

THE ECONOMICS OF WHITE MOULD FUNGICIDES

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Last year, I wrote an article on white mould fungicide performance in the December issue of *Pulse Beat*. This is a follow up article to discuss the economics of fungicide use. In 2012 and 2013, seven foliar fungicides were compared at their low and high label rate, along with a biological called Heads Up which was applied as a seed treatment at planting (Table 1). Each product was applied twice with the first application at early flowering (plants had three small pods present), and a second application occurred 10–14 days later. For Allegro and Propulse, a single application at early flowering was also tested. Each year, two studies were planted about two weeks apart at the Huron Research Station near Exeter, Ontario. The studies were intensively managed to promote disease development, including the regular use of overhead irrigation. In every study, the white mould pressure was strong,

with 100% of the plants infected in the untreated control and (eventually) 50–65% of the plants dying. Profit margins were calculated using an average crop insurance value for the crop, minus the fungicide cost and an average custom application rate.

Disease severity was measured three times after the first fungicide application, and these values were used to calculate the area under the disease progress curve (AUDPC), a common way to measure the progress of disease over time. To put it simply, the higher the AUDPC value, the higher the disease severity over time (Table 1). Disease severity was highest for the untreated control, and all treatments had lower disease except Heads Up, Vertisan and Priaxor (low rate) delivered minimal disease control. Priaxor (high rate) and Acapela performed moderately well. The top treatment was a high rate of Allegro applied twice, which had similar disease scores to Lance, Propulse (high rate two applications only) and Senator.

All of the studies were combined to compare seed yield (Table 1). The untreated control had the lowest yield with Heads Up, Priaxor (low rate), and Vertisan giving similar results. Priaxor (high rate) performed only slightly better. Acapela had similar yield to most of the top fungicides, except for Senator (high rate) which was the top yielding treatment. The low rate of Propulse had weaker yield than the top treatments of Allegro (high rate) and Senator (both rates). Seed weight tended to follow the trends seen for yield, but only the untreated control and Heads Up had a dramatic drop in seed weight.

A second application of Allegro (trt 5 vs 4) and Propulse (trt 8 vs 7) reduced disease scores and increased yield only slightly, compared to a single application. This is an important point – I believe you have to pull the trigger quickly and time the first fungicide application at very early in flowering to have the best chance for success with these products.

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Table 1. Area under the disease progress curve (AUDPC), yield and 100-seed weight for fungicide experiments in Exeter, ON, Canada, 2012–2013.

	Fungicide	Rate L or kg ha ⁻¹	AUDPC		Yield t ha ⁻¹		100-seed weight (g)	
1	Untreated	0.0	1398	<i>a</i>	1.7	<i>f</i>	26.5	<i>d</i>
2	Lance	0.77	713	<i>efgh</i>	2.5	<i>abc</i>	28.2	<i>abc</i>
3	Allegro	0.6	628	<i>gh</i>	2.6	<i>abc</i>	28.3	<i>abc</i>
4	Allegro*	1.0	766	<i>efgh</i>	2.6	<i>ab</i>	28.1	<i>abc</i>
5	Allegro	1.0	577	<i>h</i>	2.8	<i>ab</i>	28.8	<i>ab</i>
6	Propulse	0.5	830	<i>def</i>	2.2	<i>cde</i>	28.0	<i>abc</i>
7	Propulse*	0.75	811	<i>efg</i>	2.4	<i>bcd</i>	28.4	<i>ab</i>
8	Propulse	0.75	645	<i>fgh</i>	2.6	<i>abc</i>	29.4	<i>a</i>
9	Senator	1.73	763	<i>efgh</i>	2.6	<i>ab</i>	28.6	<i>ab</i>
10	Senator	2.25	638	<i>fgh</i>	2.9	<i>a</i>	29.1	<i>ab</i>
11	Vertisan	0.8	1063	<i>bc</i>	1.9	<i>ef</i>	28.1	<i>abc</i>
12	Acapela	0.88	785	<i>efg</i>	2.4	<i>bcd</i>	28.8	<i>ab</i>
13	Priaxor	0.3	1029	<i>cd</i>	2.0	<i>ef</i>	27.6	<i>bcd</i>
14	Priaxor	0.45	911	<i>cde</i>	2.1	<i>de</i>	27.9	<i>abcd</i>
15	Heads Up ST	–	1238	<i>ab</i>	1.9	<i>ef</i>	26.8	<i>cd</i>

*Single application at early (30%) bloom stage. All other foliar treatments were applied at the early and full (100%) bloom stages.

a-h LS Means followed by the same letter within columns are not significantly different according to Fisher's Protected LSD (P<0.05).

Separate profit margins were calculated for each planting date because the fungicides responded differently (Table 2). For the first planting, most of the fungicides generated a greater profit margin than the untreated control. The best treatments for disease severity and yield also had the highest profit margins for the 1st planting. Senator (high rate) was the top treatment, with a profit of almost \$1204 over the untreated control. Propulse, Allegro, Lance and

Acapela performed similarly, with a profit (over the untreated control) ranging from \$612–1040. Crop yield was lower for the 2nd planting, which reduced profit margins by more than 45% for most of the fungicides, except Allegro. Only the Allegro treatments (trts 3, 4, 5) had a higher profit margin than the untreated control, with a net profit of \$558–707. At this point, Allegro seems to be giving the most consistent returns, in high and low yielding crops.

As a grower, you have to make a decision to apply a white mould fungicide before the disease is visible in your crop. This can be an expensive investment, with a price tag of \$100+ per hectare. This research makes this decision easier in two ways. First, it identifies the products that consistently control white mould each and every year. And at the same time, it identifies products that should return a profit for the investment that you make. ■

Table 2. Profit margins over fungicide costs (CA\$ ha⁻¹) by treatment for white beans, 2012–2013.

	Treatment	Rate (g a.i. ha ⁻¹)	Profit Margin			
			1st Planting		2nd Planting	
1	Untreated	0.0	1,889.16	<i>g</i>	1,078.08	<i>c</i>
2	Lance	0.77	2,638.86	<i>bcd</i>	1,451.75	<i>abc</i>
3	Allegro	0.6	2,660.53	<i>bcd</i>	1,636.28	<i>ab</i>
4	Allegrox	1.0	2,673.26	<i>bcd</i>	1,784.94	<i>a</i>
5	Allegro	1.0	2,561.62	<i>bcd</i>	1,798.01	<i>a</i>
6	Propulse	0.5	2,501.28	<i>bcde</i>	1,167.11	<i>bc</i>
7	Propulse*	0.75	2,596.91	<i>bcd</i>	1,501.02	<i>abc</i>
8	Propulse	0.75	2,848.71	<i>abc</i>	1,369.01	<i>abc</i>
9	Senator	1.73	2,928.97	<i>ab</i>	1,307.80	<i>abc</i>
10	Senator	2.25	3,093.08	<i>a</i>	1,499.73	<i>abc</i>
11	Vertisan	0.8	2,099.03	<i>fg</i>	1,019.54	<i>c</i>
12	Acapela	0.88	2,537.97	<i>bcd</i>	1,452.04	<i>abc</i>
13	Priaxor	0.3	2,167.39	<i>efg</i>	1,166.21	<i>bc</i>
14	Priaxor	0.45	2,343.67	<i>def</i>	1,183.58	<i>bc</i>
15	Heads Up ST	–	2,129.90	<i>efg</i>	1,180.30	<i>bc</i>

*Single application at early (30%) bloom stage. All other foliar treatments were applied at the early and full (100%) bloom stages.

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