Aphid management in winter cereals 2009-2010

Background

The impact of aphid infestations on winter cereal yield and grain quality has been an NGA project theme during 2008 to 2010. In 2008 the crop focus was only on barley but this was enlarged to include both bread and durum wheat in 2009 and 2010. (2008 results can be found on pp 61-78 in our *Validator 2007-2008 Vol 2*, available at www.nga.org.au)

This project was designed to generate data on the fit and potential benefits of aphid management strategies under commercial conditions. Additionally it was hoped to generate data to confirm or suggest a suitable aphid threshold for foliar insecticide application

Project aims

1. To measure yield and grain quality impacts of aphid infestations in winter cereals
2. To evaluate the performance of seed treatment and foliar applications for aphid management
3. To determine what species of aphid infest winter cereals and start to identify population dynamics

Results in a nutshell

Aphid population:

- *Aphids pressure was rated as 'moderate' in 2009 with >10/tiller at 6 of 10 sites with peak counts at 25-50/tiller*
- *Aphids pressure was rated as 'low' in 2010 with ~5-10/tiller found at all 4 sites*
- *Three different aphid species were found at nearly all sites but varied in population dynamics and timing*
- *Oat and rose grain aphid were found in similar numbers in all crops but the corn aphid was nearly exclusively in barley*
- *Populations generally built up and naturally declined within ~3-4 weeks*
- *High levels of beneficial insects (wasps and ladybirds) were seen at a number of sites and appeared to initiate population declines*

Aphid control:

- *The standard label rate of imidacloprid seed treatment (eg Zorro® at 400mL/100 kg) provided extended aphid control (~70-90 days after planting)*
- *The high label rate of imidacloprid seed treatment (eg Emerge® at 240mL/100 kg) extended aphid suppression by an additional ~10-14 days*
- *Pirimor provided good levels of knockdown control*

Barley yellow dwarf virus (BYD):

- *Visible symptoms of BYD were clearly evident at one site - Spring Ridge 2010. Immunoassay confirmed both the presence of BYD and the visual rating trends (BYD was also suspected at Spring Ridge in 2009 but not confirmed)*
- *Two other non-symptomatic sites were tested in 2010 but neither had BYD*
- *Other than the Spring Ridge 2010 site, any measured yield impact is believed to be primarily a result of direct aphid feeding activity*

Yield and grain quality impact:

- *The standard rate of imidacloprid resulted in **mean yield benefits of ~6% (150-200 kg/ha)** at sites with aphid pressure >5/tiller during both 2009 and 2010*
- *In 2008 - with higher aphid pressure (>70/tiller in all 4 trials) - the same rate provided yield benefits of ~10% (330 kg/ha)*
- *Increased yield benefit was obtained with the high rate of imidacloprid*
- *Level of benefit reduced at sites with low aphid pressure (unsprayed sites)*
- *Pirimor resulted in mean yield benefits of ~2-4% or 100-150 kg/ha*
- *No consistent impact on grain quality from any treatment*

Net economic benefit:

- *The standard rate of imidacloprid resulted in **mean net benefits of ~$20-30/ha** at sites with aphid pressure >5/tiller during both 2009 and 2010*
- *In 2008 - with higher aphid pressure (>70/tiller in all 4 trials) - the same rate provided net benefits of ~$37/ha at a grain price of $125/t*
- ***Mean net benefit ~$9/ha at sites with low aphid pressure** (unsprayed sites)*
- *Increased net benefit was obtained with the high rate of imidacloprid*
- *Mean net benefit from Pirimor was only ~$5/ha in both years*

Overall:

- ***These trials suggest direct feeding damage from aphids is frequently causing yield loss of 5-15% in winter cereals but with little consistent impact on grain quality***
- ***Seed treatment provided more consistent yield and economic benefits than foliar applications***
- ***Imidacloprid seed treatments should be considered as a management option for growers in higher aphid pressure situations***
- ***A spray threshold of 10/tiller appears realistic but needs to be made on an increasing aphid population and where beneficial insect activity is limited***