

Hironori DEGUCHI*: *Diphyscium unipapillosum*, sp. nov.
(Diphysciaceae, Musci) from Japan**

出口博則*: イクビゴケ科蘚類の1新種ミギワイクビゴケ

There are 19 species of *Diphyscium* in the world according to Index Muscorum (Wijk et al. 1962, 1969), Iwatsuki (1958), Chang (1973), Wang & Lin (1974, 1975) and Iwatsuki (1976). The richest concentration of species of *Diphyscium* seems to be in Asia where 13 species occur. Among them, seven species are found in Japan including *Diphyscium foliosum* Mohr, *D. fulvifolium* Mitt., *D. granulatum* Chen, *D. involutum* Mitt., *D. perminutum* Tak.*, *D. satoi* Tuzibe in Nakai and *D. suzukii* Iwats.* (asterisk indicates Japanese endemics). In the course of floristic investigations in the Shikoku district, I discovered an apparently undescribed moss that grew on shaded rocks or in rock-crevices near water courses in several localities in the southern part of Shikoku Island. Although this plant seems to be closely related to *D. fulvifolium*, which is the commonest species of the genus in lowland Honshu, Shikoku and Kyushu of Japan, it cannot be placed in any known Japanese species. After comparison with exotic species by studying specimens and/or literature, I concluded that this species is new to science. This paper provides a description, illustrations and some taxonomical notes concerning this new species, and the independence of the family Diphysciaceae is also discussed.

Diphyscium unipapillosum Deguchi, sp. nov.

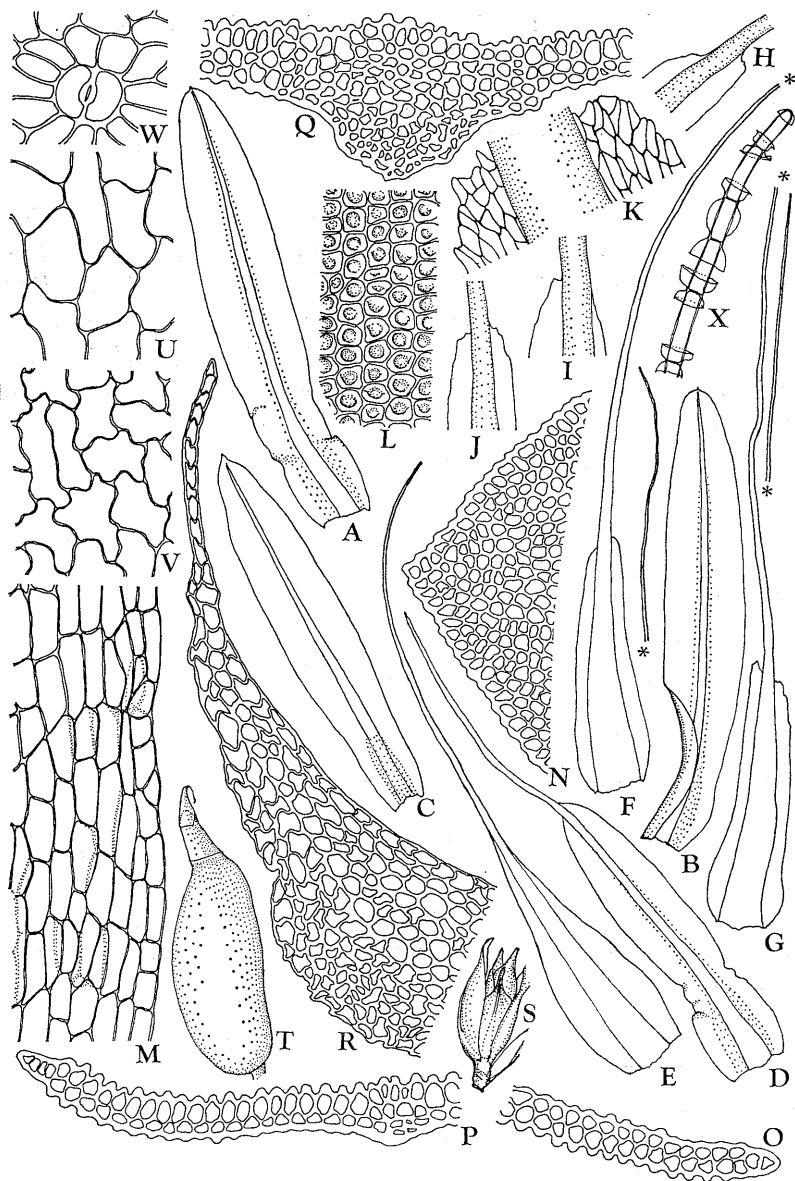
Planta habitu *Diphyscii fulvifolii* similis, sed differt foliis vegetativis cellulis unipapillois, foliis perichaetialibus subula laevi.

Type: Japan. Pref. Kochi: Kamiyashiki, Nakamura-shi; 380 m alt., on damp rock-crevices by stream, March 25, 1983, leg. H. Deguchi 24901 (holotype in HIRO; isotypes in TNS and Kochi Univ.).

Plants medium-sized, 1.5 cm high; vegetative leaves crisped and inrolled

* Department of Biology, Faculty of Science, Kochi University, Akebono-cho, Kochi 780. 高知大学理学部生物学教室.

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when dry, erect-spreading and faintly incurved on upper margins when moist, elongate-lingulate, obtuse to acute at apex; lamina (excl. leaf-base) bistratose, becoming unistratose in several cell-rows on the margin; in cross-section of leaf cells of ventral layer of bistratose lamina larger than those of dorsal layer; basal lamina transparent, unistratose; laminal cells at middle part of leaf rounded to transversely elongate-elliptic with rather thin walls, 10-12 μm wide, with a large and high papilla on centre of each cell, papillae on ventral surface of leaf more distinct than those on dorsal surface; cells at basal part of leaf transparent, with thin walls; margins entire to weakly crenate by the projection of cells; costa wide and thick, occupying most of leaf-base, gradually becoming thinner and narrower toward apex. Dioicous. Male plants with leaf size and shape similar to those of female plants; inner perigonal leaves with smooth long excurrent costa from elongate-ovate base, becoming subula; inner perichaetial leaves with transparent base and with upper ends rounded to shallowly incised, not ciliate on upper margins. Capsules 3.5-4.0 mm long, ovate-cylindric, narrowed at orifice, weakly dorsiventrally compressed: dorsal face slightly swollen and ventral face more strongly so; exothecial cells thin-walled, irregularly hexagonal with wavy anticlinal walls on dorsal face and with straight anticlinal walls on ventral face; stomata present near orifice, phaneroporous; operculum long conic with obtuse apex; outer peristome absent; inner peristome whitish, pleated, finely and densely papillose, ca 0.6-0.75 mm high; calyptra cucullate; spores finely papillose, 10-13 μm in diameter.

Other specimens examined. Japan. Kochi Pref.: Kamiyashiki, Nakamura-shi; 380 m alt., on rock-crevices by stream, March 25, 1983, leg. H. Deguchi 24904; Mt. Kuishi, Tosayama-mura, Tosa-gun; 970 m alt., on boulders by stream, Nov. 20, 1980, leg. H. Deguchi 22899; upper course of Hanegawa Riv., Muroto-shi; ca 300 m alt., on rocky cliff by river, Feb. 28, 1983, leg. H. Deguchi 24718; Yahazudani Valley, Kitagawa-mura, Aki-gun; 350 m alt., on rock by stream, Aug. 7, 1981, leg. H. Deguchi 23753. Tokushima Pref.: Hata Gotaki Falls, Hata-cho,

Fig. 1. *Diphyscium unipapillosum* Deguchi. A-C. Vegetative leaves. $\times 12$. D-G. Perichaetial leaves. $\times 12$. H-K. Shoulder parts of perichaetial leaf. $\times 25$ (H-J), $\times 125$ (K). L. Cells from middle part of leaf. $\times 325$. M. Cells from basal part of leaf. $\times 325$. N. Cells from leaf-apex. $\times 325$. O-R. Parts of cross-sections of leaf. $\times 325$. S. Perigonium. $\times 12$. T. Sporophyte with calyptra. $\times 8$. U-V. Exothecial cells from middle part of capsule; U, from ventral surface; V, from dorsal surface. $\times 225$. W. Stoma. $\times 225$. X. Part of paraphysis. $\times 225$. Drawn from holotype.

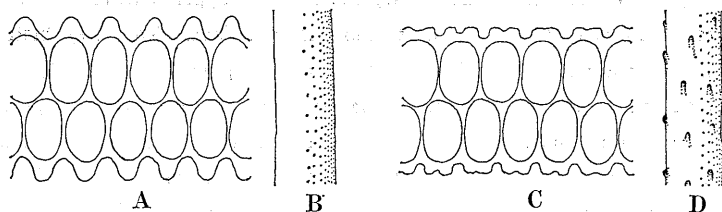


Fig. 2. Schematic representation of the papillae on leaf-cells (A, C) and the surface condition of subula of perichaetial leaf (B, D). A-B. *Diphyscium unipapillosum*. C-D. *D. fulvifolium*.

Tokushima-shi; 200-300 m alt., on rock beside stream, Sept. 16, 1983, leg. H. Deguchi 27112 (all specimens deposited in bryological herbarium of Kochi Univ.).

Diphyscium unipapillosum is very similar to *D. fulvifolium* in sporophytic features and shape and size of plants (including leaf shape), but differs from it in having the leaf-cells with a simple large high papilla and the perichaetial leaves with a smooth subula. In *D. fulvifolium*, the leaf-cells have a (1-)2(-3)-knobbed, flattened papilla on each cell and the perichaetial leaves have a papillose subula. These differences are schematically represented in Fig. 2. In addition to those morphological differences, *D. unipapillosum* is ecologically distinct from *D. fulvifolium*. The former species grows on rock or in rock-crevices with or without soil deposition, while the latter occurs on soil at roadbank or thickly soil-covered rocks in drier environments. Among the species of *Diphyscium* so far known, *D. unipapillosum* is the only species having unipapillose leaf-cells.

This new species has phaneroporos stomata near orifice of capsule. The stomata, when they are present, have been known to be limited to the apophysis in most mosses and scattered on the capsule walls in some species. The occurrence of stomata limited to the area near the orifice of the capsule was reported by Vuillemin (1886) in certain species of *Diphyscium*. But Vuillemin's observation was contradicted by Paton & Pearce (1957). As far as *D. foliosum* is concerned, Paton & Pearce's observation is correct; *D. foliosum* has the stomata at the apophysis. The position of stomata on the capsule wall seems to have some taxonomic importance, at least in the family Diphysciaceae. Among the species I was able to examine, the following species have stomata at the orifice: *Diphyscium fulvifolium* Mitt., *D. perminutum* Tak., *D. unipapillosum* Deguchi and *D. satoi* Tuzibe in Nakai. *D. perminutum* can be distinguished from *D. unipapillosum* by the smaller plants, the perichaetial leaves with the margin at the

apex of the lamina, at the subula base, has cilia and the vegetative leaves which are pluripapillose on each cell. *D. satoi* differs from *D. unipapillosum* in the smaller plants, the perichaetial leaves with entire apex of lamina tapering gradually to the base of the subula, and the vegetative leaves which are much smaller and have smooth cells.

Species with stomata at the apophysis include *Diphyscium foliosum* Mohr and *D. granulorum* Chen. These two species are considered very closely related, since both have rather acute leaves with pluripapillose cells (Iwatsuki 1976), a feature that separates them from *D. unipapillosum*. Species without stomata include *D. involutum* Mitt., *D. rupestre* Dozy & Molk. and *D. suzukii* Iwats. as well as *D. cumberlandianum* Harville (the last species was not examined; source of literature: Crum & Anderson 1981). All these species have leaves with non-papillose cells quite different from those of *D. unipapillosum*. Other exotic species not mentioned above have the dentate leaf-margins and apparently differ from *D. unipapillosum* according to information in Brotherus (1925) and Iwatsuki & Noguchi (1975). They include *D. auriculatum* Besch., *D. fasciculatum* Mitt., *D. fendleri* C. Muell., *D. longifolium* Griff., *D. loriae* C. Muell., *D. mucronifolium* Mitt. in Dozy & Molk., *D. peruvianum* Spruce ex Mitt., *D. rhynchophorum* Dix., *D. submarginatum* Mitt. in Seem. and *D. ulei* C. Muell.

The capsule of *D. unipapillosum*, as well as other species, including *D. foliosum*, shows weak dorsiventrality in outline with the ventral face more strongly bulging than the dorsal face, and strong dorsiventrality in exothecial cells, with the cells of dorsal face possessing wavy anticlinal walls, while those of ventral face are not wavy (compare U and V in Fig. 1 in this paper, and Figs. 4 and 5 in Deguchi 1983), although Lorch (1931) mentioned that no significant dorsiventrality could be seen in *D. foliosum*.

Diphyscium unipapillosum has paraphyses similar to those of *D. foliosum* whose characteristic morphology seems to have been first described and illustrated by Schimper (1848). In mature paraphyses of one cell-row, there are "collars" at the juncture of cells. These collars are formed by the rupture of outer walls which are considered to be formed as a result of decortication of outer walls (Schimper 1848). The rupture may be ascribed to the elongation of each cell constituting the paraphysis. Hairs arising from the leaf-axil also show a morphology similar to the paraphyses. This type of paraphysis was confirmed in all seven Japanese species of *Diphyscium* as well as in *D. rupestre* from the

Philippines. The same type of paraphyses was found also in the genera *Theriotia* (Deguchi 1975) and *Muscoflorschuetzia* (Crosby 1977). These three genera constitute the family Diphysciaceae. In this respect, the family Diphysciaceae is distinct from the family Buxbaumiaceae which includes only *Buxbaumia*, where the *Diphyscium*-type paraphyses are absent. The independence of the family Diphysciaceae was also supported by Nishida (1977) from the view-point of sporangium type (Nishida 1971, 1980).

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南四国の低山地（高知県：中村市，土佐山村工石山，室戸市，北川村矢筈谷；徳島県：徳島市八多町）からイクビゴケ属の一新種ミギワイクビゴケ（新称）を記載した。これまで知られている同属の種19種（内13種がアジアに，7種が日本に分布する）を標本や文献によって比較検討した結果，本種が未記載の種であることが判明した。なお本属の蘚は特異な形態の孢子体を生じるので他の属名の下に既に記載されている可能性は *Buxbaumia* 属を除いてほとんどない。本種は外見上，日本産のイクビゴケ属の種の中では，低山地で最も普通であるイクビゴケによく似ている。そのため，これまで本種の存在が見過ごされてきたようである。そのイクビゴケとは次の点で区別される。1）葉細胞に1個の高いパピラをもつ（イクビゴケではパピラは押しつぶされた格好となり，低い2～3個のこぶ状となる）。2）雌苞葉の葉身の肩にはシリアが出ない。3）雌苞葉の芒が平滑。4）生育環境が異なる（イクビゴケでは路傍などの土の上や，土の厚く堆積した岩上などで，比較的乾燥した環境に生育するが，本新種は湿度の高い溪流沿いの，土壌のごく薄く堆積したか，またはその堆積のない岩壁上に生育する）。

〔追記〕その後，本種は本州にも分布することが判ったので，産地を記録しておく。

Honshu. Wakayama Pref.: Takinohai - Komorigawa, Kozagawa-cho; 100 m alt., Aug. 13, 1972, H. Deguchi 10201.

○植物命名国際規約57条3項による学名の変更（原 寛）Hiroshi HARA: Some new combinations of the Asiatic plants based on Art. 57.3.

シドニーの第13回国際植物学会議の決定に基づいて改訂された命名規約の最新版(1983)を見ると，色々と変更が行われているが，その中で目立つものの一つは autonym (自動名)を強化する条項がいくつか入れられたことである。新しく挿入された57条3項によると，autonym はそれが自動的に作られるものになった同じ分類階級の同時に発表された他の名に対し優先権をもつことが明記されている。これによって日本植物の学名にも変更を要するものがかなりでてきて混乱を起すおそれもあるが止むをえない。