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BETLES INJURIOUS TO SUNFLOWERS IN MANITOBA

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It is one of the misfortunes of farming in a new country that the breaking up of the virgin sod has a detrimental effect upon the farmer's friends such as wild birds, while it encourages previously harmless insects to become farm pests. The breaking up of the sod naturally forces ground-loving birds to seek nesting sites elsewhere, while the planting of crops provides certain insects with an abundance of new food thus enabling them to multiply far beyond the bounds that were previously possible. We have examples of this in cutworms, grasshoppers and the Western Wheat-stem Sawfly which were brought into prominence through the growing of cereals. Newly introduced crops are always apt to encourage the spread of native insects that feed upon allied plants and for that reason the entomologist finds it desirable to study the life-habits of most native insects in order to be prepared should they spread to cultivated crops.

The recent adaption of sunflowers for fodder purposes has provided another instance in which hitherto harmless insects may be turned into pests. There are a number of wild sunflowers in Canada some of which are closely allied to the cultivated kinds and since the wild species have their insect enemies there is no reason why these should not spread to those under cultivation and so become of economic importance. Notes relating to several of these insects have been made from time to time some of which are now put together in order that sunflower growers may recognize the commoner beetles found attacking the plants involved.

The Sunflower-leaf Beetle (*Calligrapha exclamatoris*).

This is a common and widespread beetle in Manitoba where it is found feeding upon the leaves of various species of wild sunflower. It appears to be exclusively a sunflower feeder and for that reason promises to become one of the most important insects affecting these plants. The beetle has already spread to cultivated sunflowers where it breeds as readily as it does upon wild kinds. The life-history of this insect, as worked out at the laboratory under field conditions, is given, with a description, below:

Eggs—The eggs are elongate-cylindrical about three times as long as wide and slightly tapering towards one end. They are moderately densely punctate so that spaces between the punctures form a net-like surface. Colour dull white or greenish turning to orange before hatching.

The eggs are deposited singly but frequently in rows of irregular formation. They are placed on the stems usually in natural grooves when such are

present, but they may also be found on the underside of leaves though in lesser numbers. Egg laying extends over a period of two or more weeks and it is probable that at least 200 eggs are deposited by a single female. In captivity one beetle laid 116 eggs but it is believed that she had deposited a number before being captured.

Larvæ—The larvæ are pear-shaped, the head being the narrow end. They are smooth above with numerous transverse ridges terminating near the sides close to the spiracles and bordered below by a prominent, wrinkled, lateral fold and a less conspicuous one beneath it. Underside flattish containing numerous fine, short hairs; anal extremity prolonged forming a bifid process which aids locomotion. Legs well developed black at tips. Colour of head light brown with white hairs, body pale yellowish.

The larvæ are hump-backed when crawling. They are usually found clustered around the crown of the plant where they feed upon the newly forming leaves.

Pupæ—Pupation takes place beneath the ground not far removed from the plants upon which the larvæ have fed.

Adult—Superficially resembling the Colorado Potato beetle but considerably smaller. Head reddish-brown; thorax in front and at sides pale cream, basal portion with a brown area extending from the sides at base in the form of a half circle; elytra pale cream with three narrow black stripes on each side extending almost to apex and a fourth branching from the third at base extending almost a third of the elytral length, with a dot behind it thus forming the exclamation mark from which the beetle gets its scientific name. Abdomen beneath black, thorax, legs and antennæ reddish.

Beetles appear from hibernation in June; eggs are laid late in the month the ovipositing period extending into July. Larvæ are present throughout the last named month and pupation takes place at various periods towards the end of it.

Both beetles and larvæ feed upon the leaves of sunflowers. In nature they are most frequently met with on perennial species such as *Helianthus giganteus* though they have been noted in numbers upon *H. annua petiolaris* also and from these have spread to cultivated species. There is but one generation of the insect in Manitoba.

Sprays similar to those used for potato beetles are quite effective against the Sunflower beetle.

The Sunflower-pith Beetle (*Mordellistina pustulata* Melsh.)

The larvæ of this beetle were first collected in the stems of Red-root Pigweed, *Amaranthus retroflexus*, which had prematurely died. Later my brother, Evelyn, discovered them hibernating in sunflower stems some of which they had severely riddled with their tunnels. The larvæ confine themselves largely to the pith but also injure the more woody parts; they occur most frequently near the base of the plant though any portion of the stem may be infested. Plants so injured present a stunted appearance and at times die outright.

Larva—The larva is a yellowish object with black jaws. It is easily recognized by the twelve prominent protuberances on the back of the middle

segments which look not unlike prolegs and which are used for locomotion. Several larvæ may infest a single stem and these remain within the plant until the following spring when they pupate and give rise to the beetles in June.

Adult—The adults are semi-wedge-shaped beetles, black with irregular patches of pale silky hairs. There are many species of *Mordellestina* all very similar in general appearance and for that reason no effort is made to describe the one referred to above. Most of the species are found upon flowers and they skip flea-like when disturbed.

In addition to the beetles mentioned above, a weevil, *Desmoris constrictus* Say, is found feeding upon the blossoms of sunflower in some numbers, but whether it will become of economic importance remains to be seen.

IPS PINI SAY AS A PRIMARY PEST OF JACK PINE

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Although it has been generally established that *Ips pini* Say is normally a secondary insect and usually attacks only dead or dying trees, it is not uncommon to find statements in entomological literature to the effect that this insect is occasionally able to attack and kill healthy living trees. Such cases are, however, so very rare that an interesting occurrence of this sort which was observed in Itasca Park, during the summer of 1921, seems worthy of record.

The trees killed were young, rapidly growing Jack pine, *Pinus divaricata*, varying from two and one half to five inches in diameter on the stump, and healthy Norway pine, *Pinus resinosa* saplings, about fifteen years old. That these trees were in excellent health up to the time of attack was indicated by the fact that there was no slowing up of the growth previous to the attack of the beetles. The trees killed totaled ten in number, seven jack pines and three Norway pine saplings.

Each tree was very heavily infested from the surface of the ground almost to the top. The infestation was so heavy that there was not sufficient bark area available for the development of all the young brood, there being from ten to twenty nuptial chambers to the square foot of bark surface.

These trees were all infested by the first brood beetles, and must have been attacked simultaneously by a large swarm of the insects. Apparently the attack was concentrated upon the few trees killed since a careful examination of surrounding pines failed to show any signs that other trees had been attacked. Why the swarm should have concentrated upon these few trees is hard to understand as there was no apparent difference in situation, rate of growth, or any other factor which might explain the preference shown for these particular individuals.

Apparently the beetles were attracted to the place by the presence of two freshly cut pines. These fallen trees were very heavily infested with *Ips pini*. What probably happened was this. A large swarm of these beetles was attracted to the fresh logs. More beetles collected at the spot than could find

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