

### The genus *Trematodon* (Musci: Bruchiaceae) in Maine

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The Bruchiaceae are a segregate family of the Dicranaceae originally proposed (Schimper 1855) only for the genus *Bruchia*. Brotherus (1909) was the first to associate *Trematodon* with *Bruchia* when he placed the genera in the subfamily Trematodontoideae in the Dicranaceae. Britton (1913) returned *Trematodon* and *Bruchia* to the Bruchiaceae and expanded the family to include the genus *Pringleella*. All classifications since Britton's, however, placed these genera in the Dicranaceae, until Buck (1979) restored the Bruchiaceae for *Bruchia*, *Eobruchia*, *Pringleella*, and *Trematodon*. Recent opinions on the merits of the Bruchiaceae have been varied (for: Walther 1983, Allen 1994, Crum 1995, Churchill & Linares 1995; against: Crum & Anderson 1981, Vitt 1984, Rushing 1986). The Bruchiaceae are recognized here as a group of small, gametophytically reduced, acrocarpous mosses commonly found on bare disturbed soil that have capsules with long, well-developed, stomatose necks and large, highly ornamented spores with often distinct proximal and distal surfaces. As here defined the family is very similar to some members of the Ditrichaceae or Dicranaceae and may represent an intermediate taxon linking the two families.

While the merits of recognizing the Bruchiaceae are debatable there is no question that *Bruchia* and *Trematodon*, although they show remarkable differences in capsule and calyptra features, are closely related. The two genera have been shown to exhibit similar cytological features (Bryan 1956) and are able to hybridize (Rushing and Snider 1985). *Trematodon* differs from *Bruchia* in having a cucullate calyptra, well developed annulus, and a peristome present in most members. In contrast *Bruchia* has a mitrate calyptra, is cleistocarpous, and eperistomate.

*Trematodon* Michx., Fl. Bor. Amer. 2: 289. 1803.

Plants small, gregarious or loosely tufted; stems erect, simple. Leaves ovate-lanceolate; costa single, strong; alar cells undifferentiated. Autoicous or dioicous. Setae long or short; capsules exserted, long-rostrate, with a strongly differentiated, stomatose neck, operculate; peristome present or absent. Calyptrae cucullate. Spores large, reniform, highly ornamented.

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The name *Trematodon* combines the Greek "*trema* - an opening or hole" and "-*odon* - tooth" in reference to the perforated peristome teeth of some of its species. There are 83 species of *Trematodon* world-wide, an astounding number in view of the gametophytic simplicity of the genus. The taxonomy of *Trematodon* in the northern hemisphere has been fairly well worked out, but most of the southern hemispheric species remain untested. In Maine the genus is recognized by its long-necked capsules, undifferentiated alar cells, autoicous condition, vertically striate outer peristome surface, and subreniform spores. Plants of *Trematodon* have very reduced gametophytes and for that reason collections without sporophytes are difficult to distinguish from *Dicranella* or *Ditrichum*.

- Capsule neck more or less equal to urn in length; leaves abruptly narrowed above, the costa completely filling the awn; leaf margins erect  
 ..... *T. ambiguus*  
 Capsule neck twice as long as urn; leaves gradually narrowed above, the costa not occupying the width of the subula; leaf margins weakly recurved  
 ..... [*T. longicollis*]

*Trematodon ambiguus* (Hedw.) Hornsch., Flora 2: 88. 1819.

*Dicranum ambiguum* Hedw., Sp. Musc. Frond. 150. 1801.

Plants scattered, yellowish green, terricolous; stems 3--10 mm long. Leaves evenly spaced, flexuose-spreading when wet, 2--4 mm long, oblong and clasping at base; apex abruptly contracted to a long awn; margins erect, entire; costa smooth, expanding at base of awn and filling the upper leaf; upper cells quadrate or oblate to shortly rectangular, 7.5--32  $\mu\text{m}$  x 7.5--12.5  $\mu\text{m}$ , thick-walled, basal cells narrowly long-rectangular to rhomboidal, 37--92  $\mu\text{m}$  x 7.5--21  $\mu\text{m}$ , whitish yellow, thin-walls. Autoicous. Setae 7-17 mm long, yellow; capsules inclined, reddish-brown, urns asymmetric, ellipsoidal, 1.0-2.0 mm long, neck 1.2-2.0 mm long, as long as, a little shorter or a little longer than the urn, strumose; annuli deciduous, revoluble; opercula rostrate, 1.0 mm long; stomata phaneroporic; peristome teeth red, lanceolate, vertically striate. Calyptrae yellow, 1.5 mm long. Spores subreniform, thickly papillose to subwarty, 25--32  $\mu\text{m}$ .

On clayey loam along roadside, bare soil in field or gravel pit and wet soil at base of tree. In Maine known from Androscoggin (*Merrill* 28 MO), Aroostook (*Norton* MAINE), Cumberland (*Chamberlain* 902 (MAINE), Hancock (*Allen* 2121 MO), Kennebec (*Merrill* 7 MO), Oxford (*Parlin* 12857 MAINE, MO),



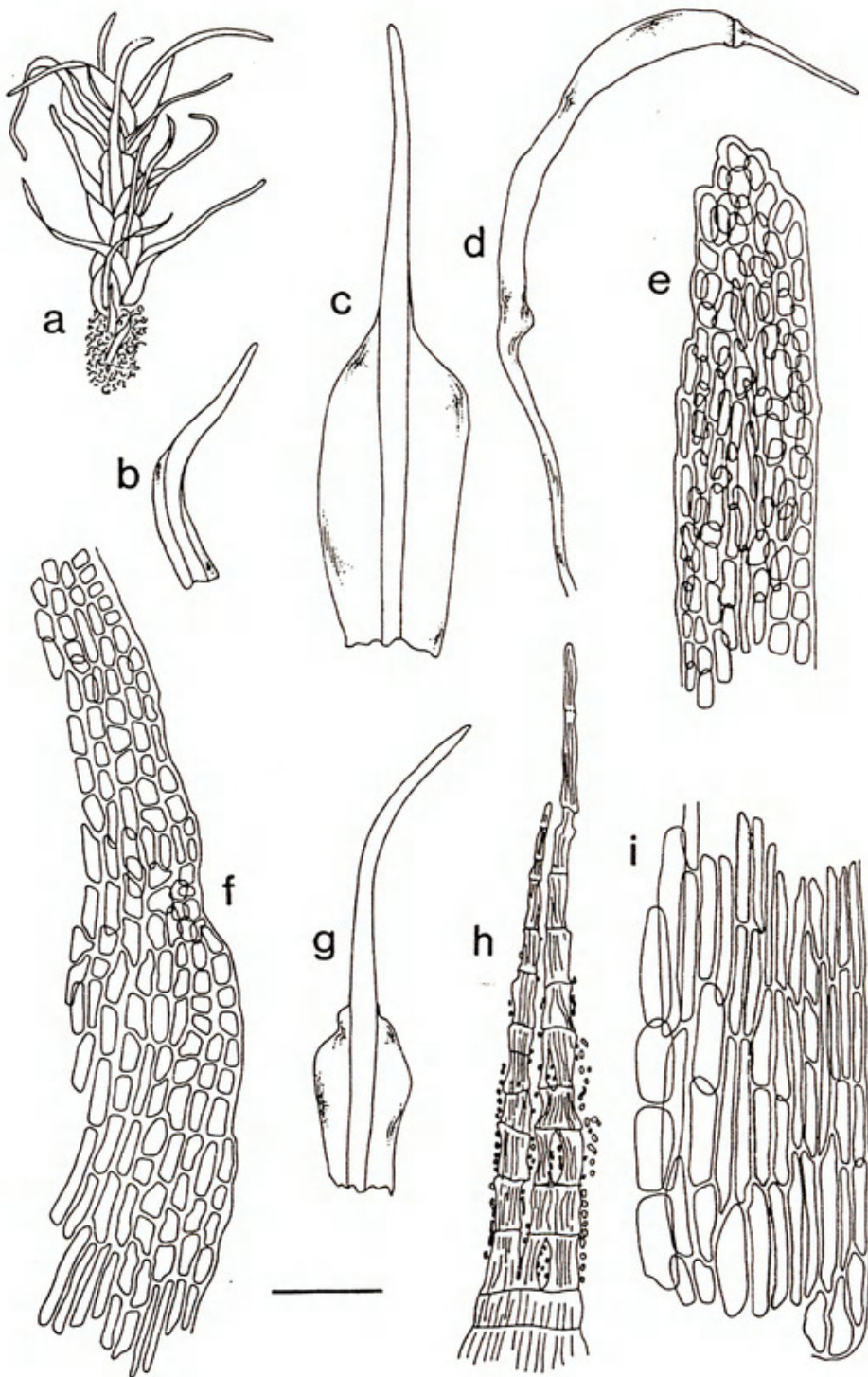


Figure 1. *Trematodon ambiguus*. a. Habit. b. Basal leaf. c. & g. Upper leaves. d. Capsule and operculum. e. Leaf apex. f. Median leaf cells at margin. h. Peristome tooth, dorsal (outer) surface. i. Basal leaf cells at margin in alar region. Scales in mm: bar = 0.05 (e,f,h,i); bar = 0.5 (b,c,g); bar = 1.01 (d); bar = 4.25 mm (a). All figures from *Allen 16536* (MO).

Piscataquis (Allen 16563 MO), Sagadahoc (Norton MAINE), Somerset, (Collins 1377 NY), Washington (Allen 16269 MO), and York (Carlson & Lowe MAINE) Counties.

*Trematodon ambiguus* is a colonizer of bare, disturbed soil and is found throughout the northern boreal region of the world. In northeastern North America it occurs from Newfoundland to Ontario, south to Minnesota and Pennsylvania. It is also present in Central America, southern Asia, the Caucasus, China and India.

The capsule neck in *T. ambiguus* is wonderfully developed and is more or less the same size as the capsule urn. Nevertheless it is distinctly shorter than that of *T. longicollis*, which is generally twice the length of the urn. The most reliable features separating *T. ambiguus* from *T. longicollis* are gametophytic. *Trematodon ambiguus* has leaves with erect margins that are abruptly constricted at the base of the awn. As a result the costa completely fills the awn. In *T. longicollis* the leaf margins are recurved and leaves gradually narrow to the apex so that the lamina reaches to the apex.

*Trematodon longicollis* Michx., Fl. Bor. Amer. 2: 289. 1803.

Plants scattered, yellow-green, terricolous, 3-5 mm long. Leaves evenly spaced, flexuose spreading when wet, clasping, oblong to oblong-ovate at base, gradually linear-subulate above, 2-3 mm long; margins weakly recurved above, entire below, weakly denticulate by blunt teeth above; costa percurrent; upper cells short-rectangular, walls firm and thickened; basal cells laxly oblong-rhomboidal to long rectangular, pale whitish yellow. Autoicous. Setae 10-15 mm long, smooth, yellow; capsules inclined, yellow, urn ellipsoidal 1.5-2.0 mm long, neck 3.0-4.0 mm long; annuli deciduous, revoluble; opercula rostrate, 1.0 mm long; stomata cryptoporic and phaneroporic; peristome teeth red, lanceolate, vertically striate. Spores densely papillose or minutely warty.

Parlin (1939) lists three collections of this species from Maine: Houghton, 1936 [Parlin 12857], Hartford, 1936 C.D. Adams, and Byron, 1937 C.D. Adams. The Parlin specimen (MAINE, MO) is *T. ambiguus*. I have been unable to locate the other two collections.

*Trematodon longicollis*, unlike *T. ambiguus*, is primarily southern in distribution. In eastern North America the farthest north this species gets is



southern Ontario and northern New Jersey. If *T. longicollis* does occur in Maine it will represent a significant range extension for the species. *Trematodon longicollis* is otherwise known from the southeastern United States, Mexico to Brazil, the Caribbean, southeastern Europe, China, Japan, India, southeastern Asia, southern Africa and some Pacific islands.

*Trematodon longicollis* is marked by its very long necked capsules and gradually narrowed leaves that have narrowly recurved margins. *Trematodon ambiguus* differs from *T. longicollis* in having a shorter capsule neck, abruptly narrowed leaves with erect margins and a costa that flares outward at the base of the awn to occupy the entire subula.

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