The Canadian Entomologist

VOL. LIV.

ORILLIA, FEBRUARY, 1922.

No. 2.

POPULAR AND PRACTICAL ENTOMOLOGY

NOTES ON SOME INSECTS AFFECTING NATIVE COTTONWOODS

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The cottonwood grows to a considerable size in the river bottoms in Alberta. It has a rapid growth, and this, together with the shade it affords renders it very valuable as an ornamental tree on the prairies. Trees planted ten and eleven years ago on the Experimental Farm at Lethbridge are now 10 to 15 inches in diameter. A feature of the trees' growth, which led to the following observations, is the cracking of the old bark, especially around the bases of the branches, and a constant exudation of sap. This is seasonal and apparently of not much consequence to the tree, though it should be mentioned in this connection that all the trees referred to are growing under irrigated conditions.

On June 28th, 1921, attention was drawn to large unsightly masses of faecal matter in the cracks of the bark, and on examining these, colonies of a noctuid larva were disclosed, apparently feeding on the bark. Examination of all the cottonwoods in the vicinity showed these colonies to be present in the cracks or in pruning wounds where the sap was exuding.

The larvae were closely packed together, were entirely concealed, and negatively phototropic. They were unable to crawl on the smoother surface of the tree, and once removed from the moist strands of old bark were unable to return.

Much of the fresh faecal matter was light green, which suggested that living tissues were being fed upon. Fresh intestinal contents showed cortical and xylem elements present which had all the usual appearances of living plant cells. It is apparent therefore, that the larvae do not confine their attentions to old bark, but feed on living tissues—apparently the scoring noticed on the new bark is a result of their activities. Specimens reared in the laboratory were fed on pieces of bark taken from the neighborhood of the colonies. About fourteen pupated, and several other pupae were obtained from the cottonwoods.

While looking for these latter, we found that numerous other forms of life inhabited these cracks in the bark. Mites, weevils, spiders, and many forms of dipterous larvae were abundant, as well as the pupae of more than one species of noctuid moth. Some of these latter proved to be *Rhynchagrotis placida* Grt.

and two larger pupæ were obtained from which later a *Catocala* species emerged. The larvae of the last mentioned were also found on the tree and two individuals were found pupating under the bark.

The pupæ of the principal species mentioned in this article were found in the trees on July 1st, in cocoons made of old strands of bark intermingled with silk. Specimens reared indoors pupated July 10th and 11th. These specimens emerged from the 30th of July to the 5th of August and were determined by Dr. McDunnough as probably *Ufeus plicatus* Grt.

Control:—The question of the control of the *Ufeus* species was given attention during the summer. Of all the colonies examined, over 80 per cent. failed to mature through natural causes. *Apanteles* sp. emerged on July 10th, from a mass of cocoons attached to a dead larva. Such masses were present on most of the colonies. Tachinid larvae were taken from a diseased specimen during the examination of intestinal contents, and a tachinid puparium was obtained from one of the reared specimens. A disease, with symptoms very much like flacherie, accounted for many of the colonies, wiping them out completely. Where the sap ceased to exude before the colony was mature, the bark dried out and the colony died.

Mention might also be made of the fact that of five *R. placida* pupæ obtained, three produced very beautiful green-bodied hymenoptera, and an *Apanteles* sp. emerged from one of the *Catocala* larva after it had spun its cocoon. Artificial control experiments were not very satisfactory owing to the difficulty in maintaining controls. An ordinary hand sprayer was used and mixtures containing Paris green sprayed into the cracks where colonies existed, but without any effect whatever. Pieces of sodium cyanide placed in the cracks destroyed the colonies completely in twenty-four hours.

The best control, however, was the simple one of carefully pruning away the splitting bark from around pruning wounds and other places in the tree where the bark naturally breaks away. The adult of the larvae is evidently an opportunist, laying its eggs in these cracks as it finds them. Cleaning up such places improves the appearance of the tree, involves the destruction of all the season's hatch, and reduces future breeding places. As cottonwoods are usually grown in small numbers as shade trees and windbreaks, such a plan is practical.

The tree survives the presence of the colonies, but the larvae spoil its appearance, with masses of faecal matter, and keep wounds open, causing decay. Several trees were noticed in which such places were full of water, and harbored numberless dipterous larvae which fed on the decaying matter.

The tree, once it attains a fair size is apparently immune, as none of the mature trees in the river bottom at Lethbridge showed any sign of the presence of larvae.

The habits of *Ufeus* in thus using cottonwoods as a breeding ground is apparently of wide occurrence, since in Montana *Ufeus* on cottonwoods is reported in several of the yearly reports of that state.