

Project Title: Camelina tolerance to soil applied herbicides

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

#### Materials and Methods:

The study was conducted under dryland conditions, using conventional tillage practices, with the previous crop being alfalfa. The soil type was 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, and a pH of 7.0. The field was fertilized with 27-30-120-24 lb/A of N-P-K-S on April 2. 'Ligena' camelina was seeded 0.25 inches deep, at a rate of 5 lb/A in six inch wide rows on April 19. Herbicide treatments were applied on April 20, with a CO<sub>2</sub> 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 on July 3, using a scale of 0 (no injury) to 100 (complete injury). Plant density and biomass were determined in each plot by collecting the above ground plant material from two, 1.5 ft<sup>2</sup> quadrates on July 27. Plant height and days to flowering also were evaluated in order to further assess crop injury potential. Plots were harvested on August 11. Plots were hand-weeded to prevent weed competition from confounding yield results.

#### Results:

Crop injury ranged from 0 to 81 percent, depending on the herbicide and rate applied. Crop injury was mostly expressed in the form of plant density reductions (Figure 1,  $R^2=0.82$ ), but stunting also contributed to the overall response. Crop injury was more severe compared to the previous year. With the exception of Facet, all herbicides caused significant stand loss relative to the check, and this had a significant effect on yield (Figure 2). Treatment differences were also noted for days to flowering. Moreover, there was a strong relationship between flowering and yield (Figure 3,  $R^2=0.59$ ) where yields declined as flowering was delayed. On average, camelina flowered within three weeks, which is similar to the previous year. Facet had no effect on flowering, while Outlook, Prowl and Cinch consistently delayed flowering. 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. Not surprisingly, yield was not strongly associated with either of these variables. Test weights varied from a high of 48.2 to a low of 44.4, with the highest test weights being associated with Facet. Test weights were strongly associated with yield, where yields increased as test weights increased (Figure 4).

All of the herbicides evaluated have a potential fit for use in camelina when applied at the lowest rate, but Facet appears to have the greatest crop tolerance. This study should be conducted on additional soil types to better characterize camelina tolerance to these herbicides.

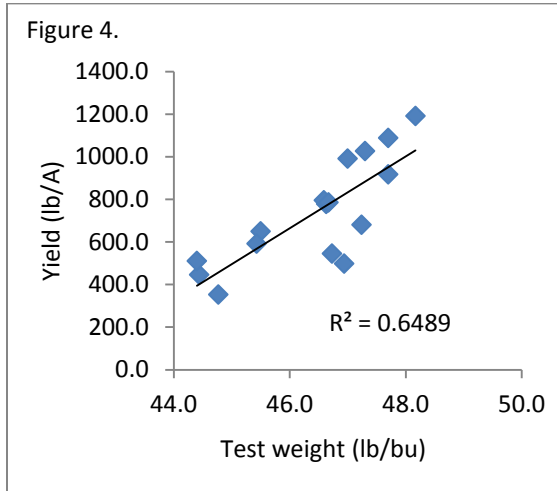
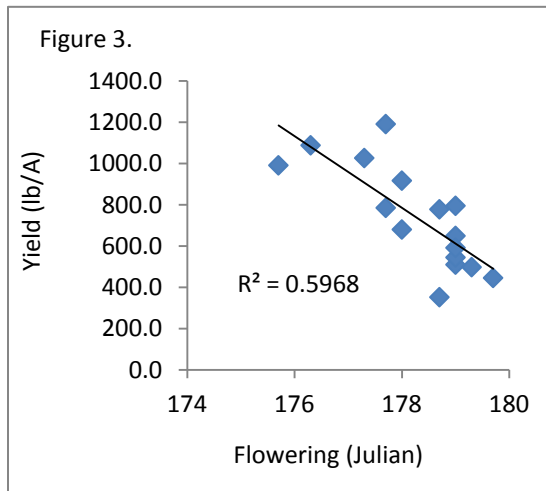
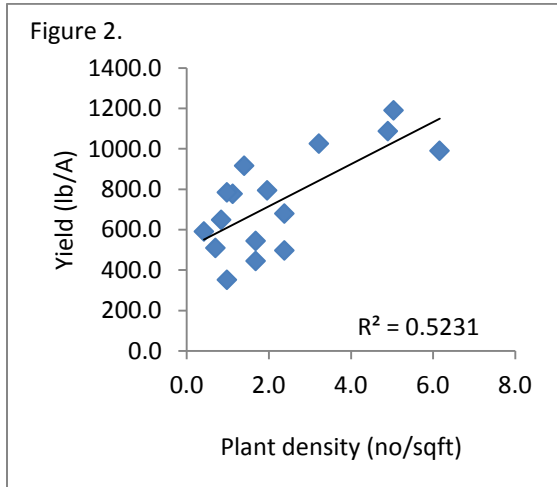
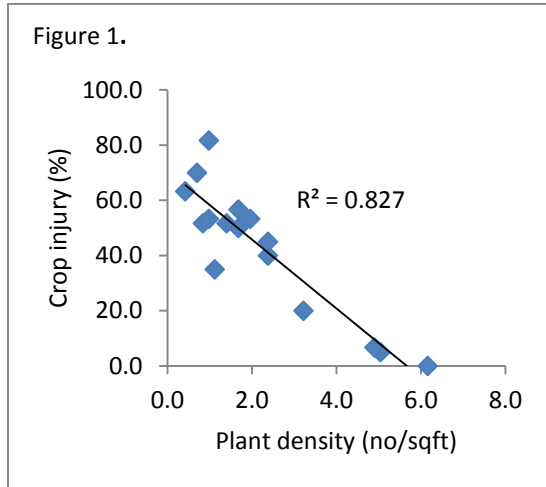


Table 1. Effect of herbicide and rate on camelina production, Kalispell, MT 2010.

Herbicide	Rate	<u>Injury</u>	<u>Flowering</u>	<u>Density</u>	<u>Biomass</u>	<u>Height</u>	<u>TWT</u>	<u>Yield</u>
	lb ai/a	(%)	Julian	No./ft <sup>2</sup>	g/ft <sup>2</sup>	(in)	lb/Bu	lb/A
		3-Jul		27-Jul	27-Jul	2-Aug		
Check		0.0	176	6.2	63.9	37.5	47.0	991.4
Outlook	0.560	56.7	180	1.7	39.9	35.0	44.4	446.0
Outlook	0.840	51.7	179	0.8	21.9	34.0	45.5	649.6
Outlook	1.125	70.0	179	0.7	37.5	34.6	44.4	510.6
Prowl	0.950	40.0	178	2.4	57.1	35.4	47.2	680.6
Prowl	1.900	45.0	179	2.4	46.1	34.7	46.9	498.2
Prowl	3.800	50.0	179	1.7	47.8	34.7	46.7	545.3
Facet	0.250	20.0	177	3.2	86.2	36.5	47.3	1026.8
Facet	0.500	5.0	178	5.0	86.4	37.3	48.2	1191.5
Facet	0.750	6.7	176	4.9	60.5	39.3	47.7	1088.5
Cinch	0.950	35.0	179	1.1	19.1	32.8	46.6	778.5
Cinch	1.910	53.3	179	2.0	41.4	33.3	46.6	795.5
Cinch	2.860	63.3	179	0.4	14.5	32.4	45.4	592.0
KIH-485	0.056	51.7	178	1.4	26.6	36.5	47.7	917.4
KIH-485	0.111	53.3	178	1.0	48.7	35.0	46.7	785.6
KIH-485	0.223	81.7	179	1.0	59.9	36.1	44.8	352.8
MIN		0.0	176	0.4	14.5	32.4	44.4	352.8
MAX		81.7	180	6.2	86.4	39.3	48.2	1191.5
MEAN		42.7	178	2.2	47.3	35.3	46.5	740.6
LSD (P=.05)		32.54	2.16	3.36	50.86	3.87	2.33	469.96
CV		45.70	0.73	89.87	64.43	6.57	2.99	38.06
Trt (Pr>F)		0.0003	0.0339	0.0315	0.1766	0.0773	0.0375	0.0234