

INSECT-NOTES FROM THE OKANAGAN IN 1914.

BY MAX RUHMAN.

Mr. President, Ladies, and Gentlemen.—I was asked by our worthy Secretary to prepare a paper on the "Comparative Prevalence of Insect Pests in Various Parts of the Okanagan." Not having had the opportunity to make a survey of the various districts, I am compelled to use a considerable amount of data collected by others. I will first take those pests which occur generally throughout the valley.

THE TARNISHED PLANT-BUG (*Lygus pratensis*).

This pest seems to be increasing to an alarming extent in the Okanagan Valley, and I think that the Capsids of British Columbia should receive more attention than they appear to be getting. I fear that a great deal of the killing of fruit buds and blossoms which occurred so noticeably this spring must be placed to the credit of the Capsids. I have no positive proof that the injury was caused by them, but the nature of the punctures at the base of most of the buds examined leads me to come to this conclusion.

THE PEAR-LEAF BLISTER-MITE (*Eriophyes pyri*).

This pest is very noticeable in most orchards where pears are grown; the pest is of considerable importance, but is easily controlled.

THE WOOLLY APHIS OF THE APPLE. (Through recent studies in Maine this pest was proven to be only another form of the elm-aphis (*Eriosoma ulmi*); this, therefore, is now the technical name.)

This pest is present in all the older orchards throughout the valley, the amount of infestation being regulated principally by the care the individual orchards receive; the elm-tree form being particularly noticeable in Vernon and Kelowna. The root form is not so often met with.

THE GREEN APPLE-APHIS (*Aphis mali*).

This pest is very common and doing a great deal of injury; it is, on the whole, the most widespread pest we have. The amount of injury done to individual orchards is generally according to the amount of attention given to the control of the pest—too frequently none at all. A mixed spray of lime-sulphur and Black Leaf 40 applied as the buds are opening is, I think, the most effective spray for the control of this pest.

THE RED SPIDER (*Tetranychus bimaculatus*).

This pest is found abundantly wherever prunes are grown in the valley, and is particularly noticeable and injurious in Vernon and Kelowna.

THE OYSTER-SHELL SCALE (*Lepidosaphes ulmi*).

Is particularly prevalent in low-lying moist places on uncleared land. Crab-apples seem to be most affected. In orchards it is met with more often than desirable, particularly in Vernon and Kelowna. Young orchards that receive a reasonable amount of care seem to be entirely free.

THE CABBAGE-APHIS (*Aphis brassicæ*).

Very common and destructive everywhere on cabbage and turnip. Little effort seems to be made to control this pest.

THE CABBAGE-WORM (*Pontia rapæ*).

Common everywhere; little effort is made to control until too late.

THE RED-HUMPED APPLE-WORM (*Schizura concinna*).

General and quite common some years, but easily controlled.

THE BLACK CHERRY-APHIS (*Myzus cerasi*).

Fairly abundant everywhere; our most important cherry pest.

THE CURRANT-APHIS (*Myzus ribis*).

This pest is general and of considerable importance.

THE FLEA-BEETLE (*Epitrix suberinata*).

General and doing considerable injury to tomatoes and potatoes, both directly and indirectly.

THE PLUM-SPHINX (*Hyloicus drupiferum*).

General; the larvæ sometimes found stripping young apple-trees.

THE CHERRY-TREE TORTRIX OR UGLY NEST (*Archips cerasivorana*).

General; very abundant on choke-cherries in the Vernon District this year.

THE FRUIT-TREE LEAF-ROLLER (*Archips argyrospila*).

General; fairly numerous in both Kelowna and Vernon this year.

THE CLICK-BEETLES.

Quite a number of species of the Elaters are general throughout the valley, and doing considerable damage by feeding on the buds and opening leaves of young apple-trees—*Corymbites inflatus* being probably the most prominent. *Cardiophorus fenestratus* has so far only been reported from Shorts Point by Mr. W. H. Brittain as injuring young trees.

THE SPRUCE GALL-LOUSE (*Chermes sp.*).

Is noticeable in all districts and frequently does considerable injury to ornamental spruce-trees.

THE APPLE-LEAF HOPPER (*Empoasca mali*).

This pest is very abundant throughout the valley; their work on the leaves and their egg-punctures on the young wood is very noticeable everywhere. Some efforts seem to be made to control this pest, but in most cases the spray is applied at the wrong time; the only time spraying is effective is if the spray is applied when the hoppers are still in the nymph stage; spraying at other times is a waste of time and good material.

THE TENT-CATERPILLAR (*Malacosoma pluvialis*).

General, but not so abundant as usual this year.

THE PEAR-SLUG (*Eriocampoides limacina* Retz).

General, but not so abundant as in other years. It is strange that a pest so easily controlled is so generally neglected year after year.

THE LESSER APPLE-WORM (*Enarmonia prunivora* Walsh).

This little pest is general, but appears to be kept well in check.

THE FALL WEB-WORM (*Hypantria cunea*).

General; fairly abundant again this year on both apple-trees and wild shrub, particularly in the Vernon District.

THE STRAWBERRY-ROOT WEEVEL (*Otiorhynchus ovatus*).

Though present generally, does not appear to be in sufficient numbers to do a great deal of harm. Grand Forks, in the Boundary District, has some quite serious local infestations.

THE ROSE-LEAF HOPPER (*Typhlocyba roseæ*).

Abundant on both the wild and cultivated roses throughout the valley.

THE ONION-THRIP (*Thrips tabaci*).

General, and quite serious, particularly in Kelowna this year.

These are the more important pests observed or reported generally, except the grasshoppers, which are certainly plentiful enough to be taken notice of. Mr. Ben Hoy reports on the 14th that he visited a small orchard surrounded with range land practically defoliated by grasshoppers (species not identified) in Kelowna. I will now take the insects observed or reported locally.

A PLUSIA (*Plusia californica*).

From Larkin, Vernon, Kelowna, Summerland, and probably Armstrong. My attention was first attracted to the larvæ of this *Plusia* in Kelowna on June 2nd, where I found it doing a great deal of damage in a market-garden, lettuce-plants being particularly attacked and completely ruined. Although general in Kelowna, I did not find any other places seriously infested, neither did I receive any later reports to this effect. My attention was next called to it on June 10th in Larkin, where a 100-acre field of alfalfa had just been cut, and millions of the larvæ were migrating to an adjoining alfalfa-field, and in transit cleaning up the home vegetable-garden; sweet corn being immune from their attack, potatoes nearly so, lettuce and peas being preferred, onions being also attacked, and large numbers were climbing on the walls of the house. The attack on the home garden seemed to be the cause of attention being first drawn to them. The same day I was called to an orchard in Vernon where alfalfa and clover was growing between the tree-rows; here they were also present in great numbers, particularly on the alfalfa, and considerable numbers were on the fruit-trees, attacking both foliage and fruit and doing considerable damage. The larvæ appeared to be coming from the weeds in an adjoining orchard which was in a state of neglect. I collected in all 200 larvæ in various stages of growth and placed them in breeding-cages; a few commenced to pupate on June 12th. A disease attacked the larvæ and large numbers were also parasitized, with the result that only eleven larvæ reached the pupal stage; the rest succumbed to the disease or parasites. Out of the eleven pupæ only four adults emerged; from the other seven pupæ Tachinid flies emerged; in the case of pupæ of larvæ taken in Kelowna, Braconids emerged. Of those pupæ parasitized by Tachinids only one parasite emerged from each pupa, whilst in the case of parasitized larvæ which did not reach the pupal stage two Tachinids emerged from each. Out of the 200 larvæ taken only 2 per cent. reached the adult stage, and apparently the results were somewhat similar in the field, as a second brood of larvæ was not noticeable and only very few adults were observed. A specimen also reached me from Summerland, but nothing serious reported from there. A report of a serious invasion of the army-worm reached me from Armstrong, but did not get the opportunity to investigate, neither did I receive any specimens from there, but from the descriptions I received of the larvæ I am led to believe that it was the same *Plusia* as I observed in Larkin, Vernon, and Kelowna.

THE CODLING-MOTH (*Carpocapsa (Cydia) pomonella*).

An incipient local infection in Kelowna. Mr. Cunningham with his usual thorough methods, will probably have it exterminated by next season.

AN APPLE-SAWFLY (*Taroxius nigrosomia*).

I first observed larvæ of this sawfly in September, 1912, in Armstrong, and Mr. W. H. Brittain found them about the same time in Vernon. The full-fed larvæ apparently come from the bush adjoining the orchard, evidently for the purpose of finding a place to hibernate in, and had selected an Ontario and a Wagener tree for the purpose. Every apple on the Ontario tree had either one or two larvæ; the Wagener apples only had a few; a hole was eaten into the fruit slightly deeper than the length of the larva, after which the larva either remained quiescent or left the fruit for more comfortable quarters. Mr. Brittain bred some of the larvæ and had them named.

THE MEALY PLUM-APHIS (*Mylopterus arundinis* Fab.).

Taken in Vernon.

THE IMPORTED CURRANT-BORER (*Aegeria tipuliformis*).

Reported as plentiful at Creston, in the Kootenays. Have found currant-canes in both Vernon and Kelowna infested with larvæ apparently of this moth, but reared no adults. I saw a few moths which appeared to be *A. tipuliformis* flying over currant-bushes at the end of May in an orchard in Kelowna, but none were taken.

THE EUROPEAN FRUIT-SCALE (*Aspidiotus ostræformis* Curtis).

Quite plentiful in the bush around Penticton, also on the Indian reserve at the same place. Has been reported on pear at Kelowna.

THE ROSY APPLE-APHIS (*Aphis sorbi*).

Found at both Vernon and Kelowna.

THE CURRANT FRUIT-FLY (*Epochra canadensis* Loew.).

Rather plentiful at Vernon.

THE ONION-MAGGOT (*Pegomia ceparum* Bouche).

Present in small numbers in some Vernon gardens.

THE CABBAGE PLUTELLA OR DIAMOND-BACK MOTH (*Plutella maculipennis*).

A number of larvæ of this little pest were sent from Armstrong, where considerable damage is reported on cabbage and turnip. This little moth is an importation from Europe, where I have at different times noticed considerable damage being done to young plants by the first brood. It makes its appearance at the end of May in British Columbia, and we get two broods, possibly three; in the Southern States five broods are reported, and I understand that in Florida broods are continuous the year round. I have found preventive measures the best means of controlling this pest—that is, by burning all the leaves and stalks of cruciferous plants left on the field after harvest in the fall. Cleanliness is as important as a preventive of pests and disease in the field as in the house and barn. The oldest reports I can find on this insect from the United States are dated 1877, by Cyrus Thomas. Out of fourteen pupæ I bred six adults and eight Braconids.

THE STALK-BORER (*Papaipema nitella* Gn.).

The larva of this Noctuid was reported as doing considerable damage to young celery-plants in Armstrong; it is known to attack a large variety of plants; one larva may do considerable damage by migrating from plant to plant. As the eggs are laid in the fall on the stems of various weeds and grasses, preventive measures are obvious and easy, as the larvæ do not migrate very far. Keep your vegetable-garden and its near vicinity free from weeds and grasses. No adults were reared.

MITES (*Eriophyes* sp.).

A considerable amount of injury was done to apple and cherry leaves by a mite. Leaves brought in showed at first glance the typical appearance of silver-leaf, but on closer examination proved to be the work of mites, which were present in large numbers on both sides of the leaves. The attention of the growers was drawn by the wilting of the leaves as if suffering from drought, though plenty of moisture was present.

A SAP-FEEDING BEETLE (*Ips quadriguttata*).

This beetle was prominent in injuring the blooms of asters in several Vernon gardens.

THE CARPET-BEETLE OR BUFFALO-MOTH (*Anthrenus scopulariæ* L.).

Larvæ of this beetle were brought in for identification from Vernon, a house and stable being badly infested.

THE BUD-MOTH (*Tmetocera ocellana*).

This pest, although as yet only reported from Kelowna, is probably more widespread in the valley, is of great economic importance, and care should be taken that it is not allowed to become a serious pest here.

BUD-WEEVILS (*Cercopus artemisæ* and *Minctus setulosus*).

Feeding on buds and opening leaves of apple-trees at Penticton.

THE FLAT-HEADED CHERRY-TREE BORER (*Dicræa divaricata*).

Only reported from Vernon, where two specimens were taken by Mr. W. H. Brittain in 1912.

THE PEACH-TREE BORER (*Sanninoidea crotiosa*).

This pest is only reported from Summerland, where a considerable number of trees have been killed by it; probably present to some extent in all the peach districts.

THE PEACH-TWIG BORER (*Anarsia lineatella*).

A serious pest in the southern Okanagan, and very abundant this year, probably owing to neglect of thorough spraying.

Mr. Lyne: To review all the insects mentioned by Mr. Ruhman would consume several days. I will confine my attention to those of most importance. The *Plusia* generally occur spasmodically owing to the extent of parasitism they are subject to in this country. Onion-thrips are very prevalent this year in Kelowna, and affected fields are especially easy to notice owing to the sickly greyish discoloration of the leaves and stalk of the onion. The result has been a reduction of growth. Onion-ground should be ploughed in the fall, the idea being to make it a difficult matter for the adults in the soil to emerge next season. Stir soil during the winter, if possible, to let the frost act. Except for the presence of the codling-moth in this locality, the peach-twig borer is very prevalent and destructive and most important. Unless spraying is done very few sound peaches will be found next year. We know this insect as very serious. This Society is posted as to procedure, for the life-history was published last year in Bulletin No. 3 of our series. Methods of combating this pest will be found in the account. The larvæ hibernate or pass the winter in crotches of the tree under bark, etc. The peach-root borer is another injurious insect of prime importance. The larvæ attack apricot and plum, as well as peach. These larvæ, which may be found around the root, and a mass of gum will indicate their presence, and must be cut out by hand, using a curved bladed knife for the purpose. An account of this insect appeared in Bulletin No. 3 of last year's proceedings. Copies of this bulletin can no doubt be obtained from the Secretary at any time.

THE CONTROL OF INCIPIENT INFESTATION OF CODLING-MOTH IN A NEW DISTRICT.

By W. H. LYNE, ASSISTANT PROVINCIAL INSPECTOR OF FRUIT PESTS.

The most practical method of dealing with a local incipient infestation of codling-moth depends upon the particular season of the year at which the infestation is discovered, and the time decided upon to commence operations with a view to its extermination. I need hardly preface my remarks by saying that it is the first object of this Department to exterminate an outbreak of this moth immediately on its arrival, for the Department has been brought up side by side with the growth and development of the fruit-growing industry of the Province.

So far experience has taught us that there are only two drastic methods that will give satisfactory results. One of these consists in *destroying every particle of fruit within the infected area during the early summer*, in order to prevent the larva