2019 Eastern Crop and Pest Management School

Soybean Production Issues

www.ag.ndsu.edu/CarringtonREC/agronomy/extension-outreach

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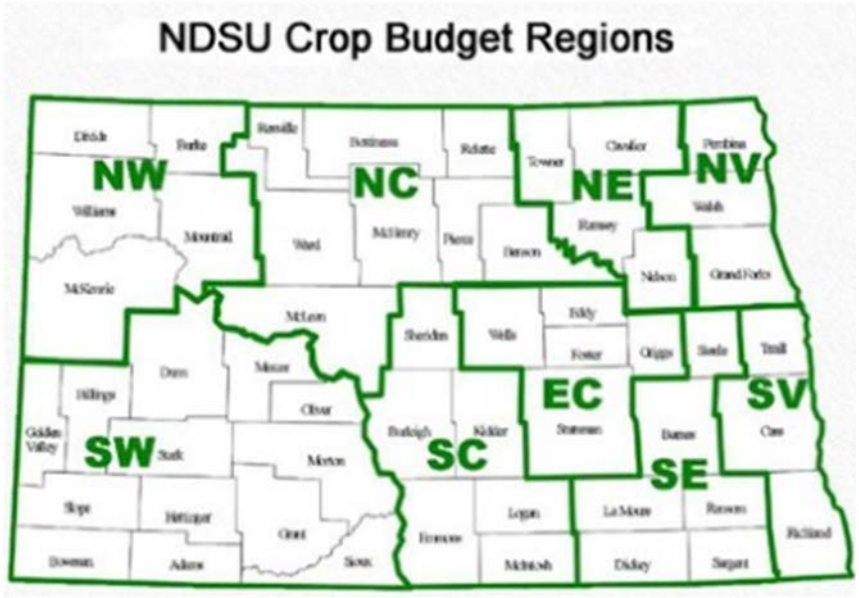
South Valley ND crop budgets, 2019



	Corn Grain		Soybeans	
	Your Per Acre	Figures	Your Per Acre	Figures
Market Yield	150		38	
Market Price	3.30		8.22	
MARKET INCOME	495.00		312.36	
DIRECT COSTS				
-Seed	93.13*		64.10*	
-Herbicides	27.00		32.00	
-Fungicides	0.00		0.00	
-Insecticides	0.00		4.00**	
-Fertilizer	110.11		3.33	
-Crop Insurance	11.90		6.00	
-Fuel & Lubrication	22.50		13.39	
-Repairs	28.49		19.42	
-Drying	27.00		0.00	
-Miscellaneous	8.00		1.50	
-Operating Interest	9.60		4.20	
SUM OF LISTED DIRECT COSTS	337.73		147.96	
INDIRECT (FIXED) COSTS				
-Misc. Overhead	12.08		8.39	
-Machinery Depreciation	38.57		22.92	
-Machinery Investment	22.10		13.33	
-Land Charge	119.00		119.00	
SUM OF LISTED INDIRECT COSTS	191.76		163.65	
SUM OF ALL LISTED COSTS	529.49		311.61	
RETURN TO LABOR & MANAGEMENT	(34.49)		0.75	
LISTED COSTS PER BUDGET UNIT	(bu):		(bu):	
-Direct Costs	2.25		3.89	
-Indirect Costs	1.28		4.31	
-Total Costs	3.53		8.20	

38 bu/A

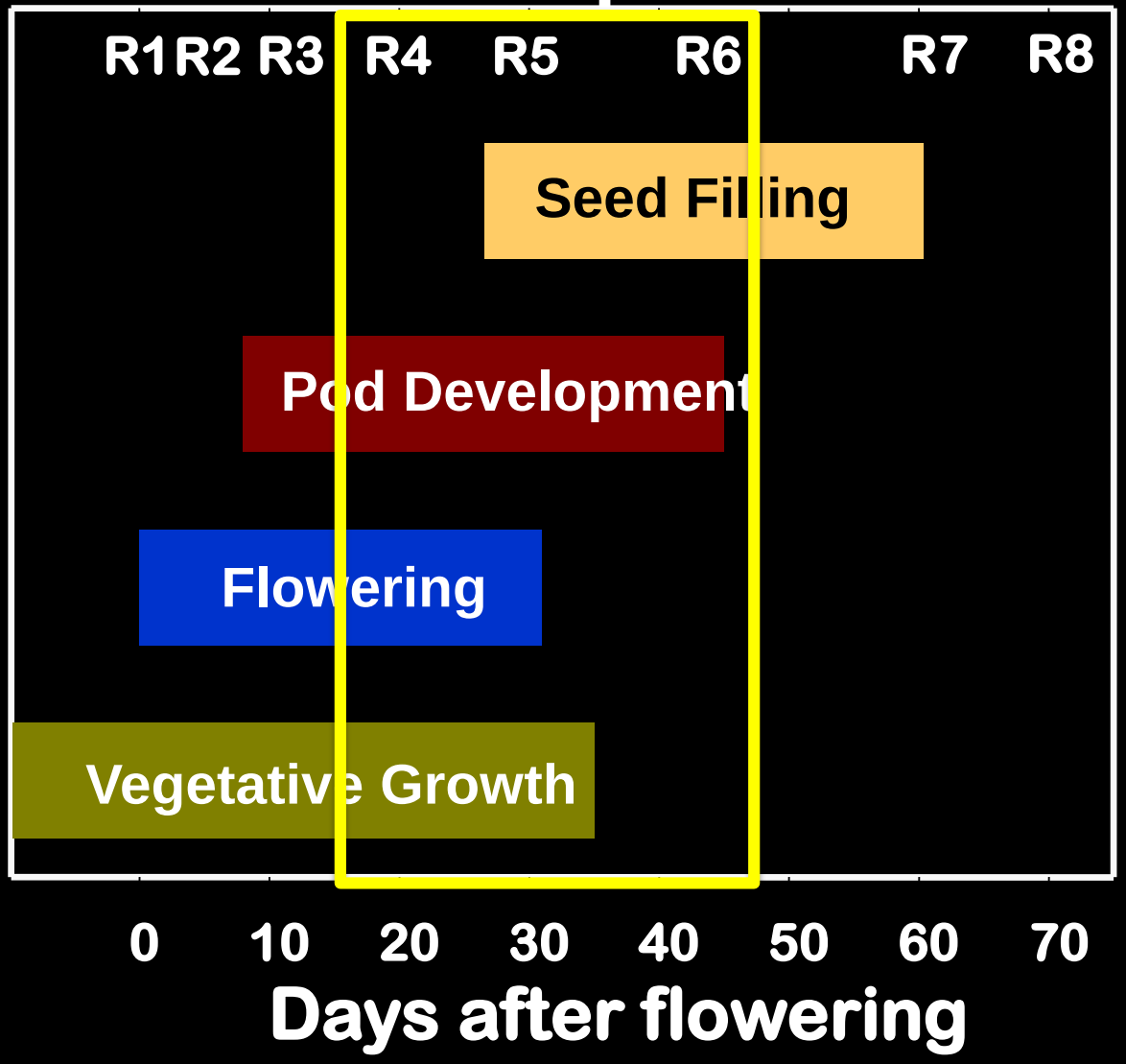
$0.75/A

Corn notes:
*GM corn with herbicide tolerance and above ground insect control traits.

Soybean notes:
*GM soybeans with herbicide tolerance. The cost includes $8 for inculant and fungicide treatment in addition to seed expense.
**Soybean aphid and/or spider mite insecticide.

- Start with high yield potential
  - **Variety selection**
  - **Plant establishment and nutrition**
- Protect yield potential
  - Manage weeds, disease and insects

Soybean Reproductive Development



Main Factors in Variety Selection

- **Yield**
- Maturity
- Disease
  - Root rot and SCN
- Herbicide tolerance or conventional
- **Iron Chlorosis**
- Specialty markets

A843-18

North Dakota Soybean

Variety Trial Results for 2018 and Selection Guide

Hans Kandel, Ted Helms, Sam Markell and Chad Deplazes (NDSU Main Station); Mike Ostlie, Blaine Schatz, Greg Endres, Ezra Aberle, Tim Indergaard, Cassidy VandeHoven, Steve Zwinger and Steve Schaubert (Carrington Research Extension Center); Kelly Cooper, Heidi Eslinger and Seth Nelson (Oakes Irrigation Site); Eric Eriksmoen and Joe Effertz (North Central Research Extension Center, Minot); Bryan Hanson, Travis Hakanson and Lawrence Henry (Langdon Research Extension Center); John Rickertsen (Hettinger Research Extension Center); Jerry Bergman, Gautam Pradhan, Tyler Tjelde and Justin Jacobs (Williston Research Extension Center); Angie Johnson, Melissa Seykora and Brian Zimprich (NDSU Extension)

We thank all producer cooperators for contributing their time, labor, land and other material to the 2018 soybean yield trial program in the central and southern Red River Valley and other off-station sites.

Research specialists and technicians helped with the field work and data compilation. Several secretaries assisted with this document by typing information. A special thank you goes to Lisa Johnson, Extension Plant Sciences, for assisting in the compilation of this publication.

NDSU | EXTENSION NDSU | NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Fargo, North Dakota
December 2018

RR and Xtend soybean variety trial results, southern RRV locations, 2018

Fairmount, Milnor and Grandin	
Varieties	44
Companies	15
Seed yield (bu/A)	
average	66.4
range	**56.1-71.1**

21%

Iron Deficiency Chlorosis (IDC)

Symptoms occur usually in the newest leaves formed. The leaf looks yellow and the veins in the leaf stay green.

IDC Remedies

1. tolerant varieties
2. tolerant varieties
3. tolerant varieties
4. in-furrow ortho-ortho-EDDHA Fe chelate
   - e.g. ‘SoyGreen’

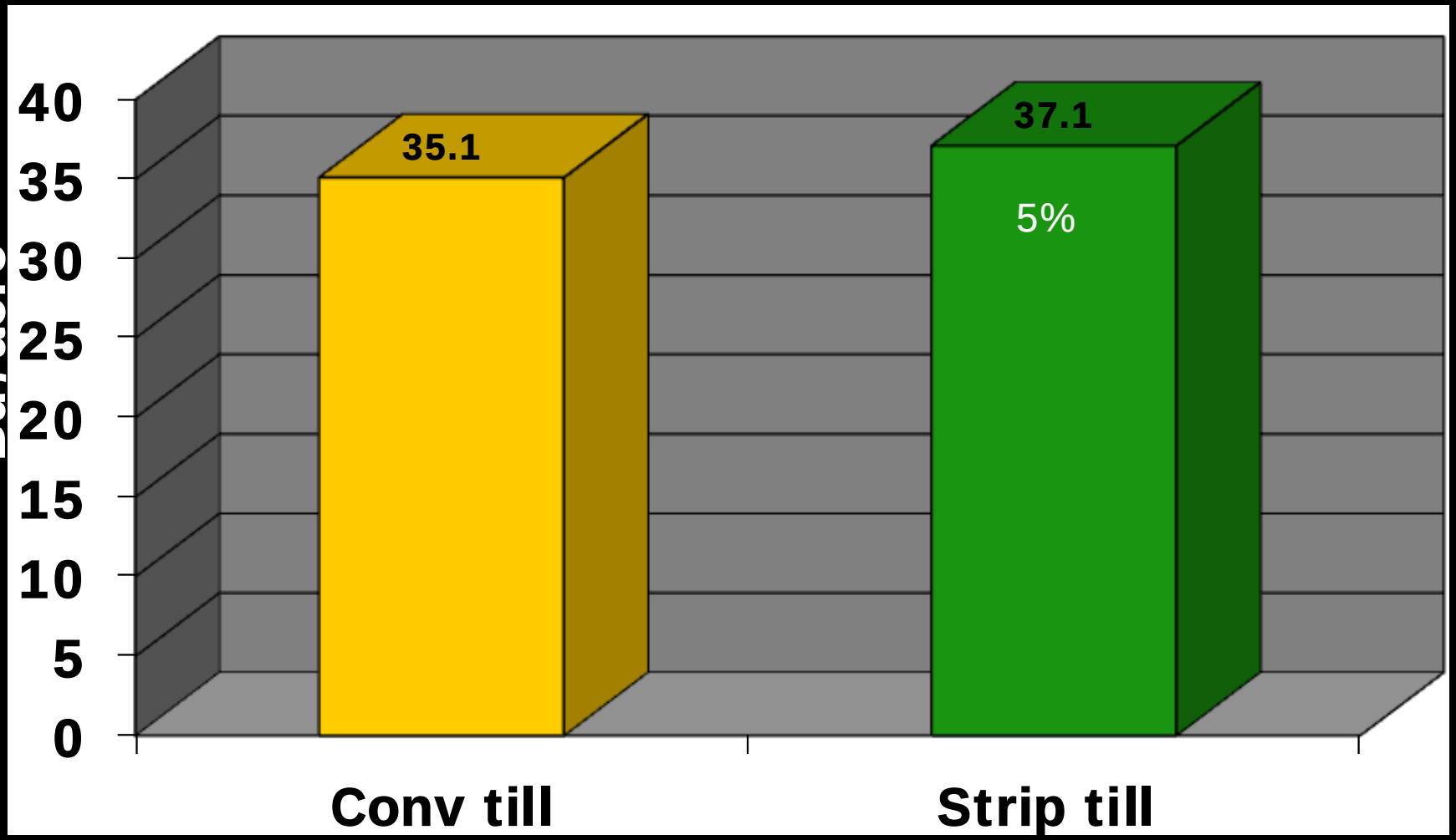
Plant establishment and nutrition

NDSU Research Summary of Soybean Plant Establishment Factors (Dec. 2018)

Factor	Option A	A Yield > B (%)	Option B	NDSU trials (conducted during 1999-2018)
Tillage system	reduced till	**4**	conventional till	37
Previous crop	wheat	**5**	soybean	6
Planting date	≤ early May	**8**	mid May	9
Planting rate (pls/A)	150-175,000	**6**	100-130,000	44
Row spacing (inches)	14-21	**4**	28-30	24
Seed fungicide	yes	**6**	no	29
Seed inoculation with soybean history	yes	**2**	no	16
P app at planting time	broadcast	**0.5**	band (away from seed)	7
Timing of initial weed control	at planting	**5**	early POST (2- to 4-inch weeds)	8

Compiled by Greg Endres, Extension Agronomist

Conventional vs. strip till soybean yield, NDSU, 2005-10 (12 site-years)*

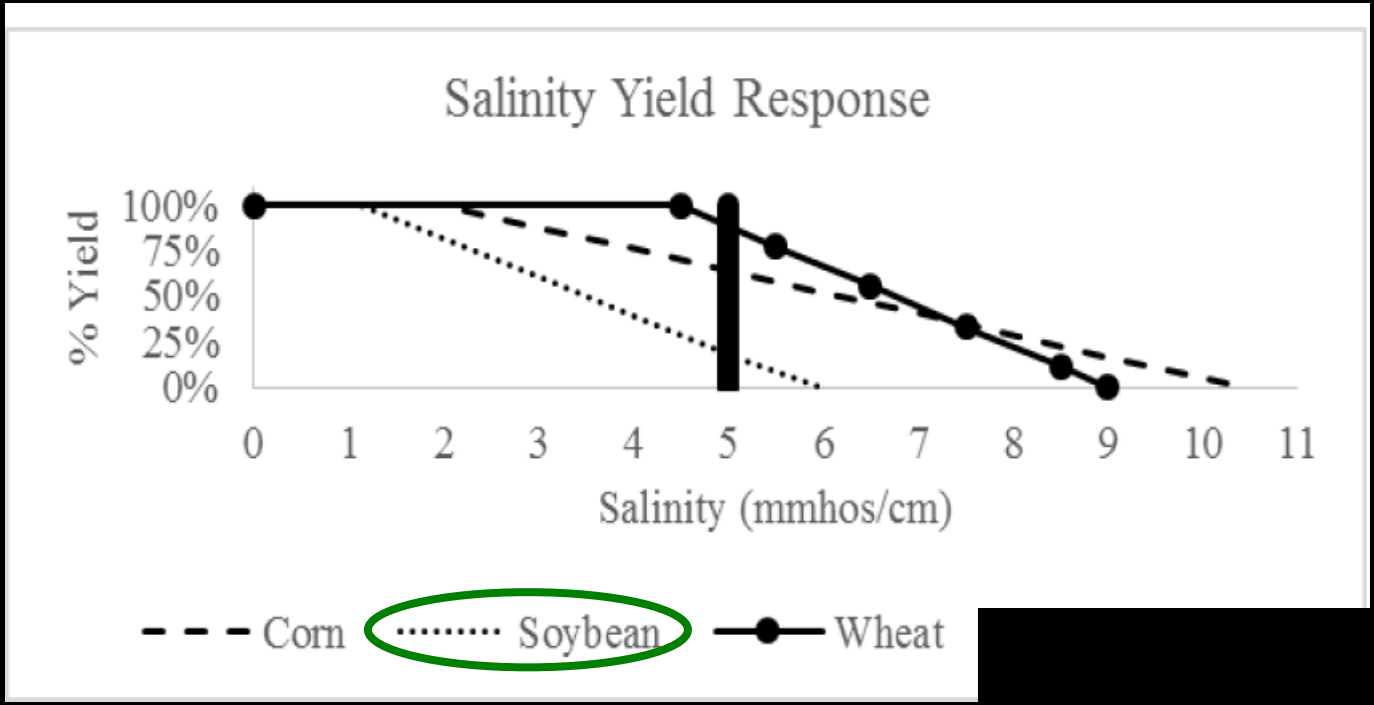


*Carrington, Prosper, Fargo and Moorhead, MN

Expense (2019 South Valley soybean budget = $148/A direct costs) with no return

Soybean - soil EC threshold

	Previous Studies		NDSU Studies (2013-2016)	
	Threshold (mmhos/cm)	Slope (% decline)	Threshold (mmhos/cm)	Slope (% decline)
Corn	1.3	12	2.0	12
Soybean	1.9	20	1.1	21



source: NDSU Soil Health and Land Management – Economics of Soil Salinity

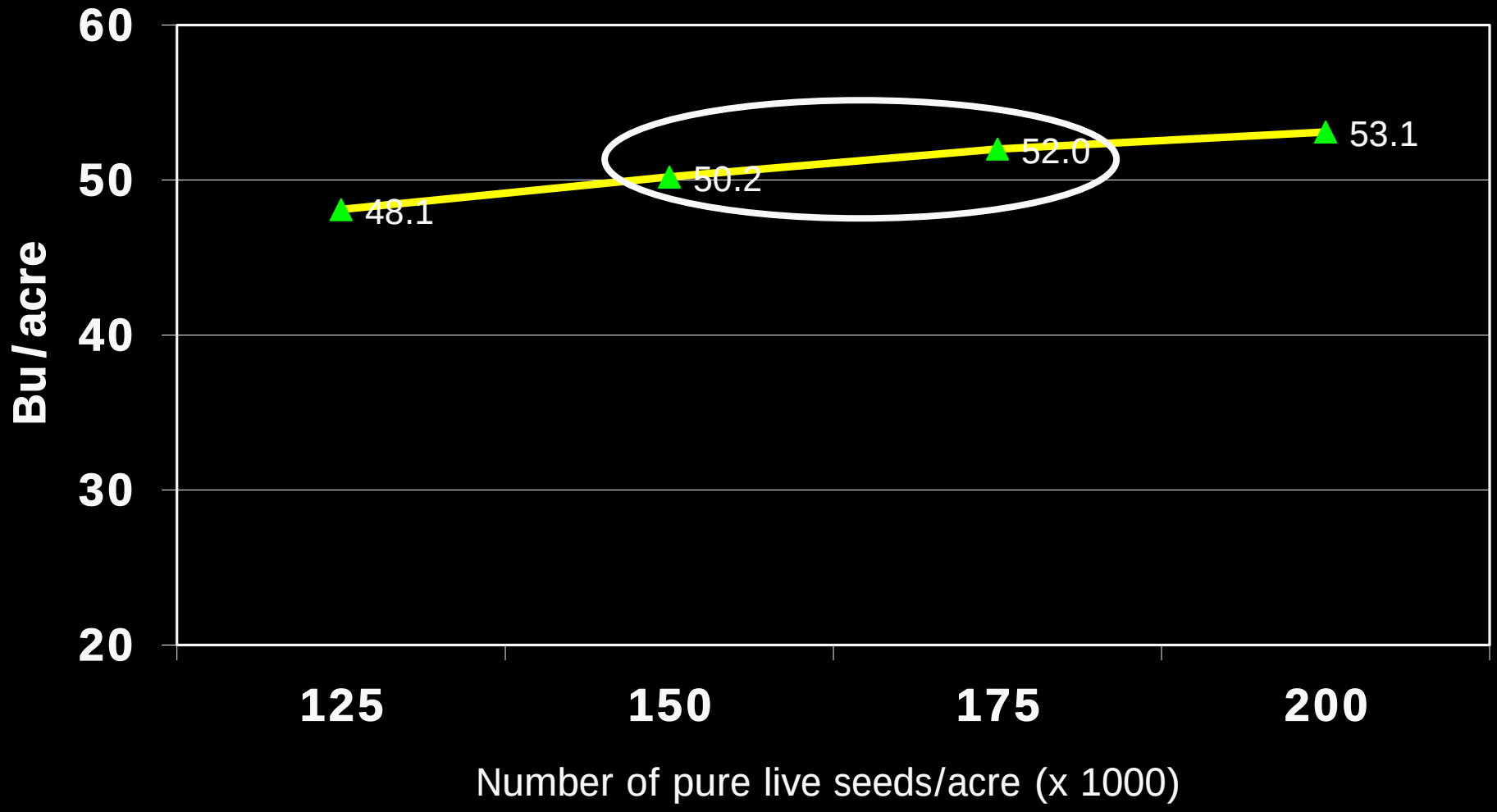
What potential yield advantage exists with **early planted** soybean?

- NDSU research in south central/east ND indicates **9%** yield increase with first week of May (or earlier) planting vs. 3rd week of May planting.
  - When soil tilth is adequate and soil temperature 1-2 days following planting is near 50 degrees.

NDSU recommends an established soybean stand of 150,000 plants/acre for any row spacing.

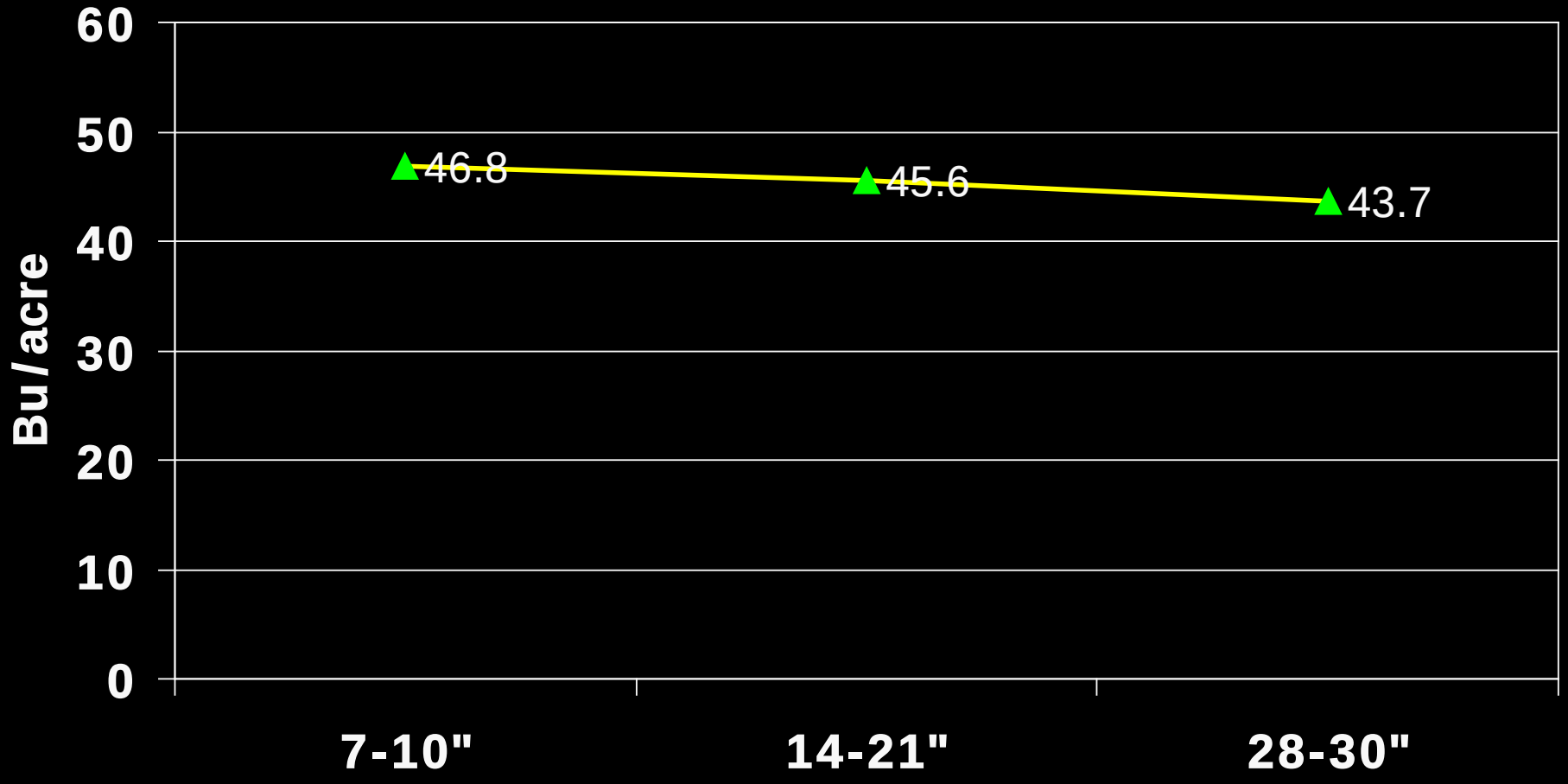
- Unlikely yield impact with variance of -10 to -12%

Planting rate influence on soybean yield, Northeast ND, 2011-16 (8 site-years)*



*Cavalier, Lakota, Langdon, Park River, Pekin, Vesleyville, and Voss. Bryan Hanson, Langdon REC

Row spacing influence on soybean yield, Carrington, Minot and Oakes, 1999-2016 (8 site-years)



Soybean Plant Nutrition

- **Do not apply Nitrogen**
  - inoculate seed (*Bradyrhizobia japonicum*)
    - field with no soybean history = yes; history = yes?
- **Apply Phosphorus with < medium-testing soils**
  - yield response greater with broadcast vs band application
  - no fertilizer directly with the seed
- **Apply Potassium if indicated by soil test**
- **Yield response unlikely with other secondary or micro nutrients**

NDSU Research Summary of Soybean Plant Establishment Factors (Dec. 2018)

Factor	Option A	A Yield > B (%)	Option B	Number of NDSU trials (2004-18)
Seed inoculation with soybean history (1-3 years separating soybean crops)	yes	**2**	no	16

Base yield	Yield increase at **2%**	Max inoculant cost with $8/bu soybean
bu/A	**bu/A**	**$/A**
30	0.6	4.80
40	0.8	6.40

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Soybean summary

- Do your homework on variety selection
- Use reduced tillage system and manage salt-affected soil areas
- Plant early and narrow at adequate rate
- Keep plant nutrition simple