

## **SOLENOBIA TRIQUETRELLA HUBNER, A FLIGHTLESS PARTHENOGENETIC MOTH, IN BRITISH COLUMBIA (LEPIDOPTERA: PSYCHIDAE)**

H. B. LEECH<sup>1</sup> AND B. A. SUGDEN<sup>2</sup>

### ABSTRACT

The occurrence of *Solenobia triquetrella* Hübner at Vernon, B.C., with notes on its habits and a brief description of the ultimate instar larva and adult is contained herein. Evidence indicating that *S. triquetrella* may have been introduced is presented.

### INTRODUCTION

Small sand-covered, elongate cases containing insect larvae were first found by the senior author at Vernon during 1941, 1945 and 1946. Adults reared subsequently were designated as *Solenobia triquetrella* Hübner. The following notes are presented since we do not know of published records of this species in North America.

### OBSERVATIONS

On April 17, 1945, hundreds of these casebearers were climbing walls, maple trees, and along the underside of fence rails not far from the site at Vernon where these insects had been discovered in 1941. Nearly 1000 cases were collected from tree branches, tall dead grasses and the underside of boards lying on the ground. Almost all produced moths, every one a female; many laid eggs which hatched. There were no parasites from any stage of *Solenobia*.

By April 18, 1946, at the same places, mature larvae were again numerous. On April 25 many cases were firmly attached to sites similar to those of the previous year. Pupae, a few adults, and eggs were present. Fifteen hundred cases were collected and caged; again almost all produced moths which laid numerous eggs, but no male moths or parasites emerged. The eggs began to hatch on May 12.

Attempts to rear the larvae on dry rotted wood, decaying leaves and on

freshly cut pieces of couch grass were unsuccessful.

The following is a description of the insect as it occurred at Vernon:

*Larva*: The fully grown larva (Fig. 3) appears early in April; it attaches the open end of the case firmly with a mass of silken threads to the substrate so that it usually hangs downward (Fig. 1). The larva then reverses its position in the case to face the distal end which is closed by three flaps fitting neatly, yet loosely, together.

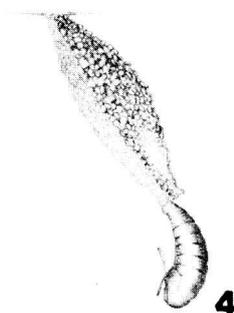
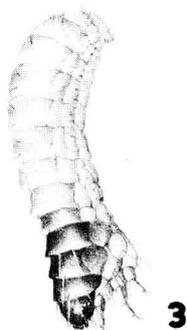
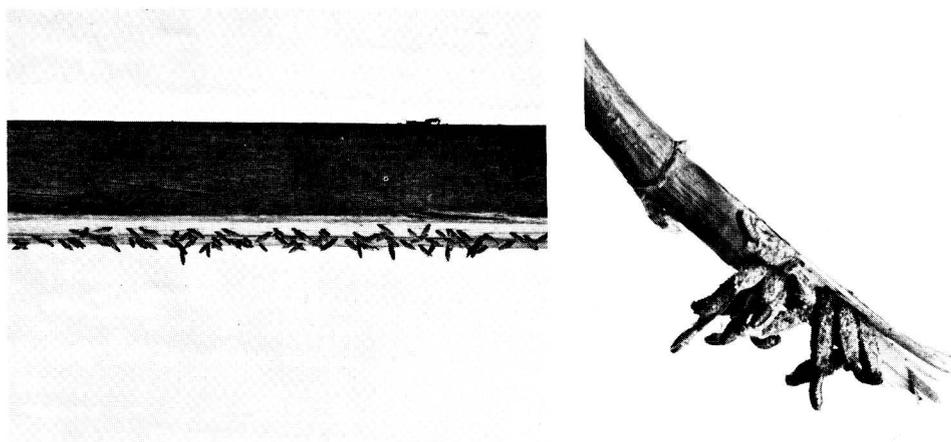
*Pupa*: The mature larva pupates within the anchored case in mid April; the stage lasts about a week. Shortly before the moth emerges the pupa moves through the flaps of the case until only the apical abdominal segment with cremaster hooks remains within (Figs. 2, 4). Most of the body is filled with eggs which are almost as large as those laid by the adult.

*Imago*: The moth is 3 to 4 mm long, wingless and mouse-grey, with whitish scales along the sides. Upon emergence there is a dense brush of long wavy hair across the apparent 5th and 6th abdominal segments (Figs. 5, 6).

The moth is parthenogenetic, and begins egg laying soon after emerging. As she oviposits, the moth ingests air, gradually inflating the anterior half of her body so that the membranous areas between segments are semi-transparent. The resulting pressure helps to expel the eggs. If the distended body is punctured with a pin, it deflates like a balloon, with-

<sup>1</sup> California Academy of Sciences, San Francisco, California, U.S.A.

<sup>2</sup> Forest Entomology Laboratory, Vernon, B.C.



**Figs. 1-6.—*Solenobia triquetrella* Hübner at Vernon, B.C.**

**Figure 1.—Larval-pupal cases on underside of fence rail.**

**Figure 2.—Larval-pupal cases attached to broken tip of a small living branch of *Acer negundo* L. Projecting farthest downward are two empty pupal skins; females at upper left, lower middle and far right are laying eggs in empty cases.**

**Figure 3.—Mature larva.**

**Figure 4.—Empty pupal skin attached to case after female has emerged.**

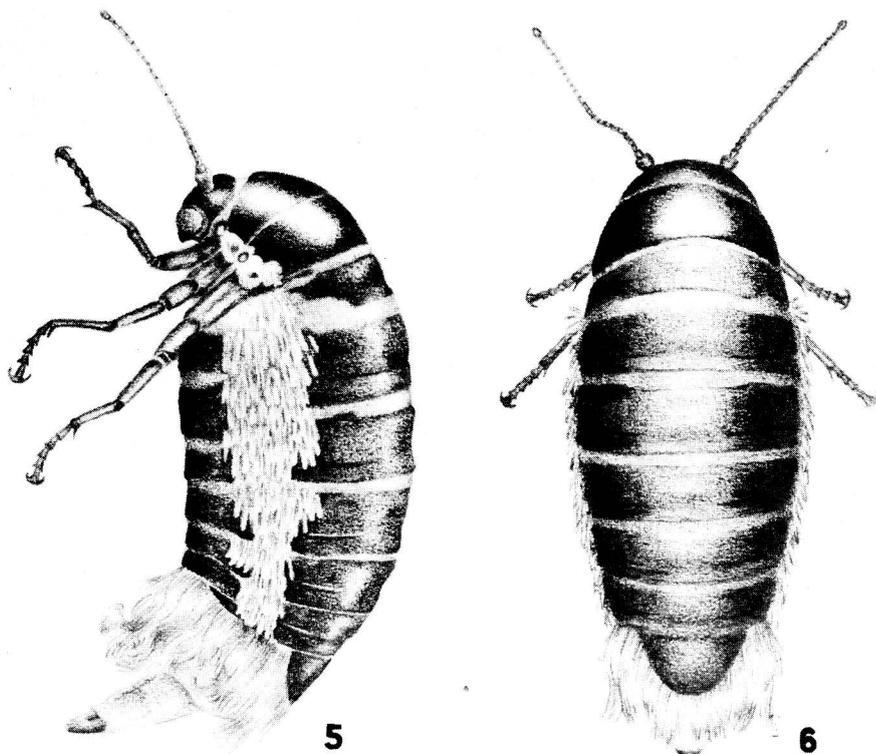


Figure 5.—Lateral view of freshly emerged female showing full pad of ventral abdominal hairs and retracted ovipositor.

Figure 6.—Freshly emerged female—dorsal view.

out loss of body fluid.

The moth uses the larval-pupal case as a receptacle for the eggs, inserting the ovipositor past the empty pupal skin without dislodging it. The first eggs are laid at the caudal end, sometimes even within the old larval skin which remains in the case. During oviposition hairs from the abdominal brush are plucked out a few at a time by the prehensile tip of the telescopic apical abdominal segments and placed with the eggs. On completion of oviposition the case is full of eggs and hairs and the abdominal brush of the moth has disappeared.

#### DISCUSSION

In 1927 Ronald Buckell sent Dr. J. McDunnough of Ottawa, a number of specimens reared from cases found on a fence rail at Vernon: Dr. Mc-

Dunnough noted that "... they might belong to the genus *Solenobia* as the simple type of case covered with earth granules point in this direction."

Specimens were sent to Dr. W. Sauter of Zurich, specialist on the genus *Solenobia*. He replied: "The shape of the cases and the female does not leave a doubt that it must be *Solenobia triquetrella* Hbn. This species is widely spread in Europe and I also saw specimens of it from North America: Montreal. Also the specimens of Montreal belong to the parthenogenic form. As Prof. Seiler stated, it was the tetraploid race. It would be very interesting to know the chromosome number of your race . . . I do not know more about the distribution of *S. triquetrella* in

America and wonder if the species really is introduced. If not, it should be possible to find also the bisexual form in parts of the continent which have not been covered with ice during the last glacial epoch."

The species could be widely distributed in British Columbia but unreported. The larval cases are small, inconspicuous, and unlikely to attract attention unless numerous. However considering the hundreds which have been found on house walls or porch ceilings it is surprising that they have not been noticed by worried householders. We found a few cases at Salmon Arm, but only after persistent searching, and because of our knowledge of larval habits.

The late E. P. Venables said that he had found cases presumably of this species near Kelowna, B.C. on the underside of bridge railings. If Venables' record is *S. triquetrella*, then the species is known from four towns over a north-south linear distance of 65 miles with Vernon near the midpoint. Considering how often boards, packing cases and vehicles, any of which may have been standing in an infested area, are moved about, the distribution seems reasonable for an

introduced species.

Two facts suggest that *S. triquetrella* is introduced: (a) despite years of searching and intensive collecting, larval cases have only been found in towns; (b) no parasite was recovered from nearly 2,000 viable larvae and pupae from a population known to have been present for at least 20 years. *Addendum*—When the above manuscript was read at the March, 1966 Annual Meeting of the Entomological Society of British Columbia, members in the audience gave additional records which are likely to be of *S. triquetrella*. Mr. P. Zuk said he had seen similar larval cases at Vancouver; Mr. C. L. Neilson reported that he had found cases on the walls of a Naramata cannery. Dr. H. A. Madsen recalled that a *Solenobia* moth was reared from egg to adult at Berkeley, California, the eggs having come from a mountain orchard at an altitude of 3,000 feet.

#### Acknowledgements

We are grateful to the persons mentioned in the text, and to Messrs. W. G. Mathers and S. H. Farris for help in collecting. The photographs were taken by Harry Andison in 1946; the drawings are by B. A. Sugden. The writers also thank Dr. L. H. McMullen for editing the text.