CONTROL OF THE CURRANT CLEARWING

R.T. BAKER*

Horticultural Research Centre, Research Division, MAF, Levin

Summary

A field trial indicated that azinphos-methyl, applied immediately post harvest and again 2 and 4 weeks later, reduced numbers of current clearwing (*Synanthedon tipuliformis*) larvae by approximately 80%. Control was not improved by an extra application of azinphos-methyl 3 weeks before harvest, nor by the immediate pre-harvest inclusion of carbaryl, naled or methomyl to the azinphos-methyl programme. Regular spraying with carbaryl, methomyl or oxamyl did not give acceptable reduction in numbers of larvae. The most complete method of assessing the effectiveness of insecticides was by counting numbers of larvae in whole bush samples but a simplified method, by counting clearwing entry holes in new season's (0 +) wood, was found to be adequate.

INTRODUCTION

The obvious damage caused by the tunnelling activities of the currant clearwing has always concerned growers. In fact, very little work has been done to evaluate the economic importance of this insect and it has been assumed, rather than proved, that control measures are necessary. The evidence which has been presented is not only sparse but also contradictory. For example Brock *et al* (1964) concluded that the economic effect of the moth in a heavily infested black currant plantation in England was negligible, whereas Toth (1962), in Hungary, considered that infestations affecting 15-25% of shoots resulted in yield reductions of 15-17.5%.

In New Zealand it is well known that currant clearwing larvae cause bud loss, breakage of fruit bearing canes and death of canes (Scott 1976). The life history of the currant clearwing has been studied in detail (Scott and Harrison 1979). Since the larvae feed on the pith within the canes they are largely immune from control measures. Control strategies, therefore, have concentrated on chemical control of eggs and newly hatched larvae, or on the pruning and burning of infested wood. However, it has been suggested that pruning has no significant effect on clearwing populations in mature black currant gardens (Scott 1976). Good chemical control of the eggs is possible with parathion (Taschenberg and Avens 1964) but the use of this insecticide is prevented in New Zealand because it could lead to residue problems in the fruit. Leska (1967) found that spraying bushes with DDT, diazinon or maldison, 10 days after the first emergence of moths, was ineffective whereas sprays of parathion, while decreasing clearwing numbers by 50-80%, left unacceptable residues on the fruit. Post harvest soil applications of systemic insecticides were advocated by Leska (1967) as the most successful method of controlling clearwing larvae but this is likely to be a laborious and expensive procedure in large plantations (Scott 1976). Sykes (1969), in field trials in England, showed that azinphos-methyl was a most promising insecticide for killing newly hatched clearwing larvae, which are vulnerable for several hours after hatching and before tunnelling into the canes.

In order to evaluate fully the impact of currant clearwing in New Zealand an adequate control programme is necessary. The experiment described in this paper was designed to test insecticidal spray programmes aimed at killing newly hatched larvae. The basic premise was that post-harvest sprays were essential and that an additional azinphos-methyl spray 3 weeks before harvest, or the use of transient insecticides close to harvest, may improve control.

* Present address: Plant Health Diagnostic Station, MAF, Mt Albert Research Centre, Auckland.

Proc. 33rd N.Z. Weed and Pest Control Conf.

Fruit Crops

METHOD

Four rows of black currant var. Magnus were divided into 40 plots, each containing approximately 30 bushes. Ten treatments (Table 1) were applied to run-off by hand lance. A randomized block design, with 4 replications of each treatment, was used.

To assess the effectiveness of the insecticides two bushes were cut from each plot at 3 weekly intervals from September 1978 to May 1979. The sampled bushes were cut into lengths representing annual growth increments over the last 4 years. For each year's growth measurements were made of length of cane, numbers of larvae and eggs, numbers of clearwing entry holes and length of cane tunnelled.

TABLE 1: Insecticides, formulations and spray dates

Treatment		Rate g/100 litres	Spray dates
1. azinphos-methyl	50 % WP	50	8.12.78; 9.1.79; 19.1.79; 1.2.79
2. azinphos-methyl	50 % WP	50	9.1.79; 19.1.79; 1.2.79
3. azinphos-methyl plus carbaryl	80 % WP 50 % WP	50 128	azinphos-methyl:- as treatment 1 carbaryl:- 28.12.78
4. azinphos-methyl plus methomyl	50 % WP 90 % WSP	50 25	azinphos-methyl:- as treatment 1 methomyl:- 28.12.78
5. azinphos-methyl plus naled	50 % WP 87 % EC	50 52	azinphos-methyl:- as treatment 1 naled:- 28.12.78
6. carbaryl	80 % WP	128	14.12.78; 21.12.78; 28.12.78; 9.1.79; 15.1.79; 19.1.79; 26.1.79
7. methomyl	90% WSP	25	as treatment 6
8. oxamyl	24% L	60	as treatment 1
9. oxamyl	24% L	60	as treatment 2
10. untreated		-	

RESULTS AND DISCUSSION

Pre-treatment samplings in September 1978, prior to pupation, showed that the plots contained an average of 337 larvae per 100 bushes with a range of 267-383 and no significant differences between the plots. Some differences between spray programmes were discernible after the February 1979 collections when larval populations varied from 19 to 104 per 100 bushes. The full impact of the treatments was noticeable by May 1979 when all eggs had hatched and all surviving larvae were inside the stems. At this time the populations varied from 92 to 804 per 100 bushes with the azinphos-methyl treated plots having significantly lower numbers of larvae than the other plots. Compared with the untreated controls the azinphos-methyl programmes had 77-86% fewer larvae but there were no significant differences between the individual azinphos-methyl programmes (Table 2). A full methomyl programme (see 7, Table 1) with 36% reduction in numbers of larvae, was significantly better than the untreated controls but inferior to the azinphos-methyl treatments, while carbaryl and oxamyl programmes gave no significant reduction in larval numbers (Table 2).

By May 1979 the new season's wood (0+) had little tunnelling (0.2-0.7%) in the azinphos-methyl treated areas compared with 5.6-8.5% in the other treatments and 8.2% in the untreated controls (Table 2). The numbers of clearwing entries/10m 0+ wood showed the same trends with 0-1.1 in the azinphos-methyl programmes, 4.5-7.3 in other treatments and 6.5 in the untreated controls (Table 2).

The results clearly indicated that the use of azinphos-methyl based programmes will give good control of currant clearwing. Furthermore, the crucial time for application of insecticide was shown to be after harvesting, since pre-harvest

Fruit Crops

applications of azinphos-methyl, in early December, and additional sprays of carbaryl, methomyl or naled just before harvesting did not result in significantly improved control. This is of great importance to growers since application of insecticides after harvesting avoids any residue problems on the fruit.

TABLE 2: Effect of insecticide treatments on currant clearwing larvae and eggs

Treat- ment*	Numbers of larvae /10 m of stem		% Control +	No. of hatched eggs/10 m Mar 1979	% of 0+ wood tunnelled May 1979	No. of entry holes/10m 0+ wood May 1979
	Sept 1978	May 1979				
1	5.5 a	0.9 c	84	1.4 a	0.5 a	0.2 c
2	6.3 a	1.4 c	77	1.2 a	0.7 c	1.1 c
3	5.0 a	0.8 c	86	1.1 a	0.2 c	0.0 c
4	5.7 a	0.8 c	84	1.0 a	0.5 c	0.4 c
5	4.6 a	1.3 c	78	1.6 a	0.5 a	0.9 c
6	5.4 a	5.7 ab	11	1.2 a	7.0 ab	5.4 ab
7	4.9 a	3.9 b	36	1.2 a	5.6 b	4.5 b
8	5.1 a	5.3 ab	10	2.0 a	8.5 a	7.3 a
9	5.3 a	5.9 a	4	1.2 a	7.0 ab	6.9 ab
10	5.1 a	6.1 a	-	2.2 a	8.2 ab	6.5 ab

* Treatment numbers refer to Table 1.

+ % control = percentage reduction in numbers of larvae/m, compared with untreated controls, based on measurements made during March-May 1979.

Counts of hatched and unhatched eggs were made but no significant differences in numbers were found between treated or untreated plots (Table 2). Hence the action of azinphos-methyl must be against the first instar larvae with no significant ovicidal effect.

Of the 3 methods of assessment used, recording numbers of live larvae in whole bushes was the most precise in a statistical sense but also the most time consuming, and necessitated complete destruction of bushes. Measurements of tunnel lengths and the numbers of entry holes in the 0+ wood during early winter led to similar assessment of the treatments but did not indicate differences of the order found between methomyl and the untreated controls as being significant. However, where differences were large these methods were adequate. Measurements of larval density, and larval tunnelling were highly significantly correlated.

Counting entry holes in 0+ wood during winter is advanced as a practical and simple procedure for field assessment of damage. This method has the advantage that it does not necessitate the removal of canes or plants. Where this method is used it is necessary to distinguish between bud damage caused by clearwing larvae from that caused by leafrollers, but this is a relatively simple matter (Baker and Batten 1978).

ACKNOWLEDGEMENTS

The technical assistance of Miss H. Dick and Mrs N. Hadland and of many members of the Management Section of Levin H.R.C. is acknowledged with thanks.

REFERENCES

- Baker, R.T. and Batten, J.F., 1978. Leafroller in black currants. *N.Z. J. Agric.* 136(1): 28-29.
- Brock, A.M., Collingwood, C.A. and White, J.H., 1964. The currant clearwing moth (*Aegeria tipuliformis* (Clerck)) as a pest of black currants. *Ann. appl. Biol.* 53: 243-249.

Fruit Crops

- Leska, W., 1967. Experiments on the control of currant clearwing moth (*S. tipuliformis*) by soil application of systemic insecticides. *Prace Inst. Sadown, w. Skierniewicach*: 11: 225-238.
- Scott, R.R., 1976. Berry fruit pests. In "New Zealand Insect Pests". ed D.N. Ferro, Lincoln University College of Agriculture, Canterbury, New Zealand.
- Scott, R.R. and Harrison, R.A., 1979. The biology and life history of currant clearwing, *Synanthedon tipuliformis* (Lepidoptera: Sesiidae), in Canterbury. *N.Z.J. Zool.* 6: 145-163.
- Sykes, G.B., 1969. Experiments on the control of currant clearwing moth (*Synanthedon tipuliformis* (Clerk)) on gooseberries. *Pl. Path.*: 18: 119-121.
- Taschenberg, R.F. and Avens, A.W., 1964. Field and laboratory studies on control of currant borer. *J. econ. Ent.*: 57(1): 123-130.
- Toth, G., 1962. The life history of and damage caused by the currant borer, *Synanthedon tipuliformis* Cl. (Lepidoptera, Aegeriidae). *Kert. szol. Foisk. Evk.*: 26: 71-88.