

# Control of Liriomyza trifolii Larvae in Head Lettuce

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## INTRODUCTION

The leafmining fly, Liriomyza trifolii (Diptera: Agromyzidae) was positively identified in southwest Arizona in the fall of 1987 as a result of damaging-size populations in head lettuce. Control of this insect is difficult due to the rapid development of insecticide resistance in the adult flies.

Most, if not all, control methodologies aimed at adult fly control failed at some time during the 1988 fall in western Arizona. The one insecticide that was available for use, cyromazine (Trigard), has plant-back restrictions that severely limit its use. An emergency exemption was passed by the Environmental Protection Agency to ease some of the plant-back restrictions of this product in the fall of 1988 and winter of 1989. This exemption was not granted until December, when most of the problems had already occurred; the exemption may not be granted in 1989-1990.

This study was initiated to determine the efficacy of various products against larval leafminers in head lettuce.

## METHODS AND MATERIALS

In cooperation with Charlie Poole, Bruce Church of Arizona, a head lettuce field near harvest with a heavy leafminer population was located southwest of Poston, Arizona. A randomized complete block design, replicated four times, was used for the six treatments and untreated check. Each plot was 25 feet long and 40 inches wide. Treatments were applied on November 23, 1988, using a hand-powered backpack sprayer calibrated to deliver 25 gal/A at 30 psi with a T-Jet 8004 nozzle. Treatments included three rates of abamectin (produced by a fungus); the insecticide endosulfan; cyromazine (Trigard) which acts as an insect growth regulator; and D-limonine (an extract from citrus).

Leaf samples were taken two days later. A sample consisted of five consecutive leaves from a lettuce head. These leaves (usually wrapper leaves) were the top-most leaf with easily visible mining and the four leaves beneath it. Samples were placed in lock-top plastic bags, marked, and kept at room temperature for the remainder of the study, which was warmer than field temperatures. Collection bags were kept upright with tops open to prevent rapid decomposition of leaves.

Samples were examined at three days (one day after field removal) and seven days post-treatment. Immature Liriomyza trifolii that emerged from the leaves were counted, recorded and removed.

## RESULTS

Large differences (178 leafminers) were noted between the highest and lowest samples in this study in the seven-day post-treatment sample. This was partly due to a border effect in one of the treated blocks, which caused this block to be removed from further calculations. All treatments had at least three samples after block removal.

No statistically significant differences were found between any treatments in this study. The best treatment for the three- to seven-day post-treatment sample was the abamectin at the 0.01 lbs of active ingredient per acre plus 6 oz of LeafAct 80A (Table 1), which provided nearly 80% control. Cyromazine was the best treatment in the two- to three-day post-treatment sample with slightly more than 58% control.

Table 1. Efficacy of Various Insecticides Against Liriomyza trifolii Larvae in Head Lettuce

Treatment	Rate (#ai/A)	Mean # leafminers Emerging Per Sample		Percent Control	
		Days 2-3	Days 3-7	Days 2-3	3-7
Abamectin 0.15 EC	0.01	9.5	18.0	20.8	59.7
Abamectin 0.15 EC +LeafAct 80A	0.01 6 oz	6.5	9.0	45.8	79.9
Abamectin 0.15 EC	0.02	6.25	11.25	47.9	74.8
Cyromazine (Trigard 75W)	<sup>Δ</sup>	5.0	13.75	58.3	69.2
D-Linonine	2 qts	8.5	36.75	29.2	17.7
Endosulfan (Thiodan 2 C.O. EC)	1.0	11.25	20.0	6.3	55.2
Untreated Check	-	12.0	44.67	-	-

<sup>Δ</sup>/This rate was not exactly weighed out due to lack of a gram specific scale; however it was close to the field rate of 0.125 # a.i./A.