2019 Winter Advisory Board Meeting

Weed Science Research Update
Caleb Dalley and Daniel Abe
February 19, 2019

Research Project Results for 2018:

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 (Sept 27, Oct 11, Oct 27, 2017)
    d. Trials conducted in Hettinger and Minot
    e. Field pea (May 5), lentils (May 7), chickpeas (May 9), and sunflowers (May 29) were planted in spring to determine if herbicide carryover would cause injury.
    f. Evaluated for injury on June 11
        i. Only injury observed was to lentils from dicamba applied at 8 oz/A, with the greatest injury from the Oct 27 application date.
        ii. Injury to lentil was minor and was only noticeable upon close examination
    g. Hail storm destroyed trial on June 26th.
    h. Trial is being repeated in 2019.
2) Flax tolerance to PRE- and POST-applied Group 27 herbicides (pigment inhibitors)
    a. Herbicides used in other crops primarily for broadleaf weed control
    b. Trials conducted in Minot and Hettinger
    c. Flax was tolerant to PRE application of Talinor but severely injured when Talinor was 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. Hailstorm severely damaged plots prior to height and yield measurements.
    g. Trial is being repeated in 2019.

Table 1. Flax response to pre and postemergence herbicides at Hettinger, ND in 2018

Treatment	Timing	Rate	Flax		Mallow		Kochia	Flax Yield
		oz/A	7 DAT	15 DAT	15 DAT	38 DAT	15 DAT	
			Injury (%)		control (%)			lbs/A
Untreated			0 e	0 f	0 d	0 g	0e	937 b
Talinor	PRE	13.7	0 e	0 f	0 d	28 f	0e	1067 ab
Talinor	PRE	18.2	9 d	0 f	0 d	45 e	23d	989 ab
Talinor	POST	13.7	73 b	61 b	65 b	56 cde	55abc	731 c
Talinor	POST	18.2	81 a	78 a	74 a	70 b	66ab	651 c
Armezon	POST	0.5	14 cd	0 f	64 bc	60 bcd	63ab	1174 a
Armezon	POST	0.75	12 d	13 de	65 b	69 bc	42c	1038 ab
Bison	POST	16	10 d	14 d	55 c	53 de	50abc	947 b
Basagran	POST	16	3 e	6 ef	63 bc	64 bcd	48bc	1061 ab
Raptor	POST	4	18 c	29 c	80 a	100 a	70a	1118 ab
Basagran+ Raptor	POST	16+4	11 d	18 d	80 a	92 a	66ab	1094 ab

3) Oat tolerance to PRE and POST applied herbicides
    a. Oats were planted on May 23 and ten preemergence herbicides were planted the next morning.
    b. Rainfall after herbicide application included 0.09 inches on May 28 and 0.33 inches on May 30; Oats emerged on May 30th.
    c. Postemergence application of Armezon (topramezone) was applied to oats with 2 to 3 leaves on June 4 and 4 to 6 leaves on June 14.
    d. No injury from PRE herbicides to oats was observed.
    e. POST application of Armezon at 2-3 leaves caused slight injury that diminished by 25 days after application; Armezon applied at 4-6 leaves caused major injury (46% at 15 DAT).
    f. None of the herbicide treatments resulted in significant yield losses, although yield was lowest following the late application of Armezon and Zidua.

Table 2. Oat response to preemergence and postemergence herbicide application at Hettinger, ND

			18 DAT	26 DAT	36 DAT	50 DAT	Yield
Treatment	Rate	Timing	% control				Bu/A
1Untreated			0b	0c	0b	0b	74
2Zidua	3oz/a	PRE	0b	0c	0b	0b	82
3Warrant	1.5qt/a	PRE	0b	0c	0b	0b	82
4Dual II Magnum	1.67pt/a	PRE	0b	0c	0b	0b	78
5Prowl	3pt/a	PRE	0b	0c	0b	0b	76
6Outlook	18oz/a	PRE	0b	0c	3b	0b	78
7Zidua	3oz/a	EPOST	0b	0c	0b	0b	67
8Warrant	1.5qt/a	EPOST	0b	0c	0b	0b	76
9Dual II Magnum	1.67pt/a	EPOST	0b	0c	0b	0b	83
10Prowl	3pt/a	EPOST	0b	0c	0b	0b	83
11Outlook	18oz/a	EPOST	0b	0c	0b	0b	79
12Armezon	1oz/a	EPOST	14a	9b	0b	3b	77
13Armezon	1oz/a	LPOST	—	28a	46a	30a	67-

4) Fall and spring application of tank-mixes of BroadAxe and Dual with glyphosate were evaluated for control of winter annual weeds including downy brome and shepherd's-purse and control of spring annual weeds kochia, common lambsquarters, and green foxtail. Fall treatments were applied on October 17, 2017 and spring applications were applied on May 5. Field peas were planted on May 3.
    a. No injury to peas was observed from herbicide treatments.
    b. All treatments resulted in excellent control of downy brome and shepherd's-purse although a single application of glyphosate alone resulted in reduced control compared to treatments including Broadaxe or Dual.
    c. Fall application of Broadaxe with or without Dual resulted in 88 to 91% control of kochia in the spring when evaluated 43 days after pea emergence.

d. Spring application of Braodaxe with or without Dual also resulted in excellent control of kochia (93 to 96%), with the exception of when BroadAxe was applied at the reduced rate of 10 oz/A where control was only 80%.
e. Dual or glyphosate alone did not control kochia.
f. Spring applications resulted in better control of green foxtail compared with fall applications; although neither timings resulted in satisfactory control of green foxtail and would require an in-crop application of a POST grass herbicide.
g. Common lambsquarters control was similar to that of kochia, with fall applications resulting in as good as or better control compared with spring applications.
h. Trial to be repeated in 2019.

Table 3. Effect of fall and spring preemergence herbicide treatments for weed control in field peas at Hettinger, ND

Treatment	Rate oz/A	Timing	Downy brome	Shepherd's purse	Kochia			Green foxtail		Common lambsquarters	
			7 DAE	7 DAE	7 DAE	18 DAE	43 DAE	18 DAE	43 DAE	18 DAE	43 DAE
			% control								
1Untreated		Fall	0c	0d	0c	0.0d	0f	0g	0c	0c	0e
2Glyphosate Broadaxe XC	32 25	Fall	100a	99a	100a	91.3a	91ab	70e	63a	94a	92a
3Glyphosate Broadaxe XC	32 19	Fall	100a	100a	95a	80.0c	90ab	58f	36b	86b	93a
4Glyphosate Broadaxe XC Dual II	32 19 10	Fall	100a	100a	98a	85.0bc	88b	78cd	73a	90ab	95a
5Glyphosate Broadaxe XC Dual II	32 19 16	Fall	100a	100a	96a	85.0bc	91ab	80bcd	74a	93a	88a
6Glyphosate Dual II	32 32	Fall	100a	100a	44b	0.0d	13e	75de	66a	0c	0e
7Glyphosate	32	Fall	96b	90bc	0c	0.0d	0f	0g	0c	0c	0e
8Glyphosate	32	Fall + Spring	100a	99a	95a	0.0d	0f	0g	0c	0c	0e
9Glyphosate Broadaxe XC	32 25	Spring	100a	98a	100a	91.0a	93ab	85a	78a	94a	87ab
10Glyphosate Broadaxe XC	32 19	Spring	100a	96ab	100a	89.1ab	96a	83abc	74a	90ab	90a
11Glyphosate Broadaxe XC Dual II	32 10 16	Spring	100a	99a	98a	86.3ab	80c	77d	75a	86b	75c
12Glyphosate Broadaxe XC Dual II	32 10 23	Spring	100a	94abc	96a	90.0ab	93ab	83ab	78a	86b	78bc
13Glyphosate Dual II	32 32	Spring	99a	98a	95a	0.0d	25d	79bcd	76a	0c	0e
14Glyphosate	32	Spring	100a	89c	98a	0.0d	0f	0g	0c	0c	0e

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 2018
    b. Oats: One trial conducted in 2018
    c. Canola: two trials conducted in 2018
    d. Flax: two trials conducted in 2018
    e. Field pea: five trials conducted in 2018
    f. Lentils: three trials conducted in 2018
    g. Chickpea: Two trials conducted in 2018
    h. Safflower: one trial conducted in 2018
    i. Sunflower: one trial conducted in 2018
    j. Dicamba and 2,4-D carryover to peas, lentils, chickpea, and sunflowers
    k. Evaluation of preharvest desiccants for wheat and durum

Presentations and Outreach:

- Wild world on weeds workshop at Fargo, ND. January 2019
- Western Dakota Crops Day at Hettinger, ND. December 2018
- Hettinger County Crop and Livestock Improvement Annual meeting, Feb 1, 2019
- Western Society of Weed Science, Denver, CO March 2019
- 2019 North Dakota Weed Control Guide contributor