

LEAF BEETLE HERBIVORY ON BRASENIA SCHREBERI

by

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August 12, 1975 transect
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transect was 100% covered with Brasenia leaves.

INTRODUCTION

The waterlily leaf beetle, Galerucella nymphaeae (L.) is a common beetle found feeding on the floating leaves of Nymphaea, Nuphar, and Brasenia. This paper reports the amount of herbivory by this Chrysomelid beetle on the watershield, Brasenia schreberi Gmel.

The adult beetle is predominantly blackish-brown with a thin strip of yellow on the outside edges of the elytra and is covered with a fine pubescence. It is approximately six mm long. The thorax is the same dull yellow with two to three dark spots. The different larval stages vary in length from approximately two mm to eight mm, and are quite black. The pupae are naked, black, and usually as long as mature larvae. The eggs are a creamy white, spherical, and about $\frac{1}{2}$ mm in diameter. All stages occur on the upper surface of the leaves of those plants on which the beetle is found.

The only location of Brasenia in Douglas Lake is in Marl Bay, situated in the northwest corner of the lake from the station.

MATERIALS AND METHODS

In order to sample the amount of herbivory, I took two transects through the Brasenia population. The first transect passed over the leaves on the outskirts of the population; the second passed directly through the mass of leaves. A thin line about nine meters long was stretched between two sticks. On the first transect every leaf over which the line passed was taken; on the second, every fifth leaf was taken. I collected twenty-one leaves from the first transect, and twenty-nine leaves from the second. This field work was done the morning of July 24, 1975.

Each leaf was then taken back to the laboratory and placed on a piece of cardboard over which was placed a small piece of window screen, this being fastened to the cardboard by thumb-tacks. The inside dimensions of the screen squares were approximately 1.25 mm square. Each square was then scored as being eaten or not eaten, resulting in a percentage figure for the amount of the leaf consumed by the beetle.

RESULTS

The average percentage of herbivory for the leaves taken in the first transect was 16.6%. In the second transect the average was 12.9%. The overall average was 14.75%. Herbivory on individual leaves ranged from 0% to 62.5% for the first transect and from .9% to 47.2% for the second transect.

DISCUSSION

The first question that should be answered is how I decided whether a particular hole in a leaf had been made by Galerucella. I watched the larvae and adults feed on leaves both in the field and in the laboratory. As with many things, a characteristic pattern can be recognized. Nor have I seen the larvae of any other insects on these leaves besides a few chironomids (midges) whose traces are easily recognized. In fact, apart from the damage by the midge larvae (which is miniscule in this particular population as compared to the damage done by the beetle), the only herbivore damage seemed to be due to the leaf beetle. Only that damage created by the beetle was scored. It is believed that most of the damage is done by the larvae.

All life cycle stages of the beetle have been observed on the

leaves at one time. The adult beetles can fly from pad to pad, but the larvae cannot swim (Usinger, 1963). I do not know the number of larval instar stages, but several different sizes were observed. I have observed one pupation and hatching in the laboratory, and the time spent in the pupal case was four days. Pennak (1953) states that the pupal stage usually persists only a few days or weeks. Once an adult, "each female may lay from 36-115 eggs over a 10-20 day period. They are deposited in masses of 6-12 each, usually at daily intervals" (Usinger, 1963, p. 368).

Points which need study include a comparison of the damage done by the larvae versus the adults, some estimate as to when the leaves are first attacked, and an appraisal of the effect of the slimy undercoating of the leaf (usually on the younger leaves) in deterring feeding, and some study of the chemical properties of the leaves and their possible defensive character.

With respect to the beetle, it should be learned how long the adults live, what percentage of the eggs hatch, how ovipositioning behavior with respect to the number of eggs or larvae already present on any one given leaf is regulated, and whether there exist any predators on any life cycle stage of the beetle.

LITERATURE CITED

- Pennak, R.W. 1953. Fresh-Water Invertebrates of the United States. The Ronald Press Co. New York. 769 pp.
- Usinger, R.L. 1963. Aquatic Insects of California. University of California Press. Berkeley. 508 pp.