Crown rot - varietal screening

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Key findings

- Durum breeders' lines screened in 2008 and 2009 do not show consistently improved resistance or tolerance to crown rot.
- Hyperno performed somewhat better than Kalka or Tamaroi.
- Data from at least two seasons is needed to make sound decisions about the response of entries to crown rot.

Why do the trials?

To evaluate a range of durum breeding lines for resistance and tolerance to crown rot.

How were they done?

Plot size	1.5 m x 5 m	**Fertiliser rate**	DAP @ 100kg/ha
Seeding date 2008	May 28th	**Plants sampled 2008**	October 23rd
Seeding date 2009	May 25th	**Plants sampled 2009**	October 29th

The trials had over 40 entries in 4 replicates. Represented were SARDI durum families (Td and W prefixes) and University of Adelaide durum lines (Q and R prefixes) provided by Hugh Wallwork, Tony Rathjen and Michael Quinn.

Checks included 2-49 which has moderate resistance; Kukri, Sentinel and Sunco which are moderately susceptible; Frame, Krichauff and Janz which are susceptible and Tamaroi and Kalka which are very susceptible.

Seed was inoculated with a crown rot spore suspension prior to seeding.

Plant samples were collected from 4 x 0.5 row from each plot in 2008 and 4 x 0.35 m row from each plot in 2009. Crown rot severity on main stems was scored visually using a 0 (no disease, no yield loss) to 5 (complete yield loss) scale. Whiteheads and total emerged heads were counted to calculate % whiteheads.

Results

Bread wheat and durum check varieties performed as expected at the sites in both years. Disease pressure was much higher in 2008 than 2009, which is reflected in higher disease scores and more whiteheads in 2008 (Table 1).

Bread wheat entries generally had lower disease scores and whitehead expression in both years than did the durum entries. Hyperno performed better than Kalka and Tamaroi in both disease score and whiteheads.

Table 1. Disease expression in bread wheats (above the double line) and durum, expressed as % white heads and disease score (0 = no disease, 5 = total crop loss) in 2008 and 2009.

Entry	% Whiteheads 2008	% Whiteheads 2009	Disease score 2008	Disease score 2009
Feb-49	1	0	0.4	0.1
Sunco	5	1	1.4	0.7
Gladius		1		1.2
Frame	15	2	1.9	0.5
Kukri	5	2	1.4	0.7
Sentinel	8	3	0.9	0.6
Janz	8	3	1.8	0.7
Krichauff	17		1.6	
R53380	39	3	2.6	1
Td19/1/1	38	5	2.2	0.8
Hyperno	35	5	2.2	0.9
RWID902		5		0.9
QD8/95-036		5		1.5
R53280	37	6	2.2	1.1
R71140	39	6	2.5	1.2
W1051/7/7		7		1.5
QD8/95-099		9		1.1
QBO417	18	9	2.3	1.9
Td10/6	35	10	2.1	1.3
Td10/8	26	10	1.9	1.5
Saintly		11		0.9
Kalka	**45**	**13**	**2.6**	**1.3**
QD8/95-119		14		1.5
R53188	20	14	1.7	1.9
Tamaroi	**45**	**16**	**2.4**	**1.9**
W979-33/6/6	21	19	1.4	1.2

Discussion

Improving field resistance and/or tolerance to crown rot in durum is proving difficult and this is reflected in the screening results from 2008 and 2009. Lines which appeared promising in 2008 generally did not perform well in 2009 and some which performed well in 2009 did not perform well in 2008. This highlights the need for acquiring data from at least two seasons before drawing conclusions about crown rot resistance and/or tolerance.

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. Despite these difficulties, in 2010 we will continue to assess new durum breeders' material and the more promising lines from 2008 and 2009.