

Pest thresholds and the economics of crop sprays

Northern region growers and advisers are advised to revise control thresholds for grain sorghum insect pests, such as corn earworm and sorghum midge, in light of the lower grain prices currently on offer. It's a timely reminder for growers in all regions to 'do their sums' before making their pest control decisions.

Grains Research and Development Corporation (GRDC) supported analysis shows the new breakeven cost of control means that higher pest densities in sorghum crops are needed before control becomes economic.

Dr Dave Murray, Queensland Department of Primary Industries and Fisheries (QDPI&F) principal entomologist says with new crop grain sorghum prices below \$200 per tonne, the control threshold is higher compared to thresholds used last season when grain values were much greater.

Dave says using a benefit:cost ratio is also an important consideration.

"The breakeven point is where the cost of control is equal to the loss caused by the pest," he said. "The benefit:cost ratio will vary according to individual preferences, and needs to be factored in to calculations."

GRDC supports the QDPI&F Integrated Pest Management program which aims to encourage reduced pesticide use through options including biological and cultural control, varietal selection and careful use of pesticides.

"Under IPM, chemical control should support but not disrupt biological control – even with major pests such as corn earworm and sorghum midge," Dave said.

Corn earworm

A corn earworm larva is estimated to consume 2.4 grams of sorghum during its lifetime.

The economic threshold (that is, the number of larvae per head where the cost of control is equal to the value of the grain saved) can be calculated using the formula:

No. larvae/head = $(C \times R) \div (V \times N \times 2.4)$

where:

C = cost of control (\$/ha)

R = row spacing (cm)

V = value of crop (\$/tonne)

N = number of heads/metre of row

2.4 = weight of sorghum (grams) lost/larva.

When sorghum is valued at \$300 per



On susceptible hybrids, one adult sorghum midge is estimated to cause 1.4 g yield loss per day. (Photo: D. Ironside)

tonne (a price on offer around 12 months ago), one larva per head could cause \$72 crop loss per hectare.

But if the price drops to \$150 per tonne, one larva per head causes just \$36 crop loss per hectare, or 50 per cent less economic damage.

"This example demonstrates just how important it is to consider each case on its merits, and in particular to consider the cost of control, as it too can vary widely depending on whether aerial or ground spraying is used," Dave said.

Sorghum midge

As with corn earworm, decisions to spray for midge are greatly influenced by crop value and it is possible to calculate yield loss estimates.

The DPI&F has generated a table of yield loss estimates based on extensive field trials. The average yield loss per midge per day on different rated midge (resistant) hybrids can be calculated (see www.thebeatsheet-ipmnews.blogspot.com).

For a susceptible hybrid, one adult midge is estimated to cause 1.4 g yield loss per day.

Research has shown that one well timed

insecticide for midge (put on from panicle emergence and before midge even enter the crop) will still only prevent 70–80 per cent of damage in lower midge rated sorghum hybrids. In 8+ rated hybrids, yield losses can be reduced by over 90 per cent with this spray timing.

For example, if the total cost of applying a synthetic pyrethroid by plane is around \$20 per hectare, at a grain price of \$150 per tonne, it is simply not economic to spray mid to high rated hybrids at one midge per head and 8+ hybrids at three midges per head.

It should be emphasised that 8+ is the highest rating that can be assigned to midge resistant hybrids. There are some 8+ lines that would have a considerably higher rating if the scale was extended – and are practically immune to midge damage.

Don't rely on fixed values

These scenarios show the importance of calculating thresholds for the current situation, rather than relying on a fixed value from one year to the next.

For more information on pest control, visit www.grdc.com.au/pestlinks.