

Wonderful World of Potatoes and Herbicides!

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EXTENSION

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SERVICE

Staff Recognition

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Herbicide injury in potato

- Plant injury affected by
 - Herbicide dose (Colquhoun et al. 2014; Hatterman-Valenti 2017; Hutchinson et al. 2014; Wall 1994)
 - Potato growth stage at time of exposure (Hutchinson et al 2014; Crook 2016)
 - Ambient temperature - affects movement in the plant (Masiunas and Weller 1988)



Plant back of seed tubers containing herbicide residues

- Dicamba rates of 0.005, 0.01, 0.02 pt a⁻¹ caused symptoms (Wall 1994)
- Growth stage of exposure the previous year affected seed (Hutchinson et al. 2014; Crook 2016)
- Glyphosate contamination adversely affected growth by germination inhibition (Worthington 1985)



Objective

- To determine the effects of planting 'Russet Burbank' potato seed tubers that were exposed to dicamba, glyphosate and the combination of dicamba and glyphosate the previous year.

Treatments

- Planted: 2015-2016
- Planted back: 2016-2017
- Location: Oakes & Inkster, ND
- Measured: emergence, height, graded yield

Treatments	Rate (fl oz/a)
1. Non-treated	0
2. Glyphosate	5
3. Glyphosate	1
4. Glyphosate	0.2
5. Dicamba	2.8
6. Dicamba	0.6
7. Dicamba	0.1
8. Glyphosate	5
Dicamba	2.8
9. Glyphosate	1
Dicamba	0.6
10. Glyphosate	0.2
Dicamba	0.1

Emergence

Treatment	Glyphosate	Dicamba	Environment 1		Environment 2	
			5 WAP	8 WAP	5 WAP	8 WAP
	oz a ⁻¹	oz a ⁻¹	Plant emergence (%)			
1	0	0	88 ab ^a	95 a	90 a	97 a
2	5	0	85 b	96 a	85 ab	90 ab
3	1	0	80 bc	86 ab	85 ab	90 ab
4	0.2	0	25 f	49 d	53 e	68 c
5	0	2.8	93 a	94 a	83 b	95 a
6	0	0.6	76 cd	89 ab	77 bc	83 b
7	0	0.1	40 e	79 bc	70 d	78 bc
8	5	2.8	91 ab	95 a	86 ab	95 a
9	1	0.6	73 d	83 b	78 b	90 ab
10	0.2	0.1	25 f	67 c	65 d	80 b

^aNumbers followed by the same letter in a column are not significantly different according to Tukey pair-wise comparison at P = 0.05

Height

Trt	Glyphosate	Dicamba	Environment 1		Environment 2	
			5 WAP	8 WAP	5 WAP	8 WAP
	oz a ⁻¹	oz a ⁻¹	Plant height (cm)			
1	0	0	17 a ^a	50 ab	36 a	65 a
2	5	0	17 a	54 a	36 a	65 a
3	1	0	14 ab	52 ab	36 a	62 ab
4	0.2	0	5 d	34 d	21 c	50 c
5	0	2.8	16 a	51 ab	34 a	63 ab
6	0	0.6	12 b	48 bc	31 b	61 ab
7	0	0.1	8 c	44 c	30 b	57 b
8	5	2.8	17 a	54 a	34 a	62 ab
9	1	0.6	12 b	49 abc	30 b	58 b
10	0.2	0.1	4 d	40 dc	30 b	56 b

^aNumbers followed by the same letter in a column are not significantly different according to Tukey pair-wise comparison at P=0.05.

Yield

Trt ^c	Glyphosate	Dicamba	Environment 1		Environment 2	
			Total Yield	TMY ^b	Total Yield	TMY
	oz a ⁻¹	oz a ⁻¹	T ha ⁻¹			
1	0	0	53 a ^a	49 a	61 a	53 a
2	5	0	54 a	49 a	56 ab	48 ab
3	1	0	51 a	46 a	54 c	47 b
4	0.2	0	27 c	21 c	39 e	31 d
5	0	2.8	56 a	52 a	60 ab	53 a
6	0	0.6	38 b	33 b	55 bc	49 ab
7	0	0.1	26 c	22 c	47 d	41 c
8	5	2.8	55 a	50 a	60 ab	52 a
9	1	0.6	40 b	36 b	52 cd	45 c
10	0.2	0.1	26 c	23 c	38 e	33 d

^aNumbers followed by the same letter in a column are not significantly different according to Tukey pair-wise comparison at P=0.05.

^bTotal marketable yield includes U.S. No. 1 and U.S. No. 2 tubers

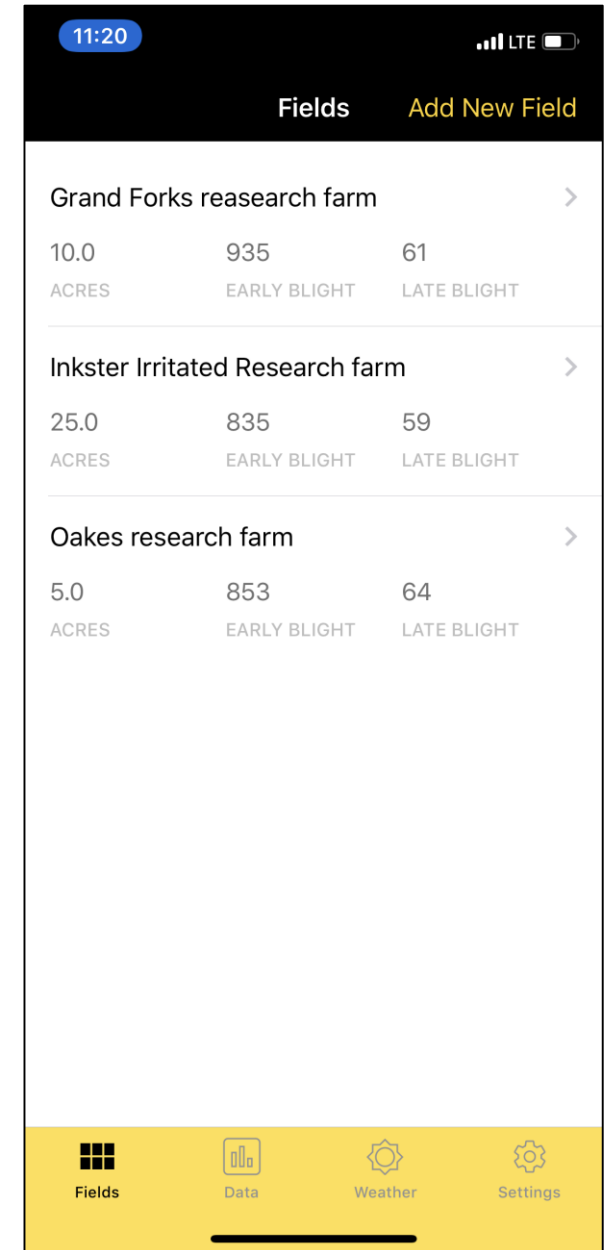
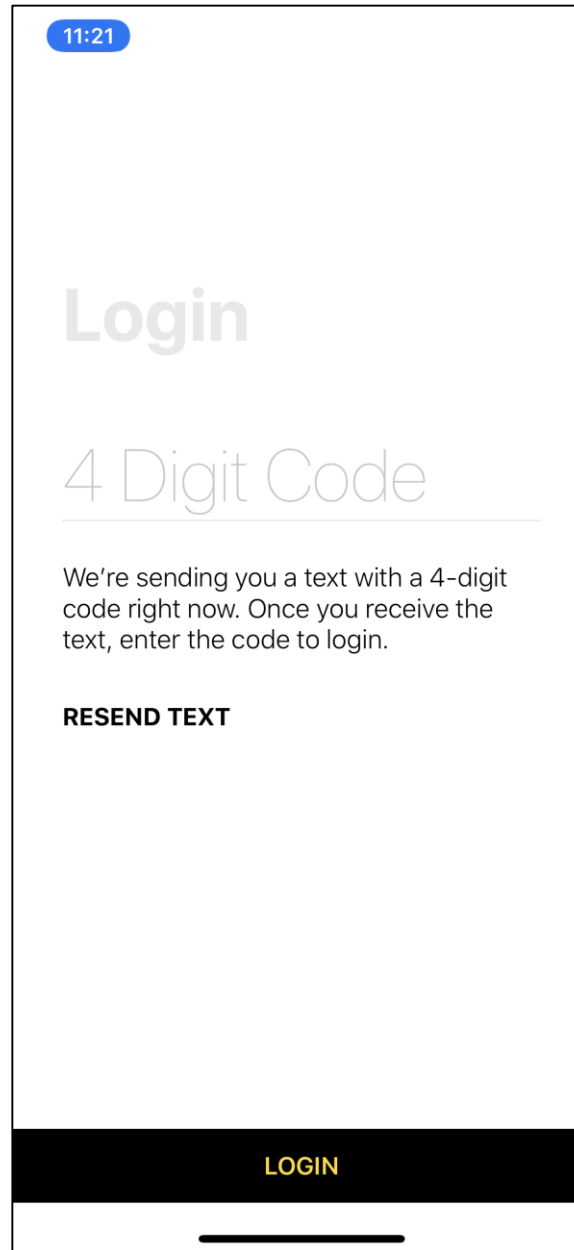
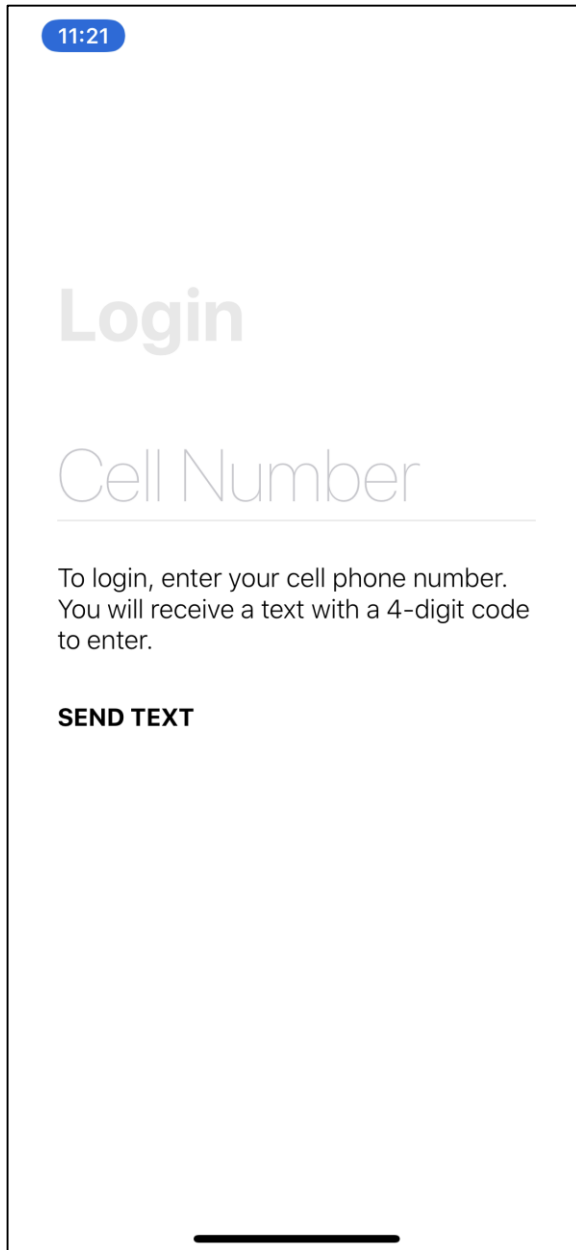
^cAbbreviations: trt, treatment

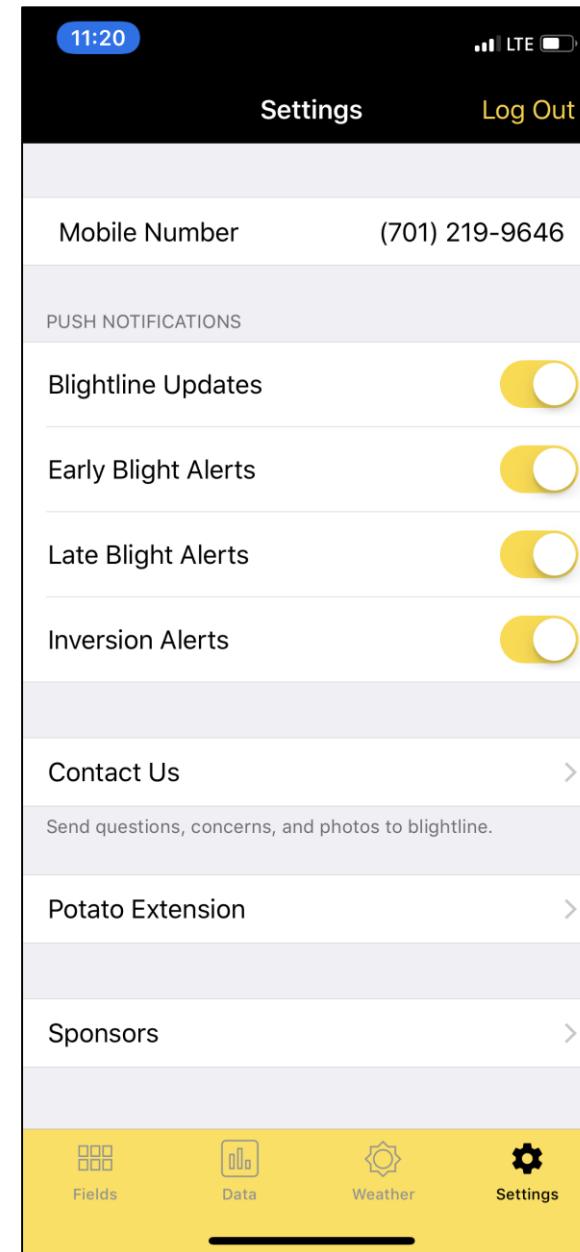
Lessons learned

- Russet Burbank potato was sensitive to glyphosate and dicamba as residues were translocated to tubers and affected seed.
- Dicamba treatments were found to be more damaging compared to glyphosate.
- Environmental conditions during herbicide treatments influenced the amount of herbicide stored in potato seed.

Potato Blight app

- Search: **NDAWN Potato Blight**
 - Apple store or Google Play (z.umn.edu/spud)
- Uses predictive model to determine favorable conditions for late blight and early blight.
- NDAWN weather (updated every 5 minutes)
- Inversion alerts





Thank you!

