

2019 Winter Advisory Board Meeting

Weed Science Research Update

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Research Project Results for 2019:

- 1) Dicamba and 2,4-D carryover following fall application.
 - a. Dicamba applied at 4 and 8 oz/A
 - b. 2,4-D (LV-6) applied at 11 and 22 oz/A
 - c. Three application timings:
 - i. Sept 27, Oct 11, Oct 27, 2017
 - ii. Sep 28, Oct 11, and Oct 26, 2018
 - d. Trials conducted in Hettinger and Minot (Brian Jenks)
 - e. Field pea, lentils, chickpeas, and sunflowers were planted in spring to determine if herbicide carryover would cause injury.
 - f. Minor injury (no stand reduction) was observed to lentils from dicamba applied at 8 oz/A, with the greatest injury from the Oct 27 application date.
 - g. No injury or stand reduction for field pea, chickpea, or lentil
 - h. Subset of trial is being repeated in 2020.
 - i. Only one application timing (November 19)
 - ii. Larger plots, will collect yield data
- 2) Flax tolerance to postemergence herbicides
 - a. Herbicides used in other crops primarily for broadleaf weed control
 - b. Trials conducted in Minot (Brian Jenks), Carrington (Mike Ostlie) and Hettinger
 - c. Flax was severely injured with Talinor applied POST
 - d. Armezon, Bison, and Basagran lightly injured flax (0 to 14%)
 - e. Raptor alone caused more injury to flax than combination of Raptor plus Basagran.
 - f. Mallow and wild buckwheat were controlled best by Raptor or Raptor plus Basagran
 - g. Flax yield was greatest with Raptor alone probably due to best weed control.

Table 1. Flax response to postemergence herbicides at Hettinger, ND in 2019

Treatment	Timing	Rate oz/A	Flax		Mallow	Wild buckwheat	Flax Yield lbs/A
			7 DAT	15 DAT	34 DAT	34 DAT	
			Injury (%)		control (%)		
Untreated			0 d	0 c	0 f	0d	899 de
Talinor	POST	13.7	49 a	48 a	50 d	59b	986 de
Talinor	POST	18.2	58 a	40 a	73 bc	75a	1119 cde
Armezon	POST	0.5	6 d	3 c	0 f	0d	934 de
Armezon	POST	0.75	11 cd	3 c	0 f	0d	778 e
Bison	POST	16	9 d	1 c	54 cd	75a	1367 bcd
Basagran	POST	16	2 d	0 c	29 e	39c	1478 abc
Raptor	POST	4	23 bcc	39 a	93 a	75a	1805 a
Basagran+ Raptor	POST	16+4	9 d	8 c	92 ab	65ab	1343 bcd

3) Flax tolerance to preemergence herbicides

- Various preemergence herbicides were evaluated for crop safety in flax
- Trials were conducted in Minot (Jenks), Carrington (Ostlie), and Hettinger
- Flax was severely injured by herbicide treatments containing the active ingredient flumioxazin (Valor and Fierce), stand population of flax were reduced by 50%, and yield was reduced 19 to 52%.
- Other treatments resulted in only minor injury, did not reduce flax population or yield compared with the untreated control
- Yield of flax treated with Warrant (acetochlor) or Outlook (dimethenamid) was less than the highest yielding treatment (Broadaxe plus Dual), but this reduction was likely due to reduced control of wild buckwheat, common mallow, and kochia. These two herbicides control primarily grass type weeds.

Table 2. Comparison of preemergence herbicides applied to flax. Flax ‘York’ was evaluated for injury from herbicide treatments and resulting yield. Weed control was also evaluated.

Treatment	Rate	12 DAE ¹	33 DAE	Flax Stand	Wild buckwheat	Common mallow	Kochia	Flax Yield
	oz/A	—% injury—		plants/m	—% control—			lbs/acre
1 Untreated		0 d	0 d	29 a	0 e	0 e	0 d	1495 ab
2 Zidua	3	10 bc	8 c	34 a	80 a	79 ab	90 a	1506 ab
3 Spartan + Zidua	4 +1.5	15 b	18 b	32 a	76 ab	85 a	96 a	1645 ab
4 Warrant	48	1.3 cd	3.8 cd	34 a	55 d	59 d	70 bc	1430 b
5 Dual II Magnum	24	7.5 bcd	4.3 cd	27 a	63 cd	64 cd	63 c	1445 ab
6 BroadAxe + Dual	22.8+5.2	8 bcd	1.3 d	30 a	80 a	91 a	100 a	1692 a
7 Fierce	3	84 a	79 a	14 b	73 ab	90 a	100 a	812 d
8 Prowl H2O	24	7 bcd	1.3 d	32 a	75 ab	68 bcd	96 a	1451 ab
9 Valor	2	84 a	78 a	15 b	75 ab	78 abc	94 a	1165 c
10 Outlook	18	3.8 cd	0 d	30 a	68 bc	55 d	88 ab	1391 bc
LSD P=.05		9.06	5.80	82.85	9.96	13.96	19	255.87
Standard Deviation		6.24	4.00	57.11	6.86	9.62	13.1	176.36
Treatment Probability (F)		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

¹ DAE, days after emergence.

4) Comparison of preemergence herbicides in lentil

- a. Prememergence herbicides were applied to evaluate for crop tolerance in lentil.
Note: all treatments included Roundup PowerMax at 24 oz/A
- b. Lentil were planted on May 10 and herbicide treatments were applied on May 13
- c. Over 3 inches of rain after application and before lentil emergence
- d. All treatments cause some injury to lentil, but injury from Spartan Charge was severe (60% at 22 days after emergence)
- e. Lentil yield was reduced only with the Spartan Charge treatment

Table. Comparison of preemergence herbicides for weed control in lentil at the Hettinger Research Extension Center.

Treatment	Rate oz/A	Lentil 22 DAE ¹	Wild buckwheat 36 DAE	Kochia 36 DAE	Lentil Stand #/ft ²	Yield bu/acre
		%control				
1 Untreated		0 e	0 c	0 c	12.3 c	5.2 c
2 Sharpen	0.75	14 d	94 a	96 a	14.5 abc	30 a
Outlook	2					
Metribuzin	4					
3 Anthem Flex	4+	19 b	94 a	92 ab	14.3 abc	31 a
Metribuzin	4					
4 Sharpen	0.75	10 d	89 a	91 ab	16.0 ab	31 a
Metribuzin	4					
Prowl H2O	32					
5 Sharpen	0.75	21 b	91 a	91 ab	16.3 a	34 a
Dual	27					
Metribuzin	4					
6 Sharpen	0.75	14 cd	94 a	94 a	15.1 ab	33 a
Metribuzin	4					
Zidua SC	3.25					
7 Sharpen	0.75	18 bc	92 a	92 ab	13.8 bc	31 a
Metribuzin	4					
Zidua SC	5					
8 Spartan Charge	5	60 a	95 a	97 a	12.2 c	15 b
Dual	27					
9 Roundup PowerMax	24	0 e	73 b	85 b	15.2 ab	32 a
LSD P=.05		4.1	8.1	8.7	2.3	5.4
Standard Deviation		3.4	5.5	6.0	2	4.5
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001	0.0001

¹ DAE, days after emergence lentil planted on May 10; emerged on May 21.

- 5) Evaluation of new herbicides for weed control and crop safety for crops grown in southwest North Dakota. The desired outcome is to increase the number of herbicides labelled for use in these crops when data shows treatments are beneficial for weed control and crop production (includes trials described above).
- a. Spring wheat: Ten trials conducted in 2019
 - b. Oats: Two trials conducted in 2019
 - c. Canola: two trials conducted in 2019
 - d. Flax: two trials conducted in 2019
 - e. Field pea: two trials conducted in 2019
 - f. Lentils: two trials conducted in 2019
 - g. Chickpea: Three trials conducted in 2019
 - h. Safflower: two trials conducted in 2019
 - i. Sunflower: one trial conducted in 2019
 - j. Dicamba and 2,4-D carryover to peas, lentils, chickpea, and sunflowers
 - k. Evaluation of preharvest desiccants for wheat, durum, and oats

Presentations and Outreach:

- Wild world of weeds workshop at Fargo, ND. January 21, 2020
- National Sunflower Association Meeting, Fargo, January 8-9, 2020
- Western Dakota Crops Day at Hettinger, ND. December 2019
- Western Society of Weed Science, March 2020
- 2020 North Dakota Weed Control Guide contributor