Aphelinus mali Hald

A Parasite of the Woolly Aphis

E. P. VENABLES, ENTOMOLOGICAL LABORATORY,
VERNON, B. C.

The control of injurious insects by parasites is a subject which is receiving a great deal of attention at the present time in all parts of the world.

This special phase of insect control is now, as a rule, in the hands of specialists who devote themselves to the study of the subject in all its aspects. In various parts of the world parasite laboratories have been established, which serve as centres of distribution of the desired species over wide areas. In Canada, the Dominion Entomological Branch has a parasite laboratory at Belleville, Ontario, where a staff is maintained for supplying parasites for all parts of the Dominion.

The promiscuous introduction of parasites into various districts is received with little favour. The danger of introducing, with desired species, secondary, or hyper-parasites, is one of the reasons for exercising particular care in this work. Such an introduction would possibly result in the destruction of the parasite itself.

The best method of shipping the insects, whether in the adult, larval or egg stage, much be studied carefully, and be the subject of experiment before any extensive shipments are made.

In our work dealing with the control of the woolly apple aphis, **Eriosoma lanigera** Haus. in the interior of British Columbia the natural enemies of the insect have been studied. Among the large number of predators attacking the insect Syrphid flies are probably the most important; their influence reaching its maximum of efficiency late in the season.

In certain sections of the United States, and in Eastern Canada, the aerial form of woolly aphis is attacked by a minute Chalcid fly known as **Aphelinus mali** Hald. This insect confines itself to destroying those aphids on the upper portions of the trees and has little influence upon the forms attacking the roots. The absence of the root form of the woolly aphis in the Okanagan Valley, together with the absence of the parasite **Aphelinus mali** Hald, was a matter of interest. The serious infestations by the aerial form of the woolly aphis in the district coupled with the connection of the insect and the Perennial canker disease of apple trees, suggested the advisability of introducing the insect.

The successful introduction of **Aphelinus mali** into many parts of the world has been carried out with excellent results. The parasite has become established in England, France, Japan, New Zealand, Australia, and Uruguay, to mention only a few of those countries, into which the insect has been artificially introduced.

Regarding both New Zealand and Australia it is from these countries that the most optimistic accounts have appeared dealing with the control of the woolly aphis by the Aphelinus. In New Zealand the parasite was widely spread during 1922 and 1923, becoming well established at all points of liberation. Its effect upon the woolly aphis was such that those in touch with the fact surrounding the infestations were of the opinion that the parasite would, under normal conditions, so reduce the number of the aphis that the necessity of spraying would be tremendously reduced.

In New South Wales the Aphelinus has done excellent work. Dr. Tillyard who was responsible for the introduction of **Aphelinus mali** Hald. into Australia shows that the results have been quite spectacular.

It is of interest to note that **Aphelinus mali** Hald. existed in New South Wales prior to its introduction from New Zealand, and was bred from the Chrysanthemum aphis, as recorded by Mr. W. B. Gurney in the Agricultural Gazette of New South Wales, 1926. The stock brought from New Zealand, however, attacked the woolly aphis and is thoroughly established.

In France the parasite is established but the natural predators of the woolly aphis so reduced the insects that the stock of Aphelinus became somewhat depleted each season, although being well establishd.

Regarding the work done with Aphelinus in the Okanagan, the parasite was imported in 1929 from Ontario. Mr. A. B. Baird, in charge of the Dominion Parasite Laboratory at Belleville, undertook the rearing of the parasites, which were shipped to Vernon as they became available.

The first shipment was sent off on August 28th and arrived in Vernon on September 3rd. Nine shipments were received, and a total of 508 living parasites were liberated during September. These insects were all sent in the adult stage.

Various methods were tested in making these shipments. A considerable number were sent in small vials, enclosed in thermos flasks. In some cases the vials were enclosed in flasks enclosing water, the vials being corked and the corks waxed. Others were enclosed in small ice boxes with the vials in racks.

A few shipments were sent by air mail.

The most successful method, and the one resulting in the lowest mortality, consisted of vials wrapped in cotton and packed in wooden boxes with no other protection. The parasites sent by this latter method arrived in excellent condition.

In most cases each vial was provided with half a raisin which was pinned to the cork. This supplied moisture and food for the parasites, which were observed to feed upon the cut surface of the fruit.

The parasites, as received, were liberated on woolly aphis infested trees in the Vernon district. Practically all the insects were placed on a single tree at Coldstream, which carried a very heavy infestation. In

liberating the Aphelinus the corks were removed from the vials and the latter were stood up in a box in the tree and the parasites allowed to make their way out. Several cases of oviposition were noted as soon as the parasites reached a colony of aphids.

At the present time, we are unable to say what the results of the importation of **Aphelinus mali** may be in the future.

Under Okanagan conditions the woolly aphis passes the winter at the base of trees, on the water sprouts, at ground level, and also upon the trunks and main limbs in knot holes, and various protected situations caused by mechanical injuries to the bark; pruning wounds and sun scald cankers are favorite sites in which the insects may winter successfully.

The mortality among the aphids is heavy during cold weather, and only a small percentage of the autumn infestation survives.

The destruction wrought by the winter, combined with the attack of Syrphid larvae in spring may, at times reduce the numbers of aphids to such an extent as to reduce the chances of the Aphelinus from finding a sufficiency of woolly aphids in which to lay their eggs.

In France the numbers of Aphelinus are at times seriously depleted by the attacks of aphid predators and other causes.

At Vernon we are cageing in the tree in which the Aphelinus were liberated; this tree will be artificially infested with aphids this spring in order to secure a plentiful supply of material for the parasite to work upon.

This tree will be used as a centre of distribution for the parasite during the next few seasons.