Can1-2011 Evaluation of Boron in Spring Canola Production

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Evaluation of Boron in Spring Canola Production

Purpose:

The project was a continuation of a previous 3 year project from 2008 – 2010 that evaluated the benefits of intensive canola management that includes the application of foliar boron alone and in combination with fungicide and insecticide to assess impact on yield and seed quality. In 2011 foliar boron was evaluated alone.

Methods:

In 2011, 10 farm co-operators applied foliar boron at 0.3 lb/ac (actual) at early flowering. At 3 of the locations foliar boron was evaluated at two timings; rosette followed by flowering stage, or rosette plus flowering stages. All sites were field length trials with 2 replications. Plant tissue tests were conducted, sampling the uppermost young leaf at the beginning of flowering. The flowering stage and weather conditions were noted at application time. From 2008 to 2011 there were a total of 33 replicated strip trials that evaluated a foliar boron treatment.

Results:

Wet April conditions in 2011 delayed planting of all trials into early to mid May. Later than normal planting was followed by hot, dry conditions during flowering and pod fill which depressed 2011 canola yields. Results from 9 sites in 2011 are presented in Table 1. Boron applied at flowering did not significantly improve yield compared to the check. A summary of all trials conducted from 2008-2011 showed that on average boron improved yield by 67 lb/ac (marginal) or 3% compared to the check (Figure 1). Yield increases from the boron were improved the most in 2010 (5%). In 33 replicated trials from 2008-2011, boron increased yields in 73% of the trials, and economic returns 36% of the time. In the 3 trial locations in 2011 that included early boron application and early plus flowering application there was no increase in yield over the check.

Summary:

In the trials conducted from 2008-2011 foliar boron applied at flowering improved yields marginally by 3% on average, but rarely resulted in an increase in return. Further analysis of the data is required to determine if the results are significant. It is interesting to note that the greatest yield improvement occurred in 2010, a year with higher temperatures at flowering than in 2008 and 2009 when temperatures were cooler than normal. In 2011 conditions were cooler than 2010 but extremely dry. This would support preliminary research conducted by Dr. Hugh Earl, University of Guelph with foliar boron applied at flowering. In Dr. Earl's growth room studies, boron applied to canola that was under heat stress, improved retention of pods on the main raceme. The results from these field trials (73 % wins) indicates that where growers intend to apply a fungicide at flowering, the application of boron at the same time is relatively inexpensive (cost of boron is approximately $5/ac @ 0.3 lb/ac B) and would likely result in breakeven or a small increase in return. A positive response is more likely under conditions where heat stress (above 28^0 C) is expected for a sustained period during flowering. Unfortunately soil tests for boron are unreliable in predicting the need for boron.

Table 1: 2011 Canola Foliar Boron Trial Results

Location	Boron Application Timing			
	Yield (lb/ac)			
	Check	Early	Early + Flowering	Flowering
Walkerton	2113	2203	2068	2035
Drayton	2985			2809
Flesherton	2310	2219	2281	2402
Shelburne	1084			1094
Shelburne	1115			1159
Fergus	2301			2240
Listowel	2009	2082	2072	2053
Grand Valley	2013			2212
Durham	1699			1742
Average	**1959**			**1972**

Notes: Early application was made at the rosette stage. Flowering state was 20-30% open flowers (fungicide timing) in general

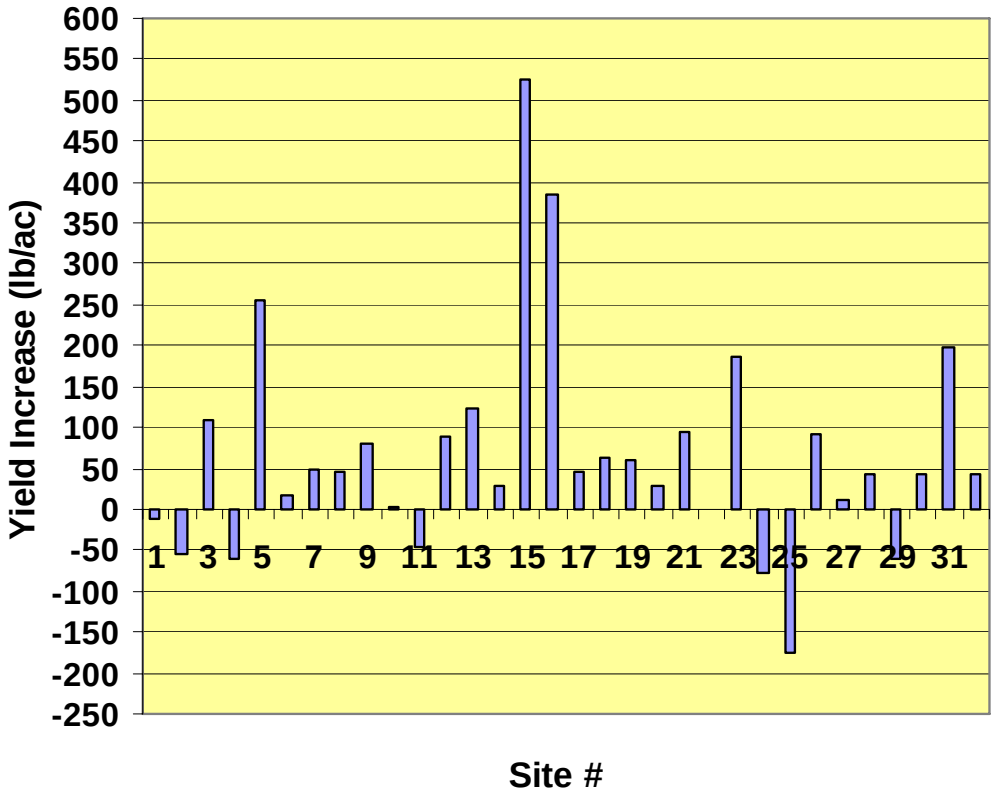

Figure 1: 2008-2011 Canola Foliar Boron Trials Yield Response

Next Steps:

Additional work on alternate timings and environmental conditions when flowering canola is under heat or drought stress is needed to refine boron response. Testing should also be conducted on sandy, low organic matter soils that are most likely candidates for low soil boron.

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