

**RECORDS OF SOME FLIES AND WASPS COLLECTED AT ROBSON, B. C.
(Diptera: Asilidae; Hymenoptera: Ichneumonidae)**

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The species listed were collected by me at Robson, B.C. The asilids were identified by Dr. S. W. Bromley; the ichneumonids, all collected in 1941, were named by Dr. H. K. Townes.

Diptera

ASILIDAE

Laphria vivax Williston.
Asilus placyterus Hine.
Cyrtopogon dassylloides Will.
Dioctria sackeni Will.
Nicoles sp. (Perhaps *N. dives* Loew, at any rate so det. by Prof. Melander).

Hymenoptera

ICHNEUMONIDAE

Coleocentrus occidentalis Cr.—July 13.

Xorides californicus Cr.—June 22.
Xorides cincticornis Cr.—July 13.
Pimpla pedalis Cr.—July 20.
Pimpla sanguineipes Cr.—Aug. 24.
Lissonota montana Cr.—Sept. 1.
Lissonota frigida Cr.—Sept. 7.
Cryptus altoni D. T.—Sept. 7.
Cryptus luctuosus Cr.—Sept. 14.
Polistiphaga fulva Cr.—Aug. 17 and 31.
Ichneumon variegatus Cr.—Aug. 24, Sept. 7.
Angitia acuta Vier.—Sept. 7.
Exochus flavifrontalis Ds.—Sept. 7.
Ephialtes imperator Krb.—July 13.
Ephialtes manifestator L.—Sept. 7.
(10 additional species, apparently undescribed, were identified to genus only).

THE PARSNIP WEBWORM (DEPRESSARIA HERACLEANA) AND ITS CONTROL IN BRITISH COLUMBIA (Lepidoptera: Oecophoridae)¹

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This insect became important as a pest in the lower Fraser valley in 1940, when the growing of parsnips for seed became more frequent.

It is an European insect that has long been known on that continent as a pest. It was known to Linnaeus, but was first properly described by Degeer in 1752. In North America it was first recorded by Bethune, from Ontario, in 1869, when it was described as a new species, *Depressaria ontariella*, but this has since been placed as a synonym of *heracleana*. It was recorded by C. V. Riley (1888) as first found in the United States in 1875.

The moths, which measure one half inch in length and have a wing spread of one inch, are light buff in colour, with lighter underwings margined with a thin

dark line. The wings are held longitudinally over the body when at rest. The pupae measure three quarters of an inch in length, are reddish brown in colour, and are smooth and shining. The larvae are yellowish-green, about one half inch long when fully fed, and have a series of black tubercles arising from each segment, which also bear a few black hairs. The eggs are spherical, greenish-yellow in colour, and just visible to the naked eye.

LIFE-HISTORY.—This insect passes the winter in the adult stage, the moths leaving hibernation in May. They then fly to any nearby host-plant coming into flower and deposit their eggs, but they may travel considerable distances in search of host plants, as parsnip stecklings several miles from any previous infestation generally become infested during June.

The moths lay their eggs in the umbels of the small flower heads as these are de-

¹ Contribution No. 2305, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

veloping, but later emerging moths continue to lay after the seeds have begun to form, in late June and early July.

The larvae on commencing to feed, immediately web together the small umbels, and feed on the flowers, bracts and young seed heads. Feeding is completed in about three weeks, when the larvae leave the seed heads and descend to the base of the plant where they bore into the main stem, generally near the axils of the lowest two leaf stalks. Pupation chambers are then hollowed out in the stem by the larvae consuming some of the soft white pith; they pupate there, changing to moths in from ten to fourteen days. Several larvae may enter the stem by the same hole and use the same pupation chamber. The moths emerge from the stem through the holes bored by the larvae on entering. This takes place throughout July and early August, and the moths immediately fly to their hibernation quarters, which are usually the nearest sheds, woodpiles or other situations that offer dry, protected winter quarters.

In one instance, hundreds of moths were found in August sheltering between the folds of empty paper cement bags in an open shed; other favoured locations were piles of closely stacked stakes and fence rails.

The essential feature of the habitat is apparently a dry narrow crevice, one quarter inch or less in depth, which probably protects the moths from mice and other enemies. Although the temperature in the lower Fraser valley may vary from 80 degrees F. or over, to as low as zero, the moths remain quiescent for over nine months without undue mortality, until they leave these winter quarters in May.

Riley mentions that the moths have the habit of creeping into crevices in the soil, but this may have been under cage conditions, as they could hardly survive the winter in such situations.

HOST PLANTS.—In the lower Fraser valley only cultivated parsnip, *Pastinaca sativa* L., and the wild hog-parsnip *Heracleum lanatum* Mich., have been found infested. The wild hog-parsnip is an import-

ant host however, and where it occurs in any quantity, has been found to support a large population of this insect. This plant is confined chiefly to acid bogs, and in such locations may be plentiful. It is undoubtedly responsible in large measure for the almost certain infestation of new plantings of cultivated parsnip stockings, through the free flying habits of the moths.

Close examination of native species of umbellifers, other than *Heracleum*, viz., *Oenanthe*, *Angelica*, *Cicuta* and *Sium*, has failed to show feeding by this insect, and cultivated carrot has been free also. Riley mentions larvae recovered from "the stem of some cruciferous plant" but there is no record of the larvae ever feeding on plants of this family, and if correctly identified, the larvae may have used it owing to the absence of its usual host. Riley also mentions an attempt to rear this insect on wild carrot, but the caged larvae declined to feed on the flower heads, turned to cannibalism or bored into the stem where they pupated.

NATURAL CONTROL.—In the lower Fraser valley three natural control factors have been noted, but none was sufficiently important to prevent this insect from becoming a pest.

A mortality of 40 per cent took place amongst some moths kept under cage conditions in a natural environment throughout the winter, and undoubtedly many moths die, or are destroyed by predators during this long hibernation period.

A few parasites, both dipterous and hymenopterous have been noted in the field, but none in sufficient numbers to effect appreciable control. Several parasites have been recorded in Europe, and it may be possible for them to be introduced here with advantage in the future.

In 1941, in one location near Fort Langley, large numbers of bats were noted by an observer to be feeding in the evening on the moths as they took flight from the parsnip stems at the height of their emergence. The destruction of the moths would appear to have been almost complete, as later no hibernating individuals could be located in adjacent sheds, though

at another farm, 4 miles distant, where no bats were seen, the moths were found plentifully in nearby sheds.

The hairy woodpecker, *Dryobates villosus* (L) was recorded by Bethune as feeding on the larvae and pupae in the stems.

ECONOMIC DAMAGE.—Garden parsnips, grown for food are not attacked, the damage by this pest consisting only of the destruction of the flowers and seeds by the feeding larvae.

Infestation has reached as high as 80 per cent of the seed umbels in portions of fields adjacent to good hibernation quarters, and when an umbel is infested, practically all the seed is destroyed. Average infestations were about 30 per cent of the crop, which would represent a loss of \$100.00 per acre. In one case a grower burned his entire crop owing to a severe and general infestation.

CONTROL.—No cultural control measures that will entirely prevent serious infestation have been found practical, and the application of chemicals is necessary to protect the crop from severe loss. However, the following measures if carried out intelligently will do much to obviate a severe infestation.

Any wild hog-parsnips growing within a mile or two of the cultivated acreage should be scythed off before flowering each year. If hibernating moths are found in appreciable numbers in sheds or in piles of lumber or logs, the sheds should be cleared out of all rubbish and sprayed with diesel or stove oil, and the piles of rails, stakes or lumber re-stacked in cold, wet weather.

It is not possible to avoid infestation by any seasonal planting of the stecklings, owing to the necessity of timely harvesting.

If parsnip stecklings are raised from seed on the same farm where the seed crop is grown, they should not be nearer the seed crop than 100 yards, as larvae occasionally crawl to seedling parsnips and bore into the crown to pupate, thus injur-

ing next year's stecklings by increasing the prevalence of rots.

In the past, arsenical sprays and dusts have been recommended against this insect, but owing to the webbing habits of the larvae this has not been found satisfactory. Dusts containing derris, pyrethrum extracts, and nicotine were tested in 1941 and 1942, but failed to show effective mortality of the larvae in the webs.

In 1942 however, preliminary tests with a proprietary barium fluosilicate dust gave surprisingly good results, which were elaborated in 1943, when cryolite-talc dusts of varying strengths were also tests.

As a result of these experiments it was found that two applications of cryolite-talc dust, 1 part cryolite to 3 parts talc, ten days apart, gave almost 100 per cent control of the larvae in the webs. The first application was made when about five or six webs were noted per plant, and the larvae were from one quarter to one half grown.

The dust was applied by means of a rotary hand duster, and good coverage was obtained by walking down the rows, moving the spout up and down so as to treat both low and high flower umbels.

From 50 to 100 pounds of dust are needed per application to treat adequately an acre of parsnips, according to the height of the plants. The cost of this is approximately from \$2.50 to \$5.00 per acre per application, which compared with an acreage value of \$300.00 for parsnip seed, is quite practical and economical.

The actual cause of the death of the larvae when dusted with cryolite is not known. It does not seem necessary to hit the larvae in the webs, as frequently this cannot occur when they are hidden amongst the tightly folded bracts. However they appear to come in contact with the dust on, or in their webs, and death may occur within four hours of dusting, though usually from 24 to 48 hours are necessary for a 99 per cent mortality.

LITERATURE CITED

- Riley, C. V. 1888. The parsnip web-worm. (*Depressaria heracliana* DeG.) Insect Life 1 (4): 94-98, fig. 13.