

of pupae per square foot of duff found in October, 1960 (Table 2). Pupal samples within the infestation area averaged 7.8 per square foot of duff. There was no significant difference in the number of pupae inside and outside the area sprayed in 1960.

Barring any unforeseen mortality a heavy population is expected in 1961.

The author wishes to acknowledge the assistance given by the District of Kitimat and the Aluminum Co. of Canada during this work.

MYZOCALLIS WALSHII MONELL (HOMOPTERA: APHIDIDAE) ON RED OAK AND A METHOD OF CONTROL¹

PETER ZUK

Introduction

The aphid *Myzocallis walshii* Monell is a major nuisance on the red oak, *Quercus borealis* Michx. f. (*Q. rubra* auth.), a boulevard tree in Vancouver.

The aphids excrete large amounts of honeydew which falls as droplets over the leaves and eventually on sidewalks, lawns, and cars parked beneath the trees. Another objectionable feature is the sooty mould that grows on the honeydew. Repeated sprayings are necessary to alleviate the nuisance.

During the 1930's the red oak was commonly planted as a boulevard tree in Vancouver. In recent years, the Parks Board, who are responsible for planting and maintaining these trees, have planted smaller flowering species in preference to the larger oaks, maples, horse-chestnuts, catalpas and birches. Another reason for this change was that the red oak in particular supported a dense population of the aphids.

This paper deals with investigations on the life-history and control of this aphid in Vancouver.

Biology

M. walshii has been recorded on the leaves of various oaks (*Quercus alba*, *Q. bicolor*, *Q. imbricaria*, *Q. palustris*, *Q. rubra*, *Q. velutina*) (2), and hickories (*Carya* spp.) (1). It has no alternate host.

During the two years of this study, apterous viviparae appeared in the first week in June, when honeydew was found on the leaves on the high branches. A few alate viviparae were found on the lower leaves about the middle of June. The numbers of aphids increased slowly until the second or third week in July after which there was a rapid increase. In 1960, the peak was reached in the first week of September. The previous year there were two peaks: in the middle of July and at the end of August. At the peak of the infestation average counts in untreated trees ran as high as 54 alatae, 107 apterae, and 343 nymphs per leaf. At this time, the honeydew could actually be seen as it fell.

In late September and early October eggs were laid upon the bark of the larger limbs, and on the trunk in the vicinity of the first crotch, in which area the bark was rough, but not so rough as on the trunk below. Distally the limb bark was smooth. After the apterous oviparae had mated with alate males they moved from the undersides of the leaves to the crotch area where they deposited eggs in the cracks of the bark. In 1961, the eggs hatched in the middle of May.

CONTROL EXPERIMENTS

Materials and Methods

The experiment was conducted on mature red oak trees in plantings of

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16 trees per city block. Di-Syston² was applied in the third week of May by two methods: the granules were (a) poured into 24 holes in the soil each 4 inches deep, spaced around the periphery of the tree, and the holes plugged with soil; (b) the granules were buried at a depth of 4 inches in a trench next to and surrounding the trunk of the tree. The material was used at three dosages: 5 oz., 10 oz., or 15 oz. per tree. The treatments were set out in random arrangement and replicated four times. The trees in Block I were treated in 1959 and again in 1960 by method (a). Trees in Block II were treated in 1960 at the three dosages. Of these four trees receiving each dosage, two were treated by method (a) and the other two by method (b).

Counts of adult aphids on ten leaves per tree were made at weekly intervals, commencing in the first week in June. In the experiment on Block I, aphid counts from two trees

were very low, perhaps because these two trees had been treated with Di-Syston in 1958. Missing data therefore were calculated for these two trees according to the method of Yates (in Snedecor (3)) for inclusion in an analysis of variance.

The circumference of the trees was measured three feet above soil level.

Results and Discussion

Since spray drift and spray residues might be hazardous to children and pets, to birds and their nestlings, and to predatory and parasitic insects, a systemic insecticide that can be applied to the soil and absorbed by the tree has obvious advantages. Such a preparation, Di-Syston, was obtained in granular form and was applied through the soil with a minimum of labor.

The average number of adult aphids on 10 leaves per tree per season for the two methods of application was:

Method of application	Oz. of 5% Di-Syston per tree		
	5	10	15
(a) in soil in holes spaced around periphery of tree	2262	1976	1389
(b) in soil buried in a trench surrounding the trunk	1927	1895	910

There were no significant differences between the two methods of applying the insecticide. Since method (a) involves a considerably higher labor cost than method (b),

the latter is preferred.

The average number of adult aphids on 10 leaves per tree per season was:

Area treated	Year treated	Untreated	Oz. of 5% Di-Syston per tree			% control determined by Abbott's formula at 15 oz.
			5	10	15	
Block I	1959	1220	843	989	719	41
	1960	3552	2335	2067	1502	58
Block II	1960	4634	2095	1936	1150	75

Any two means not underscored by the same line are significantly different at the 5 per cent level.

Although the lower rates of application did not reduce the numbers of aphids significantly in the experiment on Block I in either 1959 or 1960, the highest rate of 15 oz. per

²Chemagro Corp., Kansas City, Missouri. 0,0-Diethyl S-2-(ethylthio) ethyl phosphorodithi- cate.

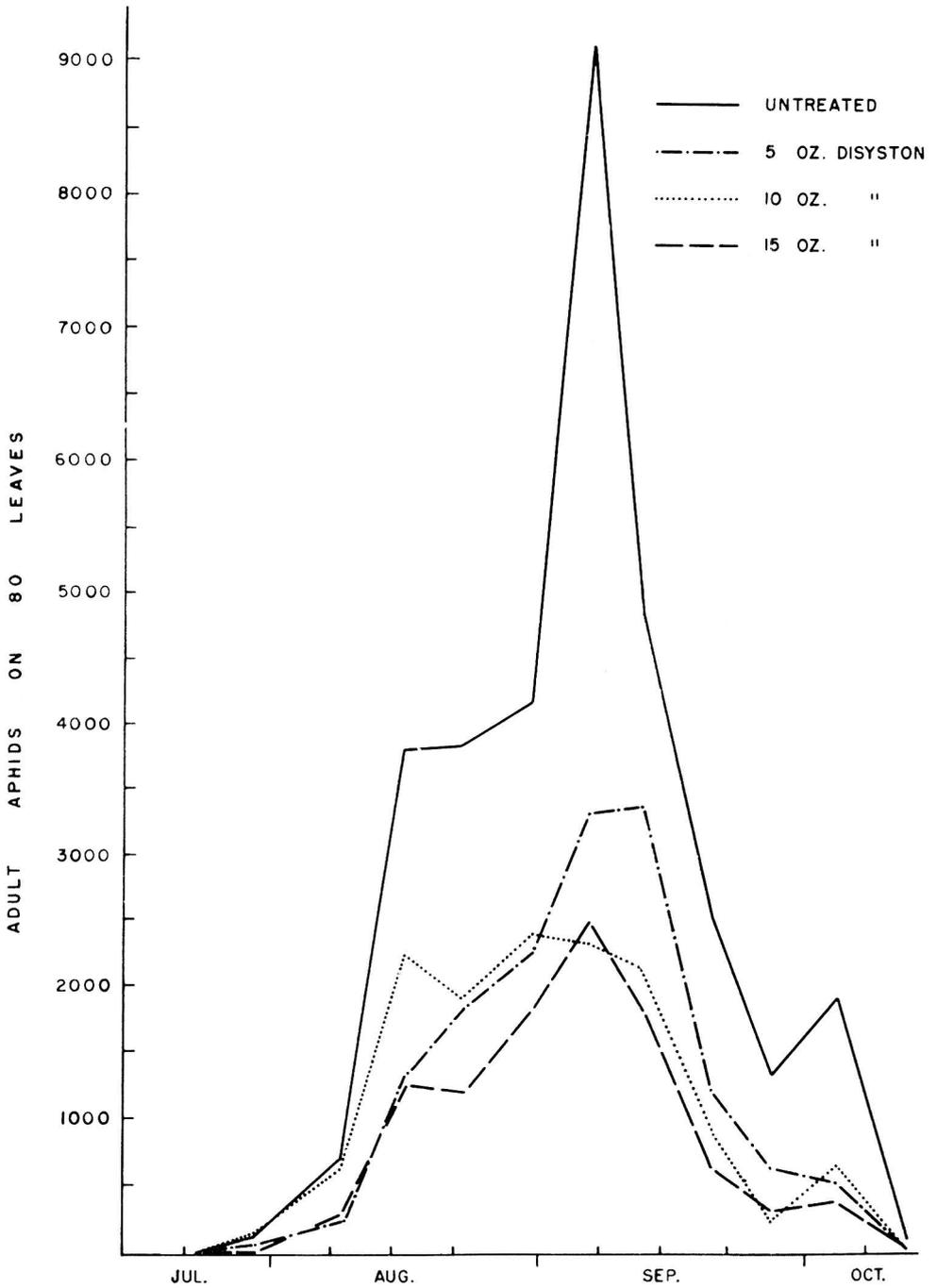


Fig. 1.—Number of adult aphids on ten leaves per tree in Blocks I and II at Vancouver, B.C., 1960.

tree did reduce the numbers significantly below that of the checks. In Block II there was no significant difference between the three levels of application but all significantly reduced the numbers below that on the untreated trees.

Adult aphids on ten leaves per tree in Blocks I and II in 1960, are shown graphically in figure 1. In late July, two months after the insecticide was applied, the populations rose sharply, but the increase in the untreated trees was much more rapid than in the treated trees.

Although the tree trunks ranged from 25 to 41 inches in circumference, the degree of aphid control was not influenced by tree size. However, trees over 40 inches in circumference should probably receive not less than 24 oz. of 5 per cent Di-Syston.

Two trees in Block I, the aphid counts from which were excluded from the experiment, had been treated for three consecutive years with 24 ounces of Di-Syston. They were virtually free from aphids. Indeed

they were the only trees under which cars could be parked with impunity.

Summary

Myzocallis walshii Monell is a major nuisance on the red oak, *Quercus borealis* Michx. f. (*Q. rubra* auth.), a boulevard tree of many streets in Vancouver, British Columbia.

The aphid has no alternate host. The males are winged. Mating takes place on the leaves, after which the apterous oviparae move to the vicinity of the main crotch to lay their eggs in crevices of the rough bark. In 1961, the eggs hatched in the middle of May.

A five per cent granular formulation of Di-Syston appreciably reduced the numbers of aphids when applied in the soil around the trees at the rate of 15 oz. per tree.

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Heliothis phloxiphaga G. & R. (Lepidoptera: Phalaenidae) on Vancouver Island

In the past twelve years I have met with this species only once, in 1957, when it was frequently to be seen on the open grassy slopes of the hillsides near Victoria and Goldstream.

It was observed in two periods, May 4 to 7, and again from July 5 to August 4. In the first period it was fairly common, feeding on the flowers either of sea blush, *Valerianella congesta*, or of several species of *Trifolium*. More commonly, it was aroused to flight on my close approach, and remaining just out of reach of the net, would fly swiftly and erratically for a short distance and then dive suddenly into the herbage, repeating the process if again disturbed.

In the second period it was not so often seen but several were taken at light. Most of the individuals were obviously second brood, judging from the fresh condition of their wings.

Jones records the species from Victoria, Mill Bay, and Duncan on Vancouver Island so there is evidently a resident nucleus which gives rise to noticeable numbers in an exceptionally favourable season.

H. phloxiphaga is closely related to *H. cbsoleta*, a pest associated with the cotton crop of the southern states. I have no information concerning its economic status in British Columbia.

—George A. Hardy, Provincial Museum (Rtd.), Victoria, B.C.