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BAITS

Insects

There are more known species of insects than of all the other known groups of animals together. Insects have become adapted to all possible habitats in air, water and land. Their importance in the world today varies from the essential pollination of flowers to their effects as economic pests of our orchards and gardens and as carriers of many dread diseases of man and domestic animals and plants. Insects are essentially terrestrial animals; only a small portion of the vast assemblage of insects have come to occupy the aquatic habitat.

Representatives of nine taxonomic orders of insects are found in water during at least some phase of their life cycle. These are the stoneflies (Plecoptera); the mayflies (Ephemeroptera); the dragonflies and damselflies (Odonata); the water bugs (Hemiptera); the hellgramites or net-winged insects (Neuroptera); the caddisflies (Trichoptera); the beetles (Coleoptera); the true flies (Diptera); and the moths (Lepidoptera). These, together with the tiny springtails (Thysanura), which hop about upon the surface of the water, and a few of the smaller members of the group to which the bees and wasps belong, make up the list of insects commonly found associated with water. Yet the majority of these insects live only the first part of their lives in the water, and as adults are flying, terrestrial forms.

The immature aquatic stages of the above insects are variously known as larvae and nymphs. In general, the term "larva" is applied to those forms which have soft, fleshy abdomens, while the term "nymph" is used to designate forms with hard bodies and three pairs of long, jointed legs. The immature aquatic stages of mayflies, dragon- and damselflies, stoneflies, and water bugs are called nymphs. Those of hellgramites, beetles, moths and true flies are called larvae.

The insects of greatest value for bait purposes, together with brief notes on their life history and habits, are listed below.

Mayflies. These insects live in all fresh waters which are not grossly polluted, being adapted to a great diversity of habitats. The adults are fragile, with three pairs of long legs, three (occasionally two) long tails and delicate net-veined wings which are held vertically in repose. The adults are known to fishermen as mayflies, "drakes," "fish-flies," and very erroneously, as "caddis." The adult lives but a short time, usually only a day or so. The nymphs of mayflies are all recognizable by the gills arranged in pairs upon the back and sides of the abdomen. The body terminates in three (very rarely two) long tails. Although there are over 500 different species of mayflies in the United States and Canada, the only ones of importance as bait are the large burrowing nymphs, variously known as "wigglers," and "seahorses." These may be recognized by their large size (1 1/2 - 2 1/2 inches), their long, feather-like gills, and by their jaws, on each of which is developed a long, pointed tusk.

Mayflies make superlative bait for bluegills, and are also good for crappies, sunfish and perch, especially in winter. Burrowing mayflies are found in mud bottom which contains enough sand, fine gravel, or

aquatic debris or plant roots to make it slightly porous. Lakes and quiet streams are preferred by these nymphs. They may be captured by the use of screens to sift bottom materials. Burrowing mayflies are rather delicate and should be handled as little as possible. After collecting, transfer them to a tank or aquarium with a layer of dead leaves and leaf mold on the bottom. In general, the lower the water temperature, the longer the nymphs will live. Avoid crowding, and if that is not feasible, aerate the water. They may also be kept for several weeks during cold weather in damp moss, but freezing should be carefully avoided.

Stoneflies. The stoneflies are aquatic insects whose nymphs prefer rapid streams or wave-washed rocky shore of lakes. The adults are flat-bodied, with lacy wings which are folded flat over the abdomen when the insect is at rest. The nymph is rather long and flat, with two tails. Most of the larger species have filamentous gills beneath the body commonly attached to the base of the legs which extend out horizontally from the body. The nymphs cling closely to the underside of stones, usually in swiftly running water, where, being flat, they offer little resistance to the current. One of the larger species frequents the quieter water among accumulations of leaf drift in the pools.

Stonefly nymphs are rather fragile and are hard to keep on a hook but are good trout bait. They require running water or very well aerated standing water. Cannibalism is not much of a problem.

Caddisflies. The adults of the caddisfly are hairy, moth-like insects with thread-like antennae which are often longer than the body. The wings are held at an angle over the back resembling the eaves of a roof. Most of the larvae live in portable cases which they drag about with them as they crawl along. The cases are remarkable for their diversity of form,

materials and construction. They are usually cylindrical tubes, open at the head-end, with the tail-end partially covered by a net. The cases may be sharply quadrangular, triangular or circular in cross section. They are made from any available materials such as sticks, pebbles, or sand grains, pieces of reeds, or other water plants, and shells. Many species have characteristic cases which help to distinguish them.

Caddis worms are more or less caterpillar-like. They have strong legs, necessary in moving about over stream or lake bottoms while dragging their heavy cases. All fresh water habitats contain caddis worms but the large species favored as bait are most abundant around weedy lake shores or in the quieter sections of streams. A few of the larvae are meat eaters, but the majority feed on vegetable matter either alive or decaying.

Caddisfly larvae (called "hellgramites," "stickworms," "caseworms," or "reedamites") are excellent winter bait for bluegills, sunfish, crappies, and perch. Caddis larvae can usually be found on the bottom near roots of aquatic vegetation or under stones. After collection the larvae should be cared for in the same manner described for mayflies. It should be borne in mind that several of the larger species may turn cannibals in captivity in spite of the fact that they normally subsist on vegetable matter.

Hellgramites. The hellgramite is the larval form of a large, winged insect called the dobsonfly. The adult of this insect is often mistaken for a dragon or damselfly, but the wings of ^{the} dragonfly when at rest are held straight out from the body and parallel to the ground, while the wings of the dobsonfly are folded flat over the abdomen like those of the stonefly.

The larvae of hellgramites are found under rocks in streams and are most abundant where the water flows the swiftest. They are carnivores, feeding upon mayflies, stoneflies and other small aquatic insects. The larvae are easily recognized by the presence of slender, fleshy appendages along the abdomen, a pair on each segment, one on either side.

The larva of this insect lives three years in the water before emerging as an adult.

In general the larvae will be found in greater numbers in warm water bass streams than in colder trout waters. The species occurring in southern Michigan attains a larger size than those in the trout country.

Hellgramites are excellent bass bait. They are more tenacious of life and tougher-bodied than are mayfly nymphs or caddisfly larvae. As these insects are carnivores they should not be crowded, or cannibalism may ensue. Feeding with ground meat is advisable if a supply of bait is to be kept more than a few days. Running water is desirable but not essential. If the larvae are crowded, the water should be aerated. Hellgramites may also be kept for weeks in a cool basement in a wooden or metal bucket containing bits of sod and decaying leaves. This material should be slightly damp but not wet.

Dragonflies and damselflies. Dragonflies and damselflies are very common aquatic insects. The adults may be seen any summer day, flying over lake, pond or stream. When at rest the wings of the dragonfly are held horizontally, airplane-like, while those of the damselfly are folded vertically at an angle over the abdomen.

The body form of the dragonfly nymph is usually broad and flat, while that of the damselfly is long and slender. The wings of both

nymphs are developed externally and stand out as two pairs of large pads behind the head. The nymphs are recognizable by the possession of an enormous, grasping lower jaw, hinged in the middle, and tipped with spiny grab-hooks. It is thrust out and withdrawn with great speed while the insect is feeding. Other insects and even young fish fall prey to this carnivore. Representatives of this group are found in practically every type of fresh water.

Dragonfly and damselfly nymphs do not seem to be used as bait very extensively in Michigan. In New York state, the large, flat dragonfly nymphs are known as "bass bugs" and are very popular with fishermen. The best means of capturing these nymphs would be by seine or dip net. Although very cannibalistic they are otherwise quite tolerant, both of oxygen and temperature extremes.

Leather-jacket. The leather-jacket is the larva of the crane fly, a large, mosquito-like insect having extremely long legs. This species lives in stream gravel, in leaf-drifts, and in weed beds. The larvae are caterpillar-like, without legs, usually brown, white or green in color, rather soft-bodied, and often reach a length of $1\frac{1}{2}$ inches. They are mainly herbivorous. Although an excellent bait for trout and bluegills, they are difficult to use as large amounts of its more or less fluid body contents escape if the skin is punctured. The best way to bait with a leather-jacket is to tie it securely with thread to the shank of the hook.

Goldenrod gall worm. There are two species of goldenrod gall worms. One is the larva of a moth; the other is the larva of a fly. The latter is found most frequently. These worms occur in the ball-like enlargements of the stems of goldenrods and are responsible for the peculiar growth. The main objection to gall worms is their small size, as several are needed to bait a hook properly. They are very good winter bait for

bluegills and other panfish. The larvae can be held in the galls throughout the winter if left in a cold place.

Meal worms. Meal worms are the larvae of beetles. They can be found in old meal that has been standing for some time, or in flour mills, and are often a very serious pest. The worm is yellow or brown, about an inch in length, tenacious of life and a good panfish bait. These worms can be successfully reared in boxes of corn meal or other cereal.

Wood borers or sawdust worms are the larvae of the metallic wood borer and long-horned borer, both of which are beetles. These forms are difficult to obtain, and are sometimes difficult to keep alive, once removed from their burrows. The larvae bore in wood and are serious pests of forest and fruit trees. They may frequently be secured from partly rotten logs, stumps or dead, standing timber. They can sometimes be kept successfully in sawdust. These larvae are good bait for panfish and are especially popular with ice fishermen.

Cat-tail grub. The cat-tail grub is the larva of a moth and can be found in the head and stems of cat-tails, where they sometimes cause galls. The grubs can usually be found by looking at the head of the cat-tail; if it presents a tattered and frayed appearance, the grub may be located there, or in the stem. It is best to keep the grubs alive in the cat-tail and remove as needed. They are excellent bait for bluegills in the summertime, and are also good for other panfish.

General Methods of Collection

Larvae of stoneflies, mayflies and dobsonflies can be taken by placing a fine-meshed seine or piece of wire window screen in the stream and by turning over the stones immediately upstream, allowing the current to wash the insects into the net. Caddis larvae and some burrowing

mayflies can be found in watercress or weed beds in creeks and in mud bottom stretches of larger rivers. A screen dredge on a pole or a scoop shovel with a wire bottom is necessary where a current is lacking.

It is unlawful to take or attempt to take aquatic insects from any trout stream except for personal use on such streams or under permit from the Director of Conservation.

INSTITUTE FOR FISHERIES RESEARCH

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