THE LONG WINGED THRIPS (Scirtothrips longipennis Bagn.) AND ITS CONTROL IN GREENHOUSES

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Introduction

In recent years, greenhouse operators of Vancouver Island have suffered heavy losses caused by the feeding of the adults and larvae of the Long Winged Thrips (**Scirtothrips longipennis** Bagn.) on greenhouse crops. Eight different species of plants were found to be attacked and of these, begonia and cyclamen were the most severely damaged. Owing to its minute size, this thrips remained unnoticed at first and the injury, which consisted of peculiar, rusty-brown, corky serpentine lines, had been attributed to other causes such as nematodes, fungi, etc. It appeared that the injury was not being controlled by the use of nicotine-soap and other spraying measures and the damage continued to increase. During the winter months of 1935, the losses became so extensive that the need of a thorough investigation was realized and studies were commenced in order to determine the nature and extent of the injury and its control.

Nature and Extent of Injury

The Long Winged Thrips obtains its food by puncturing the tissues of the leaves, stems, and flowers and draining the contents of the cells, causing the cell walls to collapse. Growth expansion of the surrounding living cells leaves the punctured and dried areas sunken and distorted. Finally, the characteristic dark, rusty-brown, irregular serpentine corky lines appear, the pattern of which is not unlike that of a topographic map. It is due to this rusty brown color of the affected parts that the injury has received such names as "rust", or "cork rust", in spite of the fact that it has nothing to do with the fungus rusts (**Basidiomycetes**).

On begonias, the injury appears mainly on the upper side, while on cyclamen, it is chiefly the under side of the leaves that are attacked. The damage to cyclamen flowers is much more severe, resembling closely the injury caused by the cyclamen mite. In some cases, the thrips feed beneath the bud scales of the cyclamen bloom and so stunt and distort the bloom that it never fully opens. In begonias, the blossoms are rarely affected, except in severe attacks, in which case they drop before they open out.

It is mainly the newly unfolding and tender leaves and buds that are atacked and, as the feeding is mostly confined to the surface, no

part of the leaf is killed outright. However, in cases where the foliage is subjected to prolonged attack, the function of all the leaves is so disturbed that the plants become stunted and never reach their normal size. As the attack continues, successive leaves are badly injured until, in extreme cases, the entire plant is killed.

Host Plants and Distribution

Begonia and cyclamen appear to be the favorite host plants of the Long Winged Thrips under glass and the tender and thin-leaved varieties are preferred. The following varieties of begonias are attacked:- Gloire de Lorraine, Lady Peterson, Metallica, Eclipse and the tuberous begonias. We have also found it on gloxinia, azalea, anthurium, orchids, gardenia and tradescantia.

Although this species of thrips is very minute and has been little studied, at the present time it has rather a wide range of distribution. Pape (7) during 1933, found the species on Gloire de Lorraine, Ensign and Eclipse varieties of Begonia hybrids and also on anthurium, caladium and philidendron in greenhouses in Germany and Denmark. Speyer (6) also adds a recent (1935) record of an infestation on cyclamen in greenhouses in Cheshunt, Herts., England. Other workers are reported by Essig (2) as finding it on olive and pine in Southern California. Bailey (1) also lists it from California, but does not consider it of economic importance. As it becomes better known it will probably be found to occur in a great many other areas as well.

Description and Habits

Adult: The Long Winged Thrips is a member of the Family **Thripidae** or narrow-winged thrips and is among the smallest of the related injurious **Thysanoptera.** To the unaided eye it resembles a tiny dust particle. The total length of the female, which is noticeably larger than the male, measures 0.75 to 0.96 mm. The color of the adult is translucent orange-yellow with dusky colored wings extending beyond the abdomen by one-fourth its length. The wings are pointed at the tip, with the forewings having two longitudinal veins. The fore vein has usually 8 spines, arranged in two groups of 3 and 2 respectively, and 3 spaced evenly on the distal part. The first and last group of 3 appears to be constant but the second group varies from 2 to 3 spines. The costa of the fore wings is thickly set with from 18 to 22 rather long spines. The costal fringe on the fore wing is about three times as long as the costal spines. The 3 evenly spaced spines on the hind vein are constant and are situated directly below the spaces between the 3 evenly spaced spines on the distal part of the fore vein. The head is small, about one-half as long as wide, and a considerable proportion of it is occupied by the large, dark purple or black compound eyes. Three red ocelli occupy the space between the compound

eyes on the upper surface of the head. The rostrum or mouth cone is short and blunt, not quite reaching across the prothorax, and is tipped with black. The antennae are about twice as long as the head, uniform yellow, having 8 segments, each bearing one or more setae.

Like other thrips in greenhouses, the life cycle of this species is short and breeding is continuous when the temperature is constantly high. Being a relatively new pest in greenhouses, the information on its development under glass is lacking. Studies are being conducted at the present time in Victoria to secure this data.

The adults and larvae are generally found feeding in colonies. They are active feeders, especially on bright warm days at a temperature of over 75° F., when they exhibit increased activity and cause a considerable amount of injury in a short time. The nature of the injury, which subsequently appears as serpentine corky lines, is related to the feeding habits of the thrips. When feeding, they rasp the surface of the plant tissue and move slowly forward at the same time, leaving a characteristic, irregular, colorless, linear excoriation. It is generally 9 to 16 days after the tissue has been lacerated that the brown, corky effect appears. This explains why the thrips are not always found where the corky lines are evident. Thus, while the cork building reaction of the plant is in process, the insects usually move from the more or less dried and lifeless earlier leaves that were first attacked, to the neighboring young tender foliage.

Control

Very little work has been conducted on the control of the Long Winged Thrips. Pape (7) found that cyanogas at the rate of 30 to 40 grams per 100 cubic metres and refumigation for one hour with a proprietary insecticide was 100 per cent effective, but he does not recommend its use when Lorraine begonias are to be treated. Speyer (6), during 1935, successfully controlled an infestation of this thrips on cyclamen, using a dust containing 4 per cent nicotine and equal parts of naphthalene and magnesium hydrate.

Experimental Control Measures

Tests with various dusts and sprays were conducted under greenhouse and laboratory conditions, using the Lorraine variety of begonia, because it was the most heavily infested of the major greenhouse crops and because of its extreme sensitiveness to chemical spray injury. Briefly stated, the following are the dusts and sprays applied at intervals of seven days during a period of five weeks, using 20 plants in each experiment;-

Dusts 1. Naphthalene and ashes dust, 30% naphthalene to 70% fine coal ashes.

2. 2% nicotine and lime dust.
3. 2% nicotine and coal ashes dust.

The 2% nicotine-ashes dust was superior, in that it was more toxic than the naphthalene-ashes dust and it did not leave a white chalk-like residue adhering to the foliage. All the dusts tested, however, had this disadvantage, that owing to the curled or distorted leaves they did not penetrate to all protected areas in which the thrips feed.

Sprays 1. Coal oil emulsion:- coil oil 2 oz.; whale oil soap 1 oz.; water 1 gal.; nicotine sulphate 1 teaspoon.

2. Paris green 1 teaspoon; hydrated lime 2 oz.; water 3 gals.
3. Volck 1% with 1 teaspoon of nicotine sulphate per gallon of spray solution added.
4. Derris (4% rotenone) 1 oz.; whale oil soap 1 oz.; water 1 gal.
5. Molasses 4 teaspoons; nicotine sulphate 2 teaspoons; water 1 gal.

The results from the spray tests showed that the coal oil emulsion with nicotine, and the derris soap solution, were superior to the other formulae tested. The Volck, Paris green, and molasses-nicotine sprays caused slight to severe burning which increased as the successive applications were made. The coal oil emulsion was considered more valuable from a practical standpoint, in view of the fact that it was also effective against mealybugs.

Following these tests, the growers who experienced losses from thrips injury were advised to use the coal oil emulsion formula. During the period from May 15 to Dec. 10th, 1936, the operators of the two greenhouses in which the experiments were conducted continued to spray more than 2,100 begonia plants at 10 day intervals and succeeded in growing their entire stock, free from insect damage of any kind. The only objection to using this emulsion is that it contains whale oil soap having an unpleasant odor which is objectionable to many purchasers of ornamental plants.

Studies were continued during the winter months of 1936-37 and an improved coal oil emulsion was developed, using a linseed oil soap, in place of the whale oil soap. The stock emulsion contains:- coal oil 10 oz.; water 5 oz.; linseed oil soap 1 oz. To prepare, heat the water and add the soap, stirring till all the soap is dissolved. Then pour the coal oil slowly into the warm soap solution as it is being stirred. This mixture is then thoroughly churned or emulsified by using a bucket pump, egg beater or "Daisy" homogenizer. The resulting thick creamy emulsion is a very stable stock solution and should be used at the rate of 3 oz. (6 tablespoons) to 1 gallon of water with 1 to 2 teaspoons of nicotine sulphate added, per gallon of spray solution. This improved

formula is just as effective as the whale oil soap formula and has given much satisfaction to the greenhouse men, their begonia and cyclamen crops being the best they have had for some years.

Summary

The Long Winged Thrips is a serious pest in greenhouses. The presence of the thrips is manifested by the appearance of characteristic rusty-brown, corky, serpentine lines on the leaves, stems and flowers of infested plants. Although begonias and cyclamen are preferred hosts, it is also destructive on gardenia, gloxinia, azalea, orchid, anthurium and tradescantia. Since the youngest leaves and buds are attacked first, and the corky tissue is not evident until 9 to 16 days after the plant tissue is lacerated by the thrips, it is difficult to detect the early stages of infestation. The life cycle of this species in greenhouses is short and development is greatly accelerated on bright warm days when the temperature is above 75° F. Spraying every 7 to 10 days with a coal oil emulsion with nicotine added, proved to be the best method of eradicating the thrips from begonia plants.

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