LASPEYRESIA_MOLESTA,_AN_IMPORTANT_NEW_INSECT_ENEMY_OF_THE_PEACH

[PRELIMINARY_PAPER]

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INTRODUCTION

Attention is called to the discovery in the District of Columbia and environs of an important insect enemy of the peach believed to be new to the United States and apparently not heretofore known to science. Observations on this species by the writers during the summer and fall of 1916 warrant the fear that another formidable insect enemy of the peach and other deciduous fruits has become established in America. The insect is a moth belonging to the tortricid genus Laspeyresia, which contains numerous species of prime importance as pests in different parts of the world. Thus, Laspeyresia funebrana Tr. is the common plum worm or plum maggot of Europe and is said to be plentiful in plum pies. L. woebberiana Schiff. in Europe bores the bark of peach, cherry, plum, and apple trees. L. nebritana is the common pea moth, and L. schistaceana Sn. is a sugar-cane pest of importance in Java. In America the most important species is L. pomonella L., as yet better known under the generic name "Carpocapsa." The lesser apple worm, L. pruniwora Walsh; the pecan moth, L. caryana Fitch; and L. pyricolana Murtfeldt are other familiar examples of the genus.

DESCRIPTION_OF_THE_MOTH

Mr. August Busck, of the Bureau of Entomology, has prepared the following description of the species with comment on its relationships and possible origin:

Laspeyresia molest{a}, n. sp.

Head dark, smoky fuscous; face a shade darker, nearly black; labial palpi a shade lighter fuscous; antennae simple, rather stout, half as long as the forewings, dark fuscous with thin, indistinct, whitish annulations. Thorax blackish fuscous; patagia faintly irrorated with white, each scale being slightly white-tipped. Forewings normal in form; termen with slight sinuation below apex; dark fuscous, obscurely irrorated by white-tipped scales; costal edge blackish, strigulated with obscure, geminate, white dashes, four very faint pairs on basal half and three more distinct on outer half besides two single white dashes before apex; from the black costal intervals run very obscure, wavy, dark lines across the wing, all with a strong outwardly directed wave on the middle of the wing; on the middle of the dorsal edge the spaces between three of these lines are more strongly irrorated with white than is the rest of the wing, so as to constitute two faint and poorly defined, white dorsal streaks. All these markings are only discernible in perfect specimens and under a lens; ocellus strongly irrorated with white, edged by two broad, perpendicular, faint bluish metallic lines and containing several small,
deep black, irregular dashes, of which the fourth from tornus is the longest and placed farther outward, so as to break the outer metallic edge of ocellus; the line of black dashes as well as the adjoining bluish metallic lines are continued faintly above the ocellus in a curve to the last geminate costal spots; there is an indistinct, black apical spot and two or three small black dots below it; a thin but distinct, deep black, terminal line before the cilia; cilia dark bronzy fuscous. Hind wings dark brown with costal edge broadly white; cilia whitish; underside of wings lighter fuscous with strong iridescent sheen; abdomen dark fuscous with silvery white underside; legs dark fuscous with inner sides silvery; tarsi blackish with narrow, yellowish white annulations.

Alar expanse: 10 to 15 mm.
United States National Museum type 20664.

The present species is very similar to the European Laspeyresia junebrana, which is an important enemy of stone fruits in Europe, and it was at first supposed that it might be this European species which had been accidentally introduced into America, but several minor discrepancies both in the ornamentation of the moth and in the biology of the larva made this determination uncertain, and specimens were therefore submitted to the European specialists, Messrs. Edward Meyrick and J. H. Durrant, both of whom pronounced the species distinct from L. junebrana and unknown to them.

There are several American species closely allied to Laspeyresia molesta, but it is unlikely that the species is a native of this country; it has more probably been accidentally introduced from Japan, where closely allied species also occur, though the present species has not hitherto been reported. The theory of the Japanese origin is strengthened by a single specimen of a species of Laspeyresia which was reared from a shipment of pears from Japan to Seattle, Wash. The writers are unable to differentiate this specimen from those reared from peach in the East, and believe it to be the identical species.

Among the American species Laspeyresia molesta may easily be confused with (Epinotia) Laspeyresia pyricolana Murtfeldt, which not only is very similar both in adult and larval stages but which has similar biological habits and has also been reared from peach in the vicinity of Washington, D. C.

Laspeyresia molesta is, however, a larger and less mottled species, without the dark-brown transverse facia on the forewing found in L. pyricolana; the hind wings are more rounded, especially in the males, and not so triangular as in L. pyricolana. The males of L. pyricolana can at once be distinguished by a large patch of black scales on the upper surface near the base of the hindwings and by a similar black patch on the underside of the forewings; no such ornamentation is found in the males of L. molesta.

FULL-GROWN LARVA

Thirteen to fifteen mm. long; whitish suffused with pink; tubercles minute, black. Head light brown with darker brown markings; hind margin, ocellar area, and the tips of the trophi black. Thoracic shield light yellow, edged with brown. Spiracles small, circular, dark brown. Anal plate blackish fuscous. Legs and prolegs normal.
DISTRIBUTION OF THE SPECIES

So far as known to the writers, the insect in the United States is still confined to the general region of the District of Columbia. It is very generally present on peach trees in yards and elsewhere in the city of Washington and adjacent towns in Virginia and Maryland within a radius of 15 or 18 miles. Examples of injury to the peach by what is believed to be this insect have, however, been seen in the environs of Baltimore. The insect is thought to have been present in the District of Columbia for four or five years, or perhaps somewhat longer. Specimens of injured twigs were received at the Bureau of Entomology in the fall of 1913, and the work attributed to an unknown lepidopterous larva, although they are now believed to have been injured by *Laspeyresia molesta*. A few examples of injured twigs were received or collected during 1914 and 1915, but it was not until the fall of 1915 that its injuries were at all common. The writers were, unfortunately, not successful in obtaining adults from the larvae until the spring of 1916, and the single specimen then obtained did not prove sufficient for identification purposes. During the summer of 1916, however, an abundance of adults were reared and certain observations made concerning the biology and injuries of the insect.

CHARACTER OF INJURY AND HABITS

The larvae have been found injuring twigs of the peach (*Amygdalus persica*), plum (*Prunus* spp.), and cherry (*Prunus* spp.) and the fruit of the peach. The scarcity of the plum and cherry during 1916 in the infested area prevented observations as to the extent to which these fruits are attacked. The plum and cherry, however, have not shown such general infestation as observed for the peach, and it would appear that this latter is the insect's preferred food plant. It should be stated, however, that flowering cherries growing here and there in parks in Washington, especially the extensive plantings of Japanese flowering cherries in Potomac Park, are very generally infested. The twig injury to the cherry and plum is essentially the same as for the peach, though it is less conspicuous, due to less gum exudation (Pl. 26, A, B).

TWIG INJURY

In one peach orchard under observation an examination in mid-September showed that from 80 to 90 per cent of the twigs had been injured, and an even higher percentage of twigs of adjacent peach nursery stock had been attacked. Its injuries to the twigs of bearing orchards, while important as interfering with normal growth, are of less significance than the injuries of the caterpillars to the fruit. Twig injury in nurseries, however, is of much more importance, as the destruction of the terminal growing shoots results in the pushing out of shoots from lateral buds, producing a much-branched and bushy plant unsuitable for nursery stock (Pl. 27). Twig injury to newly planted orchards and to replants
in bearing orchards is also quite important, and aside from the actual injury inflicted would interfere a good deal with the proper shaping of the tree.

Attack on the twigs begins in the spring when the shoots are from 6 to 8 inches long and continues until active growth of the trees ceases in the fall. Many twigs injured in the latter part of the season present the appearance shown in Plate 28, B. As the twig hardens, the larva may leave its burrow and feed more or less on the exterior of the twig, cutting holes and pits into the bark and causing a copious exudation of gum, rendering the injury quite conspicuous. The more typical injury to twigs in the fall, however, is that represented in Plate 28, A.

The larvae prefer tender, actively growing shoots, and their injury to these (Pl. 29, A, B) is scarcely distinguishable from that of the common peach-twig borer, or peach moth (Anarsia lineatella Zell). The caterpillars pass from one shoot to another in their search for appropriate food, and several shoots may thus be injured by a larva in the course of its growth. A striking illustration of this preference for tender growth was noted in an orchard near by in Virginia. Here the orchard trees had practically ceased growth, and although a large percentage of the twigs showed injury a careful search of these resulted in finding no larvae. In an adjoining block of seedling nursery trees still growing vigorously larvae in all stages were found very abundant. Injury to the shoots is apparently continuous during the active period of growth of the trees, even in the presence of fruit. The writers' observations are not conclusive as to whether the fruit is preferred to the twigs.

INJURY TO FRUITS

The fruit may be attacked while quite green, the infestation increasing as it approaches maturity. Larvae of all sizes have been found abundantly in peaches during the ripening stage from midsummer on. Midseason and early fall varieties have been noted as being worse infested, owing probably to the concentration of larvae on the fruit by reason of the cessation of active growth of the twigs. Thus, in the case of some Salway and Smock trees and certain varieties of clingstone peaches, of similar season, practically all the fruit on the trees was infested with from one to three or four larvae.

In attacking the fruit the young caterpillars rather generally eat through the skin at or near the point of attachment of the fruit stem, the place being indicated by more or less frass adhering to the surface of the fruit (Pl. 30, B). Entrance is also made at other places, especially where the fruit has been punctured by the curculio or abrased by limbs or branches or other causes, as by hail. If the fruit is ripe, or nearly so, the entrance point of the larva may soon be invaded by the brownrot fungus, the larva continuing its development, in frequent instances, in the fungus-invaded and decaying flesh of the peach. Owing to the com-
bined effect of the caterpillar and brownrot fungus, a good deal of fruit may fall to the ground, though the majority of the fruit infested by the caterpillars will remain hanging on the trees, especially if the fruit was invaded when nearly mature. If the peach be entered at the stem end, the larva as it grows makes its way to the pit, where it feeds on the flesh, which soon becomes much discolored and more or less slimy (Pl. 31). Larvae entering at the side of the fruit are more likely to eat out pockets or cavities in the flesh, as shown in Plate 30, A. The inconspicuous entrance holes of the young larvae, especially at the stem end, often render it difficult to detect wormy fruit by exterior examination. In numerous cases apparently sound fruit when cut open has been found infested with one or more larvae.

PUPATION AND HIBERNATION

The caterpillar when full grown seeks some protected place where a cocoon of whitish silk is made preparatory to pupation. Cocoons in summer have been found in the cavity at the stem end of the fruit (Pl. 30, B), between fruits in contact, on or between mummified peaches, in leaves gummed to the twigs, or similar situations. It is probable that many larvae find protected places on the twigs, in cracks, under bark scales on the trunk and branches, and in débris on the soil. During September larvae were frequently observed making their way into the cracks in the bark of the trunk and larger limbs of the peach, evidently seeking winter quarters. Winter cocoons have been found in a few instances in little cavities eaten into the bark at the tips of injured twigs and more or less protected by the dried exuded gum and attached leaf fragments. The larvae in general appear to be rather indiscriminate in their choice of pupation quarters and may be expected to choose any place on the trees where protection is afforded. Many larvae have been collected under bands of burlap wrapped around the trunk and larger limbs of the trees. In the case of nursery stock the absence of rough bark and other protection on the young trees probably forces the larvae to the ground, though a few individuals might find protection here and there on the plants. The insect hibernates in the full-grown larval condition in silken cocoons, pupation occurring in the spring. Owing to its manner of hibernating, the detection of the insect on nursery stock and young trees would be extremely difficult, and the disinfection of trees from the pest could be insured only by adequate fumigation with hydrocyanic-acid gas or other suitable substance.

EMERGENCE OF MOTHS AND NUMBER OF GENERATIONS.

Moths are out egg laying in the spring by the time the shoots of the peach are well out, as the work of the larvae is in evidence when the shoots are 6 or 8 inches long. It would appear that there are two and probably three broods of larvae each year, since injury begins early in the season, and larvae in various stages of growth are to be found in late fall.
PLATE 27

Laspeyresia molesta:

One-year budded peach nursery tree, showing injury of caterpillars.
PLATE 28

Laspeyresia molesta:

A.—Typical appearance of peach twigs in fall injured by larva.
B.—Peach twig, showing large mass of dried gum and leaf fragments due to attack by the caterpillar.
Laspeyresia molesta
PLATE 29

Laspeyresia molesta:

A.—Typical exterior appearance of larval injury to peach shoot.
B.—The same shoot cut open, showing the larva in its burrow.
PLATE 30

*Laspeyresia molesta:*

A.—Cavity excavated in peach by larva entering at the side.
B.—Larval injury at stem end of peach; also the summer cocoon of the insect.
Laspeyresia molesta
PLATE 31

*Laspeyresia molesta*:

Peach cut open to show larval injury at the pit.