



PAN ALL PULSE BULLETIN #2 – MARCH 1, 2006

What's in the PAN

FIELD PROOFING A DISEASE PREDICTION SYSTEM FOR ASCOCHYTA IN FIELD PEA

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Ascochyta blight is a fungal disease that, under favorable disease development conditions, can severely reduce field pea yields and cause crop lodging. In 2005, field trials were conducted in north central Alberta to evaluate pea yield response, thousand kernel weight, standability, and level of ascochyta infection of seeds when Headline was applied for the control of ascochyta blight. In total, five sites were chosen in the Westlock and Barrhead regions based on beneficial management practices that made these sites suitable for experimentation. The experimental design was a randomized complete block with 4 replicates for each of the sprayed and not sprayed treatments, with each plot having dimensions of approximately 200 ft by 80-100 ft depending on the size of the sprayer used. The selection of suitable sites was based on: high plant populations with a minimum of 75 plants/m², good weed control, even crop emergence, and high rhizobium nodulation. The Newbrook site had plant populations below the minimum requirement and was replaced by a site located at Shoal Creek. Starting at the end of June, an ascochyta prediction system was used to detect the level of ascochyta risk and was based on canopy density, atmospheric humidity, presence of disease symptoms, and the short-term (5 day) weather forecast. Four scores were taken biweekly and influenced when the plots should receive Headline fungicide. Once the total prediction score reached or exceeded 65, the application of Headline commenced during the middle of July, depending on the scores at each site. Following the application of Headline, standability scores were recorded at the end of August for the treated and untreated plots to determine if the fungicide treatment was effective at reducing lodging. The plots were harvested and the yield was weighed in an electronic weigh wagon. Yields in kg/ha were compared between the plots receiving Headline and untreated plots. In 2005, all 5 locations reached the minimum 65 prediction score. The final yields obtained revealed a significant yield increase from Headline application at all 5 locations with a range of yield increase of 14-35%. The average yield increase from Headline application over the 5 locations in 2005 was 26%. The thousand kernel weights were also compared between treated and untreated plots. Three of the five sites showed a statistically significant difference in terms of thousand kernel weight between the treated and untreated plots, with the treated plots having larger seed. Seed samples were also sent to 20/20 Seed Labs to detect the level of ascochyta infection. There was a slightly higher ascochyta infection level in the seed samples that were not treated with Headline, but no statistically significant results were observed (10% versus 5%). Due to the weather in 2005, no differences were observed in crop standability. The results showed that Headline was successful in reducing yield losses due to ascochyta blight and that the ascochyta prediction system proved to be helpful in predicting the onset of disease.

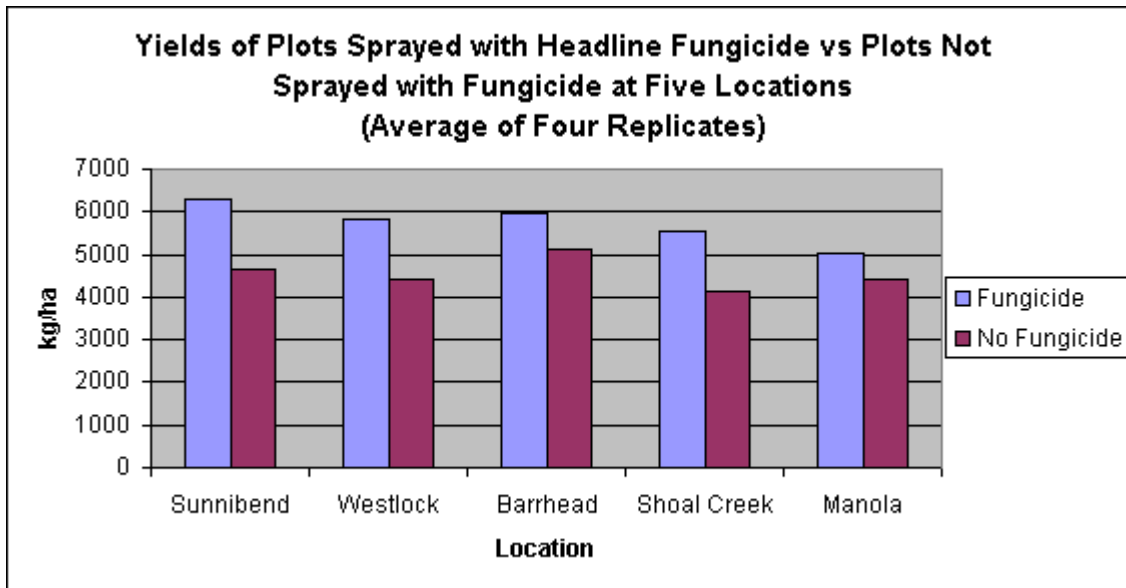


Figure 1: Field pea yield comparison in kg/ha over 5 locations between Headline fungicide treatments and no fungicide treatments.

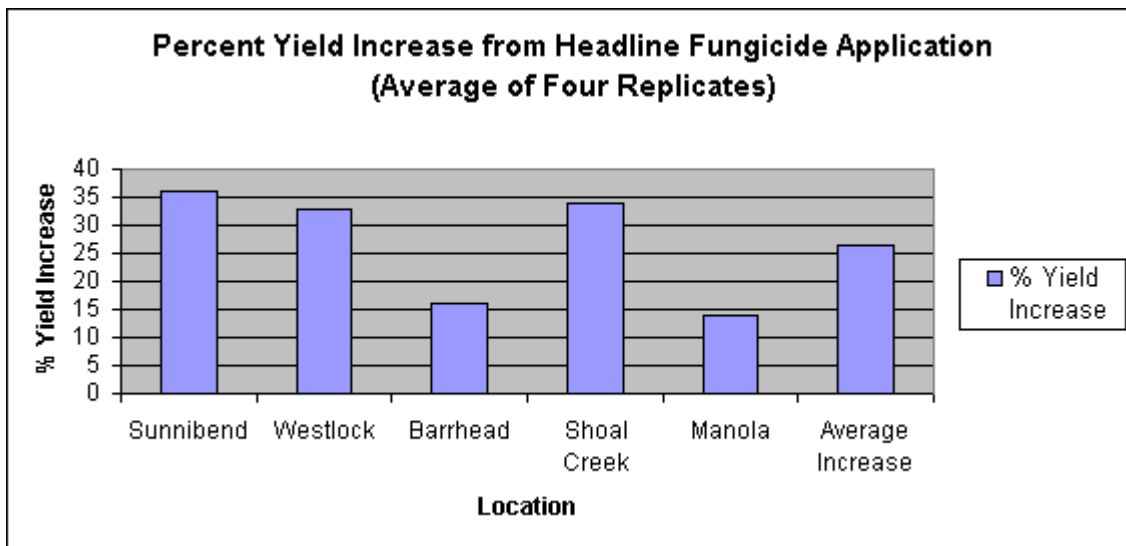


Figure 2: Percent yield increase associated with Headline fungicide application over five sites.

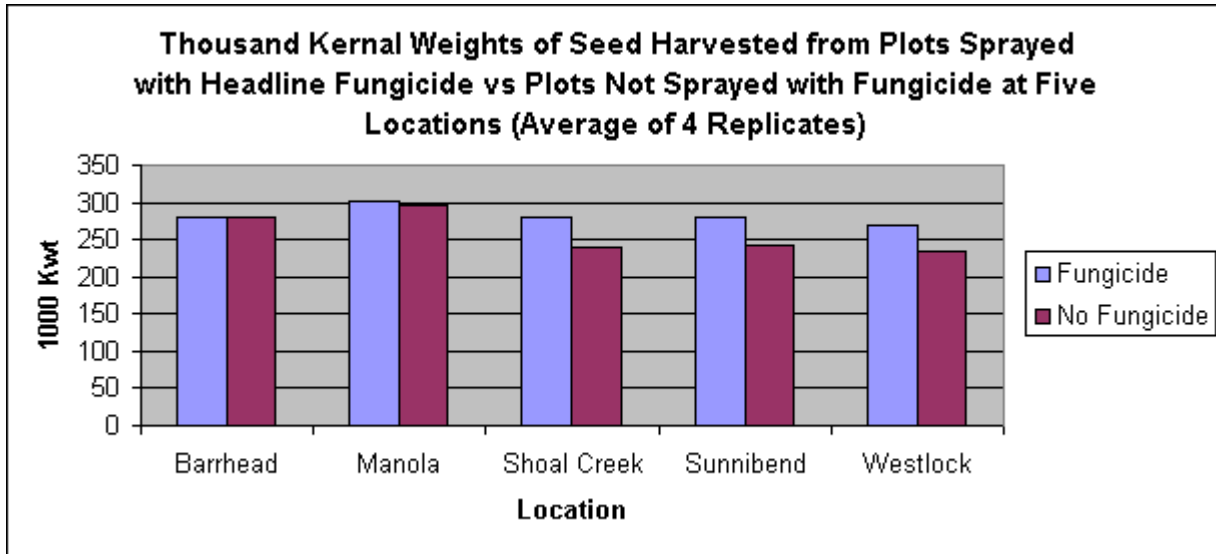


Figure 3: A graphical comparison of the thousand kernel weights obtained from plots treated with Headline and untreated plots over five locations.

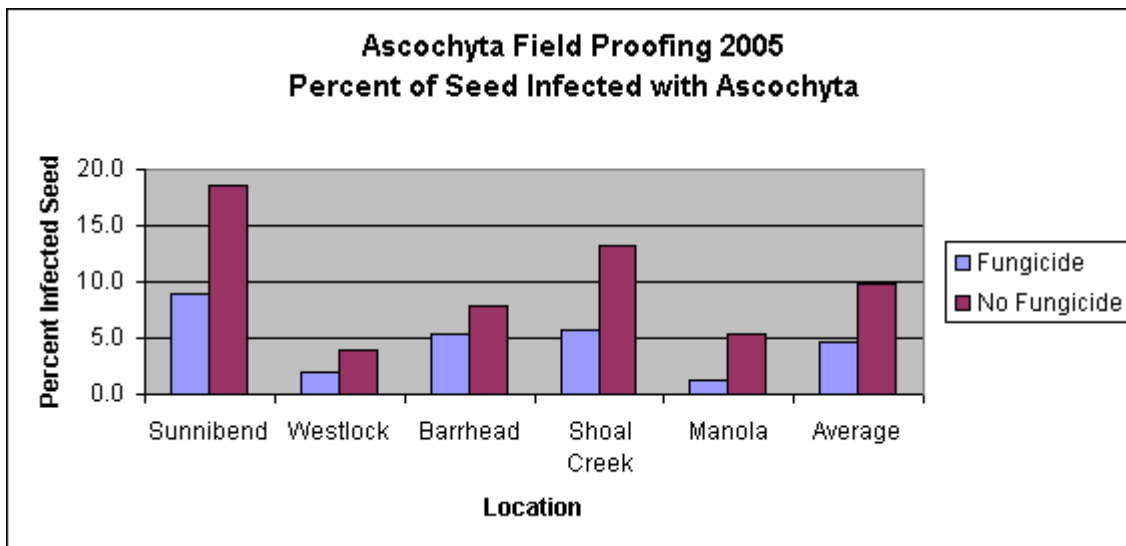


Figure 4: A graphical comparison of the percentage of seed infected with ascochyta between treated and untreated plots over five locations.

Ascochyta Prediction System

Lopetinsky and Strydhorst, 2003

Prediction Characteristic	Estimation Risk Scale				Scouting						
					Visits	1	2	3	4	5	6
1. Crop Canopy Density	Thin 0	Moderate 10	Mod/Heavy 15	Heavy 30							
2. Leaf wetness / humidity / dew at noon	None 0	Low 10	Moderate 20	High 40							
3. Percent of plants (crop) showing ascochyta symptoms	None 0	Low (<20%) 15	Moderate (20-50%) 25	High (50-100%) 40							
4. 5 day weather forecast	Dry 0	Unset 10	Showers 15	Wet 20							
Prediction Score Total											

The total prediction score is 1+2+3+4. If the total prediction score is less than 65, no fungicide application is deemed necessary, but field inspections should continue on a bi-weekly basis. If the total prediction score is +65, the fungicide spray application is recommended.