

# Effects of Lettuce Insecticides Applied at Planting

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## Introduction

Insect pests of late summer and early fall planted head lettuce include leafminers, *Liriomyza* spp., sweetpotato whiteflies, *Bemisia tabaci* (Gennadius), plant bugs, *Cyrtopeltis tenuis* Reuter and various caterpillar pests such as beet armyworm, *Spodoptera exigua* (Hubner) and cabbage looper, *Trichoplusia ni* (Hubner). Most of these pests are currently controlled by insecticide applications applied post crop emergence. Little data exist for control of these pests when applications of materials are made at planting. This experiment was initiated to obtain information about the efficacy of insecticides applied at planting for insect control and the resultant effect upon lettuce growth.

## Methods and Materials

Coated Empire variety (Asgrow Co.) lettuce seed was planted September 25th, 1990, in double rows on beds with 40 inch centers at the Yuma Valley Agricultural Center. Seed rows were left open to allow insecticide applications the following day. Plots were 1 bed (2 rows) by 25 ft long. Treatments were replicated four times in a randomized complete block design. A soil drench application, consisting of 250 ml of solution/25 ft of row applied via funnel directly over the seed row, was used for Orthene and BAY NTN 33893 FS treatments. Granular formulations were applied by weighing insecticide for each 25 ft of row, mixing with filler, and applying via funnel by making several passes directly over the seed row. Furrow irrigation was utilized immediately after application for seed germination.

Plots were sampled at the 2 leaf stage on October 13th by examining 25 consecutive plants/plot and insect numbers were counted and recorded. Insects in/on cotyledons were not counted. Plots were sampled again on October 31st for leafminers. Samples consisted of 5 plants/plot, obtained by removing every 12th plant. Samples were cleaned of debris, air dried for approximately 30 minutes and then weighed. Leaf area of plants were measured leaf by leaf for the entire plant using a LI-Cor 3100 leaf area meter. Plant material was then placed in bags and held for 6 days for leafminer immature emergence, which were then counted and recorded. Data were analyzed using an S-N-K test (Co-Stat 2.0)

Head numbers/plot and head sizes were measured on November 29th and December 20th. Plants exhibiting yellows were also recorded on the latter sample date. Photosynthesis readings were collected with the use of an LCA-3 carbon dioxide leaf chamber analysis system (Analytical Development Co. Ltd., Hoddesdon, England) on the November 29th sample date.

## Results

No significant statistical differences were found for any of the individual treatments, nor were total insects significant at the two leaf stage. Orthene treatments had almost 40% more leaf area than the untreated check on the October 31st sample date. Treatment plots and plots treated with Di-Syston 15 G were visibly smaller than plots receiving other treatments. The Di-Syston plots were expected to be somewhat stunted as application was made directly to seeds, as product label warns against such application. Leaf area and fresh weight increase were noted in other insecticide plots although this was not statistically significant (Table 1).

Head formation from the treatments are important both as a function of growth and earliness for market windows. BAY NTN 33893 plots had the most heads/plot on the November 29th sample date (Fig. 1).

Approximately three weeks later on December 20th, Orthene 75S plots (1.0 rate) averaged the most heads/plot (54.5) followed by NTN 33893 2.5G at the 2.16 oz. product/1,000 row feet rate (52.25 heads/plot) and Orthene 75S at the 2.0 rate (50.75 heads/plot). More plants/plot exhibited lettuce infectious yellows in Di-Syston 15G plots (27.75 plants/plot) than in other treatment plots.

# LETTUCE HEADS AND INFECTED PLANTS AFTER INSECTICIDE APPLICATION AT PLANTING

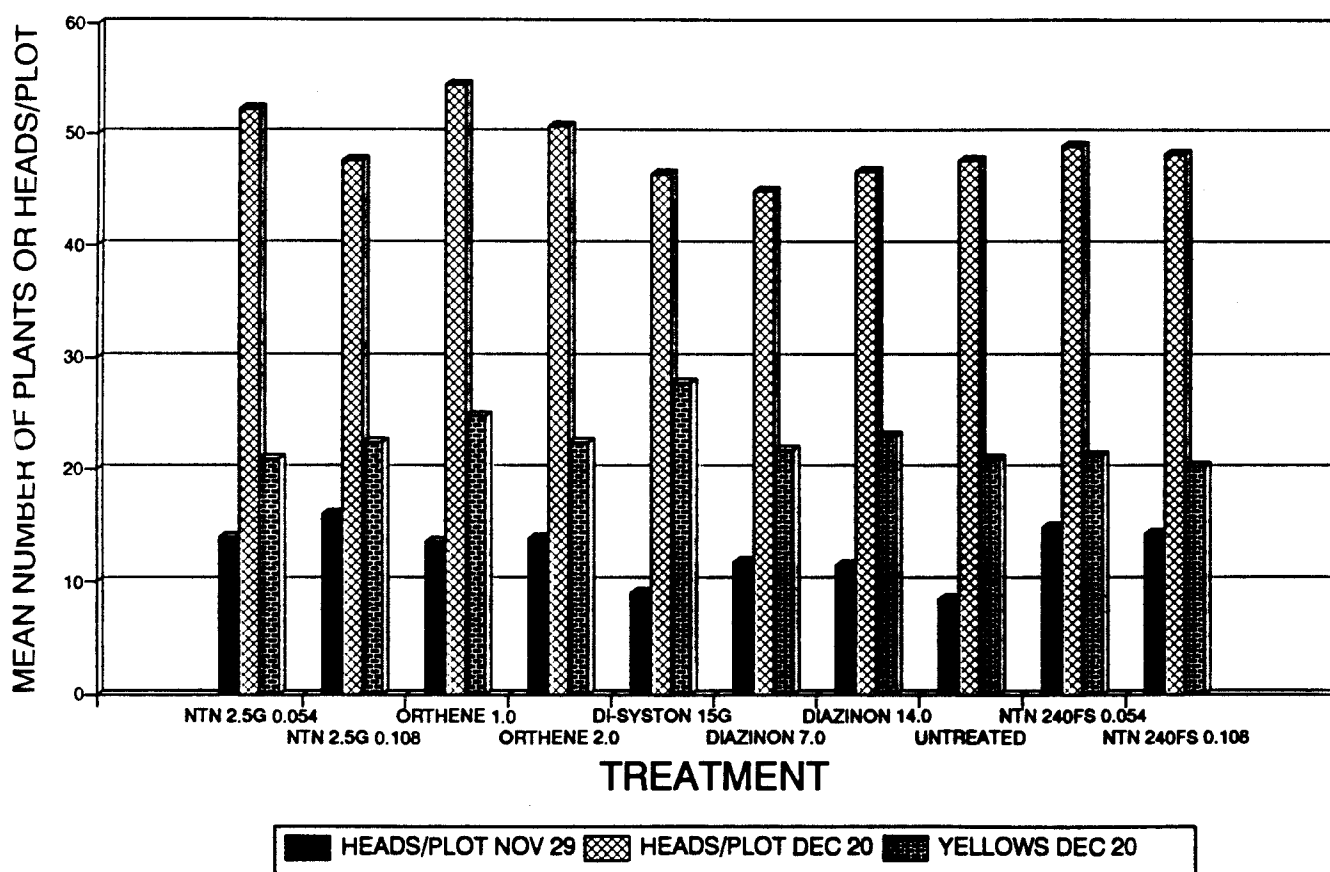


Table 1

## INSECT NUMBERS AND PLANT MEASUREMENTS FOLLOWING PLANTING TIME APPLICATIONS OF INSECTICIDES

<u>Treatment</u>	<u>(AI)/acre</u>	<u>Mean Number Insects/25 plants (Oct. 13)</u>			<u>Mean number/5 plant sample (Oct. 31)</u>			
		<u>Caterpillars</u>	<u>Mirids</u>	<u>Leafminers</u>	<u>Whiteflies</u>	<u>Leaf Area (cm<sup>2</sup>)</u>	<u>Fresh wt (g)</u>	<u>Leafminers</u>
<b>(Granular insecticides)</b>								
D-Z-N diazinon 14G	2.0	1.9*	7.0*	0.0*	4.2*	1,017.1*	47.5*	27.0*
D-Z-N diazinon 14G	1.0	2.0*	4.25*	0.25*	4.25*	913.8*	43.1*	25.0*
Di-Syston 15G	0.075 lb AI/1,000 ft	1.0*	2.0*	0.0*	3.5*	805.3*	37.1*	20.25*
BAY NTN 33893 2.5G	4.32 oz prod/1,000 ft	1.9*	4.5*	0.0*	1.75*	978.3*	46.0*	29.75*
BAY NTN 33893 2.5G	2.16 oz prod/1,000 ft	2.75*	8.0*	0.75*	3.25*	1,041.6*	47.9*	43.75*
<b>(Soil row drench liquid insecticides)</b>								
Orthene 75S	2.0	1.25*	3.4*	0.0*	2.25*	1,149.8*	50.9*	29.25*
Orthene 75S	1.0	2.5*	6.5*	0.0*	2.5*	1,137.0*	54.8*	33.5*
BAY NTN 33893 240FS	0.108 oz AI/acre	1.75*	4.9*	0.0*	2.0*	940.5*	45.0*	41.0*
BAY NTN 33893 240FS	0.054 oz AI/acre	0.9*	10.1*	0.5*	2.25*	999.9*	45.7*	24.25*
Check	----	0.75*	3.4*	0.5*	3.5*	821.4*	38.2*	28.0*

Means in columns followed by the same letter are not statistically significant at the  $P \leq 0.05$  level (Student-Newman-Keuls Test).