Lodging in association with disease in flax breeding plots

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Introduction

Lodging is a common occurrence in flax. Conditions that normally promote plant growth, such as abundant soil nutrition and moisture, may, when in excess, increase the risk of lodging. Flax (*Linum usitatissimum* L.) can be severely affected by lodging, particularly when susceptible cultivars are grown under conditions of higher than normal precipitation or when subjected to high plant density regimes (Gubbels and Kenaschuk 1989) that may weaken plant stems. Lodging in flax has been observed in association with infections by pathogenic organisms, predominantly pasmo, caused by *Septoria linicola* (Speg.) Garassini (Rashid 2001). The action of these organisms may affect seed development and eventually decrease yield and degrade seed quality of lodged flax plants.

Objectives

The objective of this project was to investigate the variable occurrence of lodging in plots of three flax breeding lines, and how lodging may affect the seed yield ability of plants from lodged areas compared to standing plants from same plots (Figure 1).

Fig. 1. Flax plot showing lodged and non-lodged areas.

Material and Methods

Plant samples (3 rows, 30 cm long) were collected at maturity from lodged and standing plot areas of 3 flax breeding lines (2 replications) from the Flax Co-op test at Melfort in 2010. Seed from each sample was threshed, clean and weighted for yield determination. Stem samples from the standing and lodged areas in each plot were assessed for disease severity by Dr. Khalid Rashid. Anova was performed on generated data.

Results and discussion

Significantly higher disease severity was detected in plants from lodged areas (94% stem area affected), compared to standing plants (56% stem area affected) from same plots of three breeding lines (Figure 2). Lodged plants also exhibited 39% reduced seed yield, compared to standing plants (259 g m2).

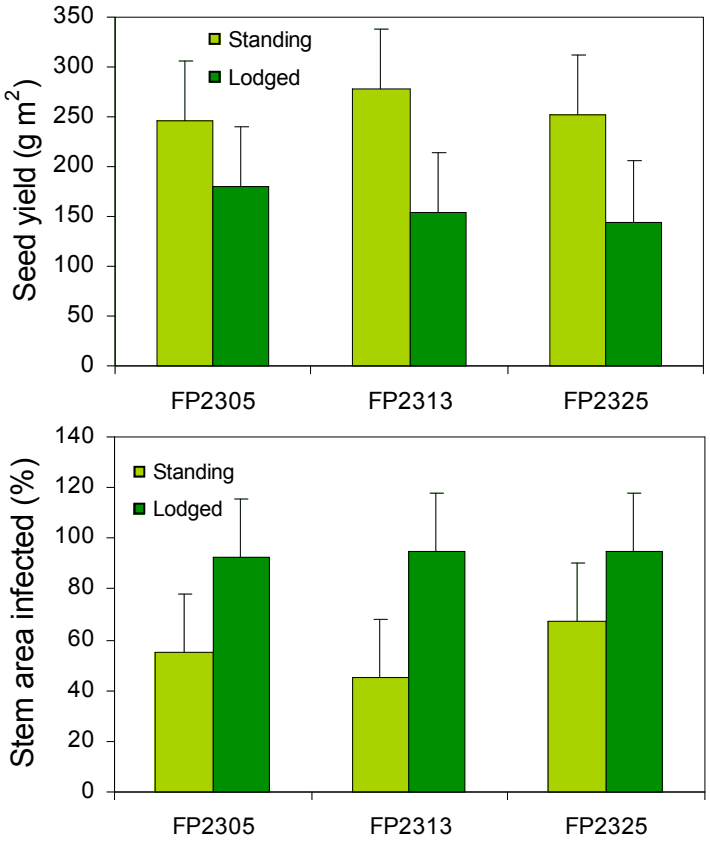

Fig. 2. Seed yield (top graph) and degree of pasmo infection (bottom graph) in lodged and non-lodged plot areas in three breeding lines in the Flax Co-op test at Melfort in 2010 (bars represent LSD values at P>0.05) .

Conclusions

There was association between lodging and level of disease severity, as well as between lodging and reduction of seed yield. Further research is needed to determine whether disease is enhanced by lodging or disease is a contributing factor in the occurrence of lodging (weakened stems) in flax.

References

Gubbels, G. H. and Kenaschuk, E. O. 1989. Effect of seeding rate on plant and seed characteristics of new flax cultivars. Can. J. Plant Sci. **69:** 791-795.

Rashid, K. Y. 2001. Pasmo disease in flax: impact in yield and potential control methods. (Abstr.) Can. J. Plant Pathol. **23:**204.

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