

## NOTES ON THE TARNISHED PLANT BUG IN THE DRY BELT OF BRITISH COLUMBIA

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Published records dealing with tarnished plant bug injury are generally confined to the insect in its relation to truck crops, flower gardens, and nursery stock. Injuries to bearing fruit trees, while occasionally mentioned in the past, have increased considerably throughout the Pacific Northwest during the past few years, particularly in those areas in which irrigation is practiced.

The following notes are based upon observations made in different sections of the Okanagan Valley between 1927 and 1932, and deal particularly with the insect and its relation to apple and pear trees grown under irrigation.

Approved orchard management, in most sections of British Columbia, includes the growing of cover crops in the orchard in order that soil fertility may be maintained, and protection afforded to the tree roots during the winter.

There is no doubt that this practice has produced conditions particularly suited to the multiplication of the tarnished plant bug.

Orchard cover crops may consist of either alfalfa, sweet clover, or vetches, and of these alfalfa is the most widely grown.

Without entering into the management of these different crops in detail it may be said that our observations have shown that the permanent growing of alfalfa results in conditions particularly suitable to the multiplication of the tarnished plant bug, and that this crop is particularly attractive to the insect in late fall, for hibernation.

### Injuries to Apples and Pears

The most serious type of injury to these trees is caused by the puncturing of the unfolding buds in early spring, by the adult insects, which have survived the winter.

The first effect of these punctures is to cause an exudation of sap from the bud, at the site of the puncture. This exudate forms large droplets on the buds and in the case of pears may be so profuse as to cover not only the buds but also the spurs and twigs on affected trees. Apple buds injured by the tarnished plant bug generally die within a short time; pear buds being considerably larger at the time injury occurs, frequently produce some leaves and may set a few blossoms, unless the injury has been very severe.

The fruit of the pear and apple is attacked early in the season, the result being that development of the fruit is checked at the point where feeding has taken place. The appearance of apples which have been attacked by the insects in early summer is distinctive and takes

the form of a deep conical depression in the surface of the fruit, which in many cases may reach to the core. Pears may be attacked in late summer when the fruit is almost mature and injury at this time may seriously lower the grade of the fruit.

### The Influence of Cover Crops On Fall Population

In order to show the influence of different types of cover crops on tarnished plant bug population it is of interest to present the results of quantitative collections of the insect made during the late summer and fall of 1931, when particular attention was paid to the activities of the insect prior to hibernation.

This data was secured by regular periodical samplings of certain areas growing various types of cover crops, including alfalfa, sweet clover and vetch. These collections were made at Vernon in alfalfa and vetch; at Penticton in alfalfa and sweet clover, and at Kelowna in alfalfa.

A total of twenty-two collections of tarnished plant bug were made between August and the end of October.

A large number of insects of various kinds were taken in these collections and 132,868 were actually counted and the number per acre of several species estimated therefrom. The data covering this work has been illuminating and has shown in the clearest manner that the type of cover crop and the type of soil have a direct bearing upon the abundance of certain pests of the orchard. It is not possible to present all the data covering this work, including as it does numerous graphs and tables dealing with several species of insects, but the final result has been to show that alfalfa as a cover crop is most favourable to *Lygus pratensis* for hibernation. The population was found to be always higher in alfalfa, and in the fall a well-defined migration occurs from areas growing sweet clover and vetches to the alfalfa, where hibernating conditions are most favourable.

### The Influence of Cover Crops On Spring Population

Information on the distribution of the tarnished plant bug in spring, after leaving hibernation, was secured by the use of the sweeping net.

A total of 100 sweeps were taken as a unit in each experiment, the sweeps being made in as uniform a manner as possible, and were carried out in orchards in which different methods of cover crop management had been practiced.

The following shows the results of collections made at six different stations in Penticton.

St.	Crop	Cultivation	Dry Cover	Insects	Remarks
I	Alfalfa	No fall discing	Thick	14	
II	"	No fall discing	Thin	11	
III	"	Fall discing	No cover	14	
IV	"	No fall discing	Fair	41	Orchard protected from wind.
V	"	Fall discing	Poor	12	Orchard sprayed with L.S. and oil
VI	"	No fall discing	Good	12	Sprayed with L.S. 1-9

From the above it appears that neither the type of cultivation, nor the absence of hibernating sites, have much effect upon the number of insects present in the alfalfa in the early spring after the insect leaves hibernation, but that they become quite evenly distributed over wide areas during the warm days of April and May.

Other collections than those tabulated were made in a number of orchards under varied types of cultivation with results quite similar to those shown above.

#### The Influence of Orchard Exposure On Plant Bug Population

In 1931, some observations were made which indicate that exposure may play an important part in regard to the prevalence of the insect.

At station No. IV the insects were almost four times as numerous as in other stations growing similar cover crops. In this area almost entire protection from the prevailing cold winds was afforded by surrounding higher land. This area included about two acres of pear trees, many of which had bud damage of over 90 per cent. The bugs were numerous within this sheltered area, although one hundred yards away an average of only twelve to fourteen insects could be taken in the usual sweeping.

#### Notes On Oviposition

The eggs of the hibernating brood have been found quite commonly in alfalfa stems during April, usually at the base of the current season's growth, when the plants were about four to six inches in height. These were located just above the soil in the rough portions of the stem, where numerous abrasions and small cracks are commonly found. In some cases the eggs were inserted in well-defined splits in the stem, near the ground level.

No eggs were found in the smoother portions of the stems, or at a height more than two inches above the soil. Isolated plants with strong crowns seem to contain most eggs.

In some cases the eggs were found inserted at right angles to the stem, in other cases they were placed at an angle immediately beneath the epidermis. Eggs may occur singly, or in groups of six or more, and in one case eight were found, in one small area.

A few eggs have been found in apple buds, and the young apples are also used for oviposition to some extent.

### Control

The control of the tarnished plant bug has been the subject of many experiments in the past; nothing outstanding, however, has yet been developed.

Under conditions as they occur in the orchard sections of British Columbia it would appear that cover crop management may offer a partial solution in preventing damage.

Repellent sprays of certain standard materials have been tried with doubtful results.

The application of lime-sulphur, both alone and in combination with oil, at the time the bugs become active in the spring, is claimed by some growers to be fairly effective. Counts made on April 15, in pear orchards which had received lime-sulphur sprays between March 21-23, showed the following percentage of injured buds:

L.S. 1-8 plus 4% oil	....Buds dead, 12.8%.	Buds injured, 20.5%
L.S. 1-9 alone	.....Buds dead, 4.2%.	Buds injured, 34.8%
L.S. 1-20 plus oil (3%)	....Buds dead, .....	Buds injured, 10.0%
L.S. 1-20 alone	.....Buds dead, .....	Buds injured, 18.0%
Check trees, unsprayed	.....Buds injured, 34%-71%	

Tests made with 5 per cent. nicotine dust against the adult insects were apparently of no value. Several hundred tarnished plant bugs were enclosed in a wire screen cage and the nicotine dust blown in with a hand rotary duster. The insects all fell to the ground and were apparently dead, but at the expiration of half an hour the insects appeared as active as ever.

In any case, control based on the destruction of the adult insects would have to be applied over wider areas in order to be effective. Reduction of injury by cover crop management seems to offer some hope of results, but will require to be tested over a considerable acreage in order to arrive at correct conclusions.

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Contribution from the Dominion Entomological Laboratory, Vernon, B.C., based on observations made by Mr. E. P. Venables and Dr. R. D. Bird, between 1927-1932, in the Okanagan Valley of British Columbia.