

Midge Tested Scheme

Rating of Midge Resistance Levels in Commercial Sorghum Hybrids

Tracey Shatte¹ and Adam Hardy¹

1. Agri-Science Queensland (DEEDI)

Background



Figure 1: Female midge laying eggs in a sorghum floret

Sorghum midge (*Stenodiplosis sorghicola*) is an important economic insect pest of grain sorghum in this country. Midge Resistance (MR) was first introduced in Australia around 20 years ago and now all sorghum hybrids on the market contain some level of midge resistance. DEEDI, with funding from GRDC and three major commercial sorghum breeding companies (Pacific Seeds, Pioneer Hi-Bred and HSR Seeds), runs the independent testing scheme which determines the midge resistance ratings for all new sorghum hybrids prior to their commercial release.

Method

The current annual testing method was first introduced in 1993 and modified in 2002 to the present format.

A plastic igloo is used to provide ideal environmental conditions for both sorghum and midge. Standard lines (hybrids of known resistance rating) are grown alongside test hybrids in the trial. High midge pressures are applied during the flowering period and daily counts of midge numbers are performed during this time. Post seed-set all lines are assessed for head damage and a value of: **% damage/total # midge present** is derived for each plant in the trial.



Figure 2: Hybrids growing inside the plastic igloo

Results

Statistical analyses are then performed and each test hybrid is rated according to their results compared with those of the standards. The rating score given (from 1 to 8+) relates to the resistance level of that hybrid. For example a 7 rated hybrid can withstand 7 times the midge pressure whilst sustaining the same amount of damage as a 1 rated hybrid.

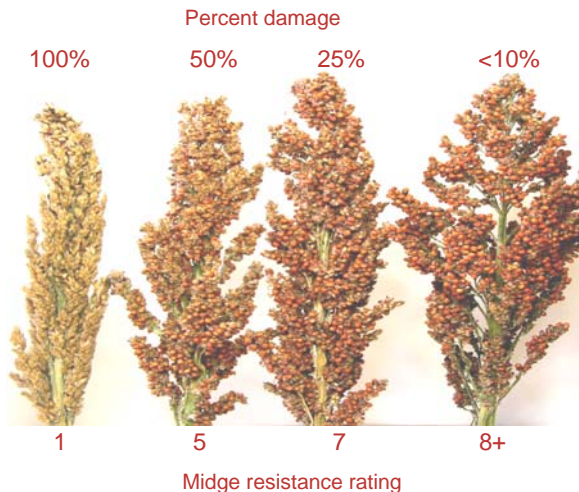


Figure 3: Damage to rated hybrids under extreme midge pressures

Outcomes

Economic Impact

The economic impact of midge damage for growers can be seen in the table below. The MR rating system allows flexibility in hybrid choice depending on planting times and midge control options.

midge rating of hybrid	yield loss (t/ha)	damage (\$/ha) @ selling price of:		
		\$140/t	\$180/t	\$220/t
Early-mid season (0.5 midge per head/day)				
1 rating (susceptible)	0.26	36	47	57
3 rating	0.09	13	16	20
5 rating	0.05	7	9	11
7 rating	0.04	6	7	9
8+ rating	0.03	4	5	7
Late season (3 midge per head/day)				
1 rating (susceptible)	1.58	221	284	348
3 rating	0.53	74	95	117
5 rating	0.32	45	58	70
7 rating	0.23	32	41	51
8+ rating	0.16	22	29	35

Table 1: Economics of midge resistance in Australian conditions (without chemical control)

Assurance

The rating score and logo give growers the assurance that the hybrid they are selecting has been independently assessed and should perform to the standard they expect.



More information

Department of Employment, Economic Development and Innovation

Name: Tracey Shatte
Phone: +61 7 4660 3628
Email: tracey.shatte@deedi.qld.gov.au

www.dpi.qld.gov.au

