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cc: Education-Game
Dr. Brown

INSTITUTE FOR FISHERIES RESEARCH
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MICHIGAN DEPARTMENT OF CONSERVATION
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WATER PLANTS

by

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There are more than 100 different kinds of water plants found in Michigan lakes. Some of these, like the cattail and bulrush, grow in shallow water or low, marshy places and stand erect with their flowers and most of their leaves and stems above the water. Other kinds, such as water lilies, float their leaves and flowers on the water surface, and still others, like most of the pondweeds, grow entirely submerged. These three general types are known as emergent, floating, and submergent, respectively.

It is not easy to identify all the different water plants, but certain of the common varieties may be determined from the descriptions and sketches which follow.

Emergent Plants (Those which stand erect above the water surface)

(Insert Fig. #1. Cattail)

The cattail grows in marshes and along the water's edge in lakes. It may reach a height of 8 feet at times. It is distinguished from other water plants by its long yet rounded head which is chestnut brown in color.

Its leaves are thin and ribbon-like and often extend above the flowers. Each cattail or head produces about one-quarter million seeds, and each seed is supplied with silky filaments which enables it to be carried by the wind. There are two common species of cattails--the broad leaf and the narrow leaf. The broad leaf is the more common, but both of these are well distributed over Michigan. The cattails are not extremely important to fish because they occur only in very shallow water. However, small game fish and minnows find shelter in their underwater stems and leaves, and no doubt certain fish use them as a place to lay their eggs.

(Insert Fig. #2. Bulrush)

The bulrush, like the cattail, grows in shallow water although this plant is capable of growing in water of 6 to 8 feet in depth. Its round or triangular shaped stems may extend above the water surface as much as 5 or 6 feet, but usually not more than 3 or 4 feet. The leaves are usually inconspicuous, and the seeds are nut-like, located within a few inches of the tip of the stem. There are at least a dozen different kinds of bulrush in Michigan. This plant has been used some in basket making, but the reeds are too soft and weak to be of much value for this purpose. Patches of bulrushes in lakes offer good cover for fish. Bass in particular use bulrush beds for shelter. Much fish food is produced on the underwater parts of the stems and roots.

(Insert Fig. #3. Spike Rush)

The common spike rush grows in very shallow water or out of the water in swampy places. It has a round stem and may grow to a height of 2 feet. The flower and fruit are at the tip of the stem. A considerable number of different kinds of spike rushes are found in Michigan. Some have square stems and others jointed stems. They all look similar in general appearance

however. The spike rush is not extremely important to fish since it occurs only in very shallow water. Its seeds are important duck food, and its leaves and stems may shelter small fish and fish food organisms.

(Insert Fig. #4. Pickerel Weed)

The pickerel weed has broad, arrow-shaped leaves with rounded points and violet-blue flowers which are crowded together in a long cluster. Its stems are thick and strong. It grows at the margins of ponds and lakes in shallow water and may reach a height of 3 feet. It is found all over Michigan where suitable conditions occur. The primary value to fish is the fish foods which are harbored on it. Dragonfly and damselfly nymphs are especially abundant on and around this plant.

(Insert Fig. #5. Arrowhead)

The arrowhead is found in shallow water, similar to the pickerel weed, cattail and bulrushes. It has an arrow-shaped leaf with rather sharp points. The flowers are white with three petals and are found in whorls (three in each) toward the terminal part of the flower stem. There are several species of arrowheads in Michigan, but all are characterized by dark green, arrow-like leaves and white flowers. Their importance to fish is the same as that of cattails and pickerel weed.

Floating Plants (Those which float most of their leaves and flowers on the surface of the water)

(Insert Figs. #6, 7 and 8. Duckweeds)

All of the duckweeds are very small and float entirely on the surface of the water with small white rootlets extending down below the water surface. These plants have no true stems or leaves. The light green leaf-like structure is called the thallus. They reproduce by budding, i.e. breaking

off of parts of the thallus which give rise to new plants. Under favorable conditions duckweeds become numerous enough to produce a thick green blanket over large areas of ponds and protected bays in lakes. Three kinds are widely distributed over Michigan. They may be distinguished as follows: 1. Greater duckweed -- leaves (thallus) round and about 1/4 inch in diameter, with 4 to 16 rootlets. 2. Lesser duckweed -- leaves smaller than 1/4 inch in diameter and with only one rootlet. 3. Star duckweed-- leaves oval and fastened together in groups making them star-like or in zigzag chains.

It is not known exactly how important duckweeds are to fish, but they certainly do give cover and food to many of the fish food organisms. They are a favorite food of certain ducks.

(Insert Fig. #9. White Water Lily)

The water lilies are the best known of all our water plants because of their beautiful flowers and leaves. The white water lily has green almost-round lily-pads or leaves which are leathery and waterproof above and crimson beneath. The flowers are white or sometimes pinkish with golden centers. They give off a sweet, pungent odor not found in the yellow water lily. The stem of the white lily leaf has 4 large tubes running through it, and the underground stem which anchors the plant to the lake bottom is thick and fleshy with little potato-like offshoots which detach to form new plants. These rootstocks are eaten by ducks, muskrats, marsh birds, deer, moose and even porcupines. There are two kinds of white water lilies in Michigan but these are difficult to tell apart. Almost all parts of the state where ponds and lakes occur support this beautiful flower. The wide leaves give ideal cover for fish, and most fishermen soon learn that bait properly placed near the lily pads

will very often bring forth a nice bass or bluegill. Water lilies also support an abundance of fish food organisms.

(Insert Fig. #10. Yellow Water Lily)

The yellow water lily or spatterdock as it is sometimes called grows under much the same conditions as the white water lily and is even more versatile since it is often found where white water lilies are absent. It is characterized by larger, more oval shaped leaves and by yellow flowers which lack any pronounced odor.

Its distribution and value to fish is very similar to that of the white water lily. Two or three varieties are found in Michigan.

(Insert Fig. #11. Water Shield)

The water shield is another of the typical floating water plants. It grows under conditions similar to the lilies. Its leaves are almost circular with no indentation as found in the water lilies. A slimy stem extends down from the center of the leaf, and the veins radiate out from the point of attachment. The flowers are rather inconspicuous, extending a few inches above the water surface. There is only one species found in Michigan and this is well scattered over the state. The value of this plant to fish is similar to that of the water lilies.

(Insert Fig. #12. Floating-leaf Pondweed)

Most of the 40 or more different kinds of pondweeds grow be neath the water surface. The floating-leaf species is somewhat of an exception to the general habits of this group. This plant is usually found in water from one foot to 12 feet in depth. Its roots are firmly anchored in the bottom and its long, thin stem extends to the surface, where it puts forth oval-shaped leaves to float on the water surface. All other leaves except

those that reach the surface are incomplete or thread-like. No leaf blades are present. The flower is inconspicuous, there being from a few to about a dozen small flowers per stalk.

This species is one of the most widely distributed pondweeds in Michigan and one of the most important to fish. Fine cover results from its extensive beds and much fish food is harbored on its stems and leaves. The pondweeds as a group are by far the most important aquatic plants from the fisheries viewpoints. They not only give cover and produce fish food but are used for spawning beds by several fish species.

Submerged Plants (Those which grow entirely below the water surface, or if they do emerge, their flowers and fruit are the only parts that stick above the water level)

(Insert Fig. #13. Common Pondweed)

The large-leaf pondweed has similar habits to the one described above. However, none of its leaves float on the surface. Only the flowers and fruits project above the water. All of its leaves are quite similar except that those at the terminal end may be somewhat shorter and more rounded. It occurs all over Michigan and is represented by a dozen or more different kinds which cannot be distinguished by the amateur. Its value to fish has been described above.

(Insert Fig. #14. Tape Grass or Wild Celery)

The stems of the tape grass are buried in the mud in water depths of from 6 inches to 4 feet. Its tape-like leaves may reach a length of 3 or 4 feet, although hardly ever wider than 1/4 inch. The female flowers are borne on long stalks, and the flowers project above the surface. When the seeds are formed, the long stalk becomes curved and waxy and pulls the fruit below.

Tape grass is widely distributed in Michigan and prefers places in lakes and streams where there is a slight current. It is a good shelter plant for fish and supports a considerable number of the fish food organisms.

(Insert Fig. #15. Waterweed - Elodea)

The waterweed forms large, crisp masses near the bottom of lakes and ponds. It roots loosely in the bottom and may grow in water as deep as 15 or 20 feet, depending on how far light can penetrate effectively. The rather small leaves are in whorls with their bases embracing the stem. The stems of this plant are brittle and when broken, the fragments continue to grow independently. This accounts for its rapid spread in streams and lakes. The female flowers reach the surface by means of their long stems, much the same as tape grass. This plant is found all over Michigan wherever suitable conditions occur. It supports much small invertebrate life such as snails, insects and fresh-water shrimp, and is especially important to those fish which feed near the bottom.

(Insert Fig. #16. Bladderwort)

There are two or three different kinds of this plant in Michigan. They are delicate, vine-like in appearance, and float about beneath the water surface among the stems and leaves of other aquatic plants. Their presence is a sign of abundance of tiny animals which they capture by means of many thousand small traps. They have slender stems which bear finely branched leaves. On the branches of each leaf are found the small bladder-like traps. There are no true roots, but brown root-like projections at one end of the stem serve the purpose of roots except that they do not anchor the plant. The flowers are yellow and are produced on stalks which extend 3 or 4 inches above the water. Each little bladder has a slit-like

opening surrounded by teeth and bristles and supporting a tiny valve. When little animals touch these sensitive hairs the value opens, which causes a suction that pulls the animal and water into the sac. Here the captured animal is digested by secretions from the plant. Most animals eat plants, but a few like the sundew, pitcher plant and bladderwort get at least part of their food from eating animals.

So far as is known, this plant has no great value to fish. It undoubtedly serves as cover and may be eaten to a small extent by some fishes.

(Insert Fig. #17. Coontail or Hornwort)

The coontail grows well out from shore and is one of the typical submerged plants. It seldom roots to the bottom but floats about sometimes in huge masses. Some lakes are completely taken over by it and control has seemed advisable. This plant looks somewhat like water milfoil, water buttercup and musk-grass or stonewort. It can be told from milfoil by the fine teeth on its leaves and by the fact that it is rough to touch. Musk-grass has toothed leaves and is rough to touch but its leaflets are not divided and its stem appears jointed. Musk-grass is always attached to the bottom, while coontail seldom is.

Coontail is found all over Michigan and seems to be able to grow in many different kinds of lakes and ponds. It is important to fish because of the cover it affords and the food it harbors.

(Insert Fig. #18. Water Milfoil)

Water milfoil is found in shallow to fairly deep water. Plants are usually rooted to the bottom, but their long, graceful branches nearly reach the surface and their deep purple flowers project above it. The leaves are feather-like (see Fig. 18) with numerous divisions and this

character alone will separate it from coontail and musk-grass. There are several different species and they have a wide distribution. These plants, like coontail and musk-grass, are valuable to fish.

(Insert Fig. #19. Musk-grass or Stonewort)

Musk-grass is usually the predominate plant in lakes containing much lime. It has a real musky smell when its brittle stems are handled or crushed. The odor resembles onions or garlick. It grows over the surface of the bottom in shallow to deep water when conditions are right. It is not classed with the higher plants because it produces no flowers or seeds. It has leaf-like structures similar to the leaves of coontail except that they are not branched or nearly so bushy looking.

It is found scattered all over the state in the hard water lakes and is particularly important to fish because it is capable of growing in many places where other plants find conditions unsuitable. It harbors large amounts of fish food, particularly fresh-water shrimp, and affords dense cover for small fish.

(Insert Fig. #20. White Water Buttercup)

The white water buttercup has a growing habitat similar to that of coontail. It grows in shallow to fairly deep water (4 to 6 feet) and seldom roots firmly in the bottom. Its long twining stems bear leaves that are alternate (first on one side then on the other). The leaves are divided into thread-like filaments. Some small floating leaves also are present in certain varities. The white flower always extends above the water surface. There are two or three species in Michigan. This plant matures early in the summer and often chokes the shallow water in protected bays and ponds. Like most other aquatic plants, it is important as cover for fish but may get so abundant that fishing and boating become impossible.

Making Collections

Water plants can be preserved and kept for long periods by careful pressing and drying at the time the plants are collected. Secure a stack of old newspapers and a dozen sheets of padding paper of the same size. This latter can be secured from furniture stores since it is used as a base for rugs and linoleum. Make two wooden lattice frames of about 3 inch squares a little bit larger in size than a single sheet of newspaper folded once. The material in an old orange crate is about sufficient for two double frames.

While the plants are in a fresh, unwilted condition, arrange a piece of each kind, showing leaves and flowers, between a double sheet of newspaper (so that there is a sheet of newspaper on each side of the plant). Place a plant sheet so prepared between two pieces of blotting paper. Now place another plant sheet on top, and then another blotter, etc. One wooden frame is then placed on either side of this stack and the whole thing weighted down. A rope tied tightly around either end of the frame will press the plants. Each day until the plants are dry it is necessary to take out the blotters and dry them. When plant specimens are thoroughly dry, they can be removed from the newspaper and mounted on a piece of white cardboard by means of glue or narrow strips of adhesive tape. The name of the plant, date of collection, place of collection, and name of collector should be written on each finished sheet.

INSTITUTE FOR FISHERIES RESEARCH

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Report approved by: A. S. Hazzard

Report typed by: V. Andres

May 9, 1941

Mr. James A. Reed
1900 Telephone
Kansas City, Missouri

Costs of survey on David and Shamrock lakes:

Dates of survey: August 29 - September 6, 1940.

8 working days for the following staff:

Aquatic Biologist I - $5.85 per day	$ 46.80
Fisheries Technician A - $5.15 per day	41.20
Fisheries Technician A - $5.15 per day	41.20
Fish Culturist C - $3.50 per day	28.00

4 working days for:

Aquatic Biologist II - $6.67 per day	26.68
Mileage on truck (40 miles at 4¢ per mile)	1.60
Materials and equipment used	10.00
TOTAL COST	$195.48

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