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A HISTORY OF *TILLAEA AQUATICA* (CRASSULACEAE) IN CANADA AND ALASKA¹

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TILLAEA AQUATICA L. (*T. simplex* Nutt.; *T. Vaillantii* sensu Gray's Manual, ed. 7, 1908, not Willd.; *Tillaeastrum aquaticum* (L.) Britt.) has been but little collected in Canada, both because of its small stature and its apparently restricted habitat. A collection from Yellowknife in Mackenzie District, N.W.T., suggested the following study.

Tillaea aquatica in Canada was apparently unknown to John Macoun as late as 1886, for there is no mention of it in his Catalogue of Canadian Plants, Part 1, 1883, or in the Additions and Corrections published in 1886.

There is a specimen in the Herbarium of the National Museum of Canada collected by Professor Macoun on August 4, 1887 from a salt marsh, Alberni Canal, Vancouver Island, British Columbia, which is apparently the first collection for Canada, but it was at first misnamed *Elatine americana*. It was not on the basis of this specimen that it was reported as new to the flora of Canada, for in the Canadian Record of Science, January 1895, the following record by J. M. Macoun appears: "*Tillaea simplex* Nutt. In mud in mill pond at Mount Stewart, Prince Edward Island 1888 (John Macoun). New to Canada." (August 17, 1888 [John] Macoun (CAN)). Other records from Prince Edward Island are those of J. R. Churchill—the fifth collection of the species in Canada—(Tracadie Beach, *J. R. Churchill* August 1, 1901 (CAN)), and Fernald and St. John (wet brackish sand, Tracadie, *Fernald & St. John 11071*, August 22, 1914 (MT)).

¹ Contribution No. 1340 from the Botany and Plant Pathology Division, Science Service, Department of Agriculture, Ottawa, Canada.

Churchill,² has the following discussion of the species: "The second native and notable plant was a *Tillaea*, which I found in the wet sandy margin of Campbell's Pond, which is separated from the ocean by the same broad beach at Tracadie. Though the station was far north of its known range, it was of course assumed to be *Tillaea simplex*, and it was only after careful examination since my return, that Mr. Fernald identified it with *T. Vaillantii*, Willd., of Africa and Central Europe. The little plant, less than an inch high, grows in moss-like tufts like its congener *T. aquatica*, L. (*T. simplex*, Nutt.) from which it differs principally in the elongated pedicels of some of the flowers. This species has not been reported from North America; but the '*Tillaea simplex*' mentioned in Mr. J. M. Macoun's Contributions to Canadian Botany as "new to Canada," and collected also on Prince Edward Island, may be '*T. Vaillantii*'."

In Contributions to Canadian Botany XVI by J.M. Macoun,³ John Macoun's collection from Mount Stewart was referred to *T. vaillantii*, but later⁴ that author published the following note:

"*Tillaeastrum aquaticum* (L.) Britton.

Centunculus minimus Cat. Can. Plants vol. II p. 340 in part.

Tillaea simplex Contr. Can. Bot. Pt. V.

T. vaillantii Contr. Can. Bot. Pt. XVI in part.

"Our specimens are from Mount Stewart, Prince Edward Island, No. 8,705; Beauport, near Quebec, Que., No. 68,640; Kamloops, B.C., No. 8,706. (John Macoun). The only specimens of *T. Vaillantii* in our herbarium are those collected on Prince Edward Island by Mr. Churchill. Prof. Macoun's specimens referred to that species in Pt. XVI of these papers proves to be *T. aquaticum*."

Fernald has since included the North American material named *T. vaillantii* with *T. aquatica*.⁵ The author is in agreement with this at least in so far as the Prince Edward Island collection is concerned. These plants, which appear to differ from typical material only in that some of the pedicels are elongated, might possibly be given the rank of form, but certainly not the rank of species. The Fernald and St. John material collected at Tracadie has short pedicels similar to all the other material observed.

² CHURCHILL, J. R. Some Plants from Prince Edward Island. RHODORA 4: 35. 1902.

³ Ott. Nat. 16: 216. 1903.

⁴ Ott. Nat. 21: 159. 1907.

⁵ FERNALD, M. L., Gray's Manual of Botany, ed. 8. 1950.

The third collection of this species was made by John Macoun in 1889, again in British Columbia (damp places, Kamloops, June 26, 1889 (CAN)) and was originally recorded as *Centunculus minimus* (see above). *T. aquatica* was recorded, presumably for the first time for British Columbia, by J. M. Macoun,⁴ on the basis of this collection. The only other records from British Columbia are from Alberni Canal, Vancouver Island (see above), New Westminster⁶ and Crawford Bay, Kootenay Lake.⁷

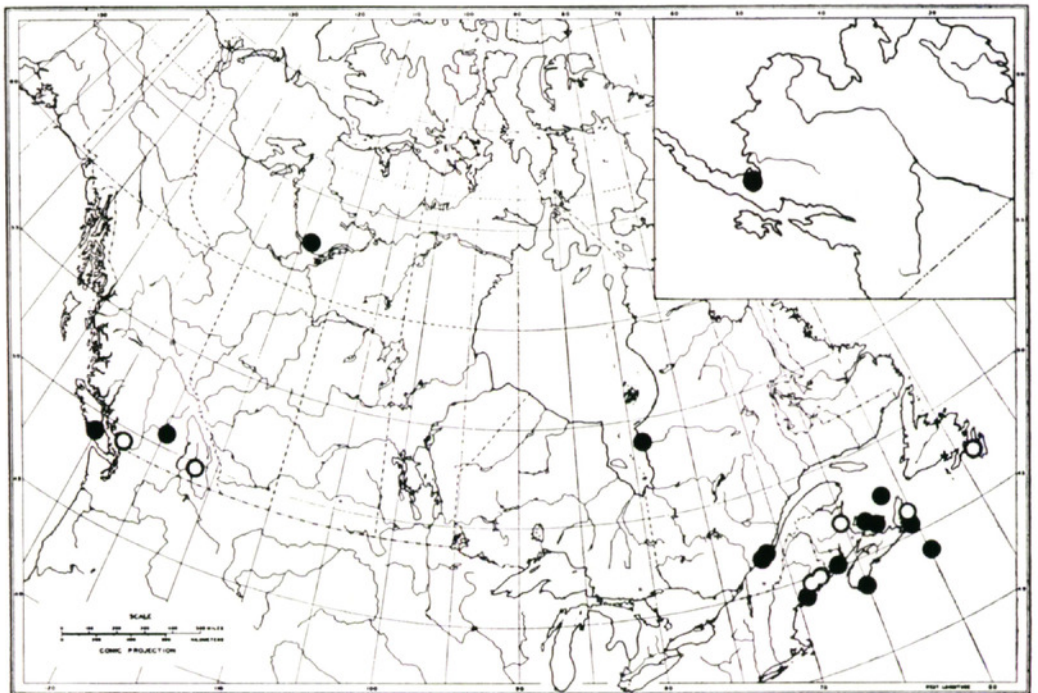


Fig. 1. The northern distribution of *Tillaea aquatica* in North America; dots: herbarium specimens; circles: literature records. (Goode's Series of Base Maps No. 111. Copyright 1939 by the University of Chicago).

In 1899 Macoun collected the plant on Sable Island, Nova Scotia—the fourth collection for Canada—(Sable Island, quite common in wet sand, [John] Macoun July 22, 1899 (CAN)), but somehow misnamed it *Montia fontana*. It was not recorded from that area until 1921 when Harold St. John published his paper, Sable Island, with a Catalogue of its Vascular Plants,⁸ based on his own collections of 1913 (CAN) as well as the earlier collection of John Macoun. *T. aquatica* was not known from the

⁶ HENRY, J. K., *Flora of Southern British Columbia*. 1915.

⁷ EASTHAM, J. W., *Supplement to 'Flora of Southern British Columbia.'* 1947.

⁸ *Proc. Boston Soc. Nat. Hist.* 36 (1): 76. 1921. *Contr. Gray Herb. Harvard Univ.*, N.S. No. 62.

mainland of Nova Scotia until 1920 when it was collected by Fernald *et al.* (damp sand-flats back of beach, Villagedale, Shelburne Co., Fernald *et al.* 21360 (CAN)),⁹ or from Cape Breton Island until recorded by Erskine,¹⁰ on the basis of a collection by Smith *et al.* No. 2853 from muddy pond behind beach, Catalogue, Cape Breton Co. A still more recent collection from Cape Breton Island is that of Smith *et al.* from Richmond County (abundant, flat area near pond), Point Michaud, 5135, August 15, 1951 (DAO).

The first collection for Quebec—and the sixth for Canada—was made in 1905 (Marshes, Beauport near Quebec, John Macoun, August 30, 1905 (CAN)). This was recorded by J. M. Macoun⁴ (see above), presumably the first published record of its occurrence in that province. Since then it has been collected numerous times along the St. Lawrence River in the fresh water intertidal zone between Lake St. Peter and Island of Orleans. Elsewhere in Quebec, it is known from the Magdalen Islands in the Gulf of St. Lawrence (wet brackish sand at the margin of a pond northwest of Etang du Nord village, Grindstone Island, Fernald *et al.* 7541, July 24, 1912 (CAN, MT) and wet brackish sand near Hospital Point, Fernald *et al.* 7540, July 18, 1912 (MT)) and Fort George on James Bay (rivage vaseux de la rivière, Fort George, E. LePage 12,986, 5 Sept. 1950 (DAO)). This latter collection is apparently a new record for the James Bay region and Ungava District, Quebec, and is an extension of range of some 550 miles northwest from the St. Lawrence River sites.

Apparently the first record for New Brunswick is that of Blake, based on a collection made in 1913 in brackish tidal mud, French Fort Cove, Miramichi River, Newcastle.¹¹ This is on the Gulf of St. Lawrence shore of New Brunswick. A second record from New Brunswick is that of C. A. and Una F. Weatherby (forming loose mats in mud over sand, margin of barrier-beach pond, Cheney Island, Grand Manan, No. 7305, August 3, 1944 (DAO, CAN)). This was reported by Weatherby

⁹ FERNALD, M. L., The Gray Herbarium expedition to Nova Scotia, 1920. RHODORA 23: 150. 265. 1921.

¹⁰ ERSKINE, D., Species newly or rarely reported from Nova Scotia and Cape Breton Island. RHODORA 53: 268. 1951.

¹¹ BLAKE, S. F., Notes on the flora of New Brunswick. RHODORA 20: 105. 1918.

and Adams,¹² from which the following note is quoted: "Not otherwise known from southwestern New Brunswick nor from Maine east of Penobscot; in Nova Scotia known from a single station in Shelburne County." Fassett¹³ records specimens from the estuaries of the Kouchibouguac and Kouchibouguacis Rivers but these specimens have not been seen.

The only record from Newfoundland is the collection by Fernald, Long & Dunbar from the sandy and peaty margin of pond back of barrier beach, Argentia, in 1924.¹⁴ Dr. Ernest Rouleau, who is currently working on a Flora of Newfoundland has kindly reported that he has seen this collection, No. 26737, in the Gray Herbarium.

On August 27, 1948 Lepage collected *T. aquatica* in Alaska (muddy shore of Naknek River, Naknek, Alaska Peninsula, *E. Lepage 24,105* (DAO)). It was again collected in this area by Schofield in 1952 (damp sandy margins of pool, *W. B. Schofield 2770* and damp sandy margin of pond among hills, *2566*, Naknek (DAO)). These collections are an extension of range of some 1400 miles from the nearest known sites in southern British Columbia and the collection from Mackenzie District mentioned below. Its occurrence in Alaska may possibly be more closely related to the Japanese and eastern Siberian distribution reported by Fassett¹³ than to the British Columbia or Mackenzie District sites. It is new to the flora of Alaska.

In 1949 the author collected *T. aquatica* at Yellowknife in Mackenzie District and in 1953 revisited the collection site (in 4 inches of water, in thick mat of moss, Yellowknife, *W. J. Cody 3511*, August 16, 1949 (DAO) and in muck sometimes in water up to ½ inch depth of flats of bay by old townsite, Yellowknife, *W. J. Cody & R. L. Gutteridge 7318*, July 14, 1953 (DAO)). Both these collections were from exactly the same locality, but a slight lowering in the level of the water of Yellowknife Bay had considerably altered the habitat. This site is some 1400 miles from the nearest known site to the southeast (Fort George,

¹² WEATHERBY, C. A. and J. ADAMS, A list of the vascular plants of Grand Manan, Charlotte County, New Brunswick. Contr. Gray Herb. Harvard Univ. N.S., No. 158. 1945.

¹³ FASSETT, N. C., The vegetation of the estuaries of northeastern North America. Proc. Boston Soc. Nat. Hist. **39** (3): 73-130. 1928.

¹⁴ FERNALD, M. L., Two summers of botanizing in Newfoundland. RHODORA **28**: 86, 210. 1926.



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