

Stenocranus dorsalis (Fieb.) Shawnigan, 15/9/22. (W.D.)

Laccocera vittipennis Van D. Gordon Head, 17/7/20. (W.D.)

Family **Chermidae**

Aphalara angustipennis Crawf. Duncan, 29/6/22. (W.D.)

Psyllia alni var. **americana** (Crawf.). Sooke, 30/6/23. (W.D.) on alder; Victoria, 8/9/22. (W.D.) on cottonwood.

THE ELM-CURRENT APHIS (*Eriosoma ulmi* L.)

BY R. GLENDENNING.

RELATIONSHIP AND DISTINGUISHING FEATURES

This aphid is a double host species and has a rather interesting life-history and relationship.

In the genus **Eriosoma** (**Schizoneura**) there are at present known some four or five species which use the various elms as primary or winter hosts. These species have been badly mixed in the past, but, now that their complete life-histories are known, they are readily distinguishable.

lanigera, Hausman, the common woolly aphid of the apple, alternates normally between the American elm (**U. americana**) and apple.

americana, Riley, spends the winter on American elm, and the summer on the roots of the Juneberry (**Amelanchier**).

rileyi, Thomas, spends its whole life on the bark and twigs of American elm and migrates only between trees of the same species.

lanuginosa, Hartig, has been recently co-related with **pyricola** (B. and D.), and migrates from English elm (**campestris** and vars.) to the roots of pear trees.

ulmi L. has as its winter host English elm, and migrates in early summer to currants and gooseberries, forming subterranean colonies on the roots.

The separation of these species on their summer hosts is easy, as apparently they are constant in their habits.

On the elms they are also separable from each other without recourse to their structural differences, which are rather minute.

KEY TO SPECIES OF **ERIOSOMA** ON ELMS IN CANADA.

On American elm—Rosette type of gall, leaves and twigs in continuous malformation **lanigera**

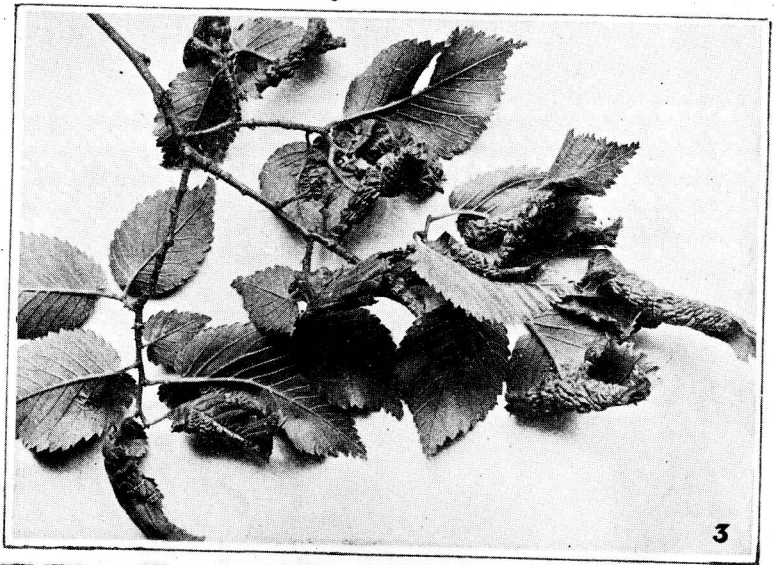
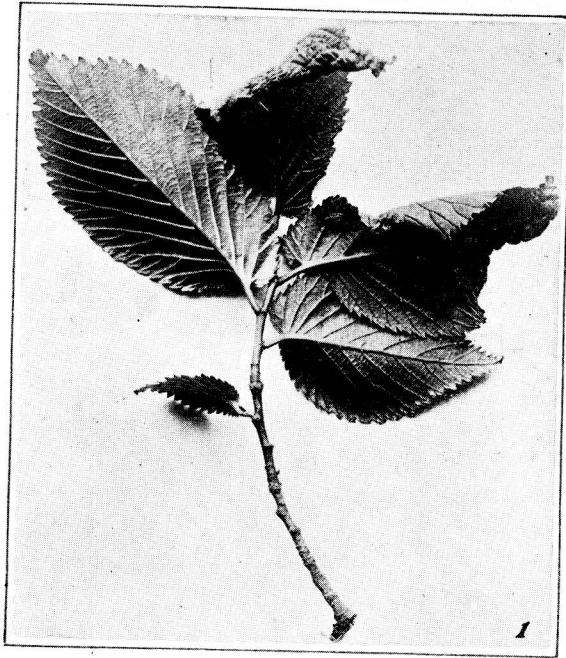


Fig. 1—Leafcurl caused by E. americana (original).

Fig. 2—Rosette curl of E. lanigera (after patch).

Fig. 3—Leaf curl caused by E. ulmi (original).

Leaves curled singly, usually one-half of blade only involved	americana
No leaf curl, insect feeding on wooly colonies on trunk and branches only	rileyi
<i>On English elm</i> —Margin of leaf enrolled usually to midrib only, no thickening tissue	ulmi
Whole leaf involved, tissue and veins much thickened, becoming baglike	lanuginosa

The only two galls liable to be confused are those of **americana** and **ulmi**, which, although on different species of elm, are very similar. The lice contained, however, are distinguishable both macroscopically and microscopically.

The young stages of **americana** are bluish-purple, those of **ulmi** are green, both covered with a flocculent wax. The pupae of both species are purple with paler wing pads. Definite determinations may be made by the antennae of the winged individuals. In **ulmi** segment III. being nearly twice the length of IV.+V.+VI., and segment V. is without annular sensoria, while **americana** has III. equal to IV.+V.+VI. and segment V. has annulations.

Distribution:

The species **ulmi** with which we are dealing is not a native insect in America, but has been introduced from Europe at a comparatively recent date.

It was first recorded from Maine in 1913 on elm, but has been seldom recorded from black currant roots in America.

In British Columbia it was first reported in 1920, when Mr. W. A. Ross identified specimens collected by Mr. W. H. Robertson, Provincial Horticulturist, from black currant roots in a nursery at Chilliwack.

In the spring of 1921 it was located freely on English elm, both at Chilliwack and Agassiz, and notes on its life-history have been taken during the following seasons:

LIFE-HISTORY.

The eggs, which are laid in the fall on the elm trunk, hatch between April 15th and 30th, according to the season. The newly emerged nymphs crawl to a bursting bud, often several yards distant, and ensconce on the underside of a young leaf. These individuals become the stem-mothers and remain in the leaf until death. With the feeding of the insects the leaf curls, forming a pseudo-gall in about a week, and thus protecting to some extent the lice therein.

The stem-mother moults four times and commences depositing young when about three weeks old. Approximately fifty young are deposited

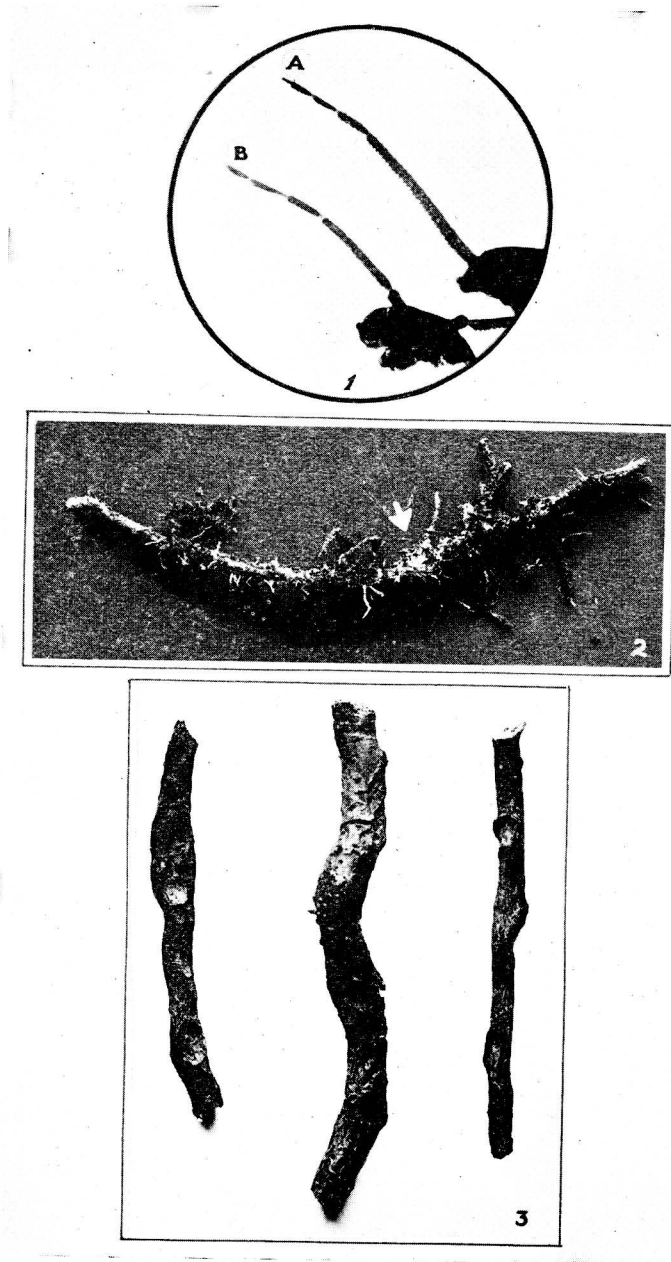


Fig. 1—“A” antenna of *E. ulmi* } Spring migrants, (original).
 “B” antenna of *E. americana* }

Fig. 2—Colony of *E. ulmi* on currant root, (original).

Fig. 3—Roots of black currant showing injury by *E. ulmi*, (original)

by each stem-mother. The lice of this second generation become winged and leave the elm early in June.

The life-history of *lanigera*, the woolly aphid of apple, differs here from this and other species of *Eriosoma*, since an apterous viviparous generation is produced by the stem-mother, this second generation producing the spring migrants, whereas with *ulmi*, as stated above, the spring migrants are the direct progeny of the stem-mothers without an intervening generation.

The spring migrants, upon leaving the gall, fly to black currant or gooseberry, often at a considerable distance; infections having been located on currants two miles from any elms.

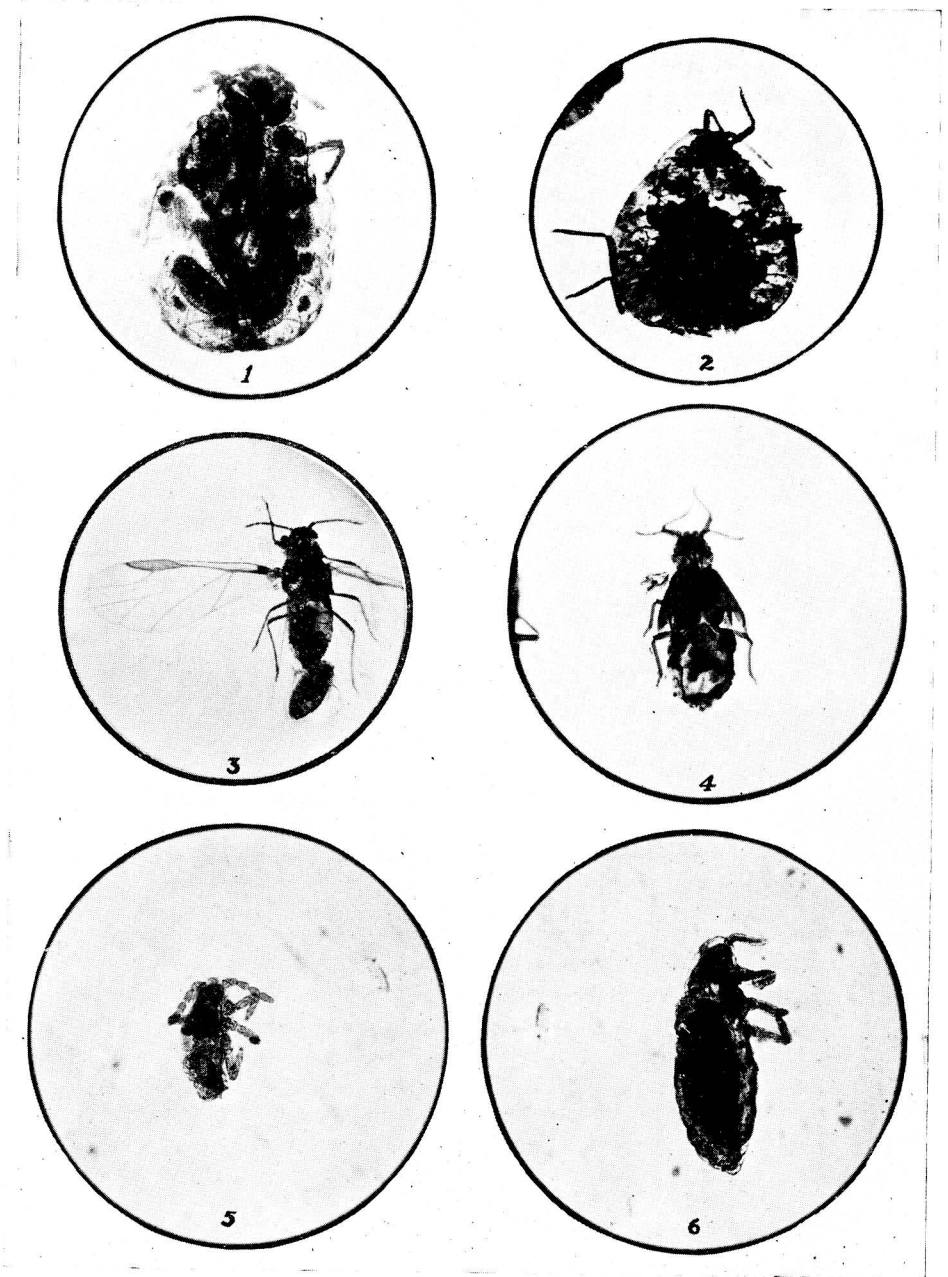
Upon arrival on the currant they alight on the leaves and travel down the stem to the ground, penetrating to a depth of from 1-4 inches. They here deposit from 12-15 young each, which become the first generation of apterous root lice which gradually colonize the entire root system, penetrating to a depth of three feet and often occur five feet from the stem.

This root louse, originally described as *fodiens*, is pale yellow, becoming orange after the third moult. Either 3 or 4 moults occur, and the adult louse then measures 1.8 mm. long by .75 mm. wide; they secrete copiously a silky wax from a series of pores. These pores occur longitudinally in two rows of four on the head and in four rows of fourteen each on the thoracic and abdominal segments, one row being on each margin of the dorsum, the other two rows equidistant between them. Lice of the apterous root generations mature in about fourteen days and commence reproduction, depositing 25-30 young each at a rate of rather more than one per day. No complete series was reared through, but, from the data obtained by several batches reared on pieces of currant root in petri dishes buried in the soil of the insectary, it would appear that from 5 to 6 root generations occur during the summer in British Columbia.

The colonies are readily located on currant roots by the masses of white waxy secretion, which indicates one or more lice, and persist for some time after they die.

Early in September pupae may be found in the soil, and the resultant winged migrants are leaving in large numbers by the middle of September, stragglers often continuing to emerge from the ground as late as the middle of October. The autumn migrants fly back to English elm, where, alighting on the trunk and main branches, they deposit the sexed forms.

The migrants are found most abundantly at a height of from five to seven feet from the ground, just below the main branches.

*E. ulmi.**Fig. 1—Adult root louse, (X25).**Fig. 2—Stem mother, (X15).**Fig. 3—Fall migrant depositing young, (X10).**Fig. 4—Pupa of spring migrant, (X7).**Fig. 5—Male, (X40).**Fig. 6—Oviparous female, (X40).**(All photos original).*

Each migrant deposits six or seven sexed individuals, which, as characteristic of the sexual forms of this genus are without functioning mouth parts.

These males and females live for about a week hidden in the crevices of the bark and amongst the damp moss of the trunk. Four moults take place before mating, after which operation the male soon dies. The female lives for a day or two and may or may not extrude her single egg before death. Eggs may often be found apparently healthy, with the shrivelled skin of the mother still adhering.

The sexes are without wooly secretion, pale straw in color, the males smaller and darker than the females, which measure 1 mm. in length; the males being only one-half mm. long.

The egg is elongate, about .6 mm. long, pellucid when laid, becoming straw yellow by spring. The eggs are not attached to anything when laid, but are simply deposited in crevices amongst the moss stems.

ECONOMIC IMPORTANCE AND CONTROL.

This insect has not proved to be of serious economic importance so far in America. It is, however, reported by Theobald as doing serious damage to young currants in the nursery row in England.

In the event of its increasing to serious extent, the following observations may be useful:

In the control of this insect on its primary host, the elm, the most vulnerable period appears to be when the fall migrants are clustered on the trunks, depositing the sexes there. At that time even one application of nicotine sulphate would undoubtedly destroy a very large percentage of this migration, and two applications ten days apart would undoubtedly destroy almost the entire number.

Where elms have been rendered unsightly by leaf curls made either by this species or other *Eriosomas*, as often occurs, the above procedure should be followed.

The leaf curls are almost impenetrable by sprays, and, with the additional protection the lice receive from their waxy secretion, they are very difficult to destroy at this stage in their life-history.

Experiments were conducted at Agassiz in 1921 with soil insecticides, such as carbon bisulphide, naphthalene, nicotine sulphate, but all failed through lack of penetration, and whereas the subterranean forms descend several feet, it would appear economically impossible to treat the roots of small fruits thus.

In 1923 an experiment was conducted with naphthalene as a deterrent, the object being to prevent the deposition of the root form by the spring migrants.

Two rows of black currants in a block adjacent to heavily infested English elm were treated with naphthalene compound (naphthalene and wood ashes) just as the migrants were leaving the elms. The treated rows kept entirely free from root infestations for two weeks. A few migrants were found in the soil and an occasional root form, but always dead and discolored. The untreated rows showed numbers of migrants, and infection of the roots soon became general. Eventually, when the effect of the light dose of naphthalene disappeared, the later migrants infected the roots of the treated rows.

From the result of these experiments it would appear that a heavier dressing of crude naphthalene—six handfuls to each bush hoed in to a depth of 2-3 inches—would be satisfactory.

PRELIMINARY LIST OF APHIDIDAE OF BRITISH COLUMBIA

BY R. GLENDENNING

Callipternini (Tribe).

- Phyllaphis fagi** (L.). On copper beech. Agassiz. The copiously flocculent lice are frequent all summer on the undersides of the leaves.
- Chromaphis juglandicola** (Kalt). On walnut. Agassiz.
- Therioaphis tiliae** (L.). Common on lime and linden, **Tilia** sp. on Experimental Farm, Agassiz. A very distinct species. Body with black bars and wing veins heavily bordered with black.
- Euceraphis gillettei** (D'son). A large free-flying species, using **Alnus oregona** as a primary host; also found on Birch.
- Euceraphis betulae** (Koch). A similar species frequent on Birch.
- Myzocallis querci** (Kalt). A small green species on introduced oak—Agassiz and Westminster.
- Drepanosiphum platanoides** (Schrank). A large active species very common on **Acer pseudo-platanus** in the Lower Fraser Valley. Very objectionable from copious excretion of honey dew, on which a black fungus grows.
- Chaitophorus viminalis** (Monell). Frequent on native cottonwood (**P. trichocarpa**), rendering the leaves very sticky.
- Periphyllus americanus** (Baker). A dark red species on **Acer circinatum**—dimorphic—tiding over the dry weather thus.
- Neothomasia populicola** (Thomas). Frequent on petioles of cottonwood leaves. Apteræ yellowish with a black **Y** on back.
- Melanoxantherium populifoliae** (Fitch). On twigs of *Salix* sps.