2023 ACAW:

Conversations Recapping the 2022 Growing Season

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EXTENDING KNOWLEDGE ›› CHANGING LIVES

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1. Ergot

Barley - Wishek

Spring rye - Carrington

59 ND grass species = hosts

NDSU HRSW variety screening (preliminary):

- Tolerant = ND Frohberg, TCG Spitfire and WB9479
- Susceptible = LCS Trigger

2. Planting date impact on crop morphology

Picture - Aug 15, 2022

Cultivar=AG03XF2. Yield: June 6=62.2 bu/A; June 23=61.6 bu/A (NS).

Picture – Oct 17, 2022

Hybrid=AC2102. Seed yield: June 23=26.3 cwt/A; June 6=20.1 cwt/A (NS).

3. Enlist soybean off-color seedcoat

Off-color Enlist beans A result of a localized accumulation of a complex of isoflavone and iron, two naturally occurring compounds found in soybean hulls

Agweek article (Oct 24, 2022): "Off-color soybeans becoming an inspection issue"

Seth Naeve, Univ Minn Extension

- "The problem appears exclusively with Enlist E3 soybeans."
- "…doesn't appear to be any consistency why some beans are off-color."
- "…color variation does not include a difference in quality or nutritional value…if the soybeans are being crushed for oil and meal."
- "…most affected would be…exporting food-grade soybeans to Southeast Asia…intended…food for humans."
- "…genetics companies are trying to get new varieties to the market quickly and using those new varieties can yield some surprises, such as off-color beans."

Kurt Haarmann, Columbia Grain

- "…FGIS…if more than 1% of soybeans are of off-color, they can't be certified as No. 1 yellow soybeans."

Carrington REC notes, Oct 2022

- Examined industry variety trial harvest samples
  - 14 of 19 entries were Enlist
    - Incidence of off-color (4 reps per E variety) varied from 0 to all 4 samples
      - very low overall incidence ($\leq$1%) of seeds/sample
      - inconsistency among varieties

4. Pinto bean

AE1370 (Revised)

Strip Till for Field Crop Production

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In dry conditions, reduced-tillage planting systems preserve moisture in the seedbed, enhancing uniform germination and plant establishment.

What is Strip Till?

The trend among northern Plains farmers is toward using less tillage to produce field crops with more residue left on the soil surface. Strip till is a field tillage system that combines no till and full tillage to produce row crops.

Narrow strips 6 to 12 inches wide are tilled in crop stubble, with the area between the rows left undisturbed. Often, fertilizer is injected into the tilled area during the strip-tilling operation. The tilled strips correspond to planter row widths of the next crop, and seeds are planted directly into the tilled strips.

Strip tilling normally is done in the fall after harvest, but it also can be done in the spring before planting.

Advantages of Strip Till

- Conserves energy because only part of the soil is tilled
- Reduces soil erosion because most of the soil remains covered with crop residue throughout the year
- Releases less carbon into the atmosphere and maintains higher levels of soil organic matter
- Warms the tilled strips sooner in the spring to promote seed germination and plant emergence
- Conserves soil moisture because most of the soil surface area is covered with crop residue
- Results in crop yields that are similar or higher, compared with other tillage systems
- Reduces expenses by eliminating some primary and secondary tillage

Strip Till and NRCS Conservation Incentives

Strip tillage can be used to qualify for the Natural Resources Conservation Service (NRCS) conservation management/no-till incentive programs. To qualify for NRCS no-till incentive programs, a Soil Tillage Intensity Rating (STIR) value of 10 or less is required.

Table 1. STIR values for common tillage operations.

Operation	STIR
No tillage	0
Double-disk opener planter	2.4
Strip till – coulter, 5-inch depth; 8-inch berm	7.7
Strip till – shank, 7-inch depth; 10-inch berm	15
Tandem disk, light finishing	19
Vertical till	20
Field cultivator, 6- to 12-inch sweeps	23
Tandem disk	32-39
Ripper	33
Chisel, twisted shovel or sweeps	42-49
Moldboard plow	55-65

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A2050 (March 2022)

Winter Rye as a Preceding Cover Crop for Pinto Bean Production in North Dakota

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Mike Ostlie, Research Agronomist, Carrington REC

Historic dry bean production in North Dakota has primarily involved conventional tillage. Conventional-tilled soils are susceptible to soil erosion before a bean crop is established and after harvest. Also, long-term soil productivity likely declines with conventional tillage. However, dry bean production with reduced tillage is slowly increasing. A 2020 dry bean grower survey (Knodel et al., 2021) indicated 65% of North Dakota acres were grown using conventional tillage compared to 35% with minimum tillage, no-till or strip-till systems.

Use of cover crops plus reduced tillage will reduce soil erosion and increase long-term soil productivity. The 2020 dry bean grower survey indicates 17% of North Dakota dry bean acres included a cover crop, primarily intended for soil and moisture conservation, weed management and to improve soil health.

Winter (cereal) rye is a common cover crop used in North Dakota and has many advantages when properly managed (Ransom et al., 2021). Expected advantages with winter rye, established prior to pinto bean production and with timely termination, include reduction in soil erosion, supplement weed management, utilize excess soil moisture and improved efficiency with direct harvest of bean seed (e.g., timely harvest and clean seed).

A study commenced at the Carrington REC during fall 2017 with seeding winter rye to provide living ground cover in the fall and spring prior to pinto bean production, providing benefits including protection from soil erosion and aid in weed management. Objectives included determining optimum time for terminating rye based on bean planting date, assessing weed suppression and measuring productivity of the bean crop. The study was completed in 2021, providing a four-year database on the production strategy.

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Materials and Methods

ND Dylan winter rye was seeded with a no-till drill in 7-inch rows into small grain or soybean residue at 60-65 lb per acre during Sep. 17 to Oct. 8, 2017-20. Late-fall rye growth stages ranged from plants not emerged to 2-leaf. Early spring rye plant populations were 432,000 plants per acre in 2020 and 354,000 plants per acre in 2021 (data not available for 2018-19). Lariat or ND Palomino pinto bean was seeded with a no-till planter in 21- or 30-inch rows into no residue (tilled plots), rye residue or living rye ("green planted") during May 31 to June 4, 2018-21 at rates targeted to establish 70,000 pinto bean plants per acre.

Standard treatments (trts) based on rye termination and pinto bean planting dates (and rye growth stages among years):

1. Conventional production system check—fall and/or spring tillage followed by preplant (PP) or pre-emergence (PRE) glyphosate (Roundup Powermax at 28.4 fl oz per acre plus adjuvant) and PRE Spartan Charge (5 fl oz per acre) or Spartan Elite (20 fl oz per acre).
2. PP glyphosate 29-36 days before bean planting (DBBP) (1-leaf to tiller).
3. PP glyphosate 29-36 DBBP plus PRE herbicide (1-leaf to tiller).
4. PP glyphosate 16-20 DBBP (tiller).
5. PP or PRE glyphosate 5 DBBP to 1 day after bean planting (DABP) (2-joint to boot).
6. PRE glyphosate 7-11 DABP (flag to flower).

After visual evaluation of weed control associated with trts, post-emergence herbicides were applied across each trial for general weed control. At bean seed maturity, plants were hand-pulled for field drying and threshed via combine.

5. Dry bean variety trial, Carrington – Direct harvest scores

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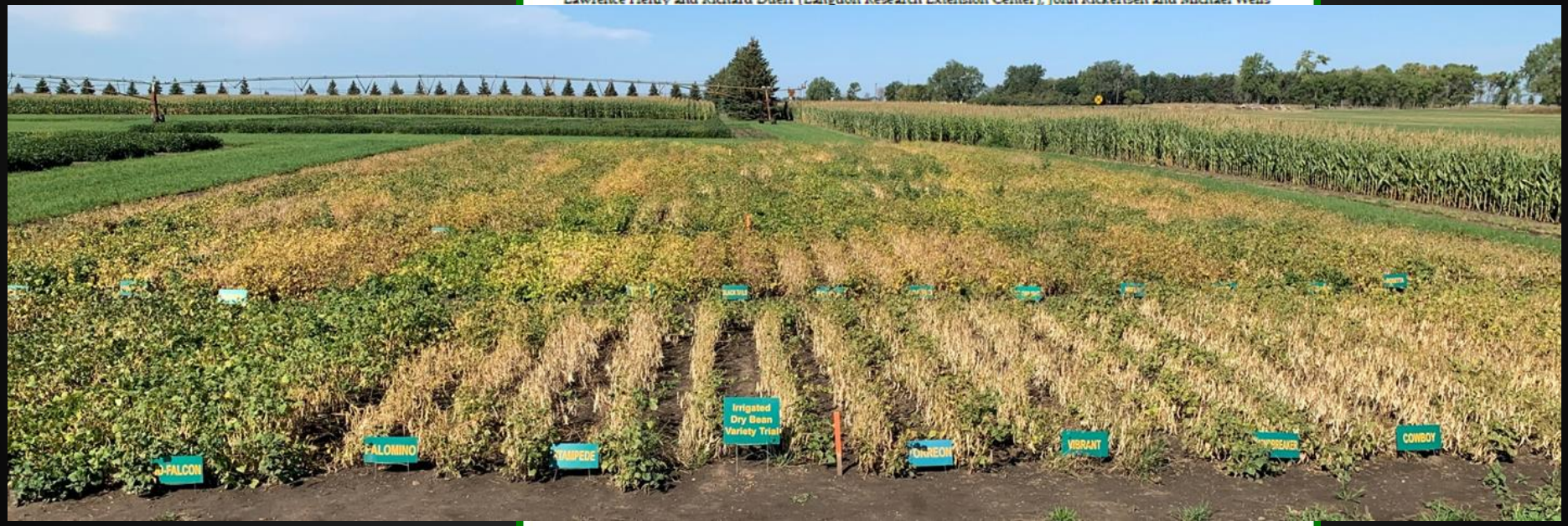
A654-22

North Dakota

Dry Bean

Variety Trial Results for 2022 and Selection Guide

Hans Kandel and Juan Osorno (NDSU Main Station); Heidi Eslinger and Spencer Eslinger (Oakes Irrigation Research Site); Mike Ostlie and Kristin Simons (Carrington Research Extension Center); Bryan Hanson, Lawrence Henry and Richard Duerr (Langdon Research Extension Center); John Rickertsen and Michael Wells



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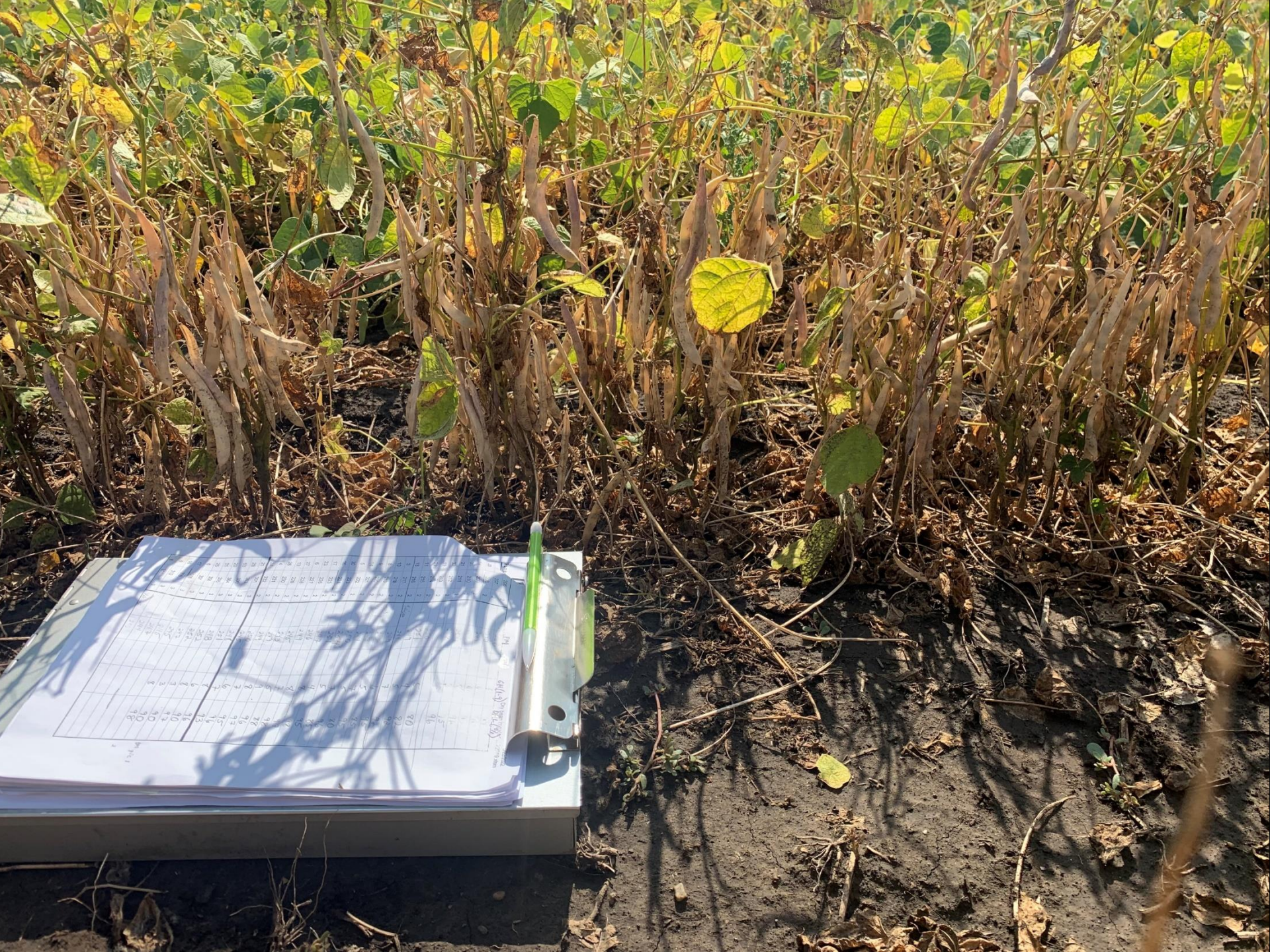
Fargo, North Dakota
December 2022



Vibrant – 85%

Cowboy – 96%

Pinto Variety Trial (Irrigated), Carrington, 2019-2022: **Direct harvest scores**

Variety	Direct Harvest 2019	Direct Harvest 2020	Direct Harvest 2021	Direct Harvest 2022	Average
	%	(%)	(%)	(%)	%
Cowboy	68	75	95	89	82
La Paz	66	79	93	89	82
Lariat	49	70	64	73	64
Monterrey	69	80	93	89	83
ND Falcon	64	76	93	94	82
ND Palomino	63	76	82	80	75
Stampede	58	79	93	93	81
Torreon	73	88	93	94	87
Vibrant	74	83	91	91	85
Windbreaker	33	68	80	81	66

Direct Harvest: A relative score to estimate the percent of beans that would be harvested successfully in a direct/straight harvest system.

6a. Corn plant development – similar timing of tassel and silk emergence

6b. Corn plant development – variable ear positions along stalk among plants

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