

Fall-planted cover crop tolerance to soybean herbicides, Carrington, 2019. Greg Endres and Mike Ostlie. The trial was conducted at the NDSU Carrington Research Extension Center with support from the North Dakota Soybean Council to evaluate the tolerance of six fall-planted, cool-season cover crops on ground previously treated with seven soybean herbicides that have soil residual. Experimental design was a randomized complete block with split-plot arrangement (whole plot = cover crop and subplot = herbicide) and three replicates. The field trial was established on an irrigated, conventionally-tilled, Heimdal-Emrick loam soil with 2.9% organic matter and 7.9 pH (0- to 6-inch depth). 'AG03X7' dicamba-tolerant soybean was planted at 165,000 seeds/A on May 20 in 22-inch rows. A hand-held boom sprayer was used delivering 17 gpa at 35 psi through TeeJet XR FF80015 nozzles to the center 6.7 ft of 10- by 30-ft strips. PRE herbicides [metribuzin (Sencor), sulfentrazone (Spartan), flumioxazin (Valor), pyroxasulfone (Zidua), and imazethapyr (Pursuit)] were applied at standard rates on May 21 with 59 F, 92% RH, and 5 MPH wind on dry soil; a total of 1.0 inch of rain followed during May 22-24. POST herbicides [dicamba (Engenia) and fomesafen (Flexstar)] were applied on June 18 with 53 F, 93% RH, and 5 mph wind to first- to second trifoliolate (V1-2) stage soybean; a total of 0.9 inch of rain followed during June 20-21. Rainfall totaled 19.9 inches during May 21 to October 9, and supplemented with a total of 3 inches of irrigation water (overhead pivot) during June 8 to July 10. Soybean at the seed formation (R5-6) stages were terminated by mowing on August 20. Cover crops were planted August 30 into the soybean stubble with a no-till drill in 7.5-inch rows: 'Explorer' barley, 'ND Dylan' winter rye, 'Flex' field pea, 'ND Gold' flax, 'Jackhammer' radish, and 'Purple Top' turnip. Barley, rye, radish and turnip at 2- to 4-leaf stages; field pea at 5- to 6-node stages; and 1- to 3-inch tall flax were visually evaluated on September 20 [21 days after planting (DAP)] for biomass and stand reduction. A second evaluation occurred on October 9 (40 DAP) of barley at 4- to 6-inch height; rye, flax, radish and turnip at 2- to 4-inch height; and field pea at 2- to 8-inch height.

Field pea was tolerant of all herbicides (Table). All herbicides caused injury to select cover crops. Plant injury exceeding 10%: barley = Valor; rye = Zidua; flax = Sencor; radish = Sencor, Spartan, Zidua and Flexstar; and turnip = Sencor and Zidua.

Herbicide			Cover crop injury ¹											
			20-Sep						9-Oct					
Treatment	Rate	Application timing ²	Barley	Winter rye	Field pea	Flax	Radish	Turnip	Barley	Winter rye	Field pea	Flax	Radish	Turnip
fl oz product/A			%											
Sencor 75 DF	0.33 lb	PRE	0	0	0	0	13	20	0	0	0	15	25	22
Spartan 4F	10		0	0	0	0	22	0	0	0	0	0	22	0
Valor SX	3 oz		10	0	0	0	0	0	20	0	0	0	0	0
Zidua SC	4		0	12	0	0	20	0	0	0	0	3	22	12
Pursuit	3		0	0	0	0	0	0	0	0	0	8	0	0
Engenia + CA Ridion	12.8 + 2% v/v	POST	0	0	0	0	0	0	0	0	0	10	0	0
Flexstar + MSO	12 + 24		3	7	0	0	0	7	0	0	0	0	12	8
C.V. (%)			412						274					
LSD (0.10)			NS						NS					

¹Biomass and/or stand reduction.

²PRE=May 21; POST=June 18.