

Hadroplontus litura (F.)

INVASIVE SPECIES ATTACKED: Canada thistle (*Cirsium arvense* (L.) Scop.)

PREVIOUSLY KNOWN AS: *Ceutorhynchus litura* (Fabricius)

TYPE OF AGENT: Stem feeding beetle (weevil)

COLLECTABILITY: Not available for general distribution

ORIGIN: France, Germany and Switzerland

DESCRIPTION AND LIFE CYCLE

Adult:

Hadroplontus litura adults are 3-4 mm long with a prominent long rostrum (nose). Their oval weevil bodies are completely covered with whitish hairs. Their upper back is dark grey to black and marked with a distinct white 'T' or cross-like formation. When the weevils are on the soil surface, the mottled markings camouflage them. In cool climates the adults appear in early spring, from March to early June and will mate and produce a generation that emerges in August and September. In the warmer areas, adults can remain active overwinter and even year round from August through to the following May, June and occasionally July, depending on habitat. In either case, the mating season remains the same. Oviposition starts when thistle rosettes first appear in the spring, between March and mid-May, and continues for 4-6 weeks. The adult feeding on the leaves creates cavities where the female will deposit the eggs. The females lay the eggs individually or in groups of 2-5 into the cavities into plant tissue or in the mid-vein on the underside of leaves. Each of the females will lay up to 120 eggs. The preferred oviposition hosts are smaller plants usually up to 5 cm tall. When the plants reach beyond this height they become unsuitable.

Egg:

The eggs hatch in 5-9 days.

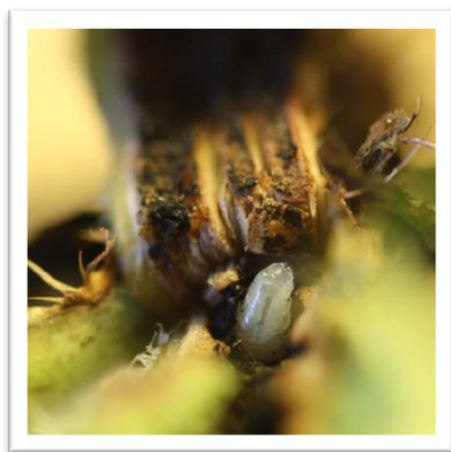


Fig. 3. *H. litura* larva in Canada thistle stem

Larva:

The larvae are whitish coloured with light brown, pointed heads. There are three larval instars which all occur within the plant. The first instar mines down the leaf vein and into the plant stem. If the plant has already started to bolt, the larvae will mine up the stem and feed on the inner pithy area. If the larvae enter non-bolting plants they will mine downward and feed on the root crown and occasionally the root. The plants react to the intruding larvae by producing "wound tissue" (a callus growth), which the larvae feed upon. In vigorous growing plants, the callus can smother up to two larvae, but if multiple tunnels are present, the plant stem bases will swell and develop woody galls which instead can kill the plant. By the end of the third instar the mature larvae move to the soil to pupate.



Fig. 1. *H. litura* adult (credit Powell et al. 1994)

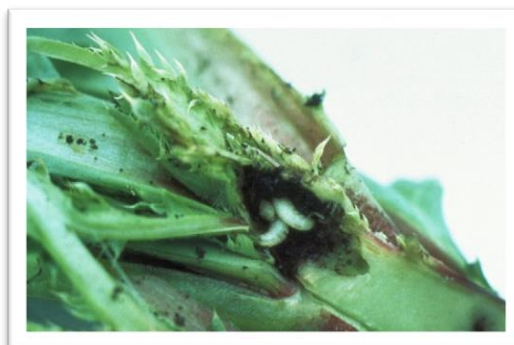


Fig. 2. *H. litura* larva in Canada thistle stem (credit Powell et al. 1994)

Pupa:

Pupation occurs in the soil in an oval cocoon made from soil particles. Pupation lasts two to three weeks before new adults emerge in late summer and fall. Cool spring weather delays the plants' bolt, maximizing larvae feeding and resulting in better plant control.

Overwintering stage:

In cool climates the adult will overwinter in the soil and leaf litter, however, in warm climates there is no rest period and the adults can remain active all winter.

EFFECTIVENESS ON HOST PLANT

To kill the host plants, the larvae need to begin feeding in early spring before bolting has started. Less impact is noticed if the attack comes after the plants have already begun their active spring growth. The overall plant height is not affected by the larvae mining. When the larvae create the exit hole for pupation, they provide an entrance for other organisms. Secondary insects or pathogens attacking the plants are often more harmful than *H. litura*. Adult foliar feeding on upper and lower leaf surfaces creates a window effect.



Fig. 4. *H. litura* larva and feeding in Canada thistle stem

HABITAT AND DISTRIBUTION

Native:

The weevils' native distribution occurs in Atlantic Europe, from the southern parts of France to southern Scandinavia.

North America:

In North America, *H. litura* will establish on thick dense Canada thistle stands, preferring bare soil surfaces between plants, and avoiding sites with competing plants. Spring flooding can be tolerated. Locations with long cool springs, which delay the plants bolting, are better suited than those that encounter rapid gains in heat.

British Columbia:

H. litura have been released into the Bunchgrass, Coastal Douglas-fir and Interior Douglas-fir biogeoclimatic zones. Establishment has been found only in the Coastal Douglas-fir zone. Efforts to determine the status of the site in the other release zones is ongoing. The release quantity made into the Bunch-grass zone may have been too small to successfully survive and go on to reproduce future generations, therefore, it difficult to determine if the weevil would prefer this habitat.

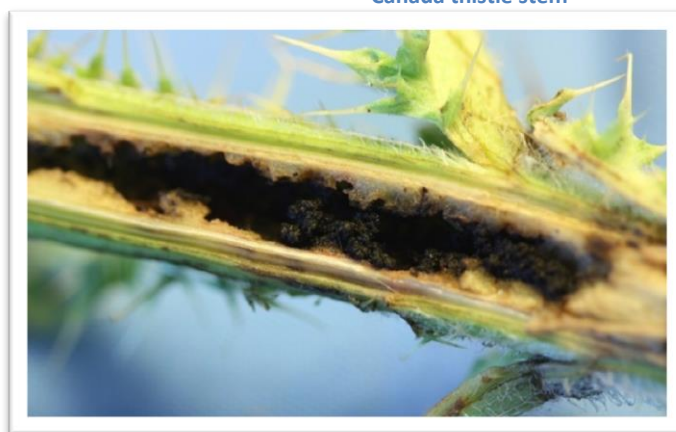


Fig. 5. *H. litura* feeding evidence in Canada thistle stem



Fig. 6. *H. litura* dispersal location near release on Westham Island (Coastal Douglas-fir zone)

BRITISH COLUMBIA RECORD

Origin:

H. litura populations released in B.C. originate from France, Germany and Switzerland.

History:

The initial release of 69 *H. litura* adults was introduced to B.C. within a protected ecological reserve in 1975 at the lower mainland on Westham Island (Ladner) and in 1987 a second release consisting of 233 adults was made on Vancouver Island near Duncan. The earliest release site was noted to be established within one year. In 1994, an attempt was made to transfer larvae/pupae infested plants from Richmond into the southern interior near Kamloops, however the success of this release method has yet to be confirmed. Recent dispersal monitoring has found the weevil dispersing in the lower mainland.

Field results:

The Westham Island treatment site was noted to be established one year after the release was made and has remained established since that time. In 2008, this site was revisited, and although the thistles at the release point had been clipped and mowed, a single adult was located. In 2014, dispersal monitoring was carried out in Ladner. *H. litura* was found to be well established in the immediate release area on the north end of Westham Island as well as on the mainland part of Ladner in an area known as Brunswick Point. The weevil was found to have dispersed over 4 km away from the original release point. The dispersal distance included the weevil crossing a 420 m (+/-) distance over brackish water where the Fraser River empties into the Pacific Ocean. The dispersal distance may be greater than what was found in 2014, however, the distribution of Canada thistle may be a limiting factor at the currently established sites. The weevil appears to be tolerant of Canada thistle plants growing at locations near salt water. The site on Vancouver Island near Duncan was briefly revisited in 2008 but no evidence was found. In 2002, an unidentified dead beetle pupae was found inside a plant root at the Kamloops site. At this same location, in 2003 and 2004 stem mining and frass was observed. Foliar feeding, stem tunnelling and one dead larva were found the spring of 2005. The results are inconclusive at this time. Dispersal monitoring in the vicinity of the Kamloops site was carried out in 2014, but no evidence of the weevil was found. This site is not a good indicator of agent preference due to the unknown quantity of larvae that may have been released in the potentially infested plants. Plants excavated and dissected during dispersal monitoring in 2014 showed plants "hinted" *H. litura* presence with reddish staining. The staining was found in both the crowns and stems where the larvae typically feed and tunnelling and frass indicated where the larvae had previously fed. Future efforts will focus on monitoring throughout the agent's lifecycle, collecting and releasing into new geographic areas and dispersal monitoring. The most recent release made near Whitecroft in 2016 had significant site disturbance that may have affected it from becoming established.



Fig. 7, 8, 9. *H. litura* dispersal locations on Vancouver Island (Coastal Douglas-fir zone)



NOTES

- Studies have shown *H. litura* capable of infesting 80% of a Canada thistle site in 10 years and dispersing 9 km in 10 years.
- In Ontario, *H. litura* was found in higher quantities on plants infested with *Puccinia punctiformis*. It is not known if the weevil prefers plants attacked with the rust, or, if the weevil may be a vector. Plant density appears to decline when attacked by both *H. litura* and *P. punctiformis* at the same time.

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