THE PEACH TWIG BORER, *Anarsia lineatella* ZELL. (LEPIDOPTERA: GELECHIIDAE), IN THE OKANAGAN AND SIMILKAMEEN VALLEYS OF BRITISH COLUMBIA

D. S. SARAI[1]

INTRODUCTION

The peach twig borer, *Anarsia lineatella* Zell., is reported from Europe, Asia, and North America. It is present in 35 states of the U.S. (Bailey, 1948), in Ontario and British Columbia, where it is often a serious pest of peach and apricot in the Okanagan and Similkameen valleys. Almond, cherry, nectarine, plum and prune are also listed as host plants (Bailey, 1948). The larva tunnels the buds and terminal twigs and infests the fruit. The present study was intended to provide information on which to base more effective timing of insecticide applications. Some growers have had difficulty in controlling this pest.

METHODS and MATERIALS

The seasonal history was investigated from 15 May to 15 October, 1966 in peach and apricot orchards near Penticton in the Okanagan Valley and Cawston in the Similkameen Valley. The presence and activities of different stages were recorded each week and the developmental stages collected for detailed study. In the laboratory cages small vials of water plugged with absorbent cotton supplied water to the moths. The larvae fed satisfactorily on green or ripe peaches and apricots. Green fruit lasted for from 10 to 15 days, and the larvae easily re-established in fresh fruit. When mature larvae left the fruit most of them moved to the top of the cages to pupate in folds of cheesecloth; others pupated in corners or in folds of paper. Tender shoots were not satisfactory food because they wilted or died within three days. It is not known whether overwintered larvae, which feed normally on buds and shoots, can also develop on fruit. They were already pupating by mid-May.

To study adult flight patterns two U-V light traps were used, one 10 miles south of Penticton, the other five miles east of Cawston. The light was on each night from 8:00 p.m. to 6:00 a.m. The bottle under the light was partly filled with a 70% mixture of ethyl and methyl alcohols, which was emptied and replenished every fourth day. The method was impractical in that it was extremely time consuming to locate the small moths in the great number of trapped insects, but it did give some indication of the adult population levels and supported the field observations. Adults are difficult to observe in the orchards because they are small and their colouration blends into the bark. Adult emergence in orchards was noted by marking pupae and checking these regularly. The cremaster is securely attached so that the empty cases remain after the adults have emerged.

SEASONAL HISTORY

The seasonal history was the same in the Okanagan and Similkameen valleys. Fig. 1 shows the seasonal history at Penticton in 1966. Overwintered larvae which had been feeding on buds and new shoots, started to pupate by mid-May. A few larvae were still feeding, but most of them were moving downwards to the large limbs and trunks to pupate in cracks, pruning scars, or under loose bark. By 24 May almost all had pupated. The mature larva is about 13 mm long. It spins a loose, grey-white web and pupates beneath it. The pupa is 3 to 4 mm long, brown to dark brown, attached by the cremaster. Moths were first seen on 7 June and the peak of adult population was reached about mid-June.

Oviposition began within a few days of emergence of the adult and

[1] Summer employee, B.C. Dept. of Agriculture, Vernon, in 1966.

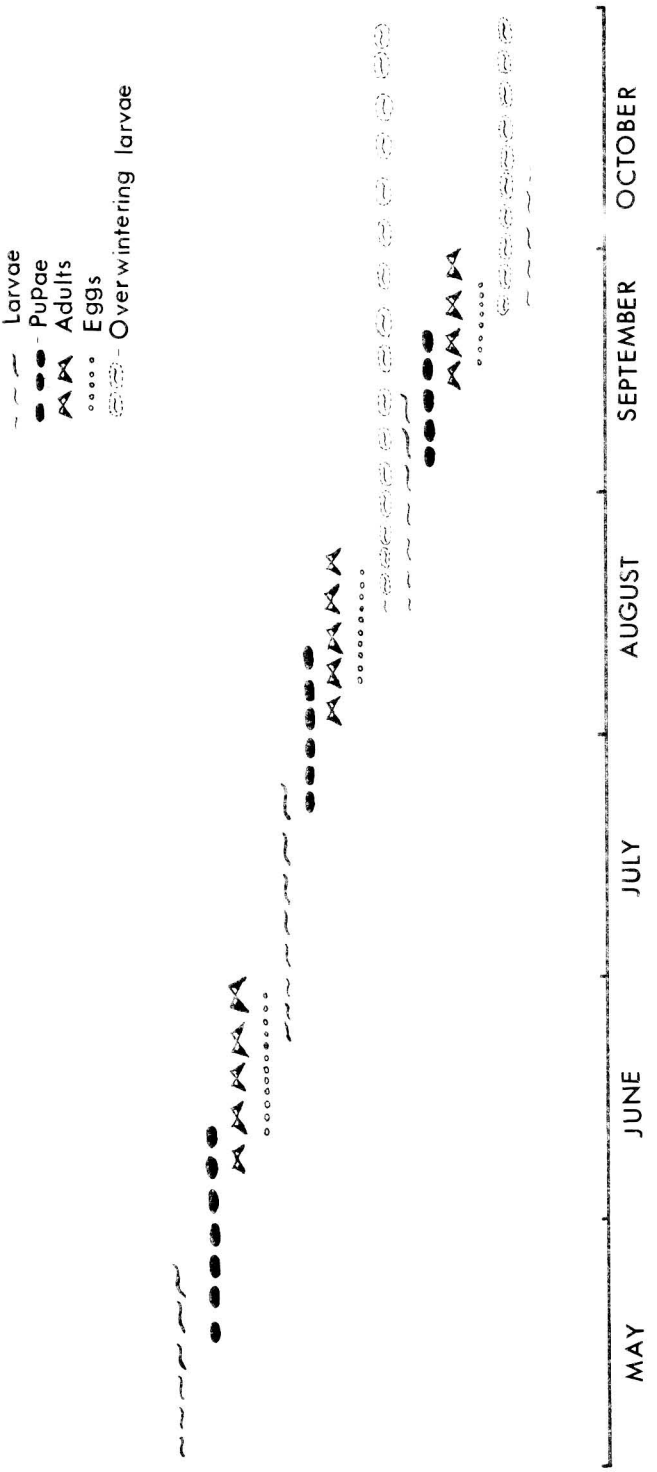

Figure 1—The seasonal history of the peach twig borer, **Anarsia lineatella** Zell. in the Penticton area of the Okanagan Valley, B.C., 1966.

continued for about two weeks. Most of the eggs were laid on the terminal parts of young shoots but some were laid on fruits. Larvae from these eggs were first seen on 22 June feeding on terminal and side shoots and leaf bases. The newly-hatched larva is about 5 mm long, light brown with a black head.

Wilted shoots caused by first-instar larvae were not noticeable since they consisted only of one or two small leaves. But by 6 July they were noticeable because the longer larval tunnels included more leaves. A wilted shoot with a larva still inside was clean, but an abandoned shoot exuded gum. Wilted shoots were fewer and damage to fruit started earlier on apricot than on peach, possibly because apricot has fewer shoots and softer fruit. Some larvae apparently fed on apricot fruit at once on hatching in late-June, whereas damage to peach fruit did not start until about mid-July. In the hard unripe fruit the tunnels were superficial, and mostly in the stem half.

Pupation began about 20 July, in cracks in the bark or curled bark, under loose bark or even on the surface of the fruit. The larvae did not spin a web. Adults emerging from these pupae were first seen on 3 August, and were in maximum numbers by 10 August. They were easily seen in heavily infested orchards resting on trunks, branches and fruit. They were seen more often on apricot than on peach fruits.

The eggs were laid on bark and on fruits. Most of the apricots were picked by the end of July so that observations after that time were made on peach fruits. Hatching started by 7 August. Larvae hatched from eggs on fruits made very small entry holes marked by brown frass on the surface; larvae hatched from eggs on bark started making overwintering chimneys in crotches of two-to four-year-old branches. They fed on the cambium to hollow out overwintering sites (hibernacula). Most of the larvae were in the first instar but a few in the second instar were involved. These larvae were not seen to migrate from bark cells to fruit as reported in California by Bailey (1948).

Larvae in fruits developed normally although some made chimneys before starting to feed. They pupated from 5 to 12 September, and the emerged adults were seen from 14 to 28 September. These laid eggs mostly on bark but also on fruits which were left on the trees. Hatching occurred in the last week of September. Most of these newly-hatched larvae made hibernacula. Thus overwintering larvae are from eggs laid by third and second generation moths.

A few larvae were still feeding in fallen fruit at the end of September and had developed beyond the second instar. None could be found after mid-October, by which time night temperatures had dropped to about 4°C for a week (40°F).

DISCUSSION

Weldon (1914, cited from Duruz, 1923) concluded that the peach twig borer in California had a single, uneven generation per year, emerging over a long period. Duruz (1922, 1923), Bailey (1948) and Price & Summers (1961) observed three to four generations. King & Denman (1960) mentioned a fourth generation in Texas The presence of hibernacula in August may have led earlier workers (Treherne, 1923; Venables, 1940; Proverbs, 1954) to assume that the August brood was the overwintering generation in the Okanagan Valley.

It appears that voltinism in this species is controlled not only by temperature, but also by food; larvae feeding on fruit in August developed and completed the third generation, whereas those feeding on bark built hibernacula.

The only parasite observed was a poly-embryonic chalcid, *Paralitomastix pyralidis* (Ashm.), which laid its eggs in the twig borer's eggs. Peach twig borer larvae from parasitized eggs died at maturity. At this time

the larvae were full of parasites which could be seen under a microscope through the translucent skin of the host. The adult chalcids emerge soon after the peach twig borer moths; oviposition in host and parasite is synchronized, and the parasite also has two or three generations per year. From 40 to 65 chalcid adults were seen to emerge from each host.

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A RECORD OF *Adranes taylori* WICKHAM (COLEOPTERA: PSELAPHIDAE

A wind-thrown western red cedar of 18 inches diameter was found to have a 9-inch dead strip on one side. This was infested with termites and field ants, *Lasius sitkaensis* Pergande. The wood with the ants was kept in the laboratory and moistened regularly. After five months two small and unusual beetles emerged; these were *Adranes taylori* Wickham 1901, of subfamily Clavigerinae, family Pselaphidae. *Adranes* is a genus of obligate inquilines, restricted to the nests chiefly of *Lasius* ants and known only from North America. Eight species are recorded from the Pacific Northwest (Hatch, M., 1962, Beetles of the Pacific Northwest, Vol. III). They are eyeless, with 3-segmented antennae, composed mostly of the very large 3rd segment, and have vestigial mouth parts. These are the only Clavigerinae in the University collection.

G. J. SPENCER,
University of British Columbia.