

# The cost of midge damage

By Queensland Department of Primary Industries & Fisheries

Over the last decade sorghum midge have not caused many headaches for most sorghum growers.

But high grain prices and staggered sorghum plantings mean that sorghum midge are likely to be found building up in numbers in later planted sorghum crops, causing economic damage.

Even if midge are not in high numbers in a crop, the high grain price combined with the low cost of the insecticide of choice (synthetic pyrethroids) means that it is likely that spraying for midge will be a simple economic decision.

In the past the best way to avoid midge damage was to plant as high a midge rating as possible as early as possible in the season, and to plant crops well outside overlapping flowering windows of two to three weeks within districts. This has not been possible for many growers this season as rain came in a late and staggered fashion. This means that many crops planted over progressive flowering windows are likely to be at risk of midge population build up.

### Careful monitoring required

In these cases the only way to avoid economic damage is to monitor very closely for midge numbers every day during head emergence and flowering and have a predetermined action spray threshold for midge numbers prior to them turning up.

This insect pest requires very careful

monitoring at exactly the right time of day. By the time you see the adult midge, they are already causing irreparable damage. Adult female midge lay their eggs inside sorghum florets where chemicals cannot reach.

As such insecticides only target the adult midge as they move about the crop and do not kill the eggs or hatched larvae that are already present inside the sorghum florets. While these midge adult flies only live for one day, they do most of their egg laying (and subsequent damage to the crop) in the morning. As such generally peak midge activity occurs between 9–11 am. Midge numbers can be widely different both within a crop and on plants right next to each other.

Changes in weather can bring midge in at any time of day from surrounding areas. So growers should monitor for midge over 10 metres of row in at least four different locations in your crop. It may be necessary to spray only one section of crop at a time, or the whole crop accordingly. Midge flies are only one to two mm long, so if your eyes are not what they used to be, then make sure you get someone with good eyes to carefully check each head. It is very easy to underestimate midge numbers if you are not careful.

### The cost of damage

Using the QDPI&F formulas based on extensive field trial tests that show average



Sorghum midge relative to sorghum florets. (PHOTO: Greg Cronholm, Kansas State University)

yield losses per midge per day on different rated midge hybrids, it is possible to calculate theoretical yield loss estimates on a particular crop scenario (Table 1).

The table results assume that spray timing and effectiveness results in a 100 per cent kill and no damage prior to chemical application. It also assumes that you will receive the same average midge pressures over four to five days. In reality research has shown that one well timed insecticide for midge (put on from panicle emergence before midge even enter the crop) will still only prevent 70–80 per cent damage protection in lower rated sorghum hybrids, while this increases well above 90 per cent in eight rated hybrids.

When we consider that spraying will not be timed perfectly in most cases a 1.5:1 or 2:1 cost benefit ratio may be a useful way to develop an action threshold. In either case the economics of spraying for midge at even the low midge pressures shown in the above scenario warrant close attention.

If the total cost of applying a synthetic pyrethroid by plane is around \$20 per hectare, we can see that at \$250–\$300 per tonne, it is clearly wise to spray everything but perhaps 8+ hybrids at three midge per panicle. And it's wise to spray low to mid rated hybrids at even one midge per panicle.

Many growers may choose to include a spray for midge with a synthetic pyrethroid in with a virus application for helioverpa, or may look to clean up midge and Ruther-glen bug at the same time with one or two well timed pyrethroid applications. In all cases spraying pyrethroids will devastate beneficial insect populations and the implications of this should be included in the decision to spray. Pyrethroid applications on their own are likely to flare helioverpa and aphid populations. ■

**TABLE 1: Economics of midge damage at different grain prices without chemical control**

Midge rating of hybrid	Yield loss* (t/ha)	Damage (\$/ha) @ selling price of:			
		\$160/t	\$200/t	\$250/t	\$300/t
<b>1 midge per panicle</b>					
Susceptible (rating 1)	0.52	42	104	130	156
3 rating	0.18	14	36	45	54
5 rating	0.10	8	20	25	30
7 rating	0.08	6	16	20	24
8+ rating	0.05	4	10	13	15
<b>3 midges per panicle</b>					
Susceptible (rating 1)	1.58	252	315	394	473
3 rating	0.53	84	105	131	158
5 rating	0.32	50	63	79	95
7 rating	0.23	36	45	56	68
8+ rating	0.12	25	24	30	36

\*A crop of 75,000 panicles per hectare, damage loss over 4–5 days assuming all panicles exposed.