

wiggling motion and lowering themselves down by means of fine silken threads. This action is very characteristic, and is resorted to when the larvæ are disturbed by any exterior stimulus.

On June 18, the first pupæ were noted, the caterpillars transforming among folded leaves, and by July 6, all the larvæ under observation with one exception had pupated. This one moulted once more than the others and did not transform until July 17, when it was in the seventh instar.

The first adult emerged on July 6, and by the 13th of the month all of those reared on the wing. On July 13, the first egg cluster was deposited, and by the 20th the eggs commenced hatching.

The behaviour of the larvæ at the time of hatching is most interesting. In one egg mass of over 150 eggs, 90 per cent of the larvæ emerged in less than ten minutes. It is a noteworthy fact that out of 150 eggs after an incubation period of two weeks, 135 of them became mature within ten minutes of each other. The regularity of their emergence is marvellous.

E. Dwight Sanderson and Alma Dyer Jackson, in the *Journal of Economic Entomology*, Vol. II, page 391, December, 1909, state that the average number of eggs per mass of this species as found by them in Ohio is 117, and that the average number of eggs deposited by one female is 305.

Almost immediately after hatching, the tiny caterpillars spread to the lower leaves and limbs of the tree, the majority letting themselves down by silken threads, a few crawling down by way of the petiole. During this change the larvæ hang suspended in great numbers, and for long periods of time by delicate silken threads from the margin of the leaves, when they may easily be blown to the ground by even moderate winds. By this means and by their inability to find limbs or foliage, upon which to alight while descending, large numbers of them are lost in weeds or loose soil at the foot of the tree. This is an important factor in their control.

After wandering over the leaves for a few hours the larvæ finally settle down, choosing the under surface in preference to the upper, upon which to feed and live. While feeding they spin on the side away from the leaf, loosely-woven shelters which are flat and waxy white in colour. After these are formed the caterpillars lie, in almost all cases, with their dorsal surfaces towards the leaves and their ventral surfaces next to the web. This position is maintained throughout their whole larval life in the fall, even when actually feeding, the larvæ at such times bending their heads back until the mouth parts come into contact with the leaf surface.

The fall injury consists of a partial skeletonizing of the leaf, the larvæ, however, confining themselves altogether to the lower surface. Hidden securely under the silken webs they gnaw away the underlayers of leaf tissues, ceasing before the upper surface is reached. In this way a greater or lesser amount of injury is done to the foliage, depending on the degree of infestation which results in a diminished food supply and weaker fruit buds for the coming season.

The larvæ remain on the leaves for nearly four weeks. Towards the last of August they enter their winter quarters, and by the end of the month few are to be found on the leaves, the old shelters and feeding grounds alone showing where the caterpillars have been at work.

There is only one generation of the oblique-banded leaf roller each year, in Nova Scotia.

#### DESCRIPTION OF *Cacoecia rosaceana* Harris.

##### THE EGG.

The mass is oval in shape, 1.2 mm long, .8 mm wide; the eggs laid overlapping, shingle-like, in flat irregular pale green masses which appear as though covered with a thin film of wax. The membrane enveloping the egg is very thin and transparent and is traversed by a fine network of ridges which divides the surface into many irregular cells. This membrane is finely pitted. Five egg masses collected in the field in Nova Scotia gave an average number of eggs per mass of 159.