Project Title: Camelina tolerance to soil applied herbicides

Project leader: Bob Stougaard

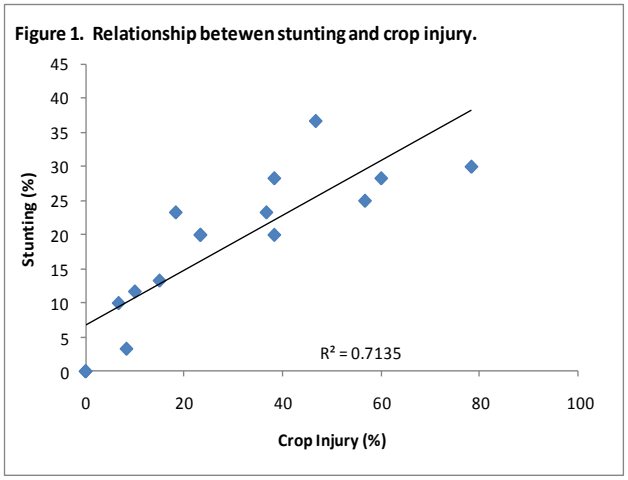
Objective: To evaluate the response of camelina to preemergence applications of several major herbicide families.

Results:

The study was conducted under dry-land conditions, using conventional tillage, with the previous crop being alfalfa. The soil type was a Kalispell very fine sandy loam with a sand, silt and clay content of 60, 25, and 15 percent, respectively. The soil had a CEC of 15, an organic matter content of 3 percent, a pH of 7.0. '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 preemergence on May 6, with a CO_2 backpack sprayer in 20 GPA of water using 11002 flat fan nozzles. The experiment was established as a randomized complete block with three replications, with each plot measuring 10 by 15 feet.

Treatments included a non-treated control along with the herbicides Outlook (dimethenamid), Prowl (pendimethalin), Facet (quinclorac), Cinch (metolachlor), and KIH-485 (pyroxasulfone). Each herbicide was applied at three rates (Table 1). Treatments were visually rated for percent crop injury and stunting on June 17, using a scale of 0 (no injury/no stunting) to 100 (complete injury/stunting). Plant density and biomass were determined in each plot by collecting the above ground plant material from two, 1.5 ft^2quadrates on August 4. Plant height and days to flowering also were evaluated in order to further assess crop injury potential. Plots were harvested on August 18. Plots were hand weeded to prevent weed competition from confounding yield results.

Crop injury ranged from 0 to 78 percent, depending on the herbicide and rate applied. Crop injury was mostly expressed in the form of plant density reductions, but stunting also contributed to the overall response (Figures 1 and 2). KIH-485 caused the greatest injury, which was largely manifested in the form of stand loss (Table 1). In contrast, Facet caused the least amount of injury.



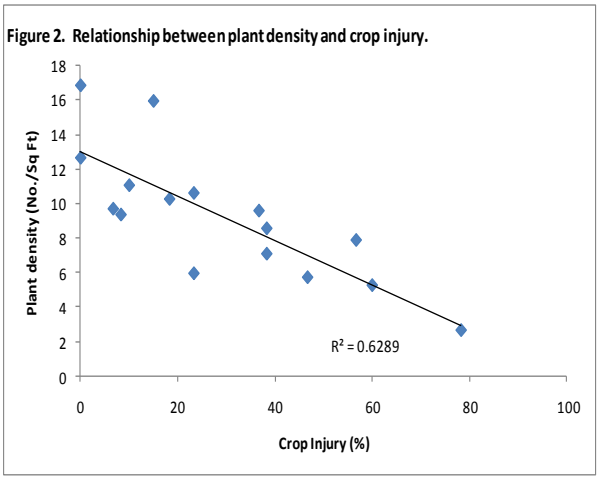


Table 1. Camelina tolerance to soil applied herbicides.

Herbicide	Rate Lb ai/A	Crop injury %	Stunting %	Height cm	Density No/Ft	Biomass g/ft	Flowering Julian	Test weight lb/bu	Yield lb/A
Check	0.000	0	0	81	13	66	175	52	1929
Outlook	0.560	10	12	84	11	85	175	51	2203
Outlook	0.840	37	23	88	10	80	177	50	2002
Outlook	1.125	60	28	84	5	90	178	50	1578
Prowl	0.950	23	20	82	11	88	176	51	1929
Prowl	1.900	23	20	83	6	55	177	50	1884
Prowl	3.800	47	37	81	6	66	178	50	1861
Facet	0.250	0	0	80	17	69	174	52	1921
Facet	0.500	7	10	86	10	89	176	52	2220
Facet	0.750	8	3	86	9	58	174	52	1951
Cinch	0.950	15	13	86	16	72	176	51	2079
Cinch	1.910	18	23	82	10	68	176	50	1942
Cinch	2.860	38	28	82	7	73	177	50	1937
KIH-485	0.056	38	20	81	9	75	178	51	1999
KIH-485	0.111	57	25	82	8	77	177	50	1875
KIH-485	0.223	78	30	81	3	62	178	49	1816
MAX		78	37	88	17	90	178	52	2220
MIN		0	0	80	3	55	174	49	1578
MEAN		29	18	83	9	73	177	51	1945
Pr>F (trt)		0.0001	0.0318	0.4929	0.0117	0.8966	0.0281	0.0002	0.0109
CV		58.13	69.9	4.83	43.08	35.05	0.81	1.34	8.03
LSD (0.05)		27.87	21.36	NS	6.69	NS	2.37	1.13	261.68

Although several treatments reduced plant densities by more than half, biomass was not affected. Similarly, height measurements were non-significant, even though stunting was initially observed. The fact that these late season measurements were non-significant indicates that camelina has robust compensatory abilities. Indeed, the high rate of Outlook was the only treatment to yield less than the check. Nevertheless, the severe injury initially observed with KIH-485 precludes its use in camelina.

Summary:

All of the herbicides evaluated appear to have a potential fit for use in camelina except for KIH-485. These results are very promising considering the soil textural class at this site.

Future Plans: Continue to evaluate soil applied herbicides for use in camelina.