

The Impact of Poncho Seed Treatment on the Performance of Corn Under Various Types of Stress

Purpose:

Results from the 2004 growing season indicate that Poncho seed treatments may have greater impact on corn productivity under high stress environments. This stress may be more related to soil temperature, speed of emergence, or other root growth factors than to insect pressure itself.

The objective of this research was to evaluate Poncho seed treatments, within a series of imposed stresses, on corn growth and yield. Information gathered would allow for a detailed examination of how planting date, soil temperature, tillage, and soil fertility could interact with Poncho seed treatments to impact corn productivity.

Methods:

Plot work was carried out in the 2005 growing season at several: Alma, Elora A, Elora B, and Ancaster. Treatments imposed at the various research and demonstration sites consisted of combinations of the following factors:

Planting Date: 1) Early, 2) Late

Tillage: 1) No-till, 2) Conventional

Starter Fertilizer: 1) None, 2) Full Recommended N, P and K in starter band

Nitrogen: 1) None, 2) Full Rate (sidedressed at 6 leaf stage)

Insecticide Seed Treatment: 1) None, 2) Poncho 250

Measurements that were recorded at these sites included:

- 1) Soil temperature at planting and regular measurements during the first three weeks after planting.
- 2) Days to 50% emergence and final emergence counts
- 3) Visual assessment of the emerging plant stands for insect damage, delayed emergence and root damage
- 4) Leaf number and plant biomass at 4 and 6 weeks after planting.
- 5) Days to 50 % silk emergence
- 6) Final grain yield, harvest moistures, and percent broken stalks

Results:

At the outset it should be noted that in nearly all of the result from this project, even where response to Poncho is quite large, plant population differences and specific insect damage were both negligible.

Alma Site – at the Alma site the only factor used to impose differential stress on the Poncho treatments was planting date. As in the 2004 work it appeared at this site that the seed treatment with Poncho did result in more corn yield response in the early planting date compared to the later date. See Table 2.

Table 1. Poncho project sites in 2005 and associated treatments at each site.

Treatments	2005 Sites			
	Alma	Ancaster	Elora B	Elora A
Early Planting Date	May 9	May11	May 6	May 6
Late Planting Date	May 19	May 26	May 26	May 26
Tillage	-	-	Conventional versus No-till	-
Starter	-	Zero versus 40-54-40 ¹	Zero versus 40-42-33	Zero versus 40-42-33
Nitrogen	-	Sidedress June 21 0 versus 150 lb N/ac	Sidedress June 22 0 versus 150 lb N/ac	Sidedress June 22 0 versus 150 lb N/ac

¹ Starter fertilizer is expressed as actual N-P-K in lbs/acre

Table 2. Impact of planting date and insecticide seed treatment on corn yield at Alma Site in 2005. Previous crop soybeans.

Planting Date	Poncho 250	No Poncho	Difference (Poncho advantage)
----- corn yield (bu/ac) -----			
May 9	183	171	+12
May 19	186	182	+ 4

Ancaster Site – at the Ancaster site there was a large response to starter fertilizer, averaged across all other factors starter fertilizer (40-54-40) produced 23 more bushels per acre than no starter treatments. It was also apparent that starter had a slightly larger impact on corn yields in the early planting date compared to the late planting date. At this site the impact of Poncho seed treatment when averaged across all other factors was a 3 bu/acre increase over untreated seed and this was statistically insignificant. In breaking the data down further looking for a Poncho response related to other potential stress factors it did appear that Poncho resulted in more positive yield gain in the early versus the late planted corn. However, it was interesting to note that this was almost exclusively in the plots that received starter fertilizer (see Table 3).

Table 3. Impact of planting date, starter fertilizer and insecticide seed treatment on corn yields at the Ancaster site in 2005. Previous crop soybeans.

Planting Date	Starter	Poncho 250	No Poncho	Difference (Poncho advantage)
----- corn yield (bu/ac) -----				
May 11	Zero	119	120	-1
	40-54-40	156	142	+14
May 26	Zero	140	134	+ 6
	40-54-40	155	159	- 4

Elora B Site – the Elora B site also included a tillage factor where one-half of the plots were spring cultivated with a c-shank cultivator and then culti-packed while the other half of the plots were planted no-till. When averaged over all other factors planting date had no impact at this site but conventional tillage out yielded no-till by 13 bushel per acre and was statistically significant. Averaged over all other factors the Poncho 250 plots yielded 109 bu/acre while the No Poncho plots yielded 107 (not significant). Again digging into the data resulted in some more consistent advantage to Poncho use in the early planting but only in the no-till scenario (see Table 4).

Table 4. Impact of planting date, tillage system and insecticide seed treatment on corn yields at the Elora B site in 2005. Previous crop soybeans.

Planting Date	Tillage	Poncho 250	No Poncho	Difference (Poncho advantage)
----- corn yield (bu/ac) -----				
May 6	No-till	104	94	+ 10
	Conventional	115	119	- 4
May 26	No-till	104	102	+ 2
	Conventional	113	113	0

Elora A Site – the Elora A site followed alfalfa and had very low soil test levels for P and K. This was a good thing in terms of stressing the crop, but these low soil test levels combined with dry weather stress tended to make some of the plots very low yielding and in the No Starter treatments the yields were highly variable across the experiment.

Averaged across all other factors the No Starter plots yielded 86 bu/ac while the plots that received starter (40-42-33) yielded 133 bu/ac. Poncho versus No poncho yields were almost identical across all other factors. Table 5 illustrates the corn yield boost that Poncho 250 caused in the early planted, No Starter treatments. However the variability at this site, as can be observed by the large negative response to Poncho in the late planting scenario, makes it quite difficult to draw any conclusion from this experiment other than starter fertilizer pays huge dividends when soil tests levels are low (i.e 6 for P and 65 for K)!

Table 5. Impact of planting date, starter fertilizer and insecticide seed treatment on corn yields at the Elora A site in 2005. Previous crop alfalfa.

Planting Date	Starter	Poncho 250	No Poncho	Difference (Poncho advantage)
----- corn yield (bu/ac) -----				
May 6	Zero	87	64	+23
	40-42-33	119	123	- 4
May 26	Zero	87	106	- 19
	40-42-33	144	146	- 2

Summary:

Increasing the potential for corn plant stress by varying a range of factors such as planting date, starter fertilizer rates, tillage intensity, or N application rates did not have a consistent significant impact on the yield advantage afforded by Poncho 250 insecticide. The one common denominator in this research appears to be planting date. If there was going to be a greater yield boost to Poncho 250 it seemed to occur under earlier planting dates when contrasted against planting dates 10 to 20 days later. Producers who are strategically trying to position insecticide seed treatments for maximum economic return should target early planted corn.

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