AREA WIDE MANAGEMENT OF HELIOTHIS

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BACKGROUND

Heliothis armigera has been a growing problem for many years. While the cotton producers have borne the brunt of it, reports of increasing damage to crops such as pulses, sorghum and maize have become more frequent. The subtropical climate of the Darling Downs, Burnett and Dawson Callide regions along with the number of host crops grown in the region have created a paradise for Heliothis and devastation for field crop growers.

The cotton industry has had a voluntary chemical usage strategy for many years, however, due to many of the same chemicals being used on other crops, chemicals are failing because of the continuous exposure of Heliothis to the same chemical in different crops e.g. Carbamates on chickpeas, cotton and mung beans.

The last 2 summer seasons have seen many chemicals on the verge of failure as the level of resistance rose with spray failures occurring when application rates and timing were not 100%. There has been little or no margin for error.

In December 1997, Downs growers were warned that cotton may become unviable with 2 years if Heliothis armigera was not managed. In some Downs areas in 1996-97 and again in 1997-98 Heliothis egg lays reached up to 800 per meter with very small and small larvae at 4 to 7 per meter during periods of the season. This pressure meant that many grain crops were also at serious risk i.e.: all pulse crops and unacceptable damage to sorghum, maize, sunflowers and millets.

Added to this list of woes was the poor performance of Ingard cotton. This along with very limited new technology available at a prohibitive price, indicated that a cropping Armageddon was fast approaching.

A spin off from the increased crop spraying was community concern e.g. anecdotal evidence of spray induced health problems, odour problems, chemical residues in non-target crops

In short, we are looking at losing most of the high value crops that also require the greatest amount of local processing. The result of this would be serious financial damage to producers and a severe economic downturn in local communities with employment and business activity being affected.

1. THE FUTURE

Do we wait for a miracle, change our farming strategies back to growing only cereal crops, go broke, sell out and move to the coast, or look outside the square for another way of solving the problem.

In early January 1998, senior members of the Queensland Grain Growers Association, Darling Downs Cotton Growers Incorporated, Cotton Australia and the Farming Systems Institute formally met to develop a strategy to manage Heliothis armigera in field crops on the Darling Downs. The decision was made to set up two experimental regions to see if area wide management would work. This strategy was not new as regional management of insect pests in California and Georgia in the USA have been successful.

Two regions were proposed as a control areas:-

1. Brookstead to Cecil Plains – consisting predominantly of irrigated cropping.
2. Jimbour Flood plain – a much more diverse farming area with very little irrigation and significant areas of no till.

These limited areas were decided on so that scientific and educational efforts could be concentrated.

A series of meetings were held throughout these areas to get approval of the growers to proceed with the strategy.

The next move was to start an education program to inform growers on all available methods of control of Heliothis. There are two main methods:-

1. Chemical control – how to maintain existing chemistry.
2. Non chemical control.

1a. Chemical Control

The wide variety of crops grown in the area and the timing of them makes successful quarantining of chemicals very difficult, such as the use of carbamates (Larvin) on chickpeas in October and then on cotton in Stage 3 (February onwards) and on mung beans from January onwards, means there is continuous exposure of Heliothis to this product.

A similar case can be shown for synthetic pyrethroids as they are used in October to control Army Worm in barley and then throughout Stage 2 & 3 for cotton, and possibly a midge spray on sorghum.

For chemical control to be successful, the timing of sprays is critical. While cotton is closely checked and spraying timed to coincide with egg hatch, checking of most other field crops is irregular. Some growers work on the basis that crows and starlings flying out of a field mean there are Heliothis present.

A key element of control in the multicropping areas is to raise awareness of Heliothis, its life cycle, when it is susceptible to spray, how to check for eggs and grubs and what are the economic thresholds. Farmers should also be looking for beneficial insects when making Heliothis management decisions.

Growers need to include Heliothis in their equation for planting a crop e.g. variety, fertilising, water, sprays and paddock history. This was common practice by good farmers growing sorghum with regard to sorghum midge prior to the introduction of midge resistant sorghum.

1b. Non Chemical Control.

This consists of agronomic practices to interrupt the life cycle of Heliothis.

This involves pupae busting of all cotton fields and other crops that have had Heliothis in them and may contain over wintering pupae. Pupae busting requires a vigorous cultivation to about 100 mm depth to damage pupae and destroy emergence tunnels.

The elimination of host weeds and volunteer plants that may act as a nursery or host.

Again I draw the comparison of the sorghum industry prior to midge resistant hybrids where growers eliminated early flowing volunteer sorghum and *Johnson Grass* so as not to build up an early population prior to their main crop.

The use of trap crops in spring to attract Heliothis at a time when there is little other host material so that the early population can be destroyed.

Using sorghum as a trap crop and spraying it with Gemstar, thereby using a totally different agent for control. The use of Gemstar or other viruses on non cotton crops assists in breaking the cycle of use of existing chemical use.

Trying to regulate the use of the "harder" chemicals early in the season to allow the beneficial insects to build up and create a biological control.

2. CAN WE ACHIEVE AREA WIDE CONTROL HELIOTHIS.

Only if the growers are frightened enough by the prospect of losing their cropping options and feel it is their best option.

It is voluntary so that it has to be driven by the people involved and must have local ownership. This does not mean that outside help is unnecessary, to the contrary, organisations like FSI, ACGRA, GRDC and CRDC are most necessary for scientific, organisational and funding assistance. The role of research, extension and education is essential e.g. newsletters, field days and shed meeting, newspaper articles.

3. WHAT ARE THE PROBLEMS OF AREA WIDE CONTROL.

3a. Getting co-operation from growers.

Problems here can arise from inter-industry animosity and from different farming practices e.g. Cotton vs Grain or no till vs tillage.

While the animosity problem is solvable though difficult, the no till situation is harder. These farmers may not own any cultivation machinery and to cultivate would completely overturn their farming system. This is an area that needs more research and the FSI are currently looking at it. Again crop type and timing may partially solve this problem. Pupae Watch is a scientific system aimed at identifying this problem.

The animosity problem arises where grain growers say it is a cotton problem and cotton should solve it. Usually they are bitter about the amount of spraying going on with their neighbours cotton, so the argument can be put to them that their co-operation may help to reduce the spray incidence next door. The cotton grower will of course need to be seen to be as co-operative as physically possible.

3b. Getting co-operation from consultants.

Because consultants often act as an individual, there can be real problems with sprays and spray mixes and the application timing. The consultants need more effective communication and co-operation so they are aware of what is happening in other fields and other crops. This is also needed so there is a better understanding of what chemicals are being used and the

efficacy of them. There is little point in my neighbour using a chemical which failed on my place two days before.

If the strategy groups already formed can be made to work and achieve positive management of Heliothis, there are many other areas that will rapidly follow because all farmers are driven by "the bottom line". They have shown that they are increasingly prepared to take up new technology once it has been shown to work. Already there are growers forming into groups to try to give themselves an edge over Heliothis.

4. INDUSTRY COOPERATION AND COORDINATION IN HELIOTHIS CONTROL

The difference between the grain and cotton industries on the Downs has blurred considerably with the expansion of the dryland cotton industry.

This has weakened the inter industry rivalries and jealousies and the explosion of resistance in Heliothis has shown us all that this insect thrives on procrastination and division. While we argue amongst ourselves or who is to blame for the problem, heliothis continues to destroy our crops, whether they be cotton, sorghum, mung beans or any other crop which hosts its dinner.

With increasing levels of resistance, co-operation between the industries was not hard to achieve. The members of our strategy group all have a common goal and that is to retain the viability of the various crops that make up the Downs farming system.

The representatives on the strategy group from the cotton industry are Geoff Hewitt, Chairman of the Darling Downs Cotton Growers Inc., Jeff Bidstrup, Harley Bligh, Board of Cotton Australia and John Woods, Regional Manager of Cotton Australia.

From the grain industry, myself Vice President of Queensland Grain Grower Association, Wayne Newton and Terry Sharpe, Board members of QGGA and John Obst, Policy Officer of QGGA.

David Hamilton (Director) and Dr David Murray represent the Farming System Institute with assistance from other QDPI personnel.

This group has the support of the industry organisations it represents and brings to the table a wide range of skills which should give it adequate credibility in the farming and business community.

Without this credibility, we may well lose the battle against Heliothis for we need the support of all farmers, the business community who have a great deal at stake, and the general community. We need time and the forbearance of the general community to make this work for if they become too demanding in relation to unpleasant farming practices in the short term, there may well be no long term.