

Heliothis insecticide resistance continues to climb

By Robin Gunning, NSW Agriculture

The 2001–02 season was a very difficult year for Helicoverpa insecticide resistance monitoring, due to lack of insects in the field. Egg pressure in cotton districts of NSW and Queensland was very low and made for a very difficult job in egg collecting. The efforts of all those cotton industry personnel who did help with the egg collecting is very gratefully acknowledged. Lack of eggs made it impossible for us in Tamworth to monitor all cotton insecticides

Given there was a shortage of eggs, and that there are a number of new Helicoverpa insecticides now being used on cotton, we concentrated on monitoring the newer compounds. There had also been a clear message delivered to us — that consultants and growers were less interested in data from older chemistry such as the pyrethroids and carbamates. After several years of the accumulation of baseline data, indoxacarb and the mectins have now been incorporated into the resistance screen.

HELICOVERPA ARMIGERA

Pyrethroids

Due to lack of Helicoverpa eggs and too many other compounds to bioassay, we cut back on monitoring for resistance to the reference pyrethroid fenvalerate, but monitoring for one commercial pyrethroid, bifenthrin (Talstar) was maintained.

While we only have one result for fenvalerate, it is important to note that the extensive use of pyrethroids against adult whiteflies at Emerald has greatly increased the fenvalerate resistance factor compared to previous years. Pyrethroid use against whiteflies in Emerald has been very detrimental to our attempts to manage

FIGURE 1: Bifenthrin resistance frequency in H.armigera cotton populations in NSW and Qld

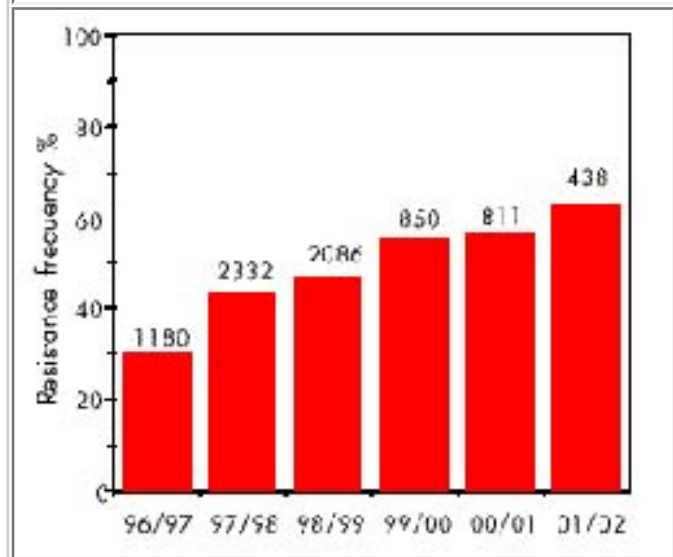


FIGURE 2: Endosulfan resistance frequency in H.armigera cotton populations from NSW and Qld

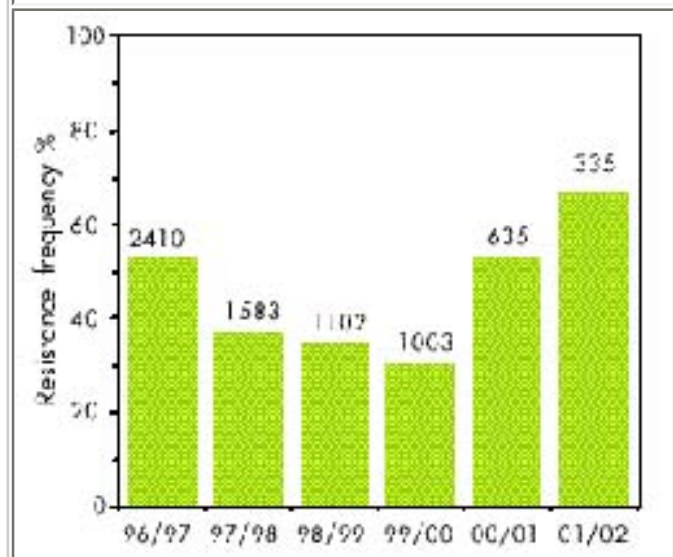


FIGURE 3: Profenofos/methyl parathion resistance frequency in H.armigera cotton populations from NSW and Qld.

insecticide resistance in *H. armigera*.

Bifenthrin resistance continues to increase in all areas both in resistance frequency (to around 60 per cent) and resistance factor (approaching 20 fold), with Emerald again being of particular concern (see Figure 1).

Overuse of PBO as a tank mix with pyrethroids over the years has exacerbated the problem of pyrethroid resistance in *H. armigera*.

Endosulfan

Endosulfan resistance frequency continues to increase (Figure 2).

Carbamates

Lack of eggs did not allow much in the way of carbamate bioassays in 2001–02 and it is impossible to comment on resistance trends.

Organophosphates

There is cross-resistance between profenofos and methyl parathion in *H. armigera*. There were no changes with respect to previous seasons, in profenofos/methyl parathion resistance (Figure 3). Overall, the resistance frequency remains low (about 10 per cent) and stable, although some 'hot spots' do occur.

In 2001–02, we detected some *H. armigera* resistance to chlorpyrifos for the first time in collections from the Darling Downs. But this resistance is unrelated to profenofos/methyl parathion resistance in *H. armigera*, which means that we can still treat chlorpyrifos as a separate group in the *Helicoverpa* resistance management strategy.

Spinosad (Tracer)

As Figure 4 shows, there has been another overall increase in spinosad resistance. The overall resistance frequency is now close to 10 per cent of the *H. armigera* population. Our research has shown that the resistance factor is approximately 30 fold. We are most concerned about these data and feel that steps need to be taken to further limit the use of Tracer.

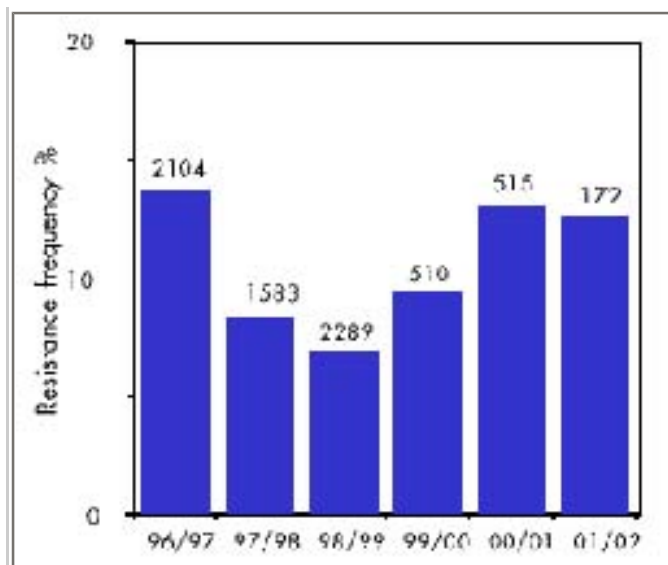


FIGURE 4: Spinosad (Tracer) resistance frequency in *H. armigera* cotton populations from NSW and Qld

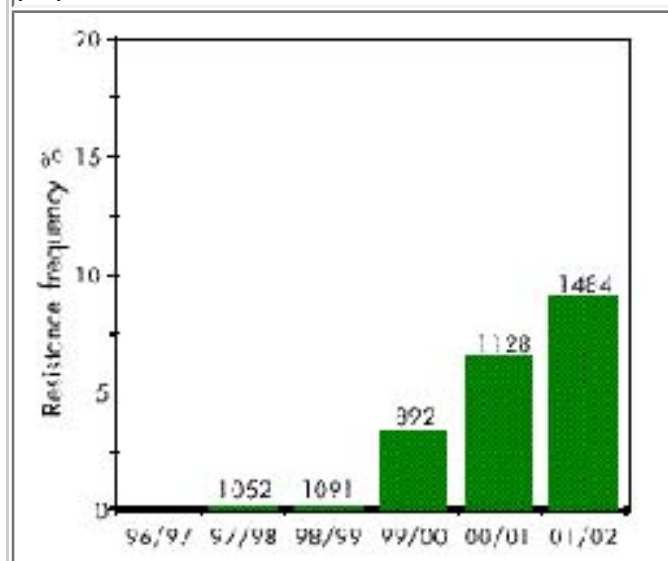


FIGURE 5: Chlorfenapyr (Intrepid) resistance frequency in *H. armigera* cotton populations from NSW and Qld

Chlorfenapyr (Intrepid)

Chlorfenapyr is an insecticide to which we have increased resistance (Figure 5) despite low use. We have suspected a puzzling cross resistance and our research has shown that chlorfenapyr resistance is related to increasing pyrethroid resistance.

Amitraz, indoxacarb (Steward) and the mectins

Monitoring is showing no resistance to Amitraz, indoxacarb and the mectins, but it can happen and extreme care is required in the management and use of these insecticides.

The use of indoxacarb on grain legumes in spring is going to be a real test to resistance management and it is important that there is a break, before use on cotton.

HELICOVERPA PUNCTIGERA

H. punctigera were monitored for resistance to pyrethroids (fenvalerate), endosulfan, carbamates (methomyl and thiodicarb) and the mectins.

Pyrethroid use against whiteflies at Emerald has selected for some pyrethroid resistance (10 per cent), in *H. punctigera*. Low frequencies of endosulfan resistance were detected in some Macquarie (two per cent) and Upper Namoi (four per cent) collections. Carbamate resistance is common in *H. punctigera* (Emerald: 19 per cent, Macquarie: 11 per cent and, Upper Namoi: five per cent).

