Lettuce Insect Control with Experimental Insecticide Compounds

(Paul D. Gerhardt)

Abstract: A number of chemical compounds have been field evaluated as potential pesticides for control of insects on lettuce over the past several years. The important pests of fall planted lettuce being the cabbage looper, beet armyworm and corn earworm. In addition to the chemical compounds, the disease organism Bacillus Thuringiensis was used. It is slower in acting, but can be quite effective, particularly against the cabbage looper. Some of the chemical compounds which have been evaluated and are now available commercially are Sevin, Dibrom and Bidrin. This evaluation will continue as new and possibly more effective materials are made available.

Introduction

The major pests of lettuce requiring pesticide treatments are the following: Cabbage looper - Trichoplusia ni (Hubner), Beet armyworm - Spodoptera exigua (Hubner), Corn earworm - Heliothis zea (Boddie) and the Green peach aphid - Myzus persicae (Sulzer). The most serious of the above tested insects are the lepidopterous larvae. They become most serious on the fall grown lettuce in all areas.

Methods

New pesticide compounds developed by the various chemical companies have been field evaluated on plots of fall planted lettuce at the Mesa Branch Station. Great Lakes variety of lettuce was planted on standard 34 inch beds with 2 rows per bed. Plots were four beds wide and 40 feet long with each treatment replicated four times.

The first insecticide treatments are usually applied at thinning time. This usually is followed within 5-7 days by a second application. Subsequent treatments are applied as required by the infestation.

Sprays on the experimental plots were applied with a 3 gallon pressure type sprayer fitted with a special boom for treating single beds of lettuce. This set up with one or two spraying system type hollow cone nozzles per row was used in applying the spray mixture at the rate of 35 gallons per acre.

Dust formulations are applied with a rotary hand duster fitted with a single discharge tube having a "Y" on the end for treating two rows of lettuce at one time.

Data was taken from the middle two rows of each plot, leaving a buffer row on either side. Twenty plants per plot were examined for the presence or absence of the various insect pests mentioned earlier.

Results and Discussion

In Table 1 are presented the results obtained from the application of various new pesticide compounds. In all cases only the numbers of cabbage looper and beet armyworm larvae have been recorded. The fluctuation in insect population from year to year can be seen when the counts from the untreated check plots are considered. In the 1963 tests of all materials appeared favorable, but it can be noticed that the untreated check plots had a low population, too. In contrast, the infestation in 1962 was much heavier with resulting less effective performance of the pesticide compounds being evaluated.

Only a few of the compounds pass all the necessary requirements to be marketed commercially. Some of these which were tested are: Sevin, Dibrom, Bidrin, and Biotrol dust. The latter, Biotrol dust, is a dust formulation of a diseased organism, Bacillus Thuringiensis Berliner. This material usually has a spore count of approximately 5 billion per gram. It may also be formulated as a wettable powder 25 billion spores per gram. Although not as quick acting as the chemicals, it is effective in control of the cabbage looper under favorable conditions.

Table 1. Results of pesticide applications to lettuce for control of cabbage and beet armyworms.

Treatment			1 week		2 weeks		3 weeks	
	Amount/Acre							
Materials	Form.	Tox.	Loopers	Beet Army Worm	Loopers	Beet Army Worm	Loopers	Beet Army Worm
1961								
*Sevin 75% Spray Pwd.	2.7 lbs.	2 lbs.	13	0	1	0	0	0
*Dibrom E.C. (8 lbs./gal.)	1 pt.	1 lb.	10	5	0	2	1	0
*Biotrol Dust (5 Billion)	30 lbs.	5 bil.	22	5	7	8	2	5
Untreated check	-	-	34	16	28	12	20	9
1962								
Zectran E.C. (2 lbs./gal.)	2 qts.	1 lb.	2	9	40	10	4	5
Bayer 44646 E.C. (1.5 lbs./gal.)	2/3 gal.	1 lb.	2	27	26	19	15	40
CL 43064 E.C. (4 lbs./gal.)	1 qt.	1 lb.	2	33	62	17	18	2
Untreated check	-	-	18	157	25	140	117	103

Treatment			1 week		2 weeks		3 weeks	
	Amount/Acre			Beet		Beet		Beet
Materials	Form.	Tox.	Loop-ers	Army Worm	Loop-ers	Army Worm	Loop-ers	Army Worm
1963								
Bayer 37289 E.C. (4 lbs./gal.)	1 qt.	1 lb.	40	18	0	0	0	0
*Bidrin Tech. (8 lbs./gal.)	1 pt.	1 lb.	24	17	0	0	0	0
Am. Cy. 47031 E.C. (3 lbs./gal.)	1/3 gal.	1 lb.	26	15	0	0	0	0
Untreated check	-	55	5	14	2	0	1	0
1964								
NIA 10242 50% W.P.	2 lbs.	1 lb.	0	5.2	3.2	0	3.2	0
Banol 75% W.P.	1.3 lbs.	1 lb.	5.2	6.0	12.0	0	14.0	0
R.P. 11783 E.C. (2 lbs./gal.)	2 qts.	1 lb.	9.2	.0	13.2	1.2	12.0	0
Untreated check	-	-	26.0	4.0	53.2	1.2	30.0	0

*Commercially available

Mechanical Harvesting of Lettuce

(B. L. Harriott)

Abstract: Research work aimed at developing a selective mechanical harvester for crisphead lettuce was initiated in 1961. During the course of the project, two experimental machines were constructed. Commercial development of the harvester was assumed by Lockwood Grader Corporation in 1964 under terms of a contract between Lockwood and the Arizona Research Foundation. Lockwood is now in the process of constructing a four row prototype harvester that will be capable of harvesting 1.5 acres of lettuce per hour.

Introduction

Over 50,000 acres of crisphead lettuce are produced annually in Arizona. Current production practices for the crop rely heavily on hand labor, particularly in the harvest operation. Recent developments in the agricultural labor market indicate that growers cannot depend on an adequate supply of hand labor and that costs for available labor will continue to increase in the future. These developments demand increases in labor productivity by mechanization if lettuce production is to remain a profitable enterprise in Arizona.

Work toward the development of a selective mechanical harvester for crisphead lettuce was initiated at the Arizona Experiment Station in 1961.