

Project Title: Camelina tolerance to postemergence herbicides.

Project leader: Bob Stougaard

Objective: To evaluate the response of camelina to postemergence applications of several major herbicide families.

Results:

The experiment was established as a randomized complete block with three replications, with each plot measuring 10 by 15 feet. The study was conducted under rain-fed conditions, using conventional tillage, with the previous crop being alfalfa. ‘Ligena’ camelina was seeded 0.25 inches deep, at a rate of 5 lb/A in six inch wide rows on May 4.

Herbicide treatments were applied just prior to the bolting stage on June 11 when camelina was approximately 3.5 inch tall. Treatments were applied with a CO₂ backpack sprayer in 20 GPA of water using 11002 flat fan nozzles. Herbicide treatments consisted of pyridine (Stinger, Starane, Grandstand, and Milestone), quinoline (Facet), phenoxy (Thistrol), aryloxyphenoxypropionate (Assure II), cyclohexanedione (Select Max), and N-phenylphthalimide (Resource) chemistries. Each herbicide was applied at two rates (Table 1).

Treatments were visually rated for percent crop injury on June 17, using a scale of 0 (no injury) to 100 (complete injury). Treatments also were visually evaluated for percent green leaf area (GLA) on August 10, using a scale of 0 (completely senesced) to 100 (completely green). Plant height and days to flowering also were evaluated in order to further assess crop injury potential. Plots were harvested on September 10. Plots were hand-weeded throughout the growing season to prevent weed competition from confounding yield results.

Table 1. Herbicides evaluated.

Herbicide	Rate (lb ai/A)		Surfactant	
	Low	High	Type	Rate
Stinger	0.094	0.187	NIS	0.25%
Starane	0.105	0.245	NIS	0.25%
Grandstand	0.094	0.187	NIS	0.25%
Milestone	0.009	0.018	NIS	0.25%
Facet	0.500	0.750	COC	2 pt
Resource	0.027	0.054	COC	1%
Thistrol	0.500	1.000	NA	NA
Select Max	0.090	0.182	NIS	0.25%
Assure II	0.068	0.137	NIS	0.25%

Table 2. Camelina tolerance to postemergence herbicides.

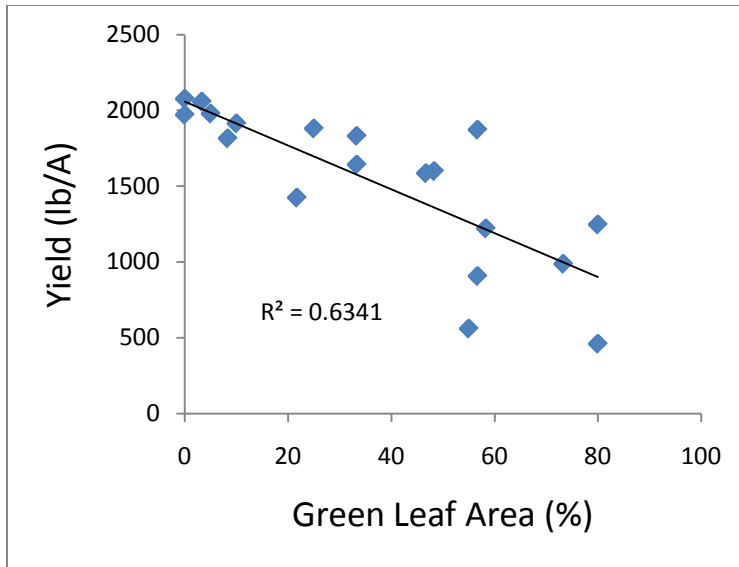
Herbicide	Yield (lb/A)		Crop Injury (%)		Flowering (Julian)		Height (inches)		GLA (%) ¹	
	Low ²	High ²	Low	High	Low	High	Low	High	Low	High
Stinger	907	561	10	13	174	174	35	31	57	55
Starane	1832	1643	65	77	181	183	26	24	33	33
Grandstand	1881	1586	33	53	179	183	29	24	25	47
Milestone	988	460	32	32	185	190	28	25	73	80
Facet	1600	1222	3	7	175	174	33	34	48	58
Resource	1873	1247	96	99	185	187	28	28	57	80
Thistrol	1816	1425	30	50	178	180	27	25	8	22
Select Max	1972	1979	10	7	175	175	31	33	0	5
Assure II	2058	1914	7	7	175	175	32	31	3	10
Check	2077		0		174		33		0	
MIN	460		0		174		24		0	
MAX	2077		99		190		35		80	
MEAN	1528		33		179		29		37	
Pr>F (trt)	0.0010		0.0001		0.0001		0.0001		0.0001	
CV	14.6		18.6		0.5		7.6		24.4	
LSD (0.05)	373.0		10.2		1.6		3.7		14.8	

¹Green leaf area: Percent of leaf tissue that is green.

²Low and High refers to the relative rate of the herbicide.

Crop injury ranged from 0 to 99 percent, depending on the herbicide and rate applied. However, crop injury ratings did not correlated well with yield ($R^2 = 0.0005$). For example, the low rate of Resource resulted in 96% injury, but yields were comparable to the non-treated check. In contrast the high rate of Stinger caused only 13% injury, but reduced yields by nearly 73%. Similarly, flowering and height measurements failed to correlate well with yield. However, there was good agreement between percent green leaf area (GLA) and yield (Figure 1).

In short, yield reductions were most severe with those herbicides that delayed plant maturity. Yields were most reduced with applications of Stinger and Milestone. Both herbicides not only delayed plant maturity, but also appeared to have had a negative effect on flower development and pollination. Although yields were reduced with Stinger and Milestone, low rates of the other pyridines afforded yields comparable to the non-treated check. Other herbicides demonstrating potential for use in camelina include Assure II and Select Max. Thistrol and Facet also showed potential. Although camelina recovered from the initial damage caused by Resource, the degree of injury precludes its use in the crop.



Summary:

Herbicides that delayed crop maturity had the greatest negative effect on yield. Postemergence herbicides that show potential for use in camelina include Select Max, Assure II, and the low rates of Starane, Grandstand, and Thistrol.

Future Plans:

Continue to evaluate postemergence herbicides for use in camelina.