

## *Tortula papillosa* and *Tortula pagorum* (Pottiaceae) in New York State

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**Abstract** -- *Tortula papillosa*, formerly considered rare in New York, occurs at 80 sites. *Tortula pagorum*, formerly unknown in New York, occurs at 6 sites.

The moss, *Tortula papillosa* Wils. in Spruce, has a wide range in eastern North America. Clemants and Ketchledge (1990) list it as known from 5 or fewer sites in New York State. However, it is widespread, common and sometimes abundant here. Collections – most within the last year – exist from 17 counties: Broome (*Trigoboff c0598, c0599*, BH); Cattaraugus (*Eckel 192284n*, MO); Cayuga (*Trigoboff c0564, c0565, c0567*, BH); Cortland (*O'Rourke 1; Trigoboff c04162, c04162a, c04163, c04165, c0518, c0520, c0521, c0522, c0523, c0524, c0525, c0526, c0527, c0528, c0529, c0531, c0532, c0542, c0543, c0544, c0545, c0546, c0547, c0550, c0551, c0552, c0555, c0556, c0557, c0558, c0559, c0560, c0561, c0562, c0563, c0589*, BH; *c04164*, BH & NY; *c04162b, c04167, c04168*, BH, NY & NYS); Kings (*Brainerd s.n.*, NY); Monroe (*Martin 539*, NYS); Nassau (*Trigoboff c04175, c04178, c04179, c04180, c04182, c04183, c04186, c04187, c04188, c04189, c056, c059, c0510, c0512*, BH; *c0511*, BH & NYS); Onondaga (*Trigoboff c0534, c0535*, BH); Ontario (*Reed 60232, 60243*, MO-REED); Queens (*Trigoboff c0513*, BH; *c0515*, BH & NYS); Richmond (*Davis s.n.*, NY); Schyler (*Trigoboff c0591*, BH); Seneca (*Trigoboff c0590*, BH); Suffolk (*Trigoboff c053*, BH & NYS); Tompkins (*Cleavitt 1598, 1602; O'Rourke 2; Trigoboff c0579, Werier b-301*, BH; *Trigoboff c0025*, BH & NYS; *Trigoboff c0025a*, NYS) Ulster; (*Haring 4588*, NY); and Wyoming (*Bassett s.n.*, MO).

*Tortula papillosa* looks very different wet and dry. Field identification is easy in both cases. When wet, the leaves, which have broadly rounded tips, spread and expose masses of distinctive globose gemmae on the upper surface of the costa. When dry, masses of *T. papillosa* appear blacker or grayer – due to the awn and prominent pale costa – than the *Othotrichum* spp. that almost always grow with it. Wetting the leaves reveals the

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gemmae and confirms the identification. *T. papillosa* occurs as scattered plants and in large pure growths, in cracks and depressions, rarely on the raised areas of the bark, at the tree base, on the trunk (to at least 3 m high) and less often on the upper surface of large horizontal branches and in and around crotches. It occurs on many different species of deciduous trees and cedar (*Davis s.n.*; *Haring 4588*, NY). The easiest way to find it is to check roadside trees in urbanized areas, especially large Norway and sugar maples that have a good growth of *Orthotrichum* (probably mostly *O. pumilum*, *O. pusillum* and/or *O. obtusifolium*). *Leskea polycarpa* is usually present. Less consistent associates include *Platygyrium repens*, *Frullania eboracensis*, *Entodon* spp., *Ceratodon purpureus*, *Bryum argenteum*, *Bryum capillare*, *Pylaisiella* and *Plagiomnium cuspidatum*.

*Tortula pagorum* (Milde) De Not. is smaller and somewhat similar. It differs most obviously from *T. papillosa* in having leaf-like gemmae clustered at the tip of the plant (Crum and Anderson, 1981). Like *T. papillosa*, the gemmae are hidden when the plant is dry. *T. pagorum* occurs in 3 Long Island counties: Nassau (*Trigoboff c04170*, *c04177*, *c058*, BH); Queens (*Trigoboff c0514*, BH; *c0516*, BH & NYS) and Suffolk (*Trigoboff c052*, BH). These collections were from cracks and depressions in bark at the bases (up to 1 m high) of roadside Norway maples over 60 cm diameter with exposed surface roots hugging the base of the tree, on urban and suburban side streets. The *T. pagorum* here is less common and generally less abundant than *T. papillosa*.

*Tortula pagorum* did not appear in Ketchledge's (1980) moss checklist of New York. It is known from 3 adjacent states: New Jersey (*364419*, NY), Connecticut (*365374*, NY) and Pennsylvania (*Zander 4641*, MO). According to Anderson (1943), "In the eastern United States, it is almost completely confined to human habitation." (He speculated that smoke may promote its establishment. I wonder whether the greater numbers, faster speeds and broader tires of today's vehicles, which kick up more road dust year round, are relevant. Perhaps, increased numbers of Norway maples have favored both *T. pagorum* and *T. papillosa*.) In the southwest, *T. pagorum* is independent of habitation and lacks the weedy aspects of its eastern range. Anderson concluded that "*T. pagorum* is native to the southwestern United States and entirely adventive in the eastern part of the continent."

In dry weather, small patches of *T. pagorum* are extremely difficult to spot in the field. Besides being uncommon, the plants are tiny, dark, low on the tree, recessed in bark crevices and greatly outnumbered by superficially-similar *Orthotrichum*. Just after a rain is the best time to search because the

leaves spread widely and turn a lighter green than most of the *Orthotrichum* that grow with it. For both species of *Tortula*, areas where the streets form a grid are the easiest to search. If the leaves are down, at each intersection you can look far, both ways, for the silhouette and bark color of large roadside maples and then choose the direction with the most suitable trees. As your car – or better, bicycle – passes each tree, you can see if there's a good growth of moss and so whether it's worth it to stop and look closer. Leaning the bicycle against the tree makes a risky but convenient step ladder.

In Australia, these two species of *Tortula* commonly occur together on tree trunks and sometimes concrete walls. The *T. pagorum* there is more abundant in drier regions and the *T. papillosa* in wetter ones (Scott and Stone, 1976; Scott, 1997). Sporophytes of both species have been found in Australia, but not in the United States. In the United States, *T. papillosa* sometimes occurs on calcareous rock and mortared walls; and *T. pagorum* sometimes occurs on rocks, bricks and stone walls (Crum & Anderson, 1981). In New York State, *T. papillosa* has been found on a mortared stone wall (Eckel 192284n, BUF; Eckel, 1985) and on ordinary shingles on the roof of a shed (Trigoboff c0555, BH) – here growing with 14 other mosses, including *Tortula ruralis* and *Lindbergia brachyptera* (Trigoboff c0554, BH).

Visch (1976) reported that in New Zealand, “*Tortula papillosa* was almost exclusively growing on the southern, shaded side of the trunk...” Schnooberger (1942) reported that in Michigan, “It has a tendency to grow on the exposed or sunny side of trees.” In New York State, the two *Tortulas* do not favor any side of the tree with respect to the sun, compass, road, sidewalk or lawn.

*Tortula pagorum* and to a lesser extent *T. papillosa* generally do not attach to the bark, but rather to a blackish layer of what I propose we call “schmutz” because there seems to be no existing term specifically for the wind-blown sand, detritus and miscellaneous fine materials that accumulate on vertical surfaces such as tree trunks, especially in cracks and depressions, and continue to accumulate on (and be generated by) the growing mosses, lichens, algae, fungi and bacteria. “Aeolian deposit” usually refers to fairly large amounts of wind-deposited materials on land.

When wet, the moss and schmutz may be scooped from crevices in the bark with remarkable ease. In my experience, these two *Tortulas* and most other bryophytes are collected best with an old credit card beveled along one edge. The card flexes and so follows the irregular surfaces of trees, rocks and ground much better than a knife. The card is faster, safer, scrapes

off larger, more intact masses of plants, collects less wood, rock, soil and schmutz, and tells more about how strongly or weakly the moss attaches to the substrate. Property-owners are less likely to be concerned with tree damage. And pedestrians and police in urban areas are less likely to feel threatened.

I examined all specimens cited except *Eckel 192284n*, and *Bassett s.n.* These were being moved from BUF to MO.

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