Integrating insect control for Ord soybean production

G R. Strickland

Follow this and additional works at: https://researchlibrary.agric.wa.gov.au/journal_agriculture4

Recommended Citation

Available at: https://researchlibrary.agric.wa.gov.au/journal_agriculture4/vol22/iss2/23

This article is brought to you for free and open access by Research Library. It has been accepted for inclusion in Journal of the Department of Agriculture, Western Australia, Series 4 by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandra.papenfus@agric.wa.gov.au, paul.orange@dpird.wa.gov.au.
Integrating insect control for Ord soybean production

by G. R. Strickland*

Since cotton growing at the Ord River Irrigation Area ceased in 1974, many different crops new to the area have been grown experimentally and commercially. The grain legume group (soybeans, mungbeans, peanuts, cowpeas) have emerged as potentially viable crops suited to wet season cropping. In particular, soybeans are commercially successful, after considerable research into pest control and agronomic methods.

Soybeans are attractive to a wide range of insect pests, so careful control strategies are necessary to prevent serious crop losses from the periodic high insect pressures characteristic of the sub-tropics. When dealing with large numbers of insects associated with susceptible crops it is paramount that as many insect control methods as necessary be used to maximise crop yields at minimum cost. The basic concepts employed for pest management are:

- Cultural practices
- Biological control
- Insecticidal control
- Insect resistant varieties

The successful integration of these methods provides good insect control. For example, it is important not to apply broad spectrum insecticides to kill minor pests when this can destroy beneficial parasitic and predatory insects and therefore expose the crop to other highly mobile serious pest species. Clearly a good understanding of the biology of the insects found in the crop and a knowledge of the quantity of damage each pest can inflict are necessary to ensure the correct pest management techniques are applied.

Key pests

Some of the pests which attack soybeans are widespread and well known in Australia while others are unique to the non-temperate regions of the continent and require special consideration. An example of the latter is the beetle Zygrita diva which, when in the larval stage, is a pest that tunnels in the stems of soybeans. This has been considered the most damaging pest of all to soybeans, since it can totally destroy infested plants by chewing through the stem. It is almost impossible to control with insecticides once inside the stem. Other important pests include several pod-sucking bugs (especially the green vegetable bug); leaf eating looper caterpillars and pod-chewing pests (especially the budworm, Heliothis spp).

Below is a review of the methods entomologists have adopted to control these pests so that the control strategy for one does not induce the build-up of another.

Cultural practices

When the biology of an insect pest is well understood there is often a great deal to be gained by adapting cropping practices to avoid peak pest levels. An example of this approach is the avoidance strategy now used to limit the level of damage from the stem borer, Zygrita diva. Time of planting trials have indicated that crops planted early in November and December suffer extremely high levels of borer damage, but that the pest’s activity declines rapidly in January. Commercial crops planted in January have been virtually free from damage. Good crops are produced without the need for several expensive insecticide applications which would otherwise be required to exclude the stem borer.

Another example of reducing the significance of pests has been the concentration on growing fast-maturing varieties. This is particularly important in avoiding the pod-sucking bug pests. Clearly, the shorter the time the vulnerable soybean pods are on the plant, the less opportunity the bug pests have to damage the developing seeds.

Biological control

The Department of Agriculture has started three important biological control programmes which have greatly influenced the overall pest management system for grain legume production. The first of these projects was the deliberate build-up and encouragement of the very small beetles Heliothis in January. Commercial crops planted in January have been virtually free from damage. Good crops are produced without the need for several expensive insecticide applications which would otherwise be required to exclude the stem borer.

Anoth er example of reducing the significance of pests has been the concentration on growing fast-maturing varieties. This is particularly important in avoiding the pod-sucking bug pests. Clearly, the shorter the time the vulnerable soybean pods are on the plant, the less opportunity the bug pests have to damage the developing seeds.

* Entomologist, Department of Agriculture
Controlling insects on susceptible crops in the sub-tropics requires an integration of pest control techniques. It is extremely important that each component of the system complements the others. The natural and introduced biological control agents, rather than insecticides, are the most significant agents in the pest management system for soybeans at the Ord.

Insect resistant varieties

Although disease resistant varieties of many crops have been used for many years, the value of insect resistant varieties has been recognised only recently. Projects of this nature are long term concepts which involve field assessments of potentially useful varieties and a great deal of plant breeding activity.

At the Ord, only preliminary results are to hand from screening trials for resistance to the stem borer *Zygria diva*. However these results give an indication of the potential of such varieties.

Insecticides

Insecticides remain the final weapon against insect pests. Basically they can be employed either to totally annihilate or to selectively remove or reduce a group of pests. Under the sub-tropical conditions of high pest densities it is most desirable to use selective insecticides which tend to minimise the destruction of natural beneficial insects and biological control agents.

Examples of selective pesticides include the bacterial preparation ‘Dipel®’, the virus ‘Elcar®’ and the ovicides chlordimeform, amitraz and methomyl. All these insecticides selectively control moth pests in either the egg or caterpillar stage without seriously affecting the range of parasites and predators.

Researchers are continuing to study the use of these chemicals, because of the considerable variation in results. However there is no doubt that they can be very valuable pesticides when used in well-timed situations.

Although there are no insecticides specifically selective for control of the pod-sucking bug pests, ‘soft insecticides’ are used when possible. The ‘soft chemicals’ are those which have a high level of activity in terms of pest species but which are ‘softer’ on beneficial insects. At the Ord, for example, endosulfan and trichlorfon have been found to be ‘soft’ on wasp and fly parasites of pests and are therefore used preferentially when broad spectrum insecticides are necessary.