Cereal Seed Health and Seed Treatment Strategies: Exploiting new seed testing technology to optimise seed health decisions for wheat.

Technical Paper No. 7

Determination of the degree of bunt (*Tilletia tritici*) contamination of seed during harvesting

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INTRODUCTION

During harvest the threshing of grain releases *T. tritici* spores from an infected crop. The spores may adhere to the grain being harvested or be dispersed and deposited over surrounding land. To help validate the data on bunt multiplication used in the development of a bunt model (Anthony, 2004) an experiment to establish the proportion of *T. tritici* spores and the proportion of whole bunt balls retained by the combine and returned with the seed to the seed store is described.

MATERIALS AND METHODS

Commercial wheat seed treated with Sibutol (bitertanol + fuberidazole) was sown in plots (c. 2.5m x 10m) at ADAS in 2001 and 2002 and at SASA in 2002. The plots received commercial farm treatments through the season. Bunt-infected tillers were placed in the plots of approximately 10,000 ears immediately prior to harvesting. Infected tillers were introduced at frequencies of 0, 0.1, 1.0 and 10 bunted tillers/plot. This resulted in ratios of bunted ear/healthy ears of 0, 0.00001, 0.0001 and 0.001. Three replicates of each treatment were established. Plots were then harvested ensuring that the lowest levels of bunt contamination were harvested first. Healthy, uninfected plots were harvested between experimental plots to clean the combine of bunt spores. Grain samples (2 kg/plot) were taken from the harvested grain and *T. tritici* spore levels on seed determined using the method described by Cockerell & Rennie (1996). A search for bunt ball contamination was made on a working sample of approximately 120g from seed harvested in 2001 and approximately 2000g in 2002.

RESULTS AND DISCUSSION

The average spore contamination for each treatment level at each site is given in Table 1. There was a strong correlation between the level of bunt infection in plots and the resulting levels of *T. tritici* spores on grain harvested from those plots (Figure 1).

Table 1 Transmission of *T. tritici* spores from infected ears to healthy seed during harvesting.

	Percentage of bunt balls*			
Infected ears/ 10,000 healthy ears	ADAS 2001	ADAS 2002	SASA 2002	Mean
0	0.1	1.9	0.3	**0.7**
0.1	0.5	0.6	0.7	**0.6**
1	7.1	17.0	3.2	**9.1**
10	38.5	80.7	88.0	**69.1**

* Mean of three replicates

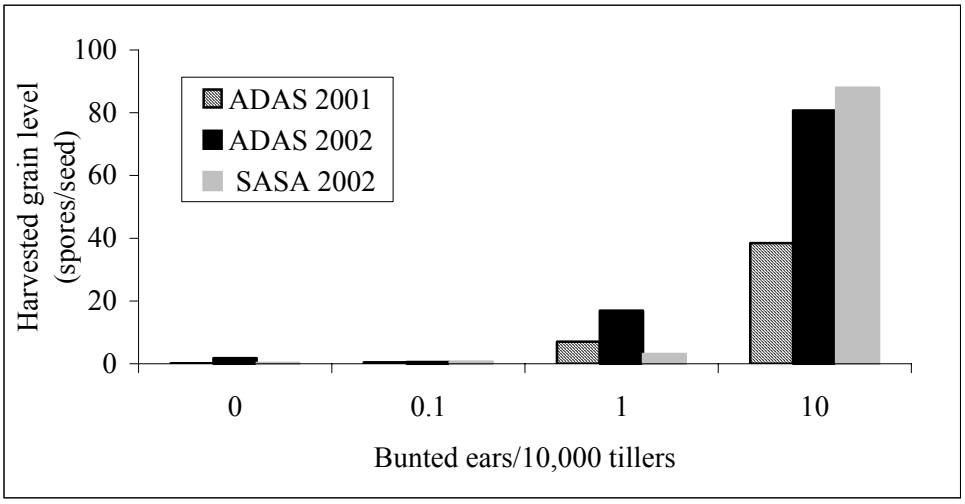

Figure 1 Bunt spores/grain resulting from bunt-infested ears in healthy crop.

The average percentage bunt ball contamination for each treatment level at each site is given in Table 2. Bunt balls were found in samples from the plots with ratios of 0.0001 and 0.001 infected ears to healthy ears only.

The information from this experiment was used to validate components of the bunt model (Anthony & Paveley, 2004) with regard to spore release and retention during threshing.

Table 2 Percentage of bunt balls by weight in the harvested seed.

	Spores/seed on harvested grain*			
Infected ears/ 10,000 healthy ears	ADAS 2001	ADAS 2002	SASA 2002	Mean
0	0.0000	0.0000	0.0000	0.0000
0.1	0.0000	0.0000	0.0000	0.0000
1	0.0000	0.0005	0.0009	0.0005
10	0.0055	0.0035	0.0025	0.0038

* Mean of three replicates

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REFERENCES

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