, Nay Pyi Taw, Myanmar

⁴✉ nobuyuki_tanaka@kahaku.go.jp;  <https://orcid.org/000-0001-8703-5967>

⁵✉ chitwinseinfarm@gmail.com

⁶✉ mumuaung85@gmail.com;  <https://orcid.org/0000-0002-8263-9099>

*Corresponding author

Oxygyne Schlechter (1906: 140) (Thismiaceae) is a poorly known genus of achlorophyllous mycoheterotrophic plants that possesses one of the most remarkable distributions of all angiosperm plant genera globally, being disjunct between southern Japan and western central Africa (Cheek *et al.* 2018). *Oxygyne* was established with the African species *O. triandra* Schlechter (1906: 140) as the type species. Subsequently, three additional species, *O. hyodoi* Abe & Akasawa (1989: 161), *O. yamashitae* Yahara & Tsukaya (2008: 99), and *O. shinzatai* (Hatusima in Ohashi 2015: 116) Tsukaya (2016: 195), were described from southern Japan. In their monograph of the genus, Cheek *et al.* (2018) described two further African species, *O. duncanii* Cheek in Cheek *et al.* (2018: 16) and *O. frankei* Cheek in Cheek *et al.* (2018: 22). Christenhusz *et al.* (2018: 55) independently described *O. confusa* E.Bidault, V.Mercx & Byng based on a specimen deposited at P. Because they were based on the same specimen, *O. confusa* is clearly conspecific with *O. frankei*. However, *O. confusa* was published before *O. frankei*.

Oxygyne is distinguished from other genera of Thismiaceae, *Thismia* Griffith (1845: 221), *Haplothismia* Airy Shaw (1952: 277) and *Relictithismia* Suetsugu & Tagane (2024: 418) by having three stamens and differing structure of the perianth and androecium. In *Oxygyne*, the outer and inner perianth lobes are generally similar in shape, lamellae are present at the mouth of the perianth tube and the androecium consists of three stamens with basally enlarged filaments that curve inward. In contrast, *Thismia* typically has six stamens, which are often connate by their broadened connectives to form a pendent staminal tube inside the perianth tube. Moreover, the inner and outer perianth lobes in *Thismia* are often morphologically differentiated, and an annulus is frequently developed at the mouth of the perianth tube.

Six species are currently recognised in the genus. However, because *Oxygyne* is so inconspicuous and many other Thismiaceae have recently been discovered in Southeast Asia, further species may yet await discovery (Cheek *et al.* 2018, Thorogood 2019).

The first and third authors have jointly conducted floristic inventory studies in various parts of Myanmar since 2015. However, recent political instability has severely restricted access to many areas of the country. We have therefore continued our floristic inventory work in collaboration with the second author, a citizen scientist. During a botanical survey conducted by the second author in the vicinity of Hlaingbwe, Kayin State, ca. 180 km east of Yangon (formerly Rangoon), we discovered a population of *Oxygyne*. Based on field observation and spirit-preserved specimens collected during the survey, we conducted detailed morphological examinations. The specimens were found to represent an undescribed species. A key to all species of *Oxygyne* is updated based upon the key by Cheek *et al.* (2018).

Taxonomic treatment

Oxygyne myanmarensis Nob.Tanaka & Paing, *sp. nov.* (Fig. 1)

Type:—MYANMAR. Kayin State: Paung Daw Oo Mountain, Hlaing Bwe Township. 16°56'34.947"N, 97°50'57.631"E, 150 m elev., 2 Dec 2025, Paing 111 (holotype: TNS; isotype: RAF, spirit collection).

Oxygyne myanmarensis is like *O. shinzatai* in having a campanulate perianth tube, long filiform perianth lobes and filaments with callus-like clusters but differs by its brownish orange perianth tube, stigma with a triangled head prolonged into an erect conical projection and papillate anther.

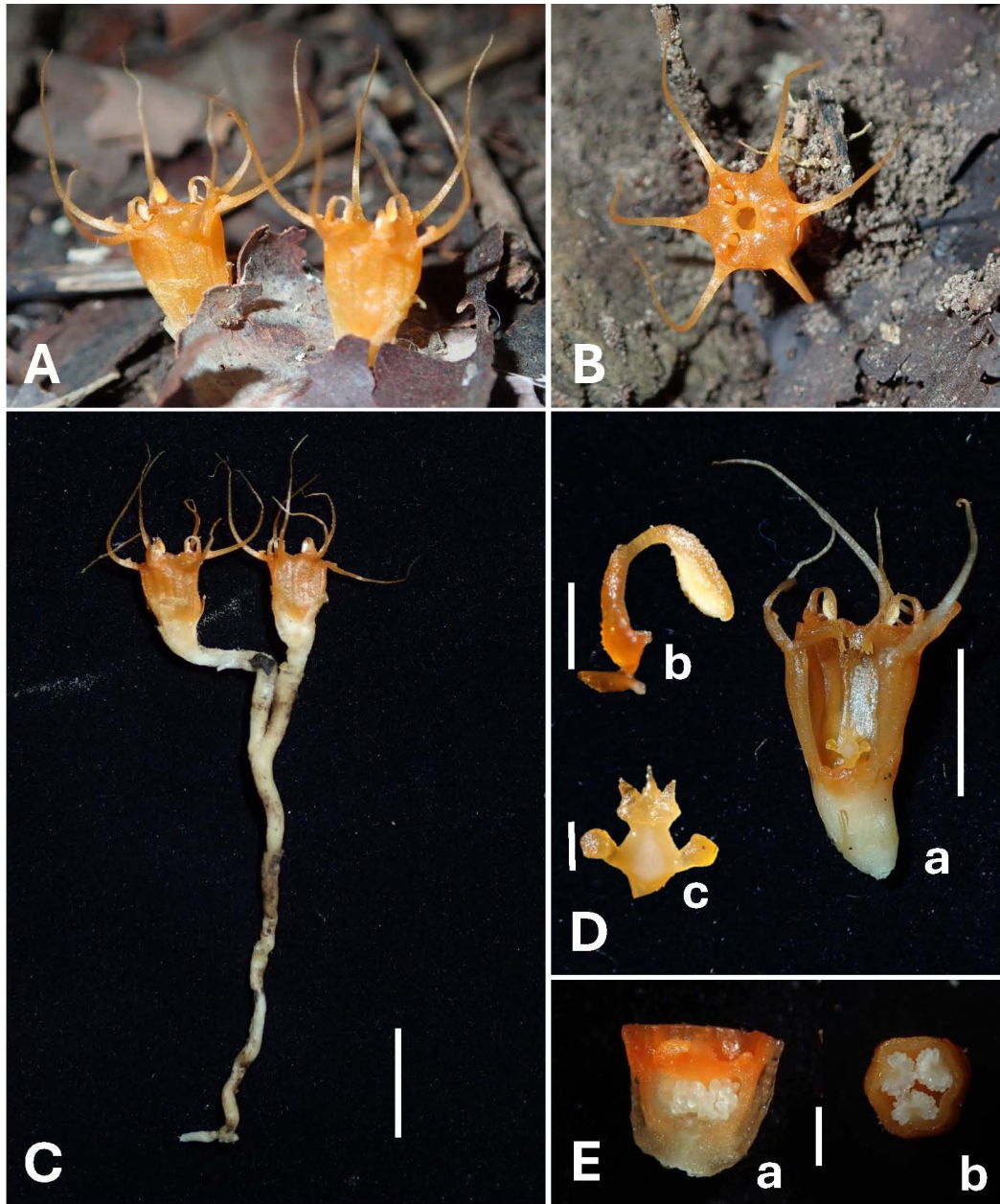


FIGURE 1. *Oxygyne myanmarensis* A. Natural habitat. B. Flower viewed from above. C. Habit. D. a: Flower with part of the perianth tube removed to expose the androecium. b: Stamen. c: Pistil. E. Ovary, longitudinal (a) and transverse (b) sections to show placentation. Scale bars: 1 cm (C, D-a), 1 mm (D-b, c, E).

Terrestrial achlorophyllous, mycoheterotrophic herbs. Plant 5–6 cm tall from tip of root to top of flower. Roots white, vermiform, creeping, 1.0 cm long, 0.1 cm diam. Stem simple or branched, erect, sometimes sparsely papillate, 4–5 cm long. Leaves scale-like, 4 mm long, white. Inflorescence 1–4-flowered, bearing scale-like bracts, peduncle short, ca. 1 mm long. Bracts 3, translucent white to light brown, glabrous, oblong-triangular, subtending the flower, 4.7–5.7 mm long, sometimes slightly papillate, especially in fruiting stage. Flowers erect, 7.5–10.0 mm long, 4.8–5.0 mm in diam., brownish orange. Perianth tube brownish orange, obconical, 7.0 mm long, 5.0 mm in diam., 6-lobed, glabrous; perianth lobes 6, subequal, patent to slightly ascending, triangular, pale orange, appendage filiform, $11.0\text{--}12.0 \times 0.5\text{--}0.6$ mm at base. Each perianth lobe with pale orange callus-like cluster on adaxial surface near the base; callus cluster 0.25 mm long, 0.40 mm in diam., with 3 trapezoid lamellae from inner perianth lobes, trapezoid lamellae 2.5 mm wide, with shallow apical teeth, brownish orange, curved downward from throat of perianth tube, forming 3 narrow slits and a small central opening of throat. Stamens 3, elongate at the base of outer perianth lobes, filaments erect at base, then at midpoint curved downward between the apertures between the trapezoid lobes into the throat of perianth tube, translucent white to light orange, filaments themselves dorsiventrally flattened, ca. 2.6 mm long, ca. 1.2 mm wide at base, ca. 0.2 mm wide at apex, anther apical, thecae $\pm$ elliptic,

ca. 0.8×0.3 mm, pale yellow, connective tissue orange, connective ca. 1.2×0.6 mm papillate on dorsal surface. Ovary white to pale yellow, campanulate, 1×2 mm, unilocular, placentae 3, in parietal placentation, subsessile, with many ovules. Style terete, with three lateral clavate appendages, appendages clavate, ca. 0.6 mm long; stigma pale orange, with a triangled head, bearing 3 erect conical projections, each 0.3 mm long, hyaline at apex; head broadly rhombic in outline. Fruits (immature) broadly ellipsoid, brownish orange, $6\text{--}7 \times 3$ mm. Seeds not seen.

Other specimen examined:—MYANMAR. Kayin State: Paung Daw Oo Mountain, Hlaing Bwe Township, $16^{\circ}56'29.291''\text{N}$, $97^{\circ}51'1.446''\text{E}$, 150 m elev., 11 September 2026, *Paing 02834* (RAF, spirit collection).

Distribution:—Thus far known only from the type locality.

Habitat & Phenology:—In the leaf-littered floor of a shaded shrub forest near a stream. Flowering September to early December; young fruits October to December.

Etymology:—Referring to the country in which this new species was discovered.

Conservation:—At the type locality, in addition to the population from which the type specimens were collected, we discovered one additional population and a single plant at a third locality. These three populations were located in the same mountain range within 500 m of one another and all occurred in humid habitats along streams. We observed 20–30 individuals in the type population, 50–100 individuals in one of the other populations and only a single individual at the third site. *Oxygyne myanmarensis* occurs in monastery forests that have long been protected by the respective monasteries. This long-term protection is probably one of the reasons why this plant has been able to persist at these sites. These forests are unlikely to be developed in the immediate future.

Notes:—*Oxygyne myanmarensis* grows on calcareous soil over limestone along stream. *Balanophora fungosa* Forster & Forster (1776: 100) was also growing at this site. *Oxygyne* had only previously been recorded from central Africa and southern Japan and was therefore regarded as one of the most striking examples of a disjunct distribution among angiosperms. Although numerous achlorophyllous species belonging to several other genera have been discovered between these two regions, *Oxygyne* remained undiscovered there. Consequently, Cheek *et al.* (2018) suggested that if *Oxygyne* were to be discovered elsewhere, it would most likely be found somewhere between Africa and Japan. The discovery of this genus in Myanmar represents the first record of *Oxygyne* from Southeast Asia (Fig. 2). This finding suggests that the genus may also be discovered in other parts of Asia through further botanical exploration. In particular, rare, tiny, and inconspicuous plants such as *Oxygyne* are more likely to be discovered by locally based citizen scientists.

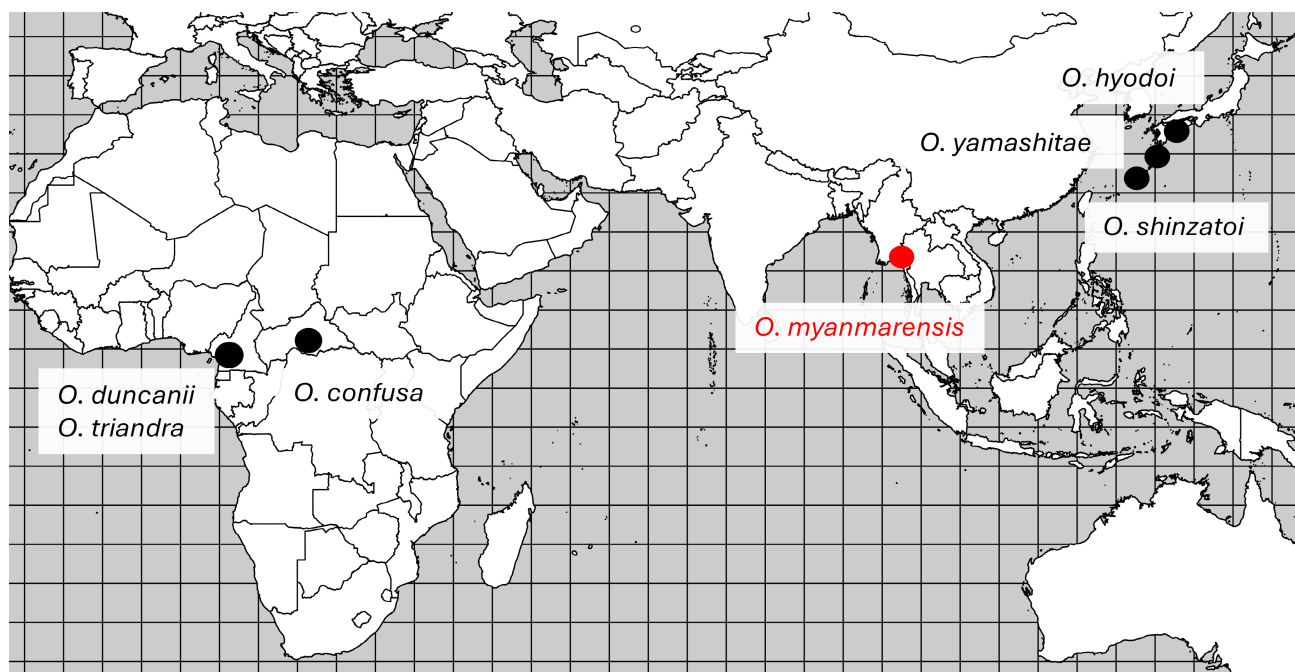


FIGURE 2. Distribution of *Oxygyne* species.

Updated key to species of *Oxygyne* (based on Cheek *et al.* 2018)

1. Flowers blue-white or blue-green.....2
- Flowers orange-brown or orange-brown and green4
2. Staminal filaments strongly dorsiventrally flattened, subfoliose, margins deeply toothed; terminal style-stigma with three acute branches, style appendages each bifurcate, apices acute.....*O. yamashitae*
- Staminal filaments subcylindrical, margins entire; style-stigma and style appendages with apices clavate or capitate, rounded3

3. Perianth lobes filiform; base of lobes with callus-like cluster of round cells on the adaxial surface *O. shinzatai*
- Perianth lobes narrowly triangular at base; base of lobes smooth.....*O. hyodoi*
4. Perianth lobes narrowly triangular; tube about as long as wide*O. duncanii*
- Perianth lobes filiform; tube about twice as long as broad5
5. Perianth lobes white; tube dark green, base orange-brown..... *O. confusa*
- Perianth lobes orange to brown; tube orange-brown.....6
6. Perianth lobes patent to slightly ascending with callus-like cluster*O. myanmarensis*
- Perianth lobes erect, without callus-like cluster *O. triandra*

Acknowledgements

We are grateful to Forest Department, Ministry of Natural Resources and Environmental Conservation for their permission to carry out fieldwork in reserved forests, and for their support and collaboration. We sincerely thank Martin Cheek at the Royal Botanic Gardens, Kew, and another anonymous reviewer for their valuable and constructive comments and suggestions, which greatly improve the manuscript. This study was partially carried out by the international cooperative project “Natural History of Biodiversity Dark Spots in the Continental Oriental Region” as the integrated research initiated by the National Museum of Nature and Science, Japan, based on a memorandum of understanding (MoU) with the Forest Department, Ministry of Natural Resources and Environmental Conservation, Myanmar.

References

- Abe, C. & Akasawa, Y. (1989) A new species of *Oxygyne* (Burmanniaceae) found in Shikoku, Japan. *Journal of Japanese Botany* 64: 161–164.
- Airy Shaw, H.K. (1952) A new genus and species of Burmanniaceae from south India. *Kew Bulletin* 2: 277–279.
<https://doi.org/10.2307/4109280>
- Christenhusz, M.J.M., Fay, M.F. & Byng, J.W. (2018) GLOVAP nomenclature part 1. *The Global Flora* 4: 1–155. [Plant Gateway Ltd]
- Cheek, M., Tsukaya, H., Rudall, P.J. & Suetsugu, K. (2018) Taxonomic monograph of *Oxygyne* (Thismiaceae), rare achlorophyllous mycoheterotrophs with strongly disjunct distribution. *PeerJ* 6: e4828.
<https://doi.org/10.7717/peerj.4828>
- Forster, J.R. & Forster, G. (1776) *Characters generum plantarum*. White, Cadell & Elmsly, London, 155 pp.
<https://doi.org/10.5962/bhl.title.4448>
- Griffith, W. (1845) On the root parasites referred by authors to Rhizanthaceae and their allies. *Proceedings of the Linnean Society of London* 1: 216–221.
- Ohashi, H. (2015) Resurrection of *Saionia* (Thismiaceae). *Journal of Japanese Botany* 90: 115–118.
- POWO (2026) *Plants of the World Online*. Royal Botanic Gardens, Kew. Available from: <http://www.plantsoftheworldonline.org/> (accessed 13 July 2026)
- Schlechter, F.R.R. (1906) Burmanniaceae africanae. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 38: 137–143.
- Suetsugu, K., Nakamura, Y., Nakano, T. & Tagane, S. (2024) *Relictithismia kimotsukiensis*, a new genus and species of Thismiaceae from southern Japan with discussions on its phylogenetic relationship. *Journal of Plant Research* 137: 411–422.
<https://doi.org/10.1007/s10265-024-01532-5>
- Thorogood, C.J. (2019) *Oxygyne*: an extraordinarily elusive flower. *Plants, People, Planet* 1: 67–70.
<https://doi.org/10.1002/ppp3.26>
- Tsukaya, H. (2016) Burmanniaceae. In: Iwatsuki, K., Boufford, D.E. & Ohba, H. (Eds.) *Flora of Japan*, vol. IVb. Kodansha, Tokyo, pp. 194–197.
- Yahara, T. & Tsukaya, H. (2008) *Oxygyne yamashitae*, a new species of Thismiaceae from Yaku island, Japan. *Acta Phytotaxonomica et Geobotanica* 59: 97–104.