

A NEW COMBINATION IN *TETRAPHIS* (BRYOPHYTA: TETRAPHIDACEAE)

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ABSTRACT

The new combination *Tetraphis pellucida* Hedw. var. *trachypoda*, is proposed to clarify the taxonomic rank of the moss *Tetraphis trachypoda* and to recognize the morphological difference of having a straight, slightly papillose seta. A revised key to the genus, a diagnosis of var. *trachypoda*, and specimens examined are provided.

RESUMEN

Se propone la nueva combinación *Tetraphis pellucida* Hedw. var. *trachypoda*, para aclarar el rango taxonómico del musgo *Tetraphis trachypoda* y para reconocer las diferencias morfológicas de tener una seta derecha ligeramente papilosa. Se ofrece una clave revisada del género, una diagnosis de la var. *trachypoda*, y los especímenes examinados.

Kindberg (1893) described *Georgia trachypoda* from specimens collected by John Macoun in British Columbia as follows: "leaves subovate or ovate-oblong, short-acuminate and acute. Perichaetial leaves with long, sublinear, acute acumens; costa not excurrent. Capsule straight; pedicel straight, rough in the upper part." In 1900 Paris accepted Hedwig's genus *Tetraphis* and *Georgia trachypoda* Kindb. became *T. trachypoda* (Kindb.) Par. Currently *Tetraphis* consists of two recognized species, *T. geniculata* Grig. ex Milde and *T. pellucida* Hedw. Because the gametophytes are undistinguishable, these two species are separated by setae characteristics. Since its description, *Tetraphis trachypoda* has been recognized at various taxonomic ranks.

In 1936 Grout combined *G. trachypoda* under *T. geniculata* noting the seta roughness and dismissing the straight seta. He comments that "*T. geniculata* is not materially different in macroscopic appearance from *T. pellucida*, as the seta is not always noticeably bent at first glance and the bend is sometimes absent as in Kindberg's *Georgia trachypoda* (the only difference of importance that he notes in his description). Specimens in the herbarium of the National Museum of Canada, labeled *Georgia trachypoda* and collected at same date and place as the type and probably a part of it, have the seta only slightly roughened and not geniculate, otherwise normal."

Van Der Wijk et al (1969) and Savicz-Ljubitzkaja and Smirnova (1970) followed Grout's lead and also placed *T. trachypoda* under *T. geniculata*. In Russia,

Abramova et al. (1954) regarded *T. trachypoda* as having only a weakly mamilllose stalk, and therefore combined it under *T. pellucida*. They did not comment on its distribution in Russia. Crum and Anderson (1981) in their treatment of *Tetraphis*, comment, "Rare specimens with some setae more or less roughened above but not at all geniculate qualify as *Georgia trachypoda* Kindb., which Grout placed in synonymy of *Tetraphis geniculata*. The sporadic occurrence of such plants (in Ontario, Minnesota, Montana and British Columbia at least) in close association with plants with smooth setae seems to indicate that they are anomalous forms of *T. pellucida*." Ignatov and Afonina (1992) in their check-list of mosses of the former USSR also treated *T. trachypoda* as a synonym of *T. pellucida*.

Forman (1962) in his discussion of the family Tetraphidaceae makes no mention of *T. trachypoda* but does comment that "separating the two species of *Tetraphis* is easy when mature sporophytes are present because very few colonies show intermediate sporophytic characters. In such intermediate cases the tuberculate character of the seta is more constant than the geniculate one." Between 1936 and 1992 *T. trachypoda* has been synonymized under both *T. geniculata* and *T. pellucida*.

While examining specimens of *Tetraphis* from North America for the Bryophyte Flora of North America project, it became apparent that an additional morphological feature of the seta could be used to help clarify the confusion surrounding *T. trachypoda*. Although Weber and Simone (1977) determined that the papillose or tuberculate surface of the seta in *T. geniculata* was the result of protruding end-walls of the cells, they did not mention the spiral vs. straight arrangement of the cells. Their paper focuses on the nature of the papillae and does not comment on the fact that the papillae are also the result of the seta cells becoming straight rather than spirally twisted.

Tetraphis pellucida has a straight smooth seta, with all of the cells strongly spirally twisted throughout its length and it is never papillose. The cells of the seta in *Tetraphis geniculata* are spirally twisted up to the point where the bend occurs. Above the bend the cells are straight and conspicuously papillose by projecting cell-end walls. *Tetraphis trachypoda* on the other hand has a straight seta, in which the cells are spirally arranged and interspersed with short sections of cells (or sometimes only a few cells) that are straight, which results in a few papillae on a normally smooth seta. When the type specimen of *T. trachypoda* was examined, this new characteristic was verified.

The change of cell arrangement correlated with papillae and a bend in the seta of *T. geniculata*, and straight, consistently spirally arranged, smooth seta cells in *T. pellucida* appear to be characteristics sufficient to maintain both of these taxa as individual species. *Tetraphis trachypoda* on the other hand appears to be intermediate between *T. geniculata* and *T. pellucida*, but its charac-

teristics are not sufficient to maintain it as a separate species. It is suggested, therefore, that *T. trachypoda* be treated as a variety of *T. pellucida* based on the straight, slightly papillose setae, the outermost cells of which have alternating zones of cells with either spiraled or straight side walls.

Tetraphis pellucida Hedw. var. **trachypoda** (Kindb. ex Paris) Harpel, comb. nov. (Figs. 1, 2). *Georgia trachypoda* Kindb., Rev. Bryol. 20:93. 1893. TYPE: CANADA. BRITISH COLUMBIA: Sicamous, 7 Apr 1889, J. Macoun s.n. (HOLOTYPE: SI).

Plants in dense turfs or scattered patches, green above, reddish-brown below. Stems 8–15 mm up to 1 cm tall. Leaves erect-spreading, ovate to ovate-lanceolate, 1–2 mm long, keeled, costa subpercurrent, margins entire, plane to broadly recurved, upper medial cells smooth, irregularly rounded-hexagonal, lower basal cells oblong-linear. Stalked, discoid gemmae present in a rosette of rounded bracts (occasionally weakly developed) formed on top of an attenuated stem. Seta 6–14 mm long, erect ± flexuose, cells lightly papillose usually near the base, cells spirally twisted but interspersed with sections of straight cells, twisted when dry. Capsule narrowly cylindrical, 2–3 mm long, peristome teeth 4. Spores 10–17 µm, green to yellowish-green, papillose. Capsules mature in spring to early summer, rare on well rotted wood, stumps and logs.

The distribution of *T. pellucida* var. *trachypoda* is interesting because it occurs in North America and Russia, although at the present time, the geographic range in Russia is unknown. Based on the North American material examined, it appears to only be found in areas where both *T. pellucida* and *T. geniculata* occur, which suggests that it would occur in the Russian Far East where both of these species also overlap. Examination of material from this area and additional fieldwork would help to validate this hypothesis.

Specimens examined: **CANADA. British Columbia:** Sicamous, 7 Apr 1889, Macoun s.n. (S). **LABRADOR:** Goose Bay, 10 Jun 1949, Schofield 32 (NY, UBC). **NEW BRUNSWICK. Restigouche Co.:** Mount Carleton Provincial Park, 12 Aug 1988, Bristow s.n. (MICH). **Northwest Territories.** Nahanni National Park, 7 Jul 1974, Scotter 22554; 15 Jul 1976, Steere 76-786, 76-822; 25 Jul 1974, Marsh 4550 (NY). **UNITED STATES. COLORADO. Gunnison Co.:** 3 Aug 1969, Weber B-34769 (COLO, NY). **MONTANA. Lake Co.:** Flathead Lake, 26 Jun 1960, Schofield 11632 (NY, UBC). **WYOMING.** Yellowstone National Park, 17 Aug 1953, Welch 16435 (NY). **Teton Co.:** 29 Aug 1973, Hermann 25571 (NY).

KEY TO SPECIES OF *TETRAPHIS*

1. Seta geniculate, outer cells smooth, and spirally twisted below the bend, cells straight and papillose by projecting cell walls above the bend _____ 1. ***T. geniculata***
1. Seta not geniculate, outer cells smooth, and spirally twisted throughout the entire length of the seta, not papillose, or sometimes lightly papillose near the base.
 2. Seta smooth, superficial cells spirally twisted throughout the entire length _____ 2a. ***T. pellucida* var. *pellucida***
 2. Seta usually lightly papillose near the base, superficial cells spirally twisted but interspersed with sections of straight cells _____ 2b. ***T. pellucida* var. *trachypoda***

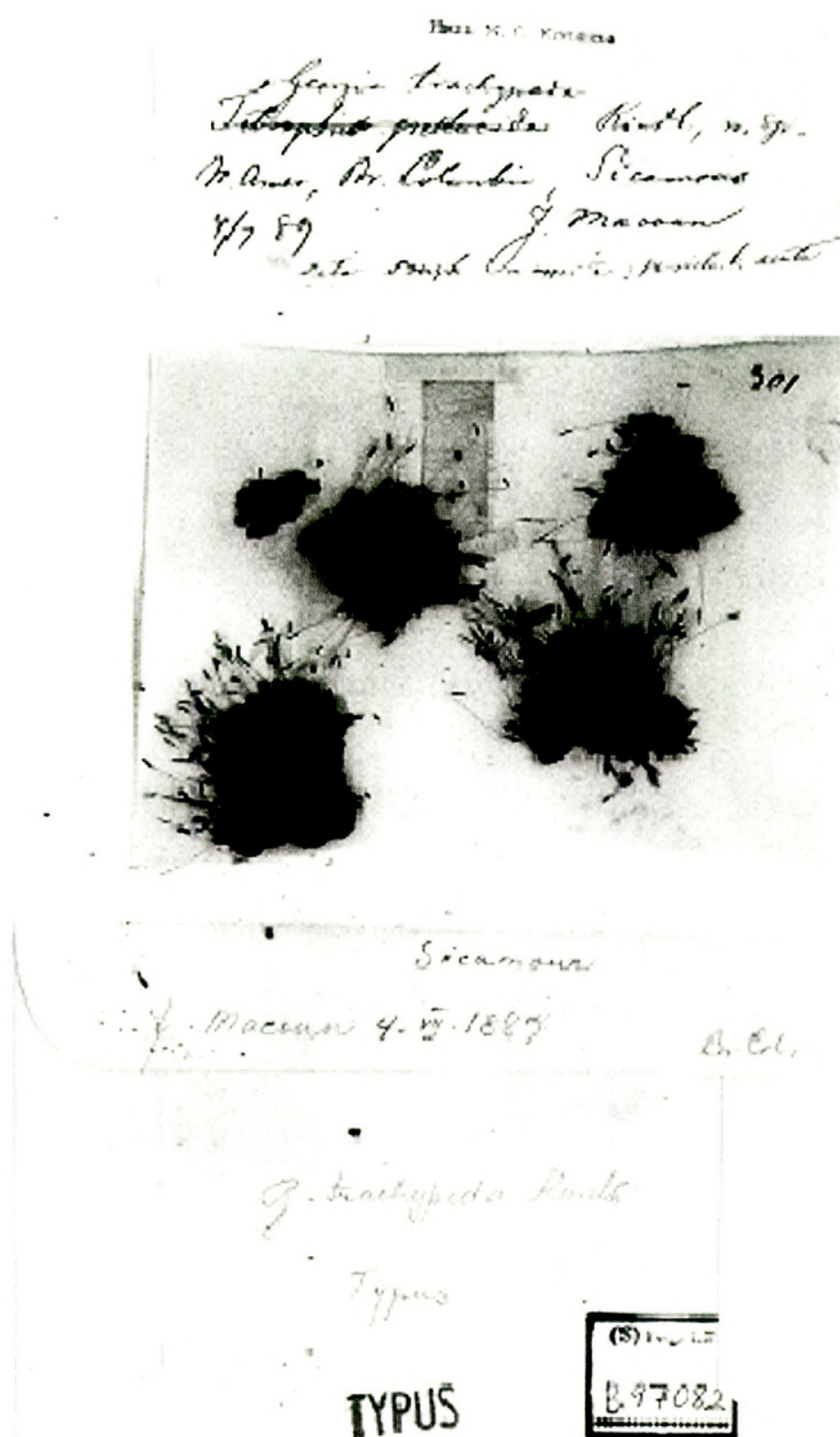


FIG. 1. Type of *Georgia trachypoda* Kindb., J. Macoun s.n. (S). Size marker in lower right corner equals 2.5 cm.

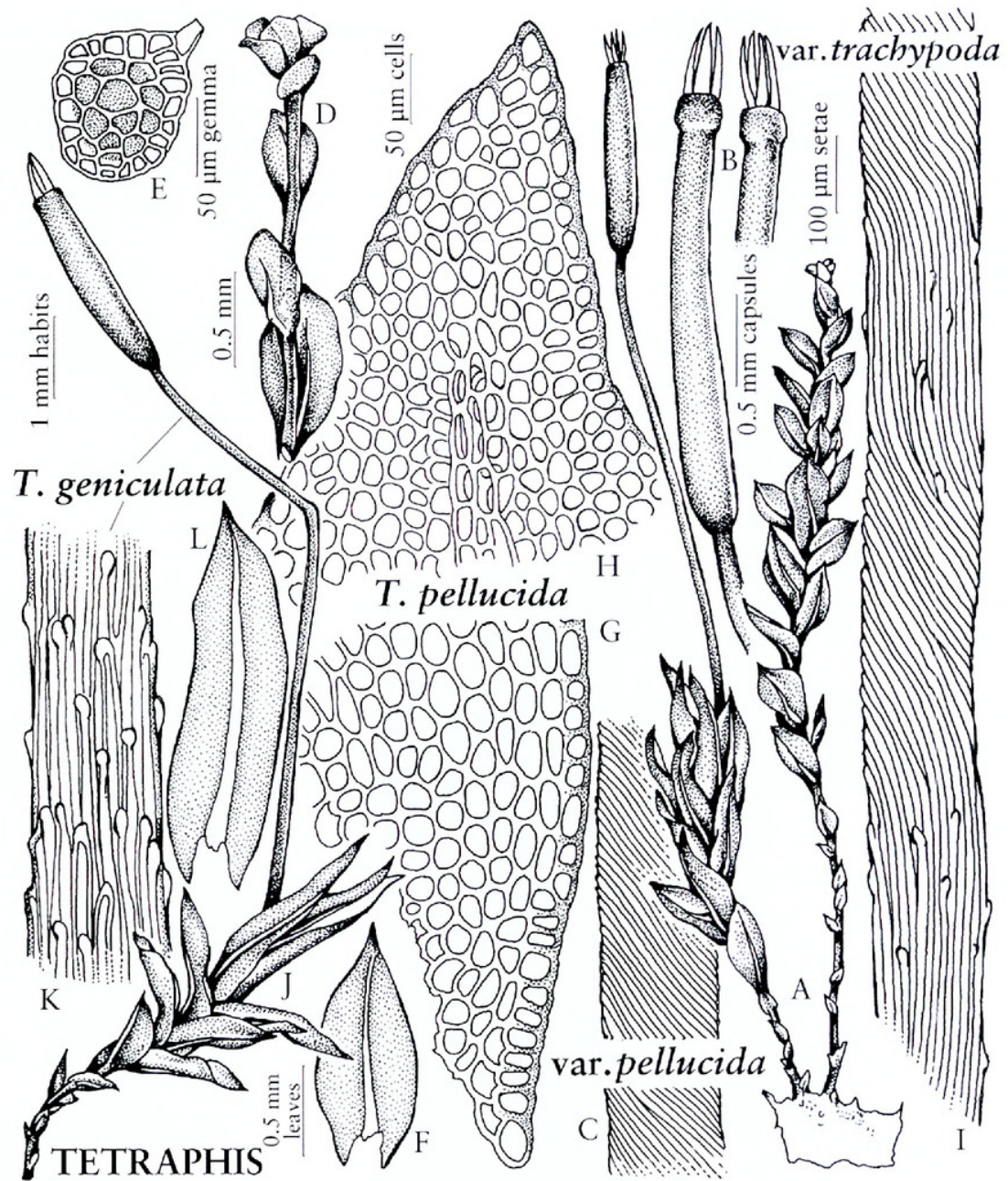


FIG. 2. A. habit *T. pellucida* var. *pellucida* and *T. pellucida* var. *trachypoda*. B. capsules. C. *T. pellucida* var. *pellucida* seta with spirally arranged outer cells. D. gemmae cup. E. gemma. F. leaves. G. basal cells. H. upper cells. I. *T. pellucida* var. *trachypoda* seta with spiral cells interspersed with papillose straight zones. J. habit *T. geniculata*. K. *T. geniculata* seta with straight papillose cells above the bend. Flora of North America Association, FNA Vol. 27, artist P.M. Eckel.

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