AWM in southern NSW and northern Victoria

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In southern NSW and northern Victoria, Helicoverpa armigera and H. punctigera are major pests of irrigated crops. The seasonal ecology of the two species differs considerably.

H. punctigera adults migrate into the region in late winter/early spring and numbers gradually decline over summer. In contrast, H. armigera overwinters as pupae in the soil under late season crop residues. These moths emerge in spring and their numbers build up over the early and middle parts of the season in the substantial areas of maize grown in the region.

The moths then move onto the late maturing crops such as cotton, maize, soybean and sunflowers. It is in the soil under residues of these crops that the pupae overwinter.

While farmers have begun to use various Integrated Pest Management (IPM) techniques such as economic thresholds, cultural control, biological insecticides and 'soft' insecticides over the past few years, insecticides are still the main weapon in the management of both species.

CSIRO Entomology scientists funded through the GRDC and the Australian Cotton CRC are developing an Area Wide Management (AWM) strategy which targets Helicoverpa in southern cropping regions. This will provide guidelines to enable region-wide rather than farm-based management of the pest. When the strategy is implemented, Helicoverpa populations over the whole area should be reduced, resulting in lower pest pressure on all susceptible crops and reduced insecticide use.

Implementation of the AWM strategy will:

• Rely on regular monitoring of Helicoverpa activity;

• Integrate the use of tactics such as pupae busting, trap cropping and beneficial nursery crops;

Researcher Scott Hardwick doing some bug checking.

Regular monitoring of crops for Helicoverpa activity would be part of any area wide management plan. Here maize silks are being checked for Helicoverpa eggs.

• Involve coordinated insecticide use and adoption of insecticide resistance management;

• Be supported by the cotton and grains industries' best management practice programs.

The combined effect of these approaches will be to reduce the impact of Helicoverpa across the whole region.

The AWM Strategy

The proposed AWM strategy would have three main aims:

• Reducing the carryover of insecticide resistant H. armigera pupae by managing late season populations;

• Managing the first spring generation (late October to late December) to reduce early season buildup of Helicoverpa on a regional/ district scale; and,

• Managing mid-season populations (December to March) to reduce mid-season population pressure on Helicoverpa-susceptible crops.

Reducing the carryover of insecticide resistant H. armigera pupae

To reduce the survival of overwintering pupae in the soil, pupae busting should be carried out. Farmers need to identify fields at risk — such as those containing late-planted maize, sorghum, sunflower, soybean and cotton crops — and cultivate as soon as possible after harvest. It should be completed by September 30.

In southern NSW and northern Victoria, fields harvested by mid-February won't support over-wintering pupae unless there is regrowth. Any fields that are attractive to Helicoverpa after mid February are at risk of carrying over-wintering pupae.

At-risk fields that are to be planted using minimum tillage systems during the autumn should be checked for diapausing pupae — such as maize/wheat double cropping systems — and pupae busting should be considered if they are present at the recommended threshold of one pupa per 10 square metres.

Late season Helicoverpa activity on susceptible crops must be monitored closely and Helicoverpa controlled where populations are above threshold.

When possible Insecticide Resistance Management Strategies (IRMS), which have been developed for Helicoverpa in grains and cotton crops in southern areas, should be implemented as they are an important way of slowing the development of insecticide resistance in H. armigera.

Reducing the early season buildup on a regional/district scale

Trap crops can either prevent pests from reaching the target crop or concentrate them in areas where they can be destroyed. Early season trap cropping can be used in southern NSW and northern Victoria to take advantage of a period when crops attractive to adult Helicoverpa are starting to dry off (such as canola, faba beans) or are immature and not yet attractive (such as maize, sweet corn, cotton) to adult Helicoverpa.

Chickpeas can be highly attractive during this period and can therefore be used to concentrate early season populations of Helicoverpa in small discrete areas. The current recommendation is that a minimum of two hectares or one per cent of the cultivated area be planted with late sown chickpeas to attract H. punctigera that are present in the region as well as H. armigera during their main emergence period (October–November). If necessary, growers can manipulate and delay trap crop flowering by slashing.

Trap crops should be destroyed within three weeks of finding the first 5th instar Helicoverpa larvae. Large commercial chickpea crops can also effectively act as trap crops and Helicoverpa on them should be managed accordingly.

It is important to maintain high levels of Helicoverpa control in commercial chickpea crops using an appropriate insecticide. If Helicoverpa are not controlled on trap crops and commercial chick pea crops, these crops run the risk of becoming a source of early season pest build up — thereby adding to the population rather than helping to reduce the problem

Sex pheromone traps can be a useful tool for detecting Helicoverpa flight activity within a region. Commercial pheromone lures are available for both H. punctigera and H. armigera. A regional grid of pheromone traps, operating from September to March and monitored on-farm, can be used as a trigger for more detailed

sampling of spring hosts (winter cereals, winter grain legumes, canola, chickpeas and weeds).

Beneficial insects, which can make a significant contribution to managing Helicoverpa populations, should be encouraged by using selective ‘soft’ pesticides early in the season, planting lucerne refuges for them and maintaining bush remnants.

Nursery crops can act as reservoirs for large numbers of beneficials. Lucerne is one example and, although it is also attractive to adult Helicoverpa, there is high mortality in the eggs from disease and predation. Lucerne refuges should be managed by slashing to ensure that they remain attractive to Helicoverpa throughout the growing season.

If disruptive insecticides (pyrethroids and organophosphates) are needed, their use should be delayed in all crops for as long as possible.

Reducing mid-season population pressure on Helicoverpa-susceptible crops

Late season trap crops such as pigeon pea, sorghum, maize and soybean are planted to flower as commercial crops are maturing and becoming less attractive to Helicoverpa. This can also result in over-wintering H. armigera pupae being concentrated into smaller areas that can be targeted more easily for pupae busting.

Insecticide use must be managed properly by:

• Using the most selective pesticide available to conserve beneficials;

• Delaying the use of disruptive insecticides (pyrethroids and organophosphates) in all crops for as long as possible;

• Coordinating insecticide rotations and alternate chemical groups in crops where multiple sprays are used and using the appropriate Regional Insecticide Resistance Management Strategy; and,

• Of course all insecticide application should follow the cotton industry BMP.

All susceptible crops must be closely monitored for Helicoverpa and, where they are above threshold, they should be controlled within the limits of insecticide resistance and available registrations. When insecticides are being applied, it is important to follow the Insecticide

Resistance Management Strategy whenever possible and spray timing is critical — ‘spray small or spray fail.’

Helicoverpa are pests of many crops and the battle to manage them economically and in a way which is sustainable is ongoing. They are mobile and don’t recognise farm or crop boundaries. This means that the adoption of an AWM strategy will be an essential tool in maintaining the viability of crops in southern NSW and northern Victoria.

This work forms part of a larger project which is collaborative with NSW Agriculture and is supported by the Grains Research and Development Corporation, the Cotton Research and Development Corporation and the Australian Cotton CRC.

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