

Fungicide application techniques fluid vs foliar vs seed applied in wheat & barley for soil borne & foliar disease control.

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There is thought that liquid delivery systems on seeding equipment may provide a better way to manage foliar and soil borne diseases in cereal crops. The cost of liquid delivery technology is reducing, thereby increasing adoption of such systems by growers. With new generation fungicides on the market better suited to these systems a trial was carried out to test if productivity gains can be made by using such systems.

This trial looked at a range of application techniques for old and new fungicide groups and their ability to control key diseases such a leaf rust in barley and stripe rust in wheat as part of the GRDC's Stubble Initiative.

Key Findings

- Intensive Foliar Application (two spray strategy) was best for Leaf rust control in this trial compared to one application at seeding through coating on fertiliser or by fluid injection.
- Injection of flutriafol resulted in a significant yield increase over the control compared to applying flutriafol in furrow which did not out yield the control. However, no significant difference in foliar disease control was observed.
- New SDHI fungicides provided some control of leaf rust but no yield increase in this season
- No stunting from application of triazole fungicide propiconazole in furrow

What was done?

A replicated trial containing wheat and barley cultivars with known poor disease packages was sown at the YPASG Glenburnie trial site. Four methods of fungicide application were used: on seed, on fertiliser, fluid delivery and foliar application. On seed, on fertiliser and fluid delivery were applied at sowing on the 13th of May. The foliar treatment which was district practice was applied at GS 31 and 39.

What was measured?

No effect of fluid injection was noted on crop emergence or early growth. Plots were monitored for signs of any foliar or soil borne diseases throughout the season. In 2015 we did not see the full spread of diseases we had hoped for, particularly stripe rust in wheat or net form or spot form net blotch in barley or rhizoctonia and crown rot. Fortunately we did have a high level of leaf rust in barley plots which allowed us to explore different applications methods and products on their ability to control this disease.

What were the treatments?

Product & Application Method	Application Method	Notes
Impact (Flutriafol)	On Fertiliser	Commonly used, wheat protectant for rusts, some activity in barley on leaf diseases &
Impact (Flutriafol)	Fluid Delivery	Same as above
Uniform	On Fertiliser	New competitor for Flutriafol, adds Rhizoctonia control
Uniform	Fluid Delivery	Same as above
Propiconazole (Tilt)	Fluid Delivery	Commonly used foliar spray for blotches in barley
Aviator X Pro*	Fluid Delivery	New generation SDHI fungicide- Broad spectrum foliar disease control in wheat and barley
Triadimefon	On Fertiliser	Old product, used before flutriafol was cheap
Prosaro	Foliar GS31&39	'Flagship' triazole fungicide, good activity on rusts in wheat, blotches and rust in barley
Systiva	On Seed	New generation SDHI seed dressing released this year, fantastic blotch control in barley, rhizoctonia control, good on leaf leaf rust.

How was it measured?

Once leaf rust was identified, plots were intensively scored for progression of the disease up the canopy. At two sampling times leaves were collected from three different heights in the crop canopy from the youngest emerged blade down. The level of leaf rust was assessed on each individual leaf using a foliar scoring key.

Foliar Disease Results

Scoring time 1 was omitted from the results due to variability in the data.

Scoring time 2 occurred on the 16th of September, with the crop in the early head emergence stage. Infection level was analysed for three different heights in the canopy at this growth stage. Flag leaf, second leaf down from flag leaf, third leaf down from flag leaf

F1- Flag leaf

On the 16th of September only two treatments were significantly different from the control, foliar fungicide and Systiva seed dressing while foliar fungicide had significantly lower levels on leaf rust unexpectedly Systiva had higher levels of leaf rust

than the control. This result is unexpected and unlikely to be repeatable as it is known that Systiva has good efficacy on early barley leaf rust.

What can we take from this?

These results show that current fungicides will not provide season long control of Leaf Rust when applied at sowing. The label for Systiva seed dressing states this, control only extends out to GS37 or up to flag leaf emergence. Therefore Systiva needs to be followed by a later season fungicide to protect leaves that develop after GS37.

Was there a yield difference?

Table 1. Harvest Yield Data (Barley Only)

Treatment	Yield (kg/ha)		Test weight (kg/hl)	
Foliar Fungicide	2814	A	57.0	ABCD
Impact Injection	2676	AB	57.8	AB
Uniform Fertiliser	2568	ABC	56.6	BCD
Propiconazole Injection	2459	ABCD	58.3	A
Aviator Injection	2446	ABCD	55.2	DE
Triad Fertiliser	2297	BCD	56.3	BCD
Prosaro Injection	2279	BCD	56.0	CDE
Systiva Seed	2278	BCD	57.4	ABC
Uniform Injection	2243	CD	54.5	E
Impact Fertiliser	2209	CD	58.7	A
UTC	2185	D	55.6	DE

Yield of the Barley varied considerably between treatments with a yield difference of greater than 0.6 t/ha between the highest yielding treatment (foliar fungicide GS31 & 39) and the untreated control. Foliar fungicide application, Impact injected at sowing and Uniform applied to the fertiliser produced grain yields that were significantly higher than the untreated control.

Discussion

Grain yield did not always correlate perfectly with the ability of a product to control leaf rust. Systiva seed dressing and Aviator X Pro injected, which showed activity on leaf rust, were not significantly different in yield from the control. Impact injected at sowing, which only showed a very slight level of control of leaf rust only on lower leaves, yielded the second highest. Unexplained yield increases that do not relate to leaf rust control could be attributed to enhanced protection from soil borne and stubble borne disease that were not observed in this trial. Injection of flutriafol has resulted in a significant yield increase over the untreated control, while addition of flutriafol in furrow has not resulted in a yield gain over control plots. This indicates that liquid delivery of flutriafol may be a more effective way of applying this product.

