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Source: Lindbergia, 40(5) : 45-48

Published By: Dutch Bryological and Lichenological Society and Nordic Bryological Society

URL: <https://doi.org/10.25227/linbg.01088>

The Japanese *Fissidens neomagofukui* (Bryophyta: Fissidentaceae) – new to India from the Western Ghats

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Fissidens neomagofukui, so far known only from its type locality in Japan, has been discovered in the Indira Gandhi National Park, Anamalais, in Western Ghats in India. A description is provided with figures, a photo plate and a key to distinguish *F. neomagofukui* from the similar *F. diversifolius*.

Surveys carried out in the Indira Gandhi National Park in Anamalais (10°13' – 10°33'N, 79°49' – 77°21'E) in the Western Ghats, led to the discovery of the moss *Fissidens neomagofukui* Z. Iwats. & Tad. Suzuki, so far known only from its type locality in Honshu, the main island of Japan. In order to facilitate recognition of this species, the Indian material is described and illustrated. A key is provided to distinguish *F. neomagofukui* from *F. diversifolius* Mitt., a similar congener, also known from India. The specimen is deposited at SCCN.

Fissidens neomagofukui Z. Iwats. & Tad. Suzuki, J. Hattori Bot. Lab. 92: 165. 2002. - Type: Japan, Honshu, Mie-ken, Iinan-gun, Iidaka-cho, Miyamae, Hanaoka Shrine, ca 180 m, on trunk of *Ginkgo*, July 18, 1975, T. Magohuku 16240 (NICH). (Fig. 1, 2).

Plants caespitose. Fertile plants 1.8–3 mm tall and 1.4–1.8 mm wide. Vegetative plants 3–5 mm tall and 1.6–2.4 mm wide, green. Stems erect, ovate in cross section, ca 0.10 × 0.08 mm, with 9–11 cells across, without a central strand, greenish-yellow distally, brownish-orange below; cortex one- or two-layered, with thick-walled, 4–10 × 3–8 μm cells; medullary cells 10–16 × 8–14 μm, thin-walled. Leaves complanate, 4 to 8 pairs, 0.6–0.8 × 0.28–0.32 mm, ovate-lanceolate, entire, broadly acute at apex; dorsal lamina narrowing down and ending at costa base; vaginant laminae subequal, closed, 1/2 to more than 1/2 as long as leaves; cells with more or less bulging walls; apical laminal cells 5–10 × 4–8 μm, quadrate-hexagonal; median cells 6–10 × 5–8 μm, quadrate-hexagonal; basal cells 8–16 × 6–10 μm, quadrate

to rectangular; vaginant laminae of vegetative leaves with a weak limbidium of 1 or 2 rows of pale-brown cells, extending 1/2 to almost its full length; costa ending below apex, with 3 guide cells in cross section. Perichaetial leaves oblong-lingulate, 1.12–1.10 × 0.38–0.40 mm, with a weak limbidium on vaginant laminae. Sporophytes apical. Setae 2–2.5 mm tall, smooth, orange-brown. Capsules 0.5–0.6 × 0.3–0.32 mm, ovoid-cylindric, brown. Peristome teeth, 40–45 × 15–18 μm, anomalous, short, undivided and obtuse or irregularly divided, highly papillose, orange-red. Spores 24–28 μm, globose, papillose, pale brown.

Habitat: Corticolous, on *Ginkgo biloba* L. and *Terminalia paniculata* Roth (Combretaceae), in a moist deciduous forest, 180–820 m.

Distribution: Japan and India: Western Ghats of Tamil Nadu (Coimbatore).

Specimen examined: Western Ghats: Tamil Nadu, Coimbatore Dist., Anamalais, Valparai, Topslip, on the way to Ambuli, ca 820 m, 25.9.2014, A.E.D. Daniels & K.C. Kariyappa 9789 p.p.

Vegetative plants of *Fissidens neomagofukui* hardly differ from those of *F. diversifolius* Mitt. Sporophytes of these two species, on the other hand, are easily distinguished by their peristomes.

- 1a. Vaginant laminae of upper leaves of perichaetial plants with a weak limbidium; peristome teeth anomalous, short, 0.7–1.0 mm high, irregularly divided or not, distally highly papillose; spores 24–28 μm in diameter ***F. neomagofukui***
- b. Vaginant laminae of upper leaves of perichaetial plants with a distinct limbidium; peristome teeth bryoides-type, 1.8–2.1 mm, spirally thickened distally, not papillose; spores smaller, 18–22 μm in diameter ***F. diversifolius***

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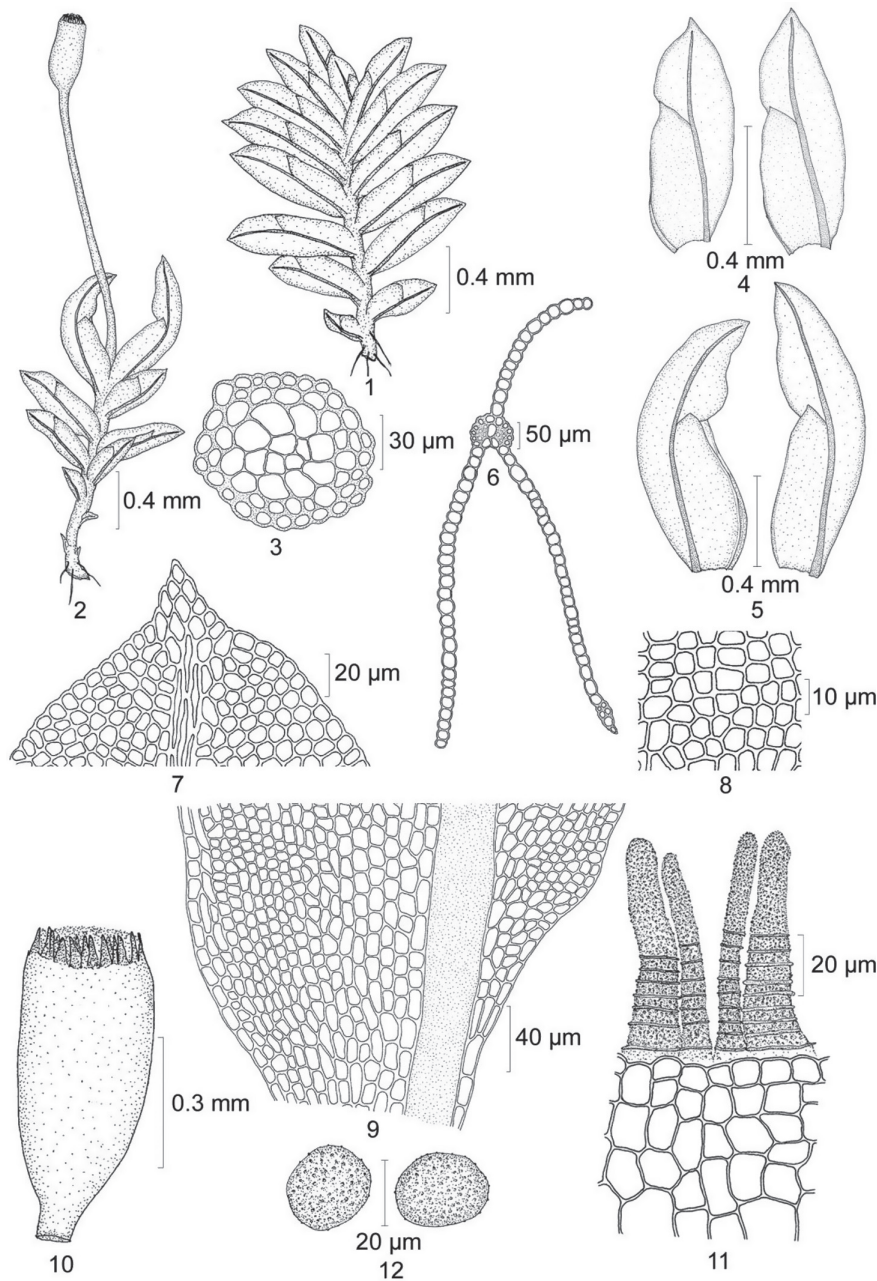


Figure 1. *Fissidens neomagofukui* Z. Iwats. & Tad. Suzuki (1) vegetative plant. (2) sporophytic plant. (3) cross section of stem. (4) leaves. (5) perichaetial leaves. (6) cross section of leaf. (7) leaf apex. (8) median cells of vegetative leaf. (9) basal part of vegetative leaf. (10) capsule. (11) peristome teeth. (12) spores. (Drawn from Daniels and Kariyappa 1978).

Discussion

The Indian plants show some variations from that of the Japanese plants in possessing more bulging walls of laminal cells, limbidium of vaginant laminae more distinct in the Indian plants than in the Japanese, limbidial cells longer and smaller in the Indian material but shortly rectangular in the Japanese, the spores are larger in the Indian material (24–28 μm) but smaller in the Japanese material (18–22 μm). The variations might be due to the different climatic conditions.

Fissidens neomagofukui is probably an arboricolous species since the types (Iwatsuki and Suzuki 2002) were

found growing on the trunk of the gymnosperm *Ginkgo biloba* L., commonly known as the maidenhair tree, a native of China, but widely planted. However, the moss does not show host specificity as the present collection is from the trunk of the angiosperm *Terminalia paniculata* Roth, a lofty indigenous tree found in moist deciduous forests of Peninsular India.

The distribution of *F. neomagofukui* is interesting since the type locality of the species is Honshu, the main island of Japan, which has a predominantly temperate, oceanic climate whereas India, especially the Peninsular region, where the Western Ghats is situated, is tropical and continental. This disjunct distribution is rather curious. Since *F. neomagofukui*

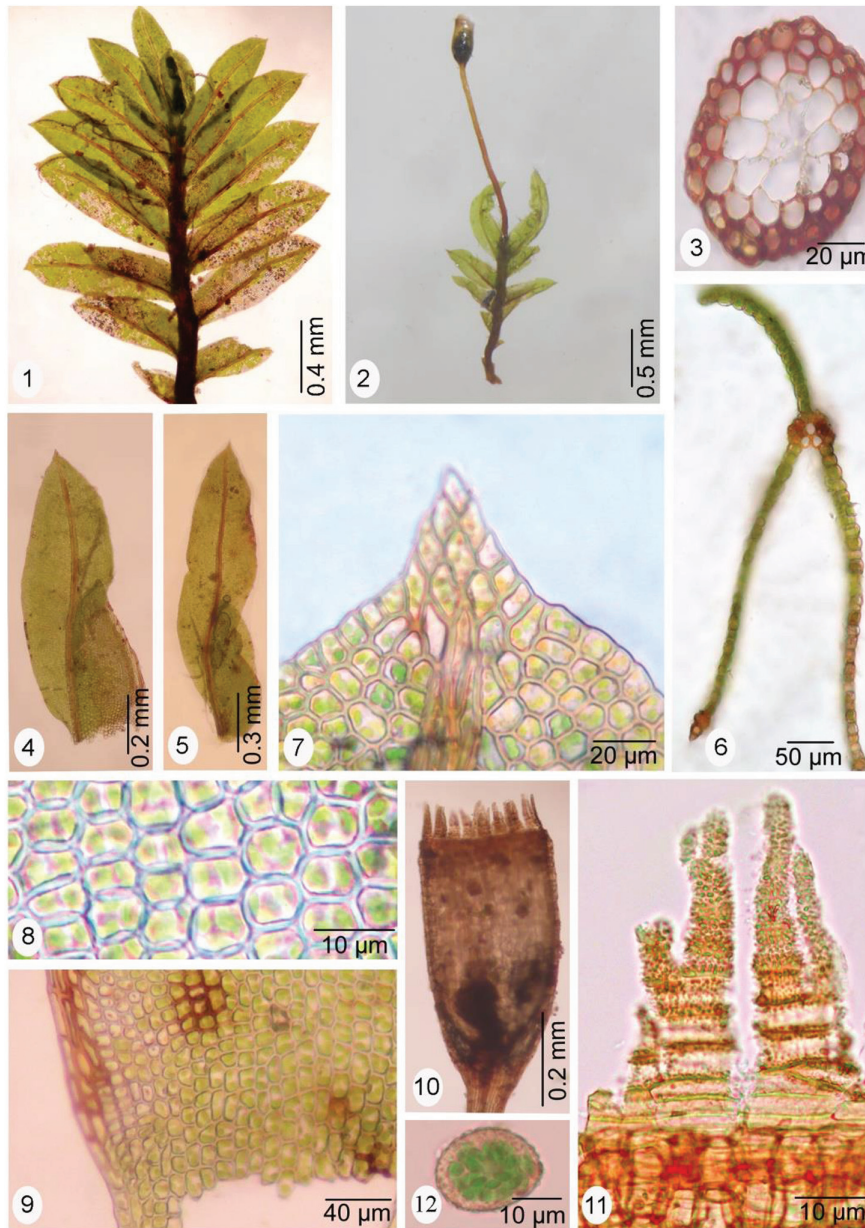


Figure 2. *Fissidens neomagofukui* Z. Iwats. & Tad. Suzuki (1) vegetative plant. (2) sporophytic plant. (3) cross section of stem. (4) leaf. (5) perichaetial leaf. (6) cross section of leaf. (7) leaf apex. (8) median cells of vegetative leaf. (9) basal cells of vaginant lamina showing weak limbidium. (10) capsule. (11) peristome teeth. (12) spore. (Daniels and Kariyappa 9789).

has been described rather recently (2002) and the vegetative plants are hardly distinguishable from *F. diversifolius*, it is likely that earlier collections of this species have been identified as *F. diversifolius* which have accounted for the disjunct distribution.

On the other hand *Fissidens neomagofukui* could be an Old World species since the Western Ghats is a part of the 250 million-year-old Gondwanaland. Therefore, one logical explanation for the present known disjunct distribution might be that, Japan as the world's largest importer of wood/timber although mostly dependent on Indonesia and Malaysia for raw materials until recent past, has also imported wood/timber from India (Leonard 1993). Teak, rosewood and sandal wood were exported to the West, Middle-east and east Asian countries from the Travancore and Malabar

regions, which include the greater part of the Western Ghats, and the timber trade was further expanded under the British rule (Aiya 1906). Hence, the introduction of *F. neomagofukui* from India or from one of the SE. Asian countries to Japan cannot be ruled out. Therefore, further studies are required to interpret the disjunct distribution.

Acknowledgements – We thank the Tamil Nadu State Forest Department, for permission to explore the study area and help in the field, and the Principal, Scott Christian College, for facilities. AEDD is thankful to Dr. M. A. Bruggeman-Nannenga (the Netherlands), for confirming the identity of the species and help with literature.

Funding – The financial assistance from the DST, GoI, New Delhi, is gratefully acknowledged.

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