

Granular Insecticides for Clover Root Borer Control

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Granular insecticides are a relatively new form of impregnated dusts in which the particle size is quite large. This gives certain advantages, such as less drift, lower plant residues, control of insects on the ground surface under rather dense foliage, and more uniform aerial application. Some of these are very important in legume insect control.

The clover root borer, *Hylastinus obscurus* (Marsh.), is a small mahogany-colored bark beetle. The larvae feed in the roots from the crown to a depth of three or four inches. Heavy infestations, coupled with the low moisture availability usually results in death of the clover plants in July and August.

Until the advent of the modern organic insecticides, cultural practices were the only means of keeping this insect under partial control and reducing stand losses. Previous experimental studies by entomologists have shown that dilute insecticidal dusts applied to the soil surface in late fall of the seeding year or early spring of the crop year will give almost 100% control. Liquid applications have shown little or no effect on this insect.

Preliminary tests in 1954, with the natural infestation of 63%, dieldrin as a 1% granular dust applied at the rate of 100 pounds per acre and BHC as a 1% granular dust applied at 90 pounds per acre gave effective reduction in numbers of infested roots.

In 1955, seven insecticides including BHC, dieldrin, aldrin, heptachlor, chlordane, methoxychlor and toxaphene were applied on May 4th as emulsions and at three different dosages as granulars. The experimental design was a 7 x 7 Latin-square, with insecticides as main plots and the four applications plus an untreated plot as five subplots. This design was used as it gives a much better indication of the variability of the natural infestation than does a simple randomized block design.

The emulsions were applied with a bicycle type small plot sprayer with control of speed, pressure, and nozzle size, which resulted in very uniform dosages. The granulars were applied with a three-foot Gandy spreader by hand. The wide variation in the dosages of the granular materials indicate the need for a more accurate method of applying this type of material in experimental studies. There is some indication from previous tests that the formulation of the granular dusts have an important effect on their rate of flowability and consequently on their rate of application.

In the emulsion tests, heptachlor, dieldrin and aldrin showed highly significant reductions in percent infestation and also in borers per 100 plants. The low granular dosage was highly significantly effective in all materials except methoxychlor and toxaphene. Borers per root were reduced the greatest amount in the BHC, aldrin and heptachlor treatments. The intermediate dosage of granulars showed heptachlor the

most effective in reducing the percent infestation, with BHC and aldrin almost equally effective. These same treatments reduced the borers per 100 roots to zero, while dieldrin and chlordane had the next fewest. The high dosage of granulars showed BHC with lowest percent infestation and dieldrin with the next best control. Aldrin, heptachlor and chlordane were about equal and showed highly significantly lower infestation than the untreated. In borers per 100 roots, BHC had none, with chlordane the next fewest, followed by dieldrin and heptachlor. Aldrin and toxaphene at the high dosage showed highly significant reductions in the number of borers. The untreated populations varied highly significant amounts among the various insecticide blocks. The highest natural infestation was 47.1% in the dieldrin treated area, with the lowest, 32.8% in the chlordane treated plots. The borers per 100 roots in the untreated plots ranged from 114.3 in the untreated methoxy-chlor area to 38.6 in the chlordane area.

Population of nymphs of the meadow spittlebug per square foot were reduced highly significant amounts in all treatments, with BHC, dieldrin and heptachlor the most effective. Infestations and damage by the lesser clover leaf weevil was also significantly reduced by the different treatments. Samples of insect populations, consisting of 10 sweeps, were taken in all the subplots two weeks after treatments were applied. These samples have not been examined and identified.

Aerial applications of a 1% granular BHC were applied May 18 to three plots 50 feet wide and 850 feet long, with two equal sized untreated areas between. Cardboard treated with clear varnish was placed at three foot intervals across the treated areas to determine the width of the swath and distribution. The percent infestation of the clover root borer was reduced from 60% in the untreated to 6% in the treated and the borers per 100 roots from 194 to less than 1, based on samples of 50 roots per plot. Spittlebug populations were reduced from 33.5 nymphs per square foot to .7. The lesser clover leaf weevil showed 86.7% infestation, 222 damaged buds and 46 weevils per 100 stems in the untreated plots. The treated plots had 56.7% infested, 98 damaged buds and 18 weevils per 100 stems. Better timing probably would have increased the control of this insect.