DEPARTMENTAL TRIALS IN CONTROL OF BLACK FIELD CRICKETS

E. N. HONORE

Research Division, Department of Agriculture, Auckland

Summary

Control of the black field cricket (*Teleogryllus commodus*) is best obtained with baits, as with the low dosage rates required per acre there is little danger of insecticides contaminating foods, especially if organophosphates are used.

Trials laid down by the Department of Agriculture in North Auckland have been mainly to compare the effectiveness of various baits against adult black field crickets and nymphs. Owing to the lack of a reliable technique for measuring the effectiveness of treatments, trials against small nymphs are inconclusive.

INTRODUCTION

THE black field cricket, *Teleogryllus commodus*, is a serious pasture pest of the heavy clay soils of the northern part of New Zealand. In bad seasons, the numbers of crickets reach plague proportions, causing serious losses of production and such severe pasture damage that large areas require resowing. As well as killing many of the pasture plants, the crickets eat any seed on the surface and thus prevent any natural regeneration of the sward.

There is some evidence which suggests that these plagues occur in cycles with a 5- to 7-year interval and are probably due to certain climatic conditions which favour early hatching of the eggs in the spring and other factors favourable to the survival of nymphs to adulthood. It is known that weather conditions which will bring about early cracking of the soil is essential for the propagation of a large population. These cracks serve a twofold purpose. One is to give the insect protection from natural enemies such as birds, and the other to give protection from the burning rays of the midsummer sun which can very quickly prove lethal to a cricket.

As each female black field cricket will lay from 500 to 1,000 eggs during the autumn, any season's egg laying can, in the following summer, produce an immense population, with expensive results to the farming industry.

CONTROL MEASURES

Dieldrin as a spray or in dust form mixed with fertilizer gave excellent control of black field crickets until restrictions in the use of chlorinated hydrocarbons on pastures required an alternative that would leave no harmful residues in produce. Poisoned baits have filled this need and a number of excellent baits are now being marketed.

Because the insect is a voracious feeder and particularly fond of grain, excellent control of the adult can be obtained by the use of baits made from suitably treated grain or grain products. Unfortunately, by the time the black field cricket has reached maturity, considerable pasture damage will have occurred, so that

killing of nymphs at an early age would be desirable. Attempts have been made by officers of the Department to gain control of nymphs using baits.

K. M. Harrow and A. Smith of the Department of Scientific and Industrial Research, Auckland, who are rearing black field crickets in their laboratory, have found that newly hatched nymphs will seek out wheat grains in their cages, but it is not definitely known whether baiting would be effective in early nymph control in the field. At this stage, there is generally plenty of food about equally as attractive as the baits, and, even if the young crickets did consume the baits, there is no really positive method of evaluating the effect. Attempts have been made to estimate populations before and after treatment, but it is an almost impossible task to keep track of such small but highly mobile insects in the normal type of pasture on cricket country in early summer. Consequently, trials to control nymphs have been of little value.

TRIALS CONDUCTED IN THE AUCKLAND DISTRICT

Fortunately for farmers, black field cricket infestations over the past three seasons in Northland have in the main been fairly light and it has been difficult to find areas where the infestation has been heavy enough to show results of treatments. Consequently, not a great deal of work has been done and practically all of it has been testing of baits. In the following trials, figures showing active ingredient of insecticides used are on a per acre basis.

An experiment was put down at Waimauku on a moderate infestation of adult black field crickets and Table 1 shows counts of crickets under 6 bags after 2 days and assessment of control gained.

TABLE 1: WAIMAUKU TRIALS ON MODERATE INFESTATION

<i>Treatment</i>	<i>Rate</i>	<i>Live</i>	<i>Dead</i>	<i>Control</i>
Control	—	47	0	Nil
"Malathion wheat" 10 lb	1.6 oz	6	7	Excellent
"Malathion/Metaldehyde Pellet" 20 lb	1.6 oz Malathion	1	2	Excellent
"Metaldehyde-treated wheat" 20 lb	Unknown	32	4	V. poor
"Lindane bait prill" 16 lb	2 oz	8	0	Excellent
"Thuricide bait prill" 20 lb (<i>Bacillus thuringiensis</i>)	Unknown	18	5	Partial
"Dieldrin bait granules" 16 lb	1 oz	2	0	Excellent

Three experiments were conducted in the Whangarei and Kai-kohe districts and used the same treatments as above. These trials were against nymphs $\frac{3}{8}$ in. to $\frac{1}{2}$ in. long. The results, which were based on counting of live nymphs after treatment, were fairly inconclusive except that in one experiment, two treatments using malathion gave better results than the other treatments.

A further experiment compared lindane bait prills with malathion wheat on a nymph population. There appeared to be no worthwhile differences in counts of live nymphs.

In early February the treatments given in Table 2 were applied to a light to moderate infestation with a mixed population of some adult black field crickets but mainly larger nymphs. Pasture damage was starting to become bad in places.

TABLE 2: FEBRUARY TRIAL ON LIGHT TO MODERATE INFESTATION

<i>Treatment</i>	<i>Rate</i>	<i>Control</i>
"Dieldrin bait granules"	0.75 oz	Excellent
"Malathion wheat"	1.25 oz	Excellent
Diazinon on kibbled maize	4.8 oz	Excellent
"Thiocron" as a spray in 20 gal water	5 oz	Nil.

Sacks were placed on the plots but black field crickets did not use them and treatments were judged on live crickets found in cracks and on pasture responses.

TREATMENT ASSESSMENTS

Evaluating the effectiveness of an insecticide against a pasture pest in the field can generally be done in the following ways:

- (1) By comparison of live insect populations before and after treatments.
- (2) By comparison of the numbers of insects killed.
- (3) By comparison of pasture responses.

None of these methods are particularly satisfactory with black field crickets, and investigations are seriously hampered through lack of a reliable technique for treatment evaluation.

Because of these difficulties, it would be foolish to attempt to place the baits used in order of effectiveness, except that metaldehyde-treated wheat and thuricide bait prills were of little value. At the rates used, malathion and diazinon in grain baits and lindane and dieldrin as bait prills gave excellent control of adult black field crickets. There is insufficient evidence to show that any of these baits was better than the others and, therefore, any choice made must necessarily be on:

- (a) The desirability of the chemical used in regard to health hazards and the Agricultural Chemicals Act;
- (b) Its suitability for spreading from the ground or from the air; and
- (c) Its cost per acre.

Judged on these factors, "malathion wheat" is probably the superior material.

Trials against nymphs conducted in the Whangarei district were appraised on counts of nymphs which landed on a random placed bag when the grass surrounding it was patted. This method, which was used several times after treatments were applied, appeared to give results indicative of the plot populations, but owing to lack of proper controls the results obtained were not particularly conclusive except that malathion baits appeared to cause the greatest reduction in the nymph population.

ACKNOWLEDGEMENTS

The author wishes to thank K. M. Harrow of D.S.I.R., Auckland, for information on the life-cycle of crickets, and officers of the Department of Agriculture who assisted with trial work.