

Pasmo Disease and Lodging in Flax as Affected by Fungicide, N Fertility and Year

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Introduction

Pasmo, caused by *Septoria linicola* (Speg.) Garassini, reduces yield of flax (*Linum usitatissimum* L.) in western Canada. Lodging in crops, especially when grown under conditions that usually promote plant growth, such as abundant soil nutrition and moisture, may limit productivity and disrupt harvest. Flax has been reported being more affected by lodging than other crops such as wheat (Vera et al. 2012), particularly when susceptible cultivars were grown under conditions of high precipitation or subjected to high plant density regimes (Gubbels and Kenaschuk 1989). Pasmo has occasionally been observed in association with lodging in flax (Rashid 2001).

Objective

The objective of this study was to explore the possible association of pasmo disease with the occurrence of lodging in flax, in the presence or absence of fungicide treatment, in a regime of increasing rates of nitrogen (N) fertilizer.

Materials and Methods

This study was run during four consecutive years (2009-2012) at the AAFC Melfort Research Farm, Melfort SK. The experimental design was a split plot, with fungicide application as main plots and N rates as sub-plots. The fungicide pyraclostrobin (Headline EC) was applied shortly (approximately 7 days) after flower initiation. N rates were 0, 33, 66, 100 and 133% of recommended, applied as urea fertilizer (46-0-0) mid banded at seeding. Plot size was 4m x 15m. Cultivar was CDC Bethune, with seeding rate of 80 kg ha⁻¹.

Results and Discussion

Pasmo disease and lodging in flax were more prevalent in untreated plots, in comparison with plots treated with fungicide (Fig. 1, Fig. 3).

Also, in untreated plots the severity of lodging drastically increased as N rate increased (Fig 1, Fig. 2B), while in plots treated with fungicide lodging remained at low levels even at high rates of N fertilization (Fig. 1, Fig. 2A).

Pasmo disease severity, under moderate levels of infection (2011), tended to increase in the absence of fungicide application, as N levels increased, but remained unchanged when plots were treated with fungicide, regardless of the levels of N fertility (Fig. 3). However, under high levels of infection (2012), pasmo disease severity increased in plots treated with fungicide, as N rates increased, while in untreated plots disease severity remained constant at the highest level (at or near 100%), at all levels of N fertility (Fig. 3).

Lodging occurred late in the plant development, near maturity.

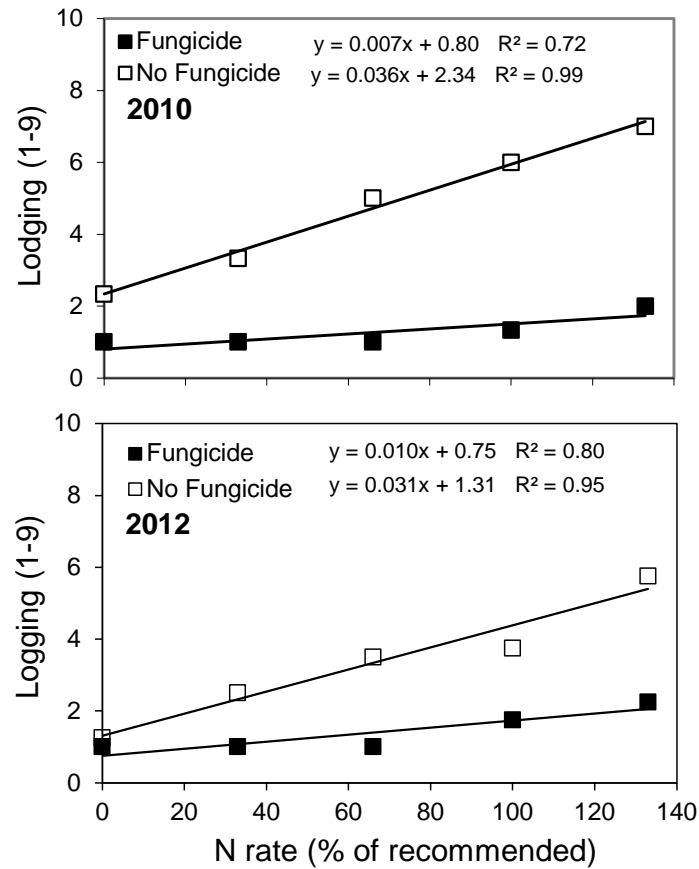


Fig. 1. The effect of fungicide and N fertilizer applications on lodging severity in flax at Melfort SK in 2010 and 2012.

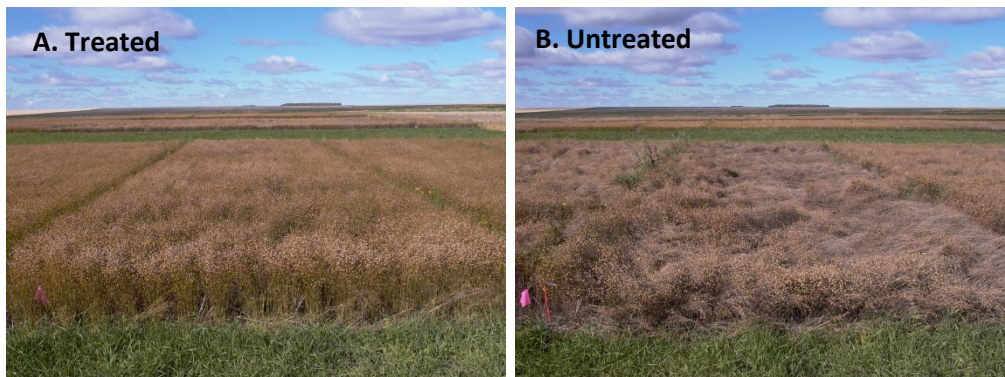


Fig. 2. Lodging in flax grown at Melfort SK in 2010, under a fertilization regime of 133% of recommended N rate. **A.** Fungicide applied **B.** No fungicide applied.

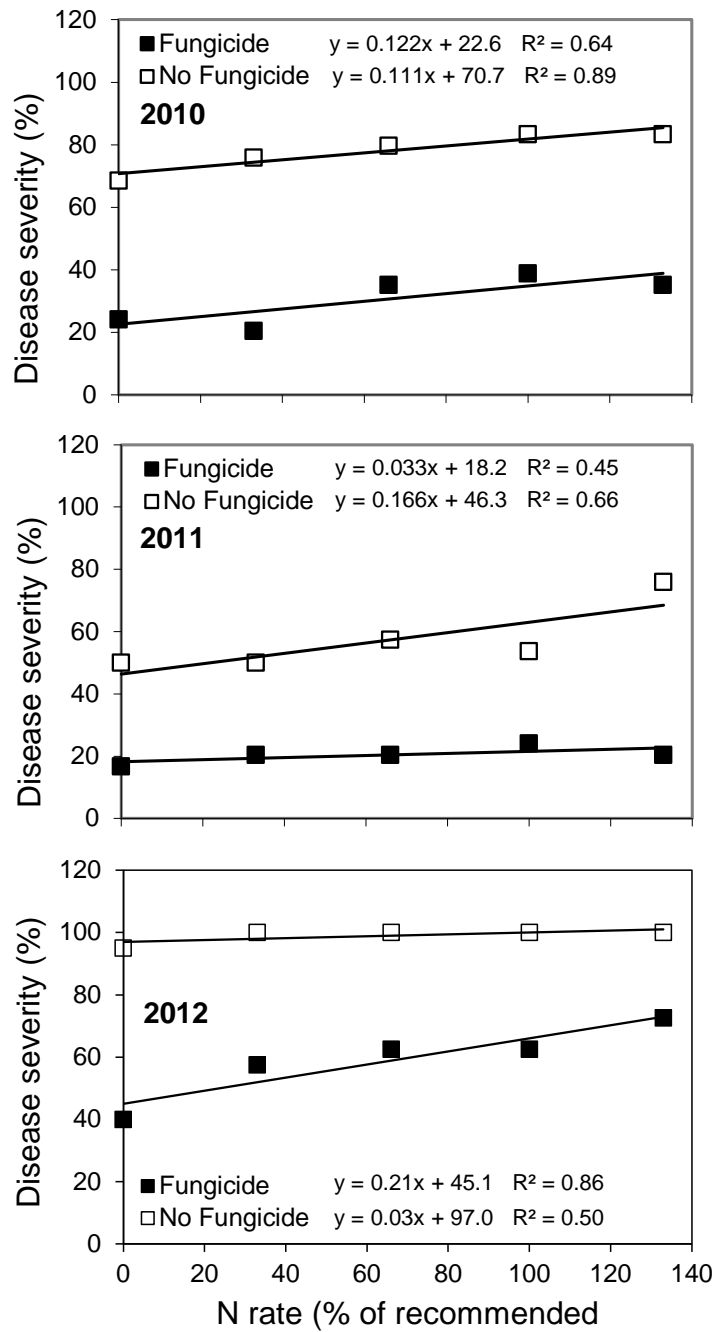


Fig. 3. The effect of fungicide and N fertilizer applications on disease severity in flax at Melfort SK in 2010, 2011 and 2012.

Conclusions

Pyraclostrobin fungicide was effective in reducing disease severity and increasing seed yield of flax. However, under extreme pasmo disease severity, as in 2012, a single application of fungicide failed to completely protect flax plants from disease, especially under high levels of N fertility.

Fungicide application also prevented or reduced the occurrence of lodging in this crop, which often took place near maturity. Lodging, probably due to wet weather conditions, was most severe in 2010.

Increasing N fertility not always resulted in increased seed yield, as N fertility also enhanced disease and lodging, which in turn tended to decrease yield.

References

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