

## THE WESTERN LARCH BORER, *TETROPIUM VELUTINUM* LECONTE, IN INTERIOR BRITISH COLUMBIA

D. A. Ross<sup>1</sup>

### ABSTRACT

In the interior of British Columbia, *Tetropium velutinum* LeConte is an important borer in the sapwood of western larch, *Larix occidentalis* Nuttall. Other authors have indicated that this borer was important only as a bark miner and killer of trees. Galleries penetrated to depths of 25 to 47 mm and ranged in total length from 28 to 69 mm. At Vernon oviposition was from early in May until the end of August. Limited observations showed that the first penetration of the sapwood by the larvae began about 6 weeks after oviposition.

### INTRODUCTION

Webb (1911) briefly described the stages, damage to the bark, and status of *Tetropium velutinum* LeConte. Craighead (1923) noted that the species "...is of considerable economic importance, causing the death of *Tsuga heterophylla* and *Larix* throughout the Rocky Mountains and the Pacific Coast region." Kinghorn (1954) observed that it infested and killed numerous mature hemlock that had been weakened by an epidemic of hemlock loopers. He indicated that it was common in western Washington and Oregon, southern Vancouver Island, coastal mainland near Vancouver, and in the southern interior of British Columbia.

These authors noted that *T. velutinum* was important as a bark miner and killer of trees. Preliminary observations indicated that it might be more important as a wood borer than as a tree killer in the southern Interior (Ross 1966). In 1965-66, activity of the insect on and in logs was investigated to determine its significance as a wood borer, and to gain information for control procedures.

Sections of infested coniferous logs from Nelson and Kamloops forest districts were caged outdoors at Vernon. The adult *Tetropium* reared were placed, usually in pairs, in small cages containing a short bolt of freshly cut larch and some sugar

solution. Adult activity, egg incubation and larval feeding were observed.

### OBSERVATIONS

**HOSTS:** In the interior of British Columbia this borer was most frequent in western larch, *Larix occidentalis* Nutt. logs or windfalls. In a few instances it was reared from *Pseudotsuga menziesii* (Mirb.) Franco, *Picea engelmanni* Parry, *Tsuga heterophylla* (Raf.) Sarg., *Pinus monticola* Dougl. and *P. contorta* Dougl. Its occurrence was confirmed as far north as Shuswap Lake.

**ADULT ACTIVITY:** The adult emergence period for material caged outdoors at Vernon was 18 May to 6 August in 1965, and to 2 May to 30 August, 1966. The major emergence period was between mid-May and mid-June. The average longevity for 17 pairs of adults was 11 days for males and 12 days for females. One male lived 13 days and one female 20 days. Adults mated readily the day of emergence when the temperature exceeded 19°C. Usually copulation was frequent for several days until the female began egg laying. Mating recurred the first day after oviposition. Both sexes occasionally mated with more than one adult.

Oviposition was observed in June between 0800 and 2000 hours P.D.S.T. at temperatures above 18°C., generally 2 to 4 days after emergence. The soft body of this insect allows it to squeeze under the loose bark and obtain deep penetration of the oviposi-

<sup>1</sup> Forest Entomology Laboratory, Department of Forestry and Rural Development, Vernon, B.C.

tor between the bark scales. White eggs (about 1.2 x 0.4 mm) were deposited in loose clusters in a compressed state under bark scales and in the crevices of the tree bole.

The number of developed ovarioles in each ovary ranged from 31 to 36, indicating a high potential egg production during a short period. In the insectary, the maximum number of eggs deposited by one beetle was 208. The average number of eggs deposited by 10 of the most productive females was 130. The longest oviposition period for an individual was 11 days, and its daily egg production during that period was 10, 51, 2, 3, 10, 0, 3, 10, 3, 3, and 9 respectively.

**INCUBATION:** Incubation time in June ranged from 10 to 16 with an average of 13 days.

**LARVAL ACTIVITY:** The newly hatched larvae bored to the inner bark to feed. The extent of mining in the bark of a recently felled larch is shown (Fig. 1) for five larvae hatched on 28 June, 1966, and allowed to feed undisturbed for 41 days. Two larvae had begun to score the wood and the other three fed on the phloem and cambium. The first recorded penetration of the wood occurred just under 6 weeks following oviposition on 27 May.

The larval entrance hole into the wood was elliptical and ranged in size from 5.0 x 2.7 to 6.0 x 3.5 mm (Fig. 2). The wood was invariably scored along the entrance side of the hole for 2 to 5 mm. Penetration of the gallery into the wood extended to a depth of 25 to 47 mm. Most galleries were L-shaped (Fig. 3) with a gentle, simple curve in the entrance arm of the gallery. Length of 15 galleries varied from 28 to 69 mm; the volume varied from 0.42 to 1.28 cc (average 0.86 cc). Most larvae in caged bolts overwintered near the lower end of the well-plugged gallery.

**PUPATION:** Pupation occurred early in the spring mostly in galleries in the wood although a few pupated

under the bark. At 21°C. the pupal stage lasted from 7 to 9 days.

The adults emerged from the entrance holes that were frequently hidden by a flake of bark. The maximum number of holes recorded was 17 ft<sup>2</sup>, in a western larch log 200 mm in diameter.

Generally, this insect completes only one generation a year. However in 1965 a female oviposited on caged logs late in May and the brood produced five adults on 23 August two of which mated and produced eggs; several eggs hatched and the larvae wintered successfully.

In another instance eggs were deposited on 16 June and hatched 13 days later. The larvae fed for 47 days on the inner bark, then pupated in the bark on 16 August and an adult emerged 8 days later.

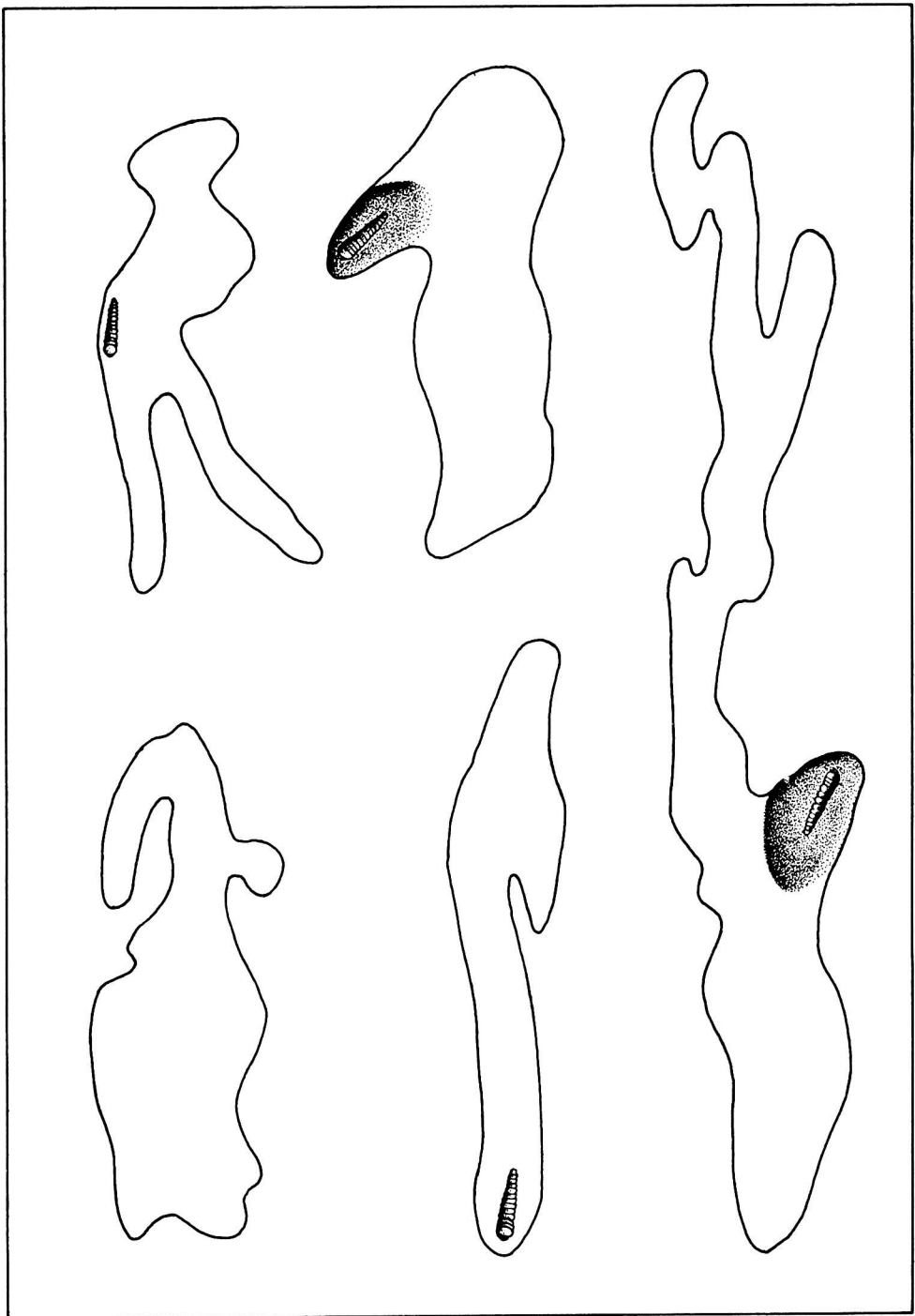
#### DISCUSSION

Other authors (Webb 1911; Craighead 1923; Kinghorn 1954; and Keen 1952) emphasized the importance of *T. velutinum* as a bark-mining tree killer, particularly of weakened western larch and hemlock. This phenomenon has not been observed in the interior of British Columbia; however, there are numerous records of the borer damaging the sapwood of western larch logs (Ross 1967). The L-shaped galleries extended into the wood to a depth of 25 to 47 mm, ranged in length from 28 to 69 mm, and had an average volume of 0.86 cc.

The life cycle usually takes 1 year, although a partial second generation may occur.

In 1966, at Vernon, oviposition began the first week in May and continued until the end of August. Therefore insecticides, which should persist throughout the summer, should be applied early in May.

There is evidence that during some years and under certain conditions larvae do not penetrate the sapwood until at least 6 weeks after oviposition. Although the duration



Figs. 1-3 *Tetropium velutinum* Lec.

1. Galleries in phloem made by five larvae left to feed undisturbed for 41 days. Stippled area is scored wood.



2. Larval entrance holes in wood of *Larix occidentalis*.  
 3. Lead castings of galleries in wood (Geistlinger and Taylor 1962).

of this bark-mining stage must be determined for different conditions, it may be assumed that damage can be prevented if infested logs are processed or peeled before the end of June of the year of infestation. In situations where cool weather delays development, damage to the wood

may not begin until later. As for many other wood borers, damage can be avoided by prompt utilization of felled trees.

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