

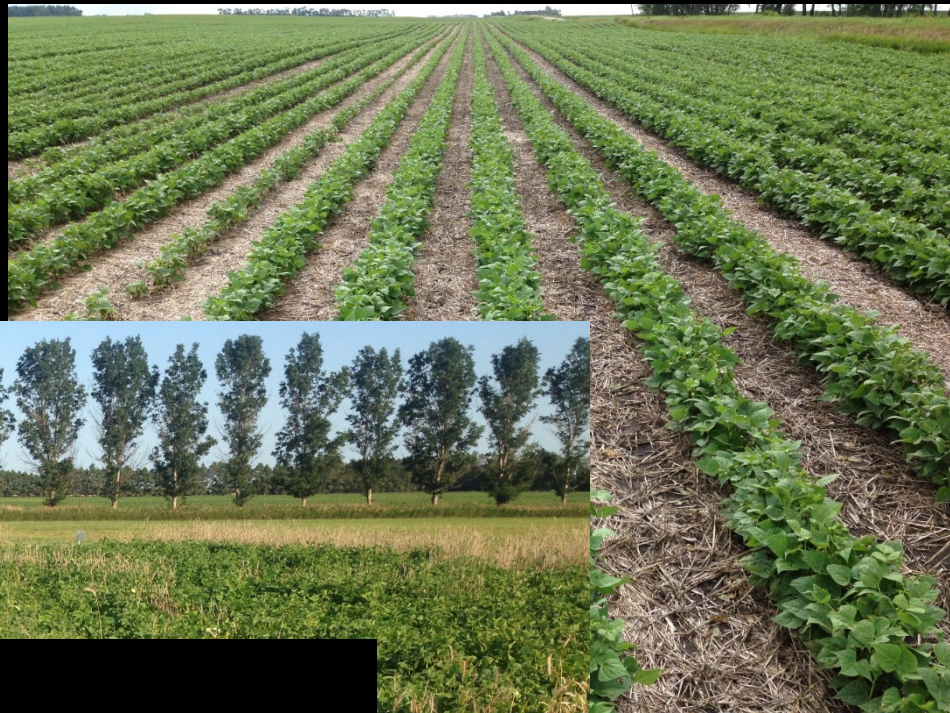
NDSU Carrington Research Extension Center: WEED MANAGEMENT PROGRAM UPDATE

Greg Endres, Extension agronomist
Carrington Research Extension Center
701-652-2951; gregory.endres@ndsu.edu

Research:

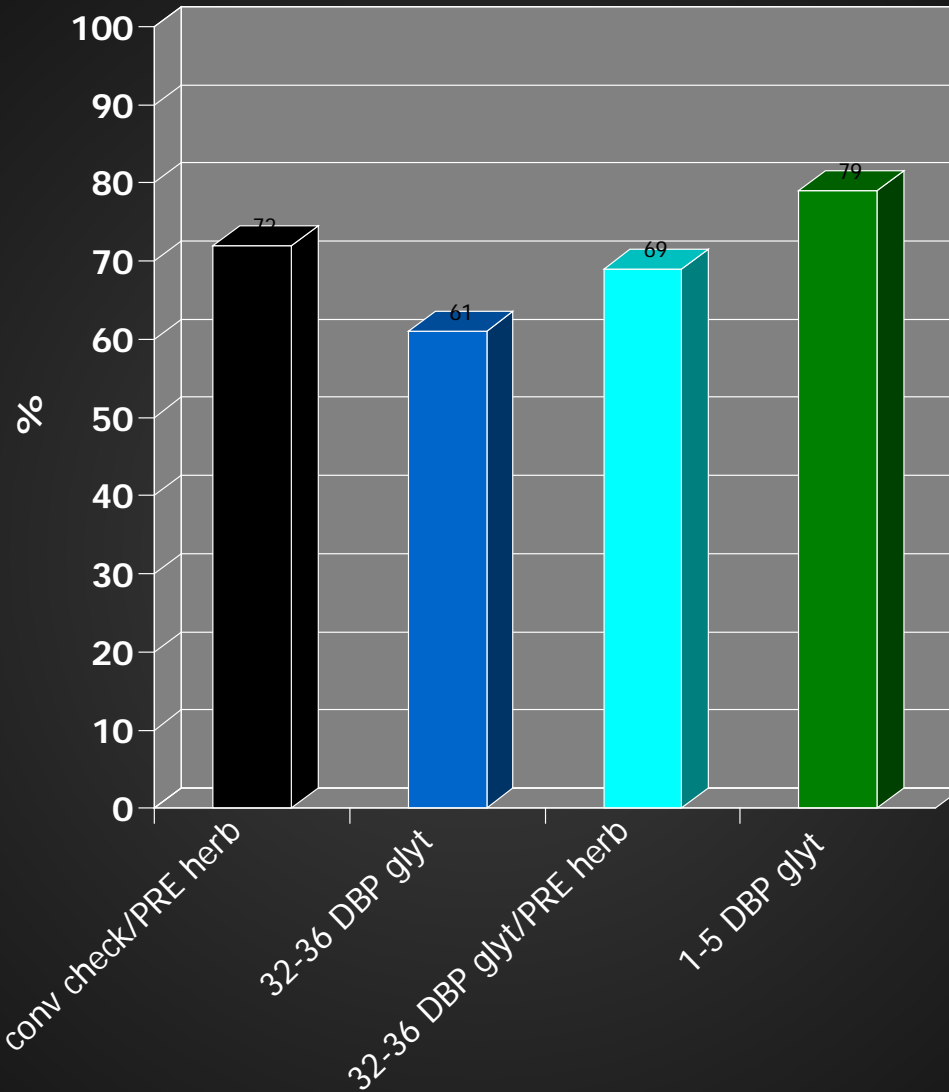
1. Winter rye as a cover crop with pinto bean and soybean: weed suppression
2. Fall-planted cover crop response to soybean herbicides

Winter rye cover crop for pinto bean



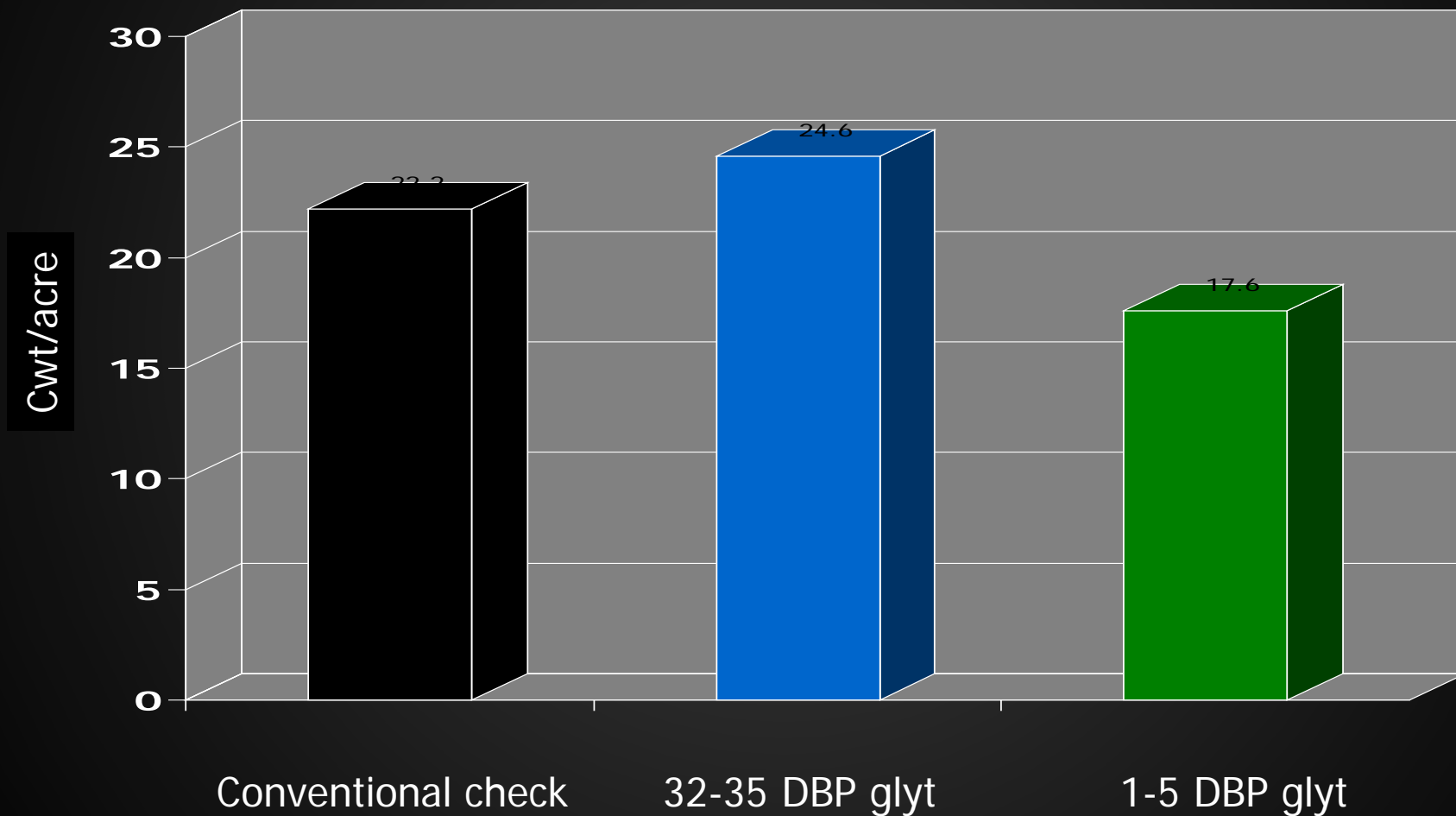
Bean yield?
Rye termination timing?
Weed suppression?

Grass weed control* in pinto bean with conventional check (no rye), and several spring termination timings of rye, Carrington, 2018-19 (2 site-years)



*Primary weeds: foxtail. Visual evaluation prior to POST herbicide application across trial for general weed control.

Pinto bean yield with conventional check, and early and late spring termination of rye, Carrington, 2017-19 (3 site-years)

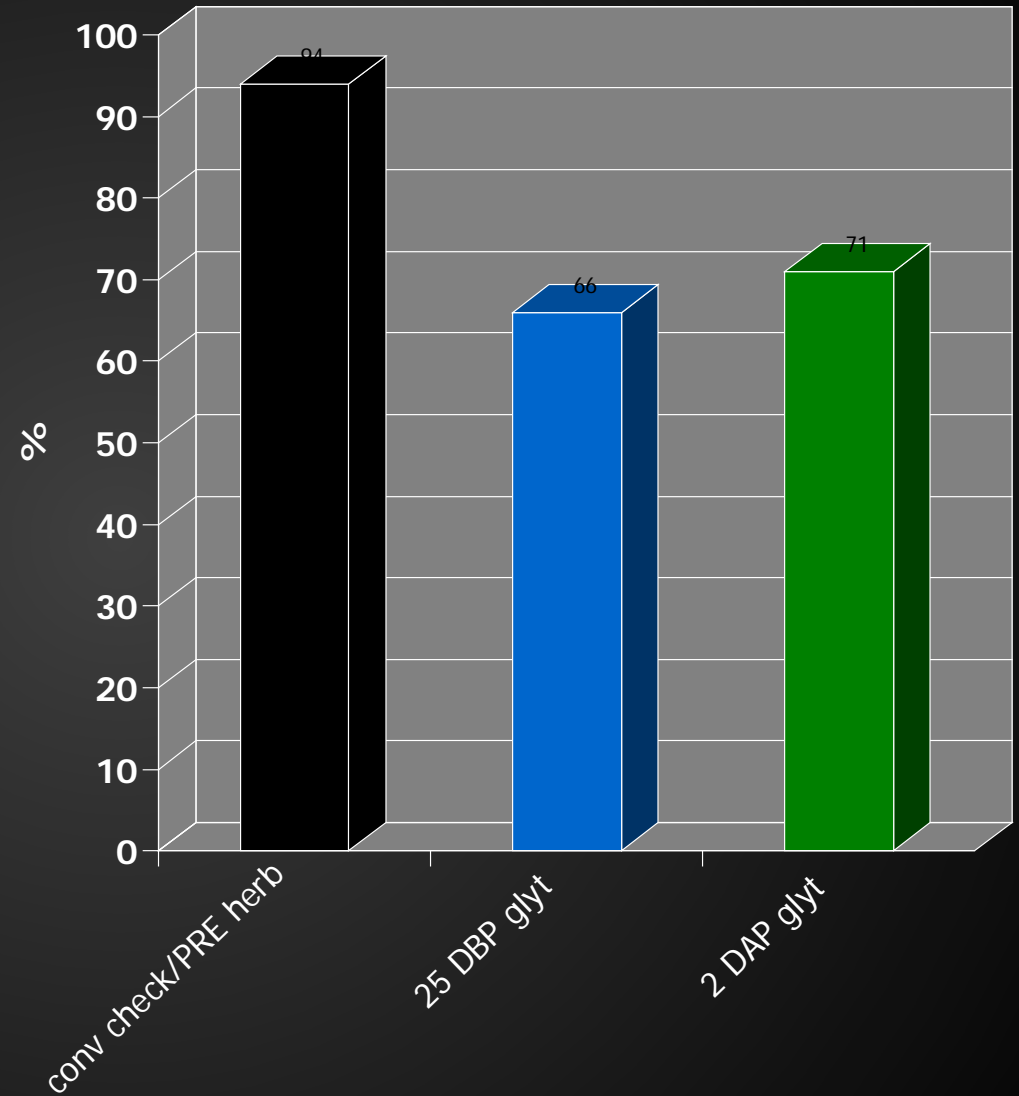


Rye cover crop/Pinto bean: Weed management notes, 2017-19

- Balance live rye period for benefits (including weed suppression) vs negative impact on dry bean (moisture stress)
- Rye density
 - ✓ 'high' = increased and extended (after rye termination) weed suppression
- Rye supplement to soil-applied herbicide
 - ✓ potentially a substitute
 - ✓ timely POST herbicide app
 - ✓ watch for tolerant weed species (e.g. legumes [black medic], lanceleaf sage)



Foxtail control* in soybean with conventional check, and two spring termination timings of rye, Wishek, 2019



*Visual evaluation prior to POST herbicide application across trial for general weed control.

Grass weed control in soybean among rye seeding dates and rates, Carrington, 2019*

Rye seeding treatment		Rye	Foxtail control
Date	Rate	Plant density (21-May)	21-June
	lb/A	plt/A	%
2-Oct	25	133,800	65
	50	352,900	70
	75	614,700	73
31-Oct	25	39,800	72
	50	167,900	74
	75	233,400	71
LSD (0.10)		120,200	NS

*Rye terminated with glyphosate on May 23 (7 days before soybean planting). Primary grass = foxtail. Visual evaluation prior to POST herbicide application across trial for general weed control.

Fall-planted Cover Crop Tolerance to Soybean Herbicides



Objective

- Can cool-season cover crops be successfully established when fall planted 2-4 months after soybean herbicides with soil residual were previously applied?

Fall-Planted Cover Crop Tolerance to Soybean Herbicides

■ Current data:

➤ Fargo, 2016 (K. Howatt)

- 11 corn and soybean herbicides (no crop); 10 cover crops
 - ❖ data published in 2016 ND Weed Control Research

www.ag.ndsu.edu/weeds/nd-weed-control-research

➤ Fargo and Carrington, 2018; Fargo and Carrington, 2019 (G. Endres, K. Howatt, J. Mettler and M. Ostlie)

Soybean herbicides:

- Soil-applied: Sencor, Pursuit, Spartan, Valor, Zidua (and Raptor - Fargo)
- POST: Engenia, Flexstar (and Raptor - Fargo)

Cover crops:

- barley, winter rye, field pea, flax, radish, turnip (and lentil - Fargo)
 - ❖ data published in 2018 and 2019 (pending) ND Weed Control Research



Fall-planted cover crop tolerance to soybean herbicides, Carrington, 2019



Table.			Cover crop injury ¹											
Herbicide			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		0	0	0	0	0	0	0	0	0	10	0	0
Flexstar + MSO	12 + 24		POST	3	7	0	0	0	7	0	0	0	0	12
C.V. (%)			412						274					
LSD (0.10)			NS						NS					

¹Biomass and/or stand reduction.

²PRE=May 21; POST=June 18.

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Fall-planted Cover Crop Tolerance to Soybean Herbicides (continued)

■ Preliminary results (3 site-years):

- High risk (51-100% injury)
 - **Valor** (flumioxazin) - radish, turnip, rapeseed (Fargo, 2016)
 - **Spartan** (sulfentrazone) - radish (Fargo, 2018)
 - **Raptor** (imazamox; PRE) - radish, turnip, flax (Fargo, 2018)
 - **Flexstar** (fomesafen) - radish (Fargo, 2016)
- Medium risk (21-50% injury)
 - **Zidua** (pyroxasulfone) - oat, rapeseed (Fargo, 2016); radish (Carrington, 2019)
 - **Spartan** - oat, radish, rapeseed (Fargo, 2016); lentil, turnip (Fargo, 2018); radish (Carrington, 2019)
 - **Sencor** (metribuzin) - radish and turnip (Carrington, 2019)
- Low risk (0-20% injury)
 - winter rye, barley, field pea (and flax) = herbicide tolerance

➤ **Research will continue in 2020...publish table in 2021 Weed Control Guide**

Weed identification (quiz)

- 2016 = 12 species

- 2017 = 7 species

- 2018 = 7 species

- 2019 = 8 species

- 2020 = 6 species

- 8319 plants in ND (USDA)

Catchweed

- Source: Stark County
- Description:
 - introduced (Europe)
 - Boraginaceae family
 - annual
 - leaves and stems covered with small, stiff bristly hairs that readily cling to animals and clothing
 - roadsides, waste places and cultivated areas
- Reference: *Weeds of the West* (pp. 200-201)



Houndstongue



- **Source: Foster and McLean counties**
- **Description:**
 - introduced from Europe
 - Boraginaceae family
 - biennial;
 - leaves: alternate, 1-12" long, 1-3" wide, rough, hairy and lacking teeth or lobes
 - reddish-purple flowers; fruit = 4 prickly nutlets each 1/3 inch long
 - toxic (alkaloids) as forage to livestock (especially horses)
- **ND noxious weed**
- **Reference: Weeds of the West (pp. 202-203)**

Yellow whitlowwort



- **Source: Ward County**
- **Description:**
 - native to Europe and America
 - Pink family
 - winter annual
 - “very common on prairie”
- **Reference: Handbook of ND Plants (p. 161)**

Silverweed cinquefoil

(*Potentilla anserina* L.)



- Source: Eddy County
- Description:
 - Rose family
 - perennial
 - common in low, especially saline soil
- Reference: Handbook of ND Plants (p. 168)

Pennsylvania pellitory



- Source: Steele County
- Description:
 - Nettle family
 - annual
 - grows around shrubbery; shady, protected locations
- Reference: Nebraska Weeds (p. 42)

Waterhemp (fasciation)



- Source: Foster County

Carrington REC living weed exhibit

