

STUDY OF EGG LAYING AND FEEDING HABITS
OF GALERUCELLA NYMPHAEAE

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This investigation on *Galerucella nymphaeae* was done at the Biological Station of Michigan during the summer of 1918 at Douglas Lake. The investigation was carried on in conjunction with certain field and laboratory courses at the station, so that but part time could be given to the study of the problem.

Observations were made in the field among the natural relations of this beetle, as well as in the laboratory where conditions could be somewhat more effectively controlled and the reactions carefully noted. The adults and larvae were brought into the laboratory on lily pads and were placed in aquaria. Some of these were placed on the leaves of white nymph (*Castalia*) and the common pondweed (*Potamogeton*), while others were left on the yellow waterlily pad (*Nymphaea*) on which they were found. These leaves were floated on lake water in the aquaria and cheese cloth was tied over the top to prevent the escape of the beetles.

LIFE HISTORY

The life history of this beetle is similar to that of all Coleoptera in having metamorphosis. The egg hatches into a larva with a black head possessing two, three-jointed tuberculous antennae. The thorax and abdomen are black except at the sutures where white fuscous lines divide the black into distinct areas. There is a similar line on the meson of the notum of the three thoracic segments and likewise on each abdominal segment, dividing it into two parallel transverse bands, the posterior of which is the longer. Prolegs are developed on the ventral surface of the last abdominal segment only.

The pupa is black except in the region of the sterna of the thorax and abdomen. The apical segment of the abdomen, however, is covered by the cast off skin of the larva. The very young pupa is lighter in color and the legs, wing pads, and antennae are not closely joined to the body.

The adult is small, oval, and of a dull yellow color, having the head usually distinct with an easily discerned median impressed line. The side margins of the elytra are lighter than other regions, and the length of the beetle when metamorphosed is 4.5—6 mm. The antennae are as long or longer than half the body, and the third joint is somewhat longer than the fourth.

FEEDING HABITS OF THE LARVAE

Larvae were placed upon leaves of the white nymph (*Castalia*) and upon those of the common pondweed (*Potomageton*) to determine whether or not they would feed on the foliage other than the yellow waterlily (*Nymphaea*). Both the yellow and white lily pads occur in the same region on Douglas Lake, but only the former were found to be eaten by the larvae. The *Potomageton* leaves were not touched, and in one aquarium where the white nymph pads were placed there were no evidences of the larvae feeding. In another aquarium under observation, containing a white nymph pad, the leaf was punctured but there were no evidences that it had been eaten. The larvae in all of the aquaria pupated in a relatively few days after they were placed on the different kinds of leaves; although it does not follow that the food relations were a factor in pupation.

FEEDING HABITS OF THE ADULTS

Three aquaria, two of which contained leaves of *Potomageton* and one of white nymph, were set up on the morning of July 30th. Into each of these several adult beetles were introduced. In one of the two aquaria containing *Potomageton* the leaves became infested with a fungus growth and had not been eaten by the insects up to the time that they were removed on Aug. 7th. In the other aquarium containing *Potomageton* two of the beetles died on Aug. 13th, two more were dead Aug. 18th, but the leaves up to this time had not been touched. Likewise in the aquarium in which had been placed leaves of the white nymph, the beetles had failed to eat any of the foliage when the experiment was discontinued on Aug. 20th.

In one aquarium where there were adult beetles the egg mass was eaten and only the chorion or egg shell remained.

BREEDING HABITS

The eggs are oblong cylindric, 0.24 mm. wide at the end attached to the leaf, 0.48 mm. at the opposite end and 0.72 mm. long. The eggs are yellow when first laid, but within a few hours change to ivory in color. The surface of the chorion or egg shell is covered with small pits.

Thirty-seven egg masses were counted, and the number of eggs in them varied from 6 to 15, confirming Needham's work on this beetle in which he describes from 6 to 20 in the mass. The eggs are arranged in rows varying from one to five in each row. The following diagrams will show several different arrangements.

Four aquaria were set up with yellow waterlily leaves in them, and adults that were found mating in the field were brought in and one pair introduced into each aquarium. The aquaria were set up July 15th. In one of them egg masses consisting of 12 eggs were laid successively on July 28th, Aug. 2nd, 4th, and 6th. Of the other aquaria that contained the breeding beetles two pairs had not laid any egg masses when the experiment was discontinued Aug. 20th. In one aquarium the male died Aug. 3rd, and another was put in Aug. 5th, but no egg masses were laid.

In one case the female was observed from the time she began to deposit the eggs until she finished. It took her one hour and twenty-eight minutes to deposit eleven eggs.

These are only a few observations and experiments made on *Galerucella nymphaeae*, but the writer hopes to do more on this problem in the near future. Very little is known of the habits of this beetle.

