University of Toronto Studies
Biological Series, No. 39

THE HIGHER AQUATIC PLANTS OF LAKE ABITIBI, ONTARIO

By
ANDREW L. PRITCHARD
(From the Department of Biology
University of Toronto)

PUBLICATIONS OF THE
ONTARIO FISHERIES RESEARCH LABORATORY
No. 51

TORONTO
THE UNIVERSITY OF TORONTO PRESS
1935

THE HIGHER AQUATIC PLANTS OF LAKE ABITIBI, ONTARIO

Abstract

This study of the higher aquatic plants of lake Abitibi and adjacent waters shows an interesting admixture of purely aquatic and shore forms in lake Abitibi, due to flooding caused by a dam in the Abitibi river. Adjacent lakes display a type of vegetation very different from that present in lake Abitibi. The commonest higher aquatic plants in lake Abitibi belong to the genus *Carex*; the *Potamogeton*, *Polygonum*, and *Nymphaea* being next in order of abundance. These occur chiefly in the protected bays, the shores of the main part of the lake supporting little vegetation, due to wave action resulting from the frequent storms.

The following notes on the aquatic plants of lake Abitibi are based on observations made during the summer of 1925 when parties from the Department of Biology, University of Toronto, and the Royal Ontario Museum of Zoology, spent some time on the lake and in its immediate environs. Some accounts of the observations made at that time have already been recorded by Dymond and Hart (1927) and Snyder, Dymond, and Walker (1928).

A feature which contributes to the interest of the study of the aquatic plants in this lake is the "drowning" of the shore due to the construction of a dam in the Abitibi river, the outlet stream. The flooding of the low land bordering the lake has resulted in the appearance in such submerged areas of semi-aquatic, and in some cases terrestrial plants, among the true aquatics which formerly inhabited these areas.

As the time available for the surveys was very limited only qualitative studies of the aquatic vegetation were undertaken, but representative collections were made from as many locations as possible. A list of the stations visited is as follows: Pearce's bay, lying north-east of Long point; the shore of Long point; Chesney lake, Long point; Shea's bay; Ghost river; lake at head of stream flowing into Camp III bay; and the lake at Red Pine point. The two locations which were examined in most detail were Shea's bay and Ghost river.

At Pearce's bay, west of Long point, the bottom is gravelly

and the shore is exposed to the sweep of the waters from the lake. Due to the general shallowness of the water, storms arise quickly, and may become serious. For this reason, little aquatic vegetation was present in this bay, *Juncus balticus* Willd. var. *littoralis* Engelm. being the only plant taken. On the sandy beach, two semi-aquatic carices were growing, *viz. Carex Houghtonii* Torr. and possibly a hybrid between *Carex vulpinoidea* Michx. and *Carex conjuncta* Boott. Along the beach to the eastward, the shore was rocky and here algae only appeared.

In Ghost river, pecular conditions obtained. As a result of the flooding mentioned above, both banks were submerged for distances varying from ten feet to one hundred yards. In this submerged area, the depth of the water varied from six inches to three feet. There, in water from one to two and one-half feet in depth, large numbers of the terrestrial and semi-aquatic species of the genus *Carex* were present, *viz.*: *Carex rostrata* Stokes; *C. vesicaria* L. var. *Raeana* (Boott) Fernald; *C. vesicaria* L.; *C. lasiocarpa* Ehrh.; *C. intumescens* Rudge; and *C. Crawfordii* Fernald. Amongst these were interspersed forms which usually occupied a more aquatic habitat, *viz.*: *Potamogeton alpinus* Balbis; *Polygonum amphibium* L.; and a few water plantains, *Alisma Plantago-aquatica* L. Here and there groups of the water horsetail, *Equisetum fluviatile* L., appeared instead of the carices. Clumps of the willow-leafed spiraea, *Spiraea salcifolia* L., were scattered throughout the area. Distributed amongst these plants, but continuing beyond into water about three feet in depth, was the eel grass, *Vallisneria spiralis* L. Outside of this, in water four to six feet in depth, occurred the pond weeds, *Potamogeton natans* L. and *Potamogeton Richardsonii* (Benn.) Rydb. The plants occupying the deepest water were the pond lilies, *Nymphaea advena* (Ait.) and *Castalia tetragona* George Lawson. The zonation which is evident here is slightly different from that found by Magnin in Jural lakes and reported by Denniston (1922) since the potamogetons are outside the Nymphaeaceae in the latter case.

At the mouth of the Ghost river lies a protected bay, the banks of which had not been flooded to any great extent. Here the zonation is more typical of an unexposed body of water.

In the depths below two feet, the dominant plant is the spike rush, *Eleocharis palustris* (L.) R. & S. Outside of this are colonies of the pond weed, *Potamogeton Richardsonii* (Benn.) Rydb. Occasional islands of the water plantain, *Alisma Plantago-aquatica* L. and *Sagittaria sp.*, are scattered throughout.

In comparison with the flooded area Shea's bay in the upper lake is of particular interest. In this case, although acres of land have been submerged and many terrestrial plants killed off, the main body of the bay does not seem to have been seriously affected. The flora of the bay proper appears to be similar to that of the sheltered bays of most of the northern lakes, in which a more or less distinct zonation usually occurs. A rough diagram is submitted in figure 1.

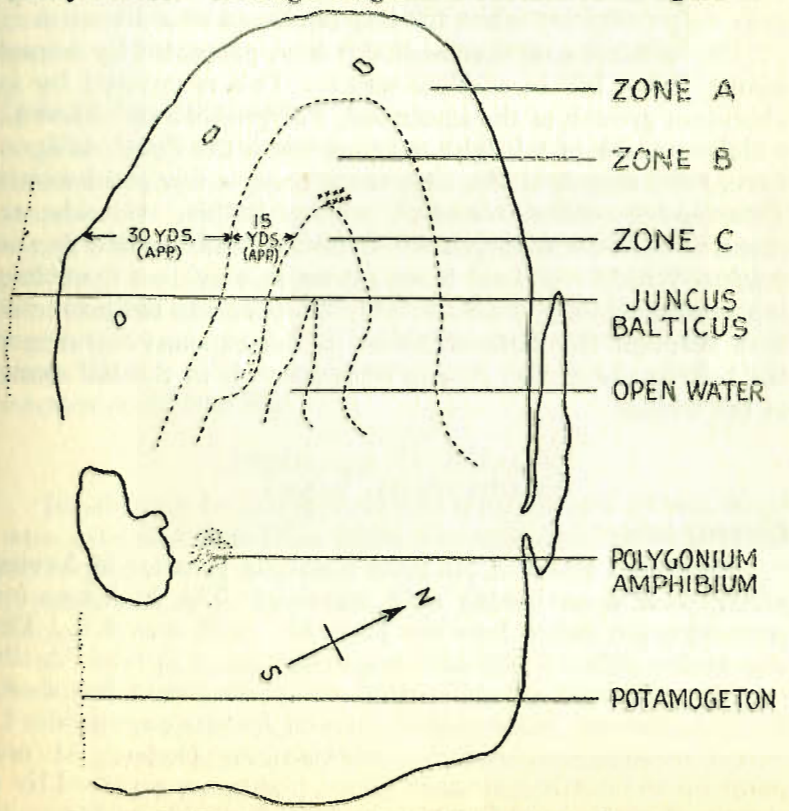

FIGURE 1.—Diagram illustrating floral zonation in Shea's bay.

Zone A, figure 1, which varies from 0 to three feet in depth, is constituted mainly by species of sedge of the genus *Carex* and by *Eleocharis palustris* (L.) R. & S., with groups of the common cat-tail, *Typha latifolia* L., a few water parsnips, *Sium cicutaefolium* Schrank, and the water knotweed, *Polygonum amphibium* L. These gradually become fewer until in zone B, which is approximately three to four feet in depth, the dominant plants are the rush, *Eleocharis palustris* (L.) R. & S., and the horse-tail, *Equisetum limosum* L. Amongst these, also, are clumps of buckbean, *Menyanthes trifoliata* L., and at the edge of the zone, some water millfoil, *Myriophyllum verticillatum* L. Outside in the open water, in a depth of four and a half to six feet, grows eel grass, *Vallisneria spiralis* L. and *Nymphaea spp.* The three zones mentioned above appear very definitely when the bay is viewed at a distance.

In the north-east corner of this bay, protected by a small island, lies a bar in shallow water. This is covered by an abundant growth of the knotweed, *Polygonum amphibium* L., which appears as a bright red mat when the flower is open. Across the mouth of the bay, there occur a few pond weeds, *Potamogeton natans* L. and *P. alpinus* Balbis. Outside, exposed to the waves, appear the spike-like leafless rush, *Juncus balticus* Willd. In these three places, it is evident that there is a gradual change from the leafy knotweed in the protected area through the Potamogetons in the exposed entrance to the bay to the hardy, pliable rush which is in the full sweep of the winds.

NEIGHBOURING LAKES

Chesney lake

This lake, situated on Long point, is peculiar in having water with a noticeable acid reaction. The hydrogen-ion concentration taken here on June 19, 1925, was 6.8. The vegetation differed radically from that found in lake Abitibi proper. Around all sides, except the east, were the sheep foils, *Andromeda glaucophylla* Link and *Kalmia angustifolia* L. and Labrador tea, *Ledum groenlandicum* Oeder. At one point on the north-east shore, these plants are replaced by a clump, about twenty feet long and ten feet wide, of flowering

fern, *Osmunda regalis* L. Amongst this rim of heaths and ferns is interspersed much sphagnum moss. In deeper water were clumps of buckbean, *Menyanthes trifoliata* L. and *Nymphaea advena* Ait. The bottom of the entire lake, which is nowhere more than fifteen feet in depth, is thickly covered with a layer of the algae, *Chara*.

Lake behind Camp III bay

This lake is typical of the small lake in sandy areas. Time prevented a close study of the plant forms, however. In the shallow water the mare's tail, *Hippuris vulgaris* L., was very common, and in the deeper water, *Ceratophyllum* sp. Beyond this some pond weed, *Potamogeton Richardsonii* (Benn.) Rydb., appeared. On the shores in one area was an abundant growth of the canary grass, *Phalaris arundinacea* L. Two species of *Carex* were also found here, but were not identified.

Lake at Red Pine point

This lake is interesting because it combines the types of habitat of the two just mentioned. At one side, the water is more or less acid and contains the sheep foils and Labrador tea, mentioned in the case of Chesney lake, in addition to the pitcher plant, *Sarracenia purpurea* L. At the south end of the lake, however, the bottom is sandy. Here, in water varying from two to four feet in depth, were collected the quillwort, *Isoetes echinospora* Dur., and the pond weed, *Potamogeton epihydrus* Raf.

ADDITIONAL COLLECTIONS

In addition to the aquatic and semi-aquatic plants which were collected from lake Abitibi proper and the other lakes mentioned above, a number were taken from ponds and pools at other places in the region. A list of these is appended below.

East of Lowbush village, Ontario

Menyanthes trifoliata L.—buckbean
Ranunculus aquatilis L.—water buttercup
Caltha palustris L.—marsh marigold
Lysimachia thyrsiflora L.—tufted loosestrife

West of Lowbush village, Ontario

Juncus sp.—bog rush
Juncus balticus Willd. var. *littoralis* Engelm.
Juncus articulatus L.
Carex spp. (2 species)—sedge
Carex intumescens Rudge var. *Fernaldi* Bailey
Carex aurea Nutt.
Carex utriculata Boott.
Carex Houghtonii Torr.
Carex conjuncta Boott.
Carex conjuncta Boott x *Carex vulpinoidea* Michx.
Carex canescens L. var. *disjuncta* Fernald
Carex vulpinoidea Michx.
Carex vesicaria L.
Carex rostrata Stokes
Carex stricta Lam.
Carex Crawfordii Fernald
Scirpus hudsonianus Fern.—cotton grass.
Eriophorum viridi-carinatum (Engelm.) Fernald
Scirpus atrocinctus Fernald var. *brachypodus* Fernald —bulrushes
Scirpus atrovirens Muhl.
Potentilla palustris (L.) Scop.—marsh five finger
Caltha palustris L.—marsh marigold
Iris versicolor L.—large blue flag

SUMMARY

In lake Abitibi the genus *Carex* is most abundant, followed closely in order by *Potamogeton*, *Polygonum*, and *Nymphaea*. Other plants such as the genus *Eleocharis* and *Equisetum* are common.

The lake is interesting since it shows the result of the flooding of the surrounding land. The terrestrial and semi-aquatic plants have been submerged in many cases and are mixed with the true aquatics which have later grown up.

In some places, *e.g.*, Shea's bay, a fairly distinct zonation occurs.

Around the shores of the main body of the lake there is very little vegetation because of the severe wave action resulting from frequent storms on the shallow lake.

ACKNOWLEDGEMENTS

I am indebted to Mr. W. R. Watson of the Parkdale Collegiate Institute, Toronto, for much assistance in connection with the identification of the plants mentioned herein and to other members of the field parties from the Department of Biology, University of Toronto, and the Royal Ontario Museum of Zoology, who co-operated in the faunal survey of the lake Abitibi area of which the work reported here was a part.

LITERATURE CITED

Denniston, R. H. 1922. A survey of the larger aquatic plants of lake Mendota. Trans. Wisc. Acad. Sci., Arts Lett., 20: 496-500.

Dymond, J. R. and J. L. Hart. 1927. The fishes of lake Abitibi (Ontario) and adjacent waters. Univ. Toronto Studies, Biol. 29. Pub. Ont. Fish. Res. Lab., 28.

Snyder, L. L., J. R. Dymond, and E. M. Walker. 1928. A faunal investigation of the lake Abitibi region, Ontario. Univ. Toronto Studies, Biol. 32.