DEPARTMENT OF
PRIMARY INDUSTRIES

Improving Lettuce Insect Pest Management Victoria

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Introduction

Victoria produces around 32% percent of the national lettuce crop producing around 48,603 tonnes, which in 2000/01 was valued at $40 million. The major production regions in Victoria are Werribee South, Cranbourne and East Gippsland with more scattered production in the north west of the state. Production in southern Victoria is for predominantly summer lettuce although some areas produce year round and in the north west winter lettuce

In the summer season of 1999/2000 around 10% of plantings were lost due to the pest *Helicoverpa armigera* (corn earworm). This was a year of extreme pest pressure. Control of *H. armigera* is complicated by its resistance to a wide range of chemical groups. At the time of commencement of the project the number of chemicals registered for control of *Helicoverpa* were limited.

Helicoverpa armigera adult moth

Scentry® pheromone trap

Key Outcomes and Conclusions

The industry now has a number of biological and selective pesticides it can use in an effective IPM program. These include: spinosad, indoxacarb, emamectin, Bt and NPV.

- The new selective insecticides evaluated were all effective against Helicoverpa, and emamectin, which is now registered for lettuce killed larvae relatively quickly.
- NPV achieved best results when larvae came into contact within 24 hours after application but still killed larvae up to 6 days after application to the crop.
- There needs to be a better understanding of resistance management and the use of IPM and soft pesticides by industry.
- Careful crop monitoring is critical under an IPM system.
- The appropriate timing for the use of biological insecticides such as NPV or Bt is from transplant to pre-hearting and the targeted selective insecticides should be used from pre-hearting to harvest unless pest pressure is high.
- Beneficial numbers increased following an increase in pest numbers, such as aphids and thrips, but there is time lag.
- Crop monitoring is integral part of IPM. An early detection of the presence of pests and diseases is critical to ensure good marketable lettuce yield. The presence and number of beneficials needs to be identified in order to make an informal decision on the need for, and method of control.
- The entire lettuce plant needs to be examined for pests, eggs (parasitised and unparasitised), larvae and feeding damage as well as for beneficials and parasitoids. For more information see the brochures "Corn Earworm Control in Lettuce – January 2005" and "Scouting Protocol for Lettuce incorporating IPM".

Evaluate the potential use of NPV through overhead sprinklers

The aim of this trial was to assess the feasibility of controlling *Helicoverpa* spp. in lettuce by applying Nuclear Polyhedrosis Virus (NPV) through the overhead irrigation system. This is potentially a cheaper and faster way of applying NPV than using a conventional boom spray.

Gemstar® was applied three times at 750 mL/ha. Applications were made 20, 27 and 35 days after transplanting. Residual Efficacy of NPV was tested in the laboratory by feeding field-sprayed leaves to *H. armigera* larvae.

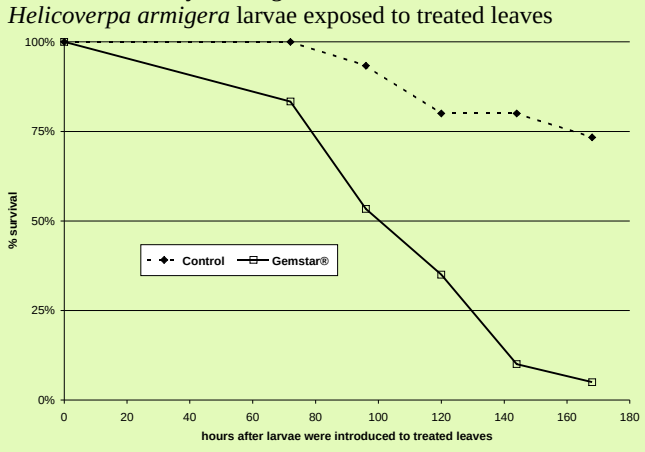
Assessment of harvested lettuce

Bioasay trial: *H. armigera* larvae exposed to treated lettuce leaves

Results showed that Gemstar® was successful controlling *H. armigera* larvae when applied through overhead irrigation sprinklers. The best results were achieved when larvae come in contact with NPV 24 hours after spraying. After 4 days exposure to the treated leaves, 54% of larvae were dead and after 7 days mortality was 94%.

Even on crop sampled 6 days after spraying, 68% of bioassayed larvae were dead after 7 days. Using overhead sprinklers is an effective method of application of NPV.

Figure 2
Gemstar® Bioassay Chemigation Trial. Survival of *Helicoverpa armigera* larvae exposed to treated leaves



Field monitoring (scouting)

Aim of the Project

The aim of this project was to develop an Integrated Pest Management program for lettuce with a focus on *Helicoverpa* spp. (corn earworm and native budworm).

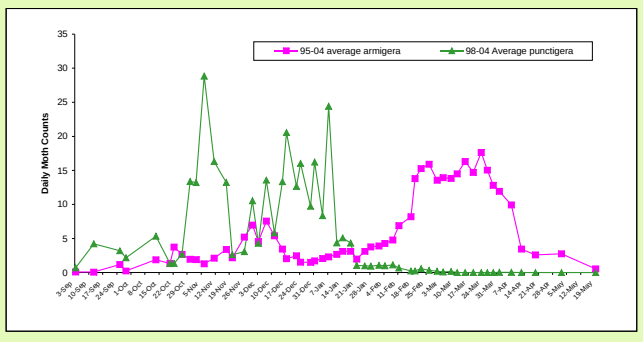
The project:

- Evaluated a range of new and existing pesticides for *Helicoverpa* control in the first season.
- Biological pesticides Nuclear Polyhedrosis Virus (NPV) and *Bacillus thuringiensis* (Bt) were evaluated for use from early transplanting and selective pesticides emamectin, methoxyfenozide and Sumitomo 1812 were evaluated from pre-hearting to harvest in the second and third seasons.
- Assessed the incidence and diversity of pests and beneficial arthropods.
- Assessed the potential to apply the biological pesticide NPV through overhead irrigation.
- Monitored current industry practices for *Helicoverpa* control to compare the impact of growers using IPM practices with those using a more preventative control program with broad-spectrum insecticides.
- Developed an IPM program for *Helicoverpa* control in lettuce.

Seeding *H. armigera* larvae on lettuce - Trial work

This graph demonstrates the changes of *Helicoverpa* moth counts in pheromone traps through spring, summer and autumn. *H. punctigera* have a peaks of activity in early September, late October/November and early January while *H. armigera* has peaks rising in pressure from mid October, mid to late December and from around mid February.

Figure 1
Long term average moth catch of *Helicoverpa armigera* and *Helicoverpa punctigera* from Scentry® traps at East Gippsland



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