NDSU Carrington Research Extension Center: WEED MANAGEMENT PROGRAM UPDATE

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Research:

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

Rye cover crop with pinto bean

support from Northarvest Bean Growers Association

‘Lariat’ pinto bean seeded May 31, 2017

July 10, 2017: Weed control (Raptor app to all plots on June 26)

June 16, 2018:

16 days after pinto planting (May 31) and one day after POST Raptor across trial (June 15)

Fall till; May 31 PRE glyt + Spartan Charge (conv. check)

Apr 26 glyt

May 30 glyt

Weed management notes, 2017-18

- 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 termination
  - ✓~~tillage~~
    - multiple passes required; volunteer rye and more weeds (?)
  - ✓glyphosate
    - ≥ 1 lb ae/A glyt
    - coverage with ≥ boot stage rye?
- Rye (living) potentially a substitute for soil-applied herbicide
  - ✓timely POST herbicide app
  - ✓watch for tolerant species (e.g. legumes, lanceleaf sage)

Fall-Seeded Cover Crop Tolerance to Soybean Herbicides

- Many factors to consider when planning and establishing cover crops
  - ✓ Herbicide history of field - data on impact of soybean herbicide soil residues on cover crops is limited
    - Herbicide residues can negate resources (e.g. time and costs) used to establish cover crops in the fall following a soybean crop
- Current NDSU **wheat herbicide** risk to cover crops data:

Risk of cover crop injury based on highest damage recorded at 5 ND locations in 2016-2017.

Herbicide*	Radish	Turnip	Field pea	Lentil	Flax	Oat	Barley	Dwarf Essex Rape
Dicamba	MR	~~HR~~	LR	MR	MR	LR	MR	MR
Everest	MR	MR	LR	MR	LR	LR	LR	MR
Goldsky	MR	MR	LR	LR	MR	LR	LR	LR
Huskie	LR	LR	LR	LR	MR	LR	LR	MR
PowerFlex	LR	LR	LR	MR	MR	LR	LR	MR
Quelex	MR	MR	LR	LR	LR	LR	LR	LR
Supremacy	LR	LR	LR	LR	LR	LR	LR	LR
Varro	MR	LR	LR	LR	LR	LR	MR	LR
WideMatch	MR	MR	HR	~~HR~~	LR	LR	LR	MR
2,4-D	MR	LR	LR	LR	LR	LR	LR	MR

* or generic herbicide.
Key: LR - low risk - 0 to 20% injury, MR - medium risk = 21 to 50% injury, HR - high risk = 51 to 100 injury, Strike through = severe injury. Products were chosen due to known residual activity. Other products may be safe for cover crops. This list is not all-inclusive. Most instances of medium or high risk were observed in only one environment. Most combinations were LR in most environments. High OM, high rainfall, tillage, low pH, and other factors will reduce the risk of herbicide carryover to cover crops. If cover crops will be grazed or harvested in some way (including haying), refer to label regarding grazing restrictions.

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

- **Current data:**

  1. **Fargo, 2016** (K. Howatt)
     - 11 corn and soybean herbicides; 10 cover crops
       - ❖ data published in 2016 ND Weed Control Research

  2 and 3. **Fargo and Carrington, 2018** (G. Endres, K. Howatt, and M. Ostlie; support from ND Soybean Council)
     - Soybean herbicides
       - Soil-applied: metribuzin (Sencor), Pursuit, Spartan, Valor, Raptor, and Zidua
       - POST: Engenia, Flexstar, Liberty, and Raptor
     - Cover crops
       - barley, winter rye, field pea, lentil, flax, radish, and turnip
         - ❖ data published in 2018 ND Weed Control Research

Fargo: Oct 6, 2018
(CC planted Aug. 22)

Carrington: Oct 29, 2018
(CC planted Sept. 24)

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

- **Preliminary results:**
  - 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)
    - Spartan - oat, radish, rapeseed (Fargo, 2016); lentil, turnip (Fargo, 2018)
  - Low risk (0-20% injury)
    - balance of treatments

➢ **Research will continue in 2019 at Fargo and Carrington**

Weed identification (quiz)

- 2015 = 12 species
- 2016 = 7 species
- 2018 = 10 species
- 2019 = 8 species

➢ 8319 plants in ND (USDA)

Asparagus

- Source: Foster County
  (edge soybean field)
- Description:
  - perennial (30+ years)
  - most well-drained soils
- Reference: Handbook of ND Plants (p. 105)

Pink beardtongue

- Source: Burleigh County
- Description:
  - native perennial forb
  - sandy soils and hillsides
  - fair forage
- Reference: Plants of SD Grasslands (p. 122)

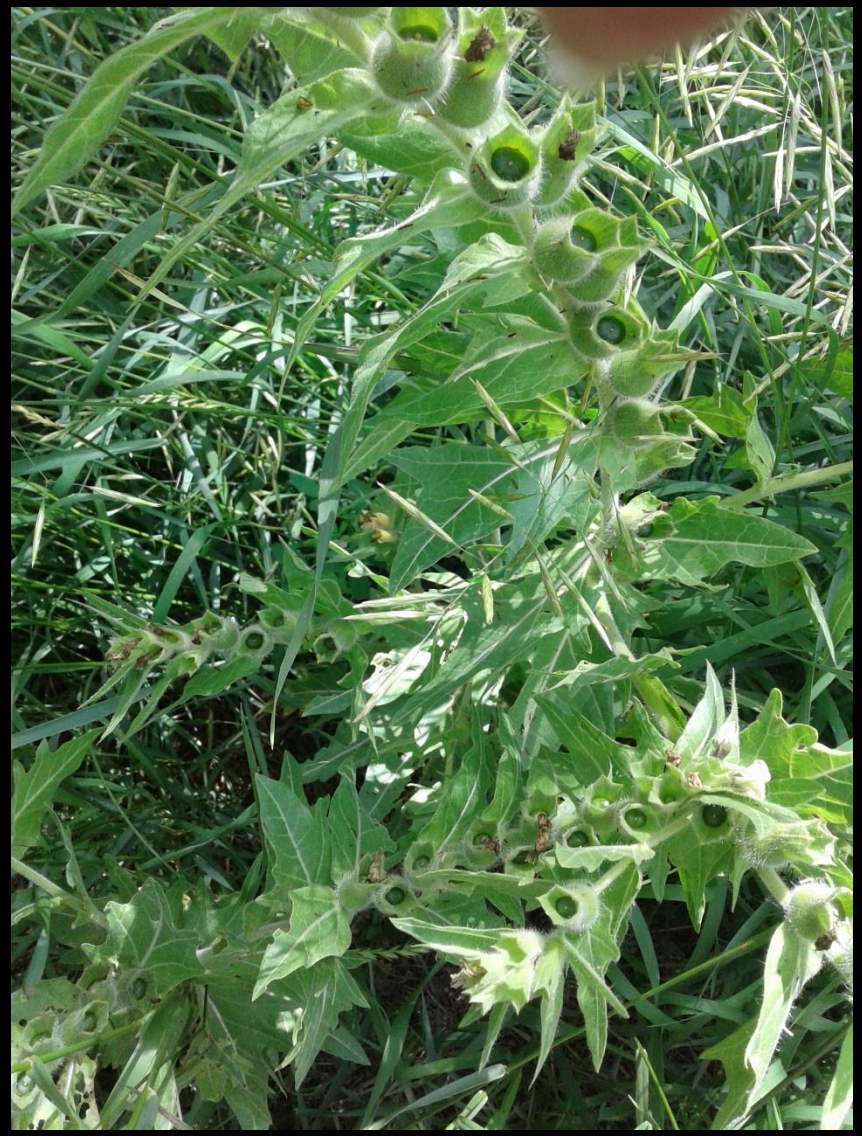
Chicory

- Source: Wells County
  (salt-affected soil area of field)
- Description:
  - native of Europe
  - sunflower family
  - perennial
  - bright blue flowers; milky sap
  - potential as a cultivated crop
- Reference: Weeds of the Midwestern US and Central Canada (p. 77)

Wild four-o'clock

- Source: Morton County
- Description:
  - native of North America
  - Four O'clock family
  - perennial herb
  - Stems squarish; nodes swollen, resembling ball-and-socket joints
  - flowers open in late afternoon and close next morn
- Reference: Weeds of the Midwestern US and Central Canada (p. 247)

Black henbane



- Source: McLean County
- Description:
  - native of Europe
  - nightshade family
  - annual or biennial, reproducing by seed
  - fruits 1-inch long and 5-lobed
  - common pasture weed
  - foliage has foul odor
  - poisonous to humans and livestock
- Reference: Weeds of the West (p. 558-559)

Forage kochia
(Kochia or Basia prostrata)

- Source: Foster County
- Description:
  - Goosefoot family
  - introduced; well adapted in Intermountain West; saline sites
  - semi-evergreen, half-shrub; perennial
  - highly nutritious to cattle
- Reference: NRCS

Cutleaf nightshade

- Source: Logan County
- Description:
  - native of west US
  - nightshade family
  - warm-season annual
  - large calyx; berry green at maturity
- Reference: Weeds of the Midwestern US and Central Canada (p. 302)

Biennial wormwood

- Source: McIntosh County (flax field)
- Description:
  - native to U.S. (northwest)
  - sunflower family
  - annual or biennial, reproducing by seed
- Reference: Weeds of the West (p. 62-63)

Carrington REC living weed exhibit