

THE LOTUS BORER

By F. H. CHITTENDEN, *Entomologist in Charge, Truck Crop Insect Investigations, United States Department of Agriculture*

The resemblance of the lotus borer to the recently introduced European cornstalk-borer (*Pyrausta nubilalis* Hübner.) is so close that the two species are apt to be mistaken for each other. It has, therefore, been thought advisable to bring together an account of the former from notes which the writer accumulated some years ago.

When this common pyraustine moth was given its specific name, *Pyrausta penitalis* Grote, a statement was made, from Prof. F. H. Snow, who supplied specimens from Lawrence, Kan., as follows: "Common; feeds upon the 'receptacle' of the Western Water-lily (*Nelumbium luteum*)."

This was in 1876.¹ Since that time the insect has several times come under notice as an enemy of this plant.

Some years ago the writer observed the larva in considerable numbers in raspberry canes. As about 40 per cent of the canes contained larvæ, it was naturally supposed that the species might prove a pest, more especially as we had also received larvæ boring in cornstalks. The result of studies of the insect's habits shows conclusively, however, that the hypothesis that it might do serious injury to other plants than the lotus was unfounded. A number of unrecorded observations, however, have been made, and these, with the Bureau of Entomology notes on the insect's life history, add considerably to our store of knowledge of this species. No extended article on this insect has been published so far as the writer is aware.

DESCRIPTION

The moth is pale yellow, and has been described as pale clear luteous, varying to ferruginous reddish luteous, with all intervening shades. The distinctness of the markings as shown in the accompanying figures (Pl. 16, figs. 1 and 2) has led to the species being described under a synonymical name. In faintly marked individuals the zigzag and other lines of both primary and secondary wings are very faint; in the darkest forms they are strong. The wing expanse is between three-fourths and one and one-tenth of an inch.

The larva when full-grown measures about an inch (25 mm.) in length. It is nearly cylindrical, being slightly depressed. It is marked with dark piliferous tubercles somewhat like the common

¹ Grote, A. R. Can. Entom., May, 1876, pp. 98, 99.

garden webworm (*Loxostege similalis*), as will be seen by reference to pl. 16, fig. 1, *b*, *c*, *d*. It is also of a similar color, which may best be described as dirty gray, with a dull reddish or purplish tinge.

The pupa (*e*) measures about half an inch in length, and just before the issuance of the moth is very dark brown, nearly black, the empty pupal skin being pale yellowish brown.

References to technical descriptions will presently be furnished.

DISTRIBUTION

The list of localities from which we have received this insect and from which it is already recorded shows general distribution from New Jersey westward to Illinois and Kansas, and southward to Texas. The exact localities known are as follows: Bordentown, N. J.; Washington, D. C.; Urbana and Champaign, Ill.; St. Louis and Kirkwood, Mo.; Lawrence and Onaga, Kan., and Hockley, Tex.

HISTORY

This species came under the observation of Dr. C. V. Riley in its larval stage in the year 1876 in galls, evidently lepidopterous, on the so-called slender pink Persicaria, (*Polygonum incarnatum*). Moths from this lot began issuing May 29, continuing to June 6. The locality is not specifically mentioned, but it was undoubtedly St. Louis, Mo., as Dr. Riley was stationed there that year.

We have received larvæ from Miss M. E. Murtfeldt which were found boring in the stems of Eupatorium at Kirkwood, Mo.; also moths from the same source labelled October 9, 1884. In the biological collection of the National Museum is a moth reared from the stems of the wild water pepper (*Polygonum hydropiperoides*).

The first recorded description of the habits of this species is that by D. W. Coquillett in 1880.¹ The larva is there described under the name *Botis penitalis* Grote, with the statements that it "feeds on Indian hemp (*Apocynum cannabinum*)," that it "lives in a nest of leaves which are fastened together with silken threads," and that the species "assumes the chrysalis form in its nest."

An account of this species is also given by C. A. Hart,² in which mention is made of the occurrence of the larva in the large receptacles of *Nelumbo lutea*, and of its having been reared from larvæ boring in the stems of *Polygonum incarnatum* near Urbana, Ill. This account is accompanied by technical descriptions of the larva, pupa, cocoon, and imago, with notes on the insect's life habits.

¹ Can. Ent., Vol. XII, p. 45. The description furnished of the larva shows considerable disagreement with what we now know to be *penitalis*, and it is probable that some other species was under observation.

² Bul. III., State Lab. Nat. History, Vol. IV, pp. 180-183, 1895.

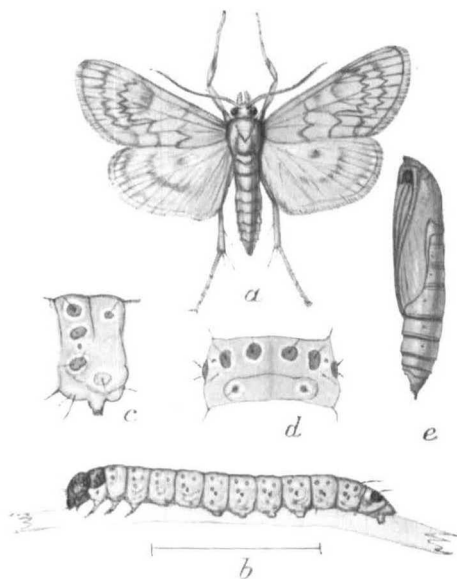


Fig. 1. The lotus borer (*Pyrausta penitalis*): a. male moth; b. larva, lateral view; c. abdominal segment with proleg, lateral view; d. same, dorsal view; e. pupa from side—all enlarged. (Original.)

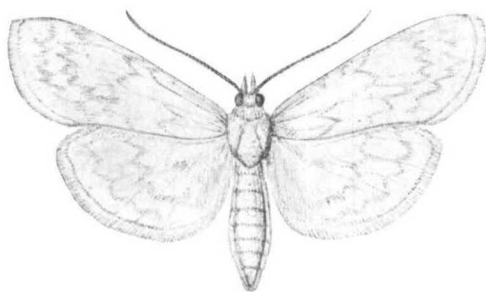


Fig. 2. The lotus borer (*Pyrausta penitalis*), female moth. (Enlarged, original.)



Fig. 3. Section of corn stalk showing perforations made in interior by lotus borer (*Pyrausta penitalis*), also exit hole at left. (Original.)

In the summer of 1889 Dr. J. B. Smith received specimens from Bordentown, N. J., where the caterpillar was feeding in the flower-stems and leaves, buds, flowers, and seed capsules of the Egyptian lotus. Assuming it to be a new species, a technical article was published on the insect under the caption "A New Species of *Botis*,"¹ and a popular one entitled "An enemy to the Egyptian Lotus."² The former includes a description of the species, as *Botis nelumbialis* n. sp., and of the mature larva. Both articles are illustrated with a figure of the moth, showing two color varieties, and of the larva with details.

August 28, 1890, we received larvæ from Mr. F. W. Thurow, Hockley, Tex., found feeding on the leaves and boring into the stems of *Nelumbium luteum* (= *Nelumbo lutea*).

November 31, 1891, we received from Mr. F. F. Crevecoeur, Onaga, Kan., pieces of the stalk of a late variety of corn (shown in pl. 16, fig. 3) which contained larvæ that were ultimately reared, the moths issuing the year following, March 12 and April 2.

The moths issued from June 4 to 14. One larva transformed to pupa May 16 and to adult June 2, in cool weather, having been in the pupal stage seventeen days. Another pupated June 3 and transformed to adult June 14, having passed eleven days as pupa; weather warm and sultry during the latter period.

As previously stated the finding of this species in abundance in the stems of raspberry led to the impression that the larva was injurious to that plant, and as a consequence a considerable number of specimens and infested canes were gathered for study. That this assumption was natural it will only be necessary to state that sketches were prepared at the time of the receipt of this species and its subsequent rearing in corn, and that the impression was an erroneous one is proved by the fact that there is no evidence that the species feeds on either healthy corn or raspberry, although it feeds on the pith to a considerable extent, but on the contrary develops chiefly upon lotus and other aquatic or semiaquatic plants and enters cornstalks and the cut ends of raspberry canes chiefly as a retreat for passing the winter and for subsequent transformation.

SUMMARY OF LIFE HISTORY AND HABITS

From available sources including the accounts of Smith and Hart, and from analogy, an approximate life history may be summarized as follows:

The species hibernates in the larval stage, the first moths issuing from March until June, according to locality. The eggs and place of

¹ Entomologica, Americana, Vol. VI, pp. 88-90, 1890.

² Garden and Forest, Feb. 19, 1890, p. 88.

oviposition have not been observed, but the larva when it first appears lives on the outer and upper surface of leaves in a little silken tent-like web, but it soon displays a strong tendency toward what is termed "inside feeding," in perforating and devouring buds and seed capsules and the interior of stems which may be available. During summer it feeds and grows apace until toward the end of August. It then crawls into whatever stems are convenient for the purpose and forms its winter retreat. From one to three or four larvæ sometimes enter a single stem; one is the usual number, although two are frequently found. In stems like those of raspberry the larva makes a burrow wide enough so that it can turn about if necessary, and measuring from an inch and a half to two inches. Both ends are frequently found plugged with small masses of pith, and when more than a single larva inhabits a stem their burrows are separated by a considerable mass. A small amount of silk is used in the construction of these hibernating chambers, and a little is usually to be found at either end. The writer has not seen in raspberry canes anything approaching a true cocoon, but it constructs them in other plants. Some of the hymenopterous parasites form a distinct cocoon.

The observed food plants are Lotus (*Nelumbo lutea*), Polygonum, Apocynum and Eupatorium.

NATURAL ENEMIES

Panzeria penitalis Coq. Less than half of the larvæ collected by the writer in the stems of raspberry were reared to the imago, the remainder being parasitized, chiefly by the tachina fly mentioned, which issued June 3 to 20, Washington, D. C.

Zemelucha (Porizon) facialis Cr. This ichneumonid parasite reared with the above June 3.

Three other tachina flies are recorded as parasites of this insect.¹ They are *Exorista vulgaris* Fall., *Hypostena variabilis* Coq., and *Phorocera comstocki* Will.²

Bracon xanthostigmus Cr. was reared at St. Louis, Mo., September 15, 1875.³ This has also been reared on more than one occasion from blackberry canes, including some that were infested by *Agrilus ruficollis*.⁴

Mention is made in the article by Mr. C. A. Hart⁵ of a braconid

¹ Technical Series No. 7, of this Bureau, p. 27.

² The first and last of these three tachinids were mentioned by Prof. C. H. T. Townsend (Psyche, Vol. VI, June, 1893) as having been reared from this pyralid by Dr. S. A. Forbes, Champaign, Ill.

³ Insect Life, Vol. II, p. 349.

⁴ L. c., Vol. IV, p. 257.

⁵ L. c., p. 181.

and a chalcidid parasite of this species, the latter being secondary on the former.

In addition to the parasites which destroy this species, blackbirds are said to eat the larvæ before they go into shelter.

CONTROL

A spray of arsenate of lead, Paris green or other arsenical could be used in the destruction of the young larvæ before they penetrate the interior of buds, seed capsules, stems, and the like. Where they are found at work in these shelters, however, about the only recourse would be to pick the affected portions by hand and burn them. The collection and destruction, also by burning, of the stalks in which the insects are found late in the season, is also advisable. In the occurrence of the insect on Lotus all parts of the plant containing the insect above the water line should be cut away as soon as this can be conveniently done.

ANASTREPHA FRATERCULUS WIED. (TRYPETIDAE)—A SEVERE MENACE TO THE SOUTHERN UNITED STATES

By E. W. RUST, *Entomologist of the Tucumán Experiment Station,
Tucumán, Argentina*

In almost all tropic or sub-tropic lands fruit-growing is subject to severe losses occasioned by insect pests, and among the latter one of the most damaging is almost sure to be some one of the fruit-flies of the family *Trypetidæ*.

In the northern part of the Argentine Republic, where the writer is stationed, the particular scourge of the fruit-grower is *Anastrepha fraterculus* Wied., and during the past two years it has been the subject of more or less constant observation. During that time we have noted with surprise that so little is known, and even less published, about an insect which is such a menace to the fruit-growing interests of the semi-tropic portions of the United States. The Mediterranean fruit-fly is known by name and dreaded by a great number of fruit- and vegetable-growers, thanks to the wide-spread publication of the most excellent work done by the United States Bureau of Entomology. The melon fly (*Bactrocera cucurbitæ*) and the Mexican fruit-fly (*Anastrepha ludens* Loew) have also come in for some share of popular attention, but it appears that comparatively few people realize what a scourge *Anastrepha fraterculus* might become if once it gained entrance to the Southern portion of the United States.