



Frost tolerance of faba bean varieties

CATEGORY [agronomy](#) | June 19, 2019

Tannin-containing faba bean varieties had less frost-damaged seed after a frost event compared to zero-tannin varieties. Yield and Thousand Seed Weight (TSW) declined with increasing frost damage for both variety types.

Ten faba bean varieties were assessed after a frost event that occurred during the night of September 10, 2014 at Barrhead, Morinville and Vegreville, Alberta. It lasted for 13 hours and temperatures dropped to -3.0C in Morinville, to -5.2C in Barrhead and to -6.5C in Vegreville.

The frost tolerance trial was part of two experiments with normal and zero-tannin varieties. Experiment 1 was evaluating the adaptability of non-registered European varieties in Alberta, and Experiment 2 was evaluating agronomic performance of newly registered varieties in Alberta.

Frost damage was assessed by visually determining the number of damaged seeds (blackened) present in a 100-seed sample obtained randomly from harvested grain. Mean frost damage across all test sites ranged from 7.7% to 48.2% in Experiment 1 and from 8.6% to 54% in Experiment 2. There were significant differences in frost damage between varieties and between tannin types.



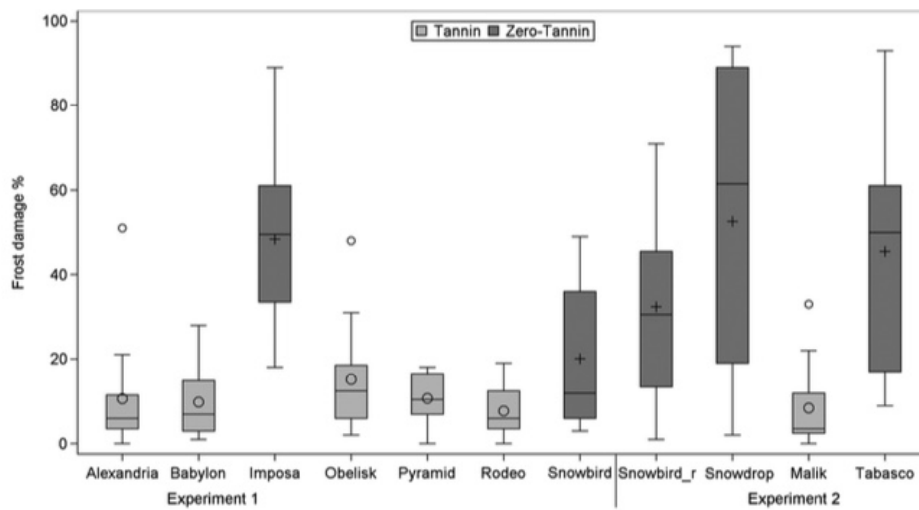
Undamaged and frost damaged (blackened) faba bean.

Photos by Boris Henriquez

Tannin-containing varieties had a significantly lower proportion of frost damage even after accounting for differences in maturity. Zero-tannin varieties had 2.2 times more frost-damaged seeds than normal tannin varieties in Experiment 1, and 4.5 times more in Experiment 2.

For example in Experiment 2, Snowbird (zero-tannin) had 30.6% frost damaged seed and Tabasco (zero-tannin) had 44.5% frost damaged seed, while the normal tannin variety Malik had only 7.8% frost damaged seed.

Distribution of frost damage in Experiment 1 and Experiment 2 in central Alberta.



Source: Henriquez et al. 2018

Yield and TSW decline with frost damage

There was a negative correlation between the amount of frost damage and the yield of affected varieties, and this relationship was much stronger among the zero-tannin varieties.

Frost also resulted in a significant drop in TSW compared with non-frost years. The reduction in weight for damaged seeds averaged 11.8 g per 100 seeds, or the equivalent of a 21.4% reduction in TSW.

The researchers indicated that the presence of tannins might explain the large discrepancy in frost damage differences when maturities were comparable. The selection of tannin-containing varieties that are early maturing can assist in reducing the risk of frost damage and commercial downgrading. This will help improve faba bean marketability into the human and livestock markets that accept tannin-type varieties.

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Henriquez, B., Olson, M., Hoy, C., Jackson, M., and Wouda, T. 2018 Frost tolerance of faba bean cultivars (*Vicia faba* L.) in central Alberta. *Can. J. Plant Sci.* 98(2): 509-514

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