

Crown rot varietal screening

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Key findings

- Durum breeders' lines Td17/1 and WID902 showed promise of improved resistance/tolerance to crown rot.
- Hyperno and AGT Katana performed best of the recently released durum wheat and bread wheat cultivars, respectively.
- Gladius expressed significant crown rot symptoms (but not whiteheads) and may contribute to rapid build up of crown rot inoculum.

Why do the trials?

To evaluate durum breeding lines and commercial cultivars of bread wheat and durum wheat for resistance and tolerance to crown rot (*Fusarium pseudograminearum*).

How were they done?

Data presented in this report were compiled from a number of sites and seasons. For assessment of crown rot symptoms – Hart 2007-2011, Cambrai 2008-2010, Mallala 2007-2008, Roseworthy 2010 and Wunkar 2011. For whitehead expression data were only used from sites with medium to high disease pressure – Hart 2007-2008, Cambrai 2008 and Mallala 2007.

Trials were laid out using randomised block designs and had at least 4 replicates (except Wunkar, which had 3 replicates).

Only information relating to commercial cultivars of bread wheat and durum wheat and advanced breeders' durum lines is presented in this report. Seed of SARDI durum families (Td and 979- prefixes) and University of Adelaide durum lines (WID prefix) was provided by Hugh Wallwork and Jason Able, respectively. Checks were 2-49 (moderate resistance), Kukri and Sunco (moderately susceptible), Frame and Janz (susceptible) and Tamaroi and Kalka (very susceptible).

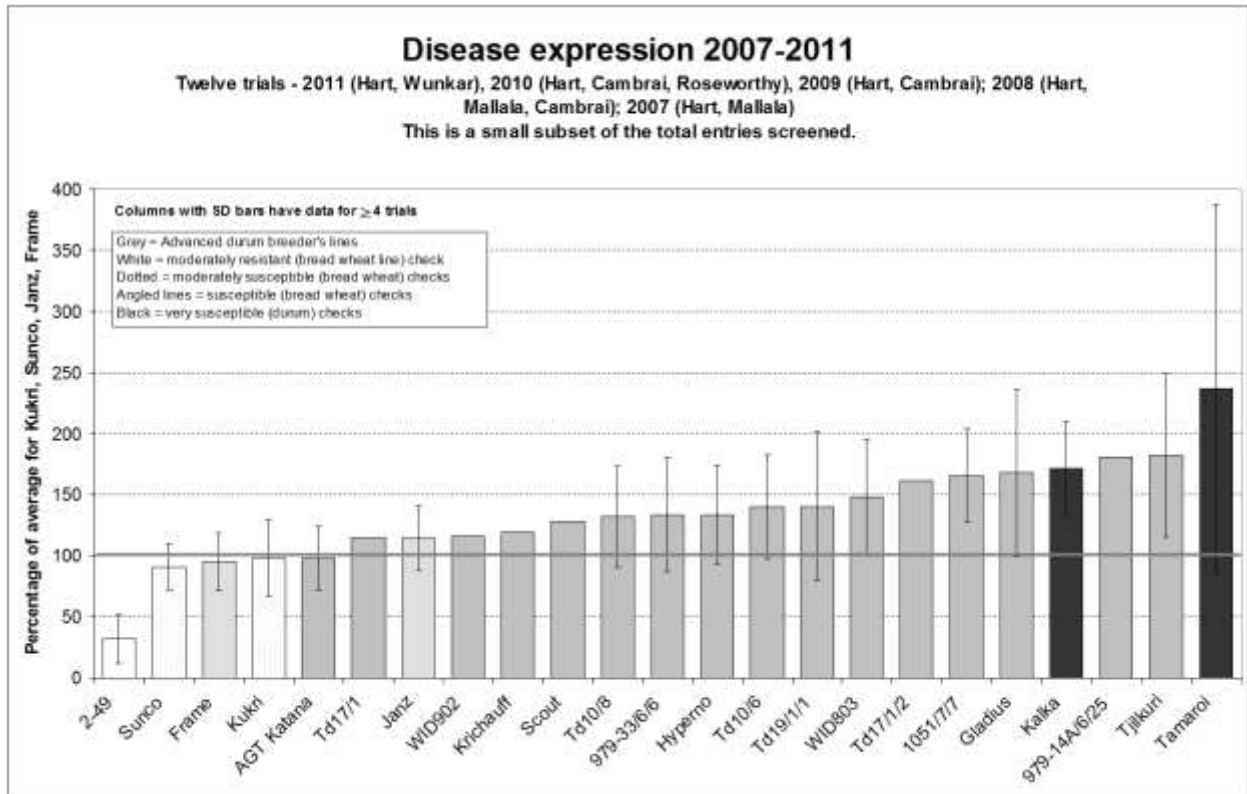
Seed was inoculated with a crown rot spore suspension prior to seeding, except at Cambrai where there was a naturalised inoculum source. To assess yield loss, a second, uninoculated plot was included for selected entries. Plant samples were collected at early grainfill, when whiteheads and total heads were counted and main stems were assessed for severity of crown rot symptoms.

Crown rot severity on main stems was scored visually on the following scale:

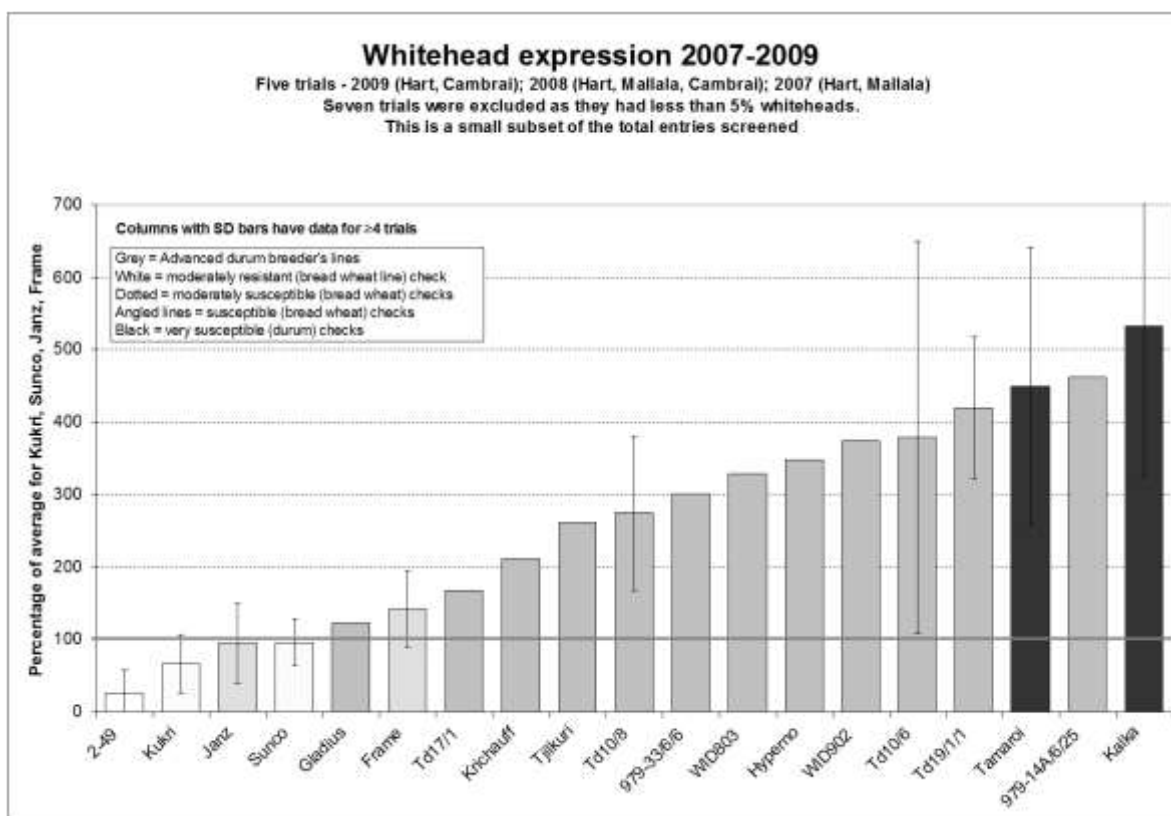
0 = 0%	No yield loss
1 = 1-10%	Possibility of minor yield loss
2 = 10-25%	Possibility of some yield loss
3 = 25-50%	Probably some yield loss
4 = 50-75%	Significant yield loss likely
5 > 75%	High yield loss likely

Results

Entries were not always present in every trial, making direct comparisons difficult. For this reason, results for disease and whitehead expression are presented as a percentage of averaged results from Kukri, Sunco, Janz and Frame. Where there are no error bars, the entry has only been present in a few trials. This means the result is less reliable and may be an artefact of exposure to only low or only high disease pressure when compared with the other entries.



Bread wheat entries generally had less disease than did the durum wheat entries, although Gladius had unexpectedly high levels of stem browning. Bread wheat entries (including Gladius) had lower whitehead expression than did the durum wheat entries.



Tamaroi had the most and Hyperno the least disease expression of the commercial durum wheat cultivars. The best breeders' lines were Td17/1 and WID902, which both had disease expression in the same range as that for commercial bread wheat cultivars. All durum wheat entries had high levels of whiteheads when compared with bread wheat entries, although whiteheads are not as reliable an indicator of resistance/tolerance to crown rot.

Discussion

Improving field resistance and/or tolerance to crown rot in durum wheat is proving difficult as there is considerable variability in responses of entries between seasons. Some of this variability in performance, particularly in terms of whiteheads, may be accounted for by the lack of agronomic adaptation exhibited by many of the durum lines. The large data set presented in this report has helped to demonstrate that some of the current breeders' lines are showing promise, particularly Td17/1 and WID902.

AGT Katana performed best of the recently released bread wheat cultivars and Hyperno performed best of the recently released durum wheat cultivars. Gladius did not have large numbers of whiteheads, but its disease expression was in the same range as that of durum wheat cultivars. Gladius may contribute to rapid build-up of crown rot inoculum.