

(Insect Life 1, 1888). Recently this species has been received from Mr. O. French of Lempriere, B.C. These specimens also were taken from beaver skins.

The mandibles appear to be vestigial but the maxillae are well developed with a fringe of recurved spines around the margin of the galea. The antennae are 11 segmented, the abdomen with 6 visible segments as in *Leptinus* but the intercoxal piece of the prosternum separates the front coxae and the tip is blunt, not acuminate as in *Leptinus*. There is also a long tuft of hairs projecting from the tip. This species is nearly 5 mm. long. It is apparently blind as is *Leptinus*.

L. aplodontiae was described by Ferris in 1918. It was taken from a species of *Aplodontia* or mountain beaver, a genus of rodents peculiar to the Pacific Coast. The type locality is Fallen Leaf Lake, Plumas Co., California, the host animal

being taken in August, 1917, by W. R. Fisher. The fifth species here dealt with is in the family Silphidae with only one member of the genus, *Lyrasoma opaca*. Mann. It resides in the nests of certain maritime birds and may not be parasitic in the strict sense although it apparently utilizes the birds for transportation purposes. This species does not have the extreme modifications of the other forms such as excessive flattening, blindness, and vestigial mandibles. The compound eyes are well developed but the facets are rather coarse and there are only about 200 to each eye. It is suggested that this may be a species in process of acquiring a parasitic habit, but as yet not strictly parasitic.

I am indebted to Professor Spencer for making certain records available to me in connection with some of these species of parasitic Coleoptera.

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NOTES ON THE LIFE HISTORY OF *XANTHORHOE DEFENSARIA* GN. (Lepidoptera: Geometridae)

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Several specimens of the geometrid moth, *Xanthorhoe defensaria* Gn., were taken at light on September 19-21, 1947 in the Municipality of Saanich, Vancouver Island, B.C. From one of the specimens a batch of eggs was obtained and half of the resulting caterpillars were reared to maturity. Since no account of the life-history of this species was available, it is thought that the following notes may be of interest as a confirmation or supplement to what may already be known about this species.

Ovum. Laid on September 20, 1947, in a glass phial in ones and twos, or in small,

irregular groups promiscuously disposed on the sides or in the angles of the container. A total of 25 eggs was deposited. They were subsequently kept at a cool room temperature.

The egg is oval, smooth and whitish in colour with a pearly lustre, becoming darker towards hatching time. It is attached to the substratum by an adhesive substance at the small end. Length 0.75 mm. Width 0.5 mm.. The shell is not consumed by the newly emerged caterpillar.

Larva. Eggs hatched on October 8, after an average incubation period of 18 days. As I was not aware of the food plant,

and little choice being available at this season of the year, recourse was made to chickweed (*Stellaria media*) which was reluctantly accepted by the caterpillars. Twelve out of twenty-five were successfully reared; the remainder died during their first instar from unknown causes.

1st Instar. October 8. Length on emergence from egg, 2 mm. General appearance, translucent with a tinge of green. Head oval, light pinkish cinnamon; ocelli conspicuously black; thoracic and prolegs colourless. Each segment with a few very short, slightly knobbed setae, less noticeable on the anterior and posterior segments. Towards the end of this instar a tinge of cinnamon stains the first six abdominal segments. When disturbed, the caterpillar raises the body vertically, curling the anterior portion in a loop, head uppermost. Stadium, 13 days.

2nd Instar. October 21. Length 6 mm. Apart from an increase in size, the colour is more definite, though not pronouncedly so. A light translucent green, tinged as before with pale cinnamon, prevails, with more distinction in shade between dorsal and ventral surfaces. Stadium, 7 days.

3rd Instar. October 27. Length 12-17 mm. Development is irregular, some moulting a few days ahead of others of the same instar. Color still somewhat indecisive; head mottled brown on greenish background and furnished with short depressed hairs; the thoracic and last abdominal segments green, the remainder pale cinnamon, which now shows a definite pattern of small black spots on the dorsum of the second to fifth abdominal, inclusive. These spots mark the outline of an X and are in the form of four black dots with a central longitudinal black dash between them. The X mark is most distinct on the fifth abdominal segment, becoming progressively less toward the second, where it is represented by only two dots.

A loose epidermal fold is now discern-

able along each side just below the spiracles. Spiracles, almost invisible whitish dots. Stadium, 7 days.

4th Instar. November 4. Length 20-22 mm. In addition to the same general pattern as noted in the previous instar there is a noticeable increase in opacity. An interrupted wavy lateral line of dark brown is now evident, becoming continuous on the last three abdominals. Numerous, very fine longitudinal whitish lines appear on both dorsal and ventral surfaces. These lines are grouped in threes and fours, each group bounded by a more strongly marked line. Spiracles whitish with a faint dusky outline, set on a lighter ground colour. Some caterpillars are more strongly marked than others, or have a more greenish tone throughout. The green, in all cases, prevails to a greater or lesser extent in the thoracic and anal segments. When disturbed, the caterpillars still adopt the curled attitude, but also have developed a habit of straightening and remaining quiet in the typical twig-resembling characteristic of geometrid larvae. If forcibly knocked off the food plant, they feign death by lying stiffly straight like bits of sticks.

They feed at night, and at all times show a decided avoidance of daylight, keeping well to the base of the food plant during the day. Just before pupation, the greatest length of the caterpillars was 23 mm. Stadium, 7 days.

Pupa. Pupated November 11th-18th. Length 10 mm. Width 3 mm. A very slight silken cocoon is made, either among the leaves of the food plant, which are lightly drawn together to form a small cubicle, or as in one case observed, by burrowing just beneath the surface of the soil and spinning a cocoon of grains of soil held together by silken strands. When the cocoon is completed the caterpillar remains quiescent for a period of four days, as noted specifically in one case and assumed to be so in others. The pupa is green at first, changing to a dark mahogany colour in five hours' time. The pleura of the pupa are much lighter in

colour. Abdominal segments are finely punctate. The cremaster is composed of two long and several very short bristles, each with a strongly recurved hook at the tip. These hooked bristles allow the pupa to hold on to the silken strands of the cocoon. Period of pupal stage averages 25 days.

Adult. Emerged December 6-12. The reared specimens average a wing expanse of 27.88 mm. as compared with 24.55 mm. for those taken under natural conditions. These measurements include both sexes, which were approximately equal in numbers.

Remarks. No doubt the temperature of the room was responsible for the unexpected hatching of the eggs, laid so late in the season. It is presumed that under normal conditions these would not have hatched until the following spring, or if the larvae emerged in the fall they would have hibernated in the early stages. No adults have been observed under natural conditions, at or since the emergence of the reared specimens, which would suggest that overwintering in the egg or young larval stage is the rule.

I am indebted to Mr. J. R. Llewellyn Jones for a list of the food plants known to him. These are *Salix* spp., *Alnus rubra*, *Ribes sanguineum* and *Acer macrophyllum*. He adds that the species probably feeds on a wider range of food plants than indicated above, a surmise substantiated in the present instance. All these plants had shed their leaves before the larvae could have utilized them this season, further evidence against normal hatching of the eggs in the fall.

The fact that the bred specimens were larger than their parents is of some significance, for they closely match the form *gigantaria* Swett. which is the normal

spring brood. As this species is said to be many brooded, the three other named forms, all from the same district and named by the same authority, may be seasonal varieties. Further breeding along these lines would be interesting and might test the theory that all the forms could be produced from one set of parents in succession during the course of the year. The several variations of this species were pointed out by Blackmore (1917) and described by Swett (1916). Blackmore suggested that they may be seasonal forms of the same species, a status that can only be proved by life history and genitalia studies. The present life history is submitted as a contribution towards a solution of the first of these objectives.

Summary. A female of *Xanthorhoe defensaria* Gn. captured in the Municipality of Saanich, Vancouver I., B.C., on September 20, 1947, laid 25 eggs. These hatched 18 days later and half of the resultant larvae were brought to maturity on the common chickweed (*Stellaria media*). Food plants hitherto recorded are all shrubs. The first instar lasted 13 days; second, 7 days; third, 7 days; fourth, 7 days; a total of 34 days. Pupation took place on December 6-12, and lasted for 25 days. The complete life history from oviposition to adult is therefore 77 days. The reared adults averaged larger than their parents.

Under natural conditions it is assumed that the egg is the overwintering stage and that those laid in confinement developed prematurely owing to the artificial stimulus of ordinary room temperature.

The theory is advanced that all the named forms of this species are seasonal variations, and could be produced in one season by successive breeding from one set of parents.

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