Crop Updates - Comparison of aerial and ground application of fungicide for leaf disease control in wheat

Comparison of aerial and ground application of fungicide for leaf disease control in wheat

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SUMMARY

Aerial application of fungicide using 20 L/ha of water to control leaf disease in wheat was compared to fungicide applied with a ground boom delivering 105 L water/ha with fan jet nozzles.

The aerial application was more effective and more economical than the ground application, particularly when vehicle damage estimates are included.

BACKGROUND

Fungicide spraying in wheat to control leaf diseases (yellow spot and septoria nodorum blotch) is increasing especially in high potential (more than 3 t/ha) crops in high rainfall areas. In the past few years significant yield responses were obtained from experiments with fungicide applied in 105 L/ha with fan jet nozzles spraying 0.5 m above the crop. However, in practice most wheat growers apply fungicide by aeroplane using 20 L/ha of water. It is not known whether aerial and ground application of fungicide using different spray volumes are equally effective.

METHODS

The commercial fungicide Folicur 430EW (430 g tebuconazole/L) was used for the comparison of ground and aerial application. A completely randomised design with five replicates and 20 m x 1.8 m plots with 2.2 m wide buffers was used. The experiment was established in a commercial crop of cv Amery wheat approximately 10 km north of Mingenew. Control plots (nil spray) and plots to be sprayed from ground were covered by 20 m x 4 m plastic sheets (Picture 1). Folicur® was then applied @ 145 mL/ha in 20 L/ha of water to spray the entire paddock by aerial contractor on 19 August at Z55 (ear half emerged) crop stage. The plastic sheets were removed 12 hours after placement and one hour after the aerial application. Remaining plots were treated with 145 mL/ha Folicur® applied in 105 L/ha with fan jet nozzles spraying 0.5 m above the crop. Disease assessment was made 5 weeks after the treatment. Plots were harvested and yield, test weight, screenings and grain weight were measured.

For the poster, not for the abstract.

RESULTS

At the time of trial establishment 6, 13 and 61% of leaf area were covered by disease lesions on flag, flag-1 and flag-2 leaves, respectively. Assessment at Z83 (early dough) crop stage showed that both aerial and ground applications of fungicide are equally effective in reducing the disease on flag-1 leaves

(Table 1). Both the applications of had significantly improved the yield. Highest yield was obtained with aerial application of fungicide. There was small improvement in grain quality by both the treatments.

Table 1. Effect of ground and aerial application of Folicur® applied @ 145 mL/ha on leaf disease, grain yield, quality components, and economics of the two applications

	% Disease at Z83		Yield	Screening	Test wt.	Grain wt.	Net profit*
	FL	F1	t/ha (%)	(%)	(kg/hL)	(gm/1000)	($/ha)
Ground application	37	69	3.11 (109)	0.8	78.4		2.60
Aerial application	39	69	3.24 (114)	1.0	78.1		18.20
Untreated	36	87	2.84 (100)	1.1	76.9		
LSD (5%)	ns	16	0.07	ns	0.9		
P	0.8	0.0	< 0.001	0.1	0.007		
CV	20	15.3	2	24	0.8		

* See text for calculations.

Net profit was calculated for both the applications using following formula:

$$Net\ profit = YI \times P - (CC + CA)$$

where, YI = yield increase (t/ha) over control; P = farm gate price of ASW wheat ($157/t); CC = cost of chemical ($17.75/ha) and CA = cost of application of chemical ($8.30 for aerial application and $3.50 for ground application).

Note that in case of ground application, crop damage due to vehicle's wheels was not included in this formula. Some crop damage occurred in control plots and in plots that received ground application due to the plastic sheets used to cover these plots in this experiment. Yield in the control plots was increased by 4% to compensate this damage for above calculations. In this experiment the aerial application of fungicide was more economical than the ground application (Table 1).

CONCLUSION

Aerial application of fungicide using lower spray volume (20 L/ha) is as effective as ground application using higher spray volume (105 L/ha) to control leaf disease and improving grain yield of wheat. The crop damage done by vehicle's wheels used to apply fungicide could be avoided in case of aerial application. The aerial application is, therefore, more economical than the ground application. The data presented here will increase growers' confidence in the aerial fungicide application.

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