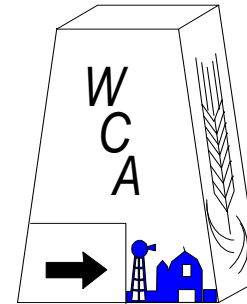


# Demonstrating Nitrogen Fertilizer Response in Yellow and Brown Mustard

Wheatland Conservation Area, Swift Current  
Saskatchewan Mustard Development Commission AGM  
January 17, 2019

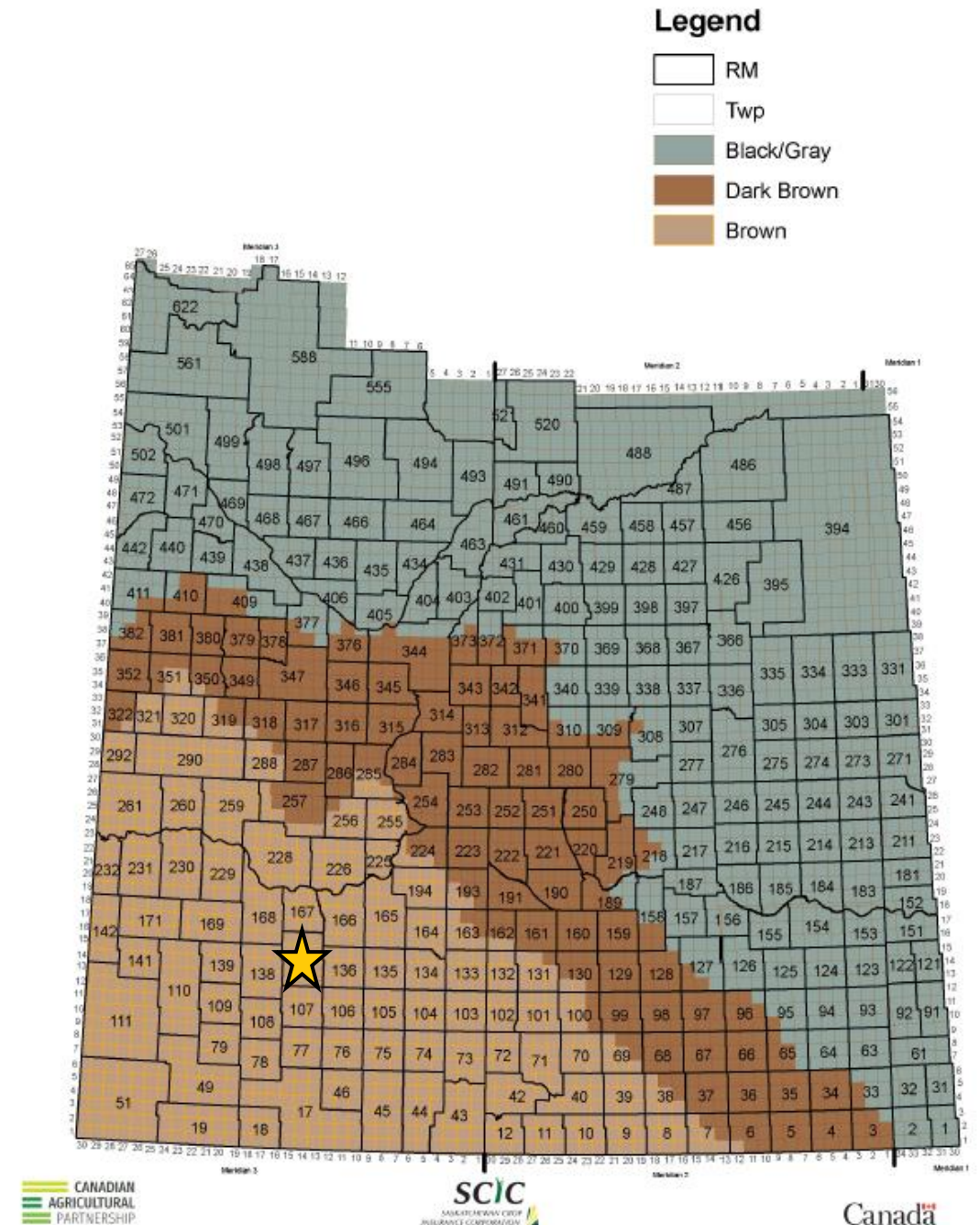


# Overview

- ▶ Wheatland Conservation Area/Agri-ARM background
- ▶ 2018 Year in Review
- ▶ Why is Nitrogen important?
- ▶ Previous Research
- ▶ Experimental Results
- ▶ Summary

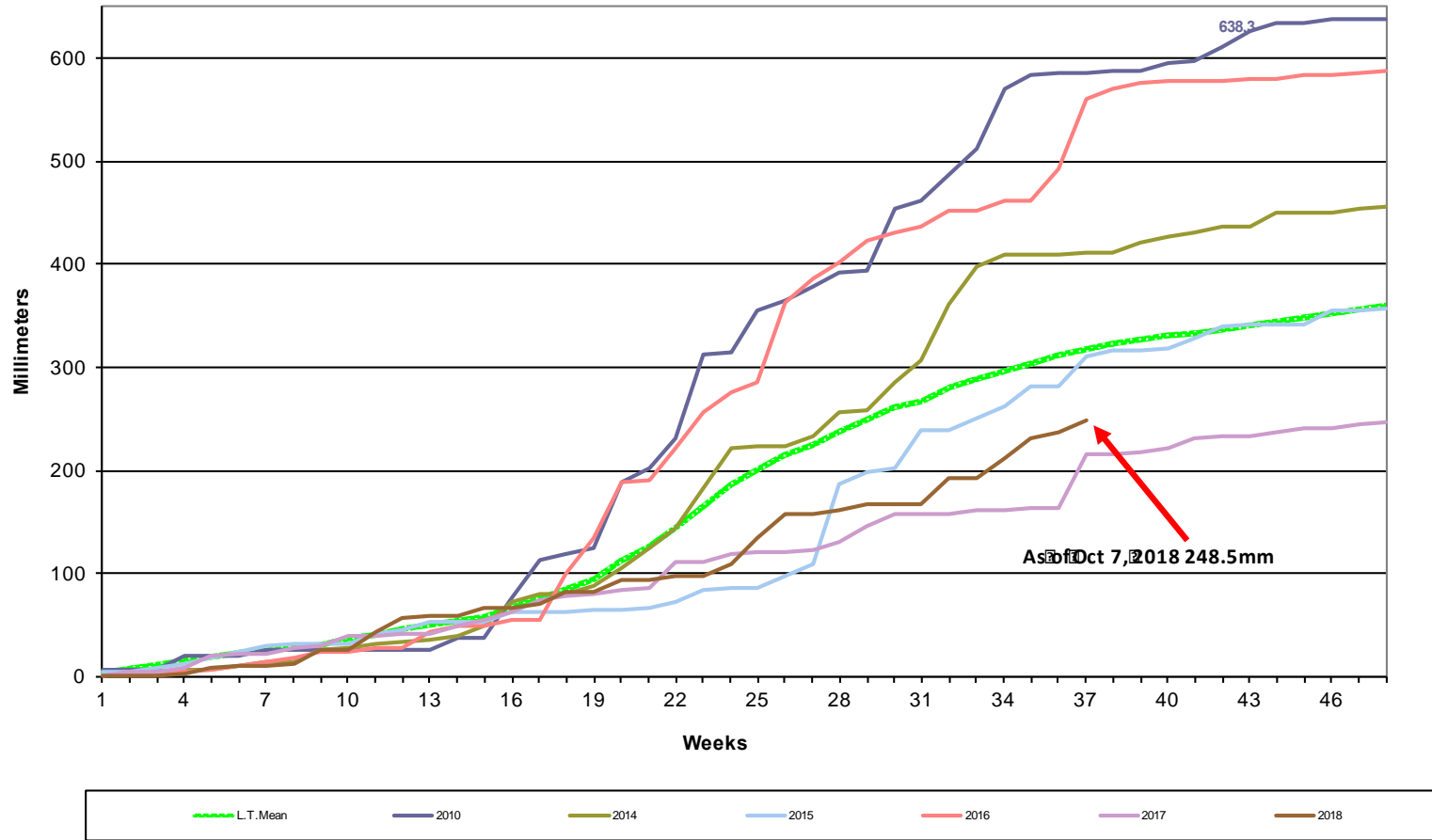
# Wheatland Brief History

- ▶ Non-profit / producer run since 1982.
- ▶ We operate under the Agri-ARM umbrella of Applied Research sites (8 sites)
- ▶ Trials from the Dry Brown Soil Zone of Southwest Saskatchewan
- ▶ Presenting results from Swift Current 2018



# 2018 Accumulative Precipitation

Accumulative Weekly Precipitation for Years 2010-2018



# Adequate Nitrogen allows for:

- ▶ Vigorous plant growth
  - ▶ Large leaf area
  - ▶ Deep green color
  - ▶ Branching
  - ▶ Flowering
  - ▶ Pod development
- 
- ▶ The most influential agronomic factor controlling mustard yield and quality

# Previous Research

- ▶ Fertilizer recommendations and other agronomic information for mustard production is predominantly based on mid-1970s data and area producers have traditionally thought of mustard as an inexpensive crop to grow, requiring fewer inputs such as nitrogen.
- ▶ However, more recently research scientist Ross McKenzie with Alberta Agriculture, Food and Rural Development (AAFRD) at Lethbridge has completed a four year study to update the recommendations for mustard production.



# Demonstrating Nitrogen Fertilizer Responses in Yellow and Brown Mustard

- ▶ **OBJECTIVE:** to demonstrate to producers' optimum fertility management practices in yellow and brown mustard, by varying nitrogen fertilizer rates and to promote the findings of Dr. Ross MacKenzie that dismiss the myth that mustard does not respond to inputs as well as other crops.



# Treatments

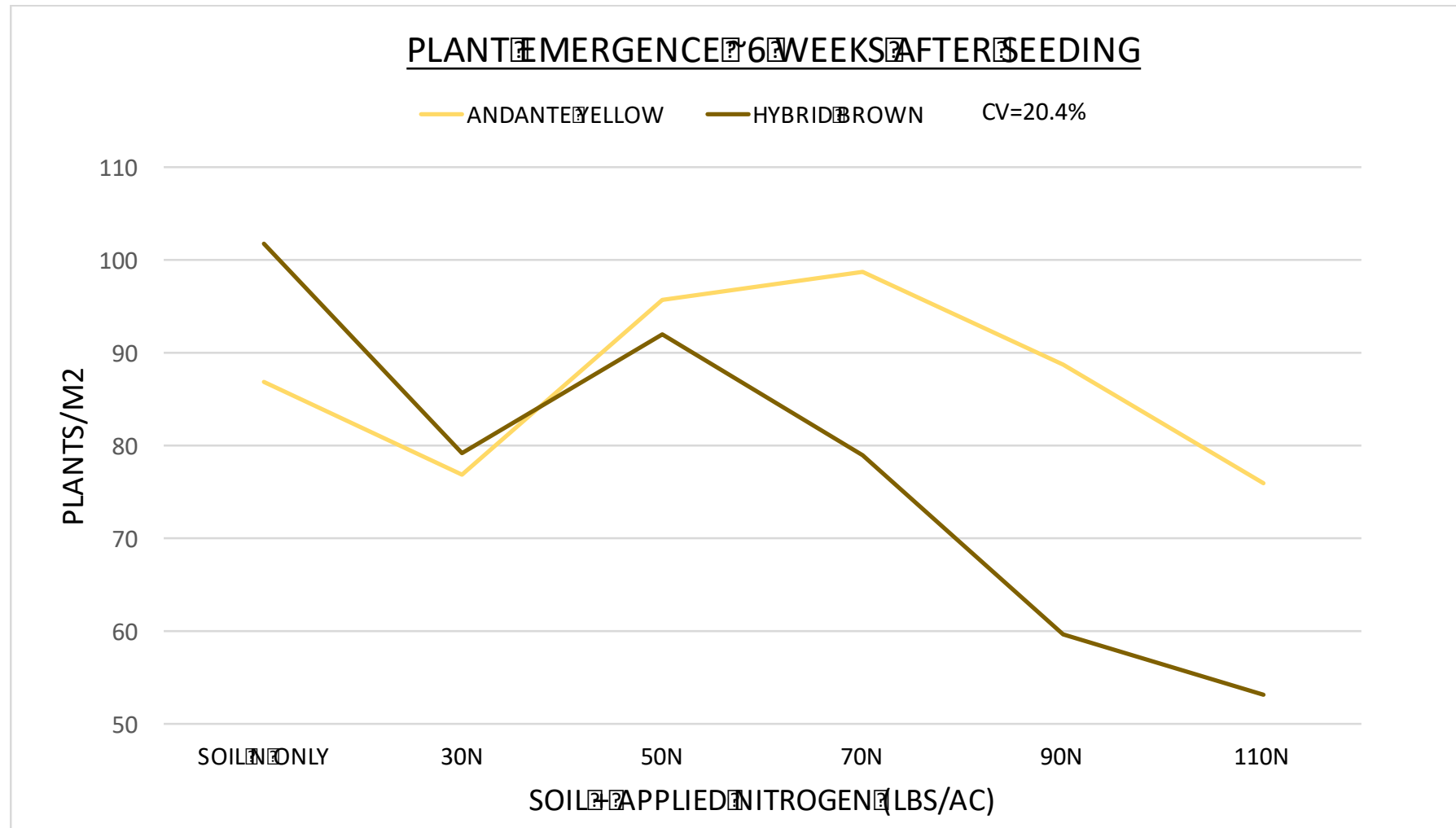
<u>TREATMENT #</u>	<u>Mustard</u>	<u>Nitrogen</u>
1	Yellow	Stored *Soil Nutrients Only
2	Yellow	30lb/ac actual N (*Soil N + Fertilizer)
3	Yellow	50lb/ac actual N (*Soil N + Fertilizer)
4	Yellow	70lb/ac actual N (*Soil N + Fertilizer)
5	Yellow	90lb/ac actual N (*Soil N + Fertilizer)
6	Yellow	110lb/ac actual N (*Soil N + Fertilizer)
7	Brown	Stored *Soil Nutrients Only
8	Brown	30lb/ac actual N (*Soil N + Fertilizer)
9	Brown	50lb/ac actual N (*Soil N + Fertilizer)
10	Brown	70lb/ac actual N (*Soil N + Fertilizer)
11	Brown	90lb/ac actual N (*Soil N + Fertilizer)
12	Brown	110lb/ac actual N (*Soil N + Fertilizer)

\*Spring Soil test results revealed 30 # actual N already in the soil



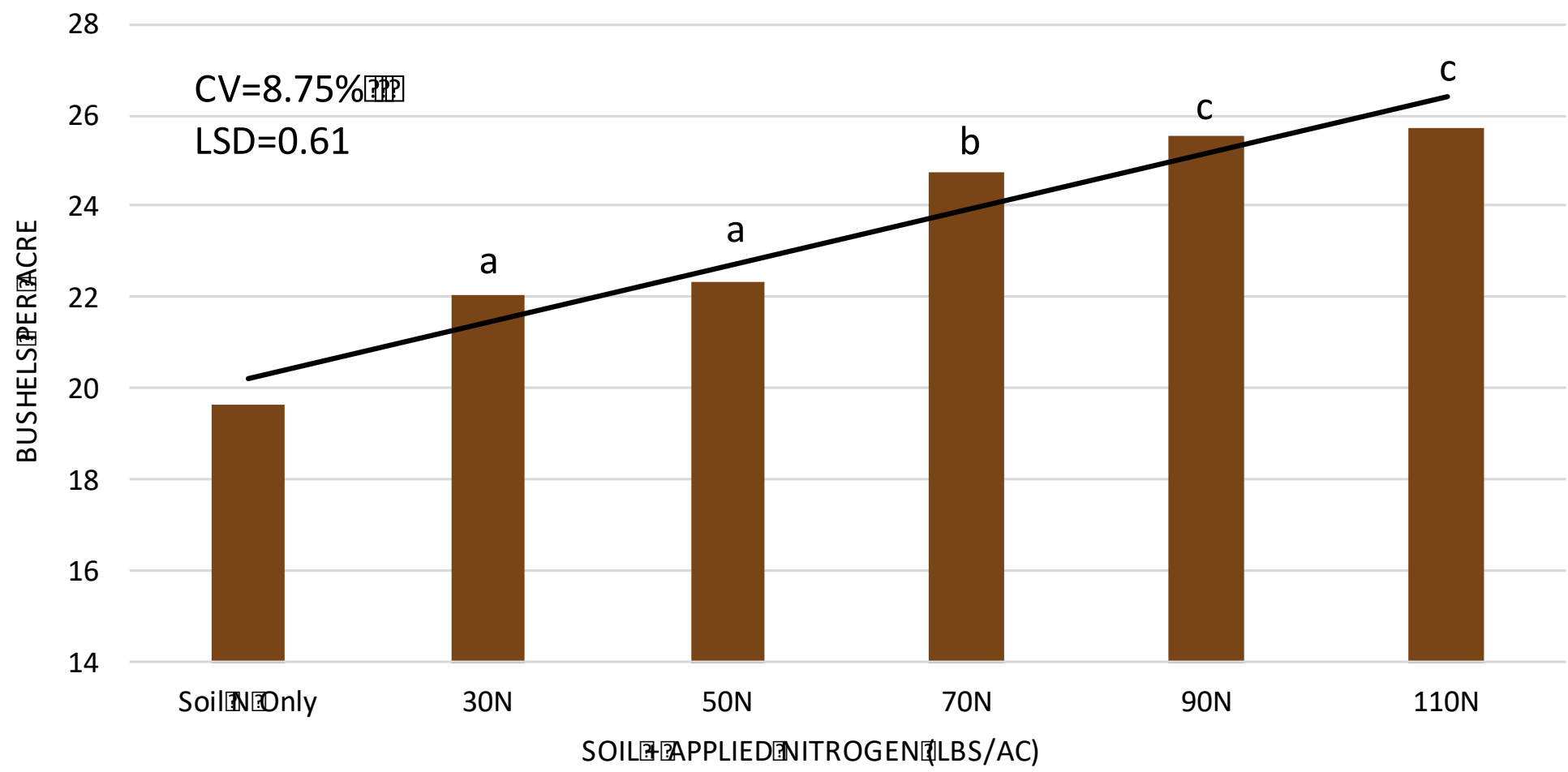
# Operations

- ▶ Seeded May 22<sup>nd</sup> into durum stubble
  - Andante Yellow @ 10lbs/ac
  - Hybrid Brown @ 6lbs/ac
- ▶ Seed treated with Helix Vibrance
- ▶ ¾” to 1” depth
- ▶ 9” row spacing
- ▶ ALL Fertilizer Side-banded
- ▶ All treatments receive a blanket application of P and S (Except T1 & T7)
  - (11-52-0) @ 30lbs/ac
  - (21-0-0-24) @ 25lbs/ac
- ▶ Irrigated June 13 → 1”
- ▶ Irrigated June 26 → ½”
- ▶ Combined September 11<sup>th</sup>



Plant emergence counts with increasing nitrogen rates were done about 6 weeks after seeding for brown and yellow mustard

BROWN HYBRID MUSTARD (AACBROWN18) WITH INCREASING RATES OF NITROGEN







Treatment #10  
70lb/ac  
total N

Treatment #12  
110lb/ac  
total N

Treatment #9  
50lb/ac  
total N



Treatment #11  
90lb/ac  
total N

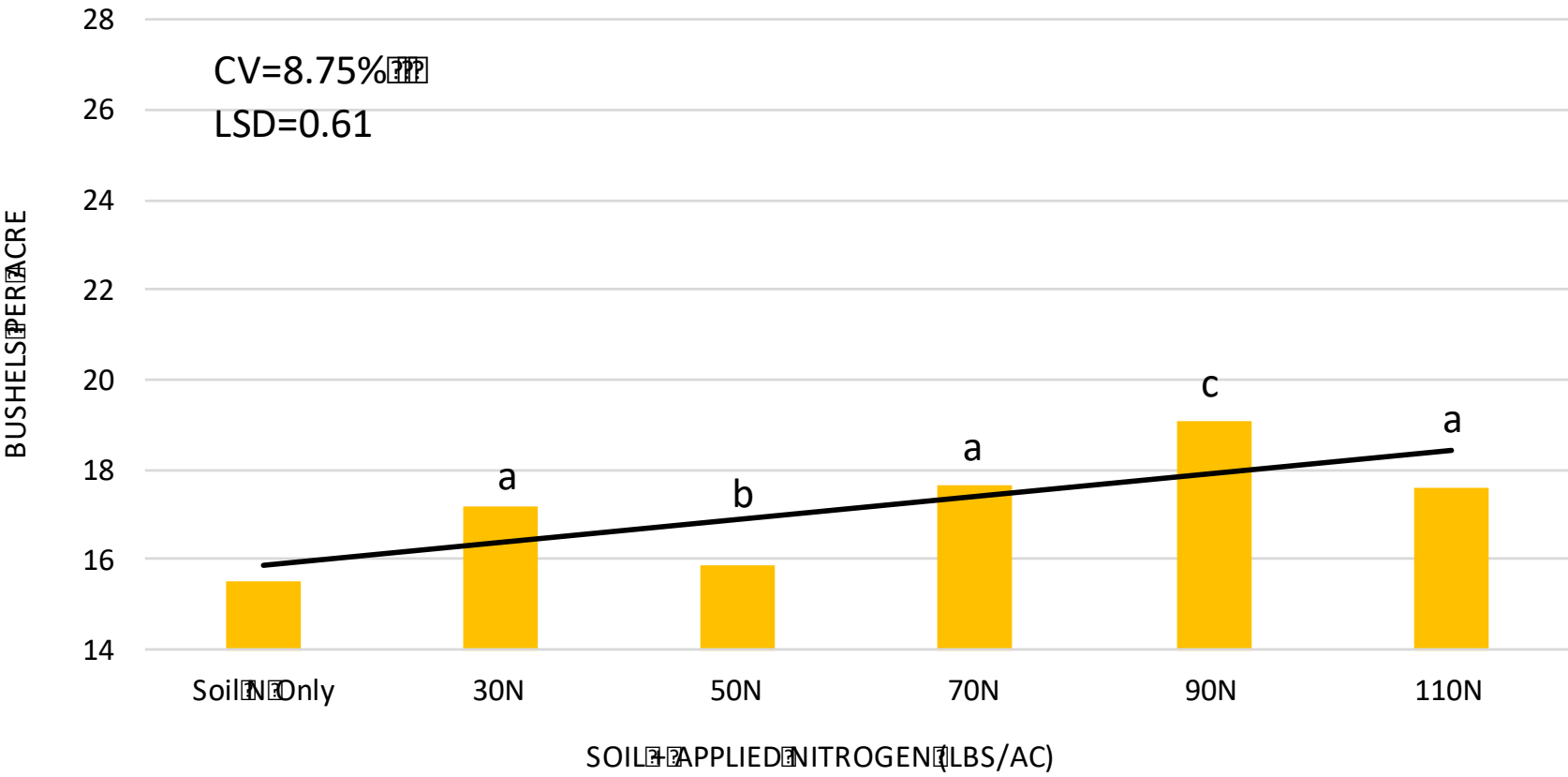
Treatment #8  
30lb/ac  
total N



ANDANTE YELLOW MUSTARD YIELD WITH INCREASING RATES OF NITROGEN

CV=8.75%


LSD=0.61







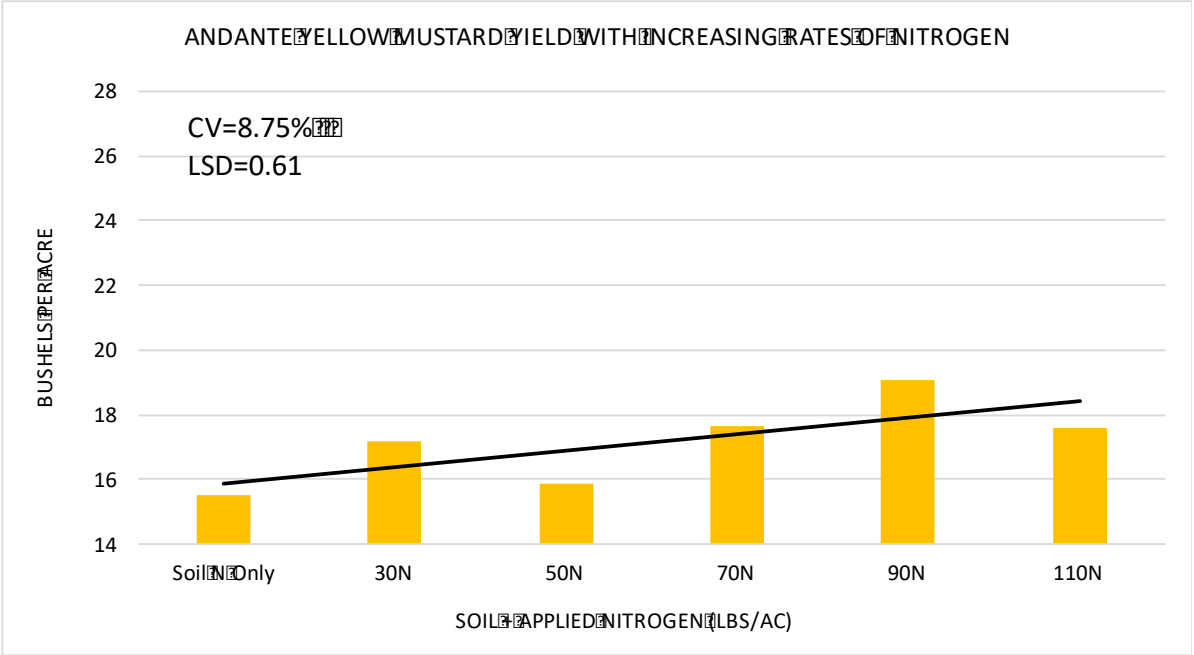
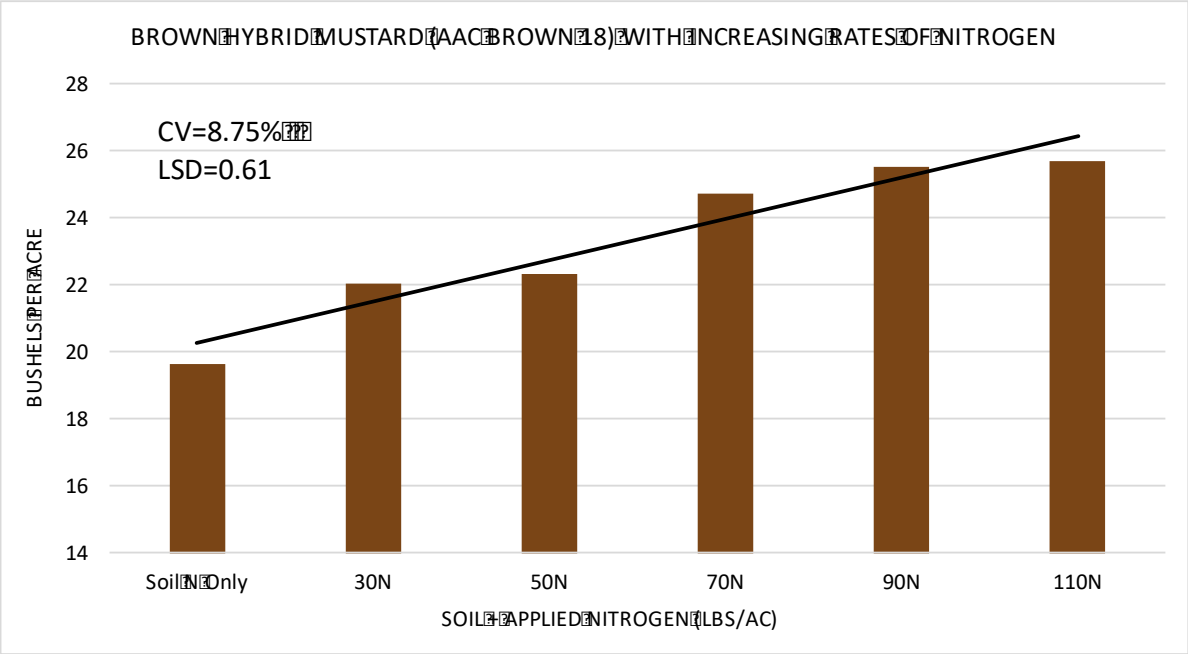


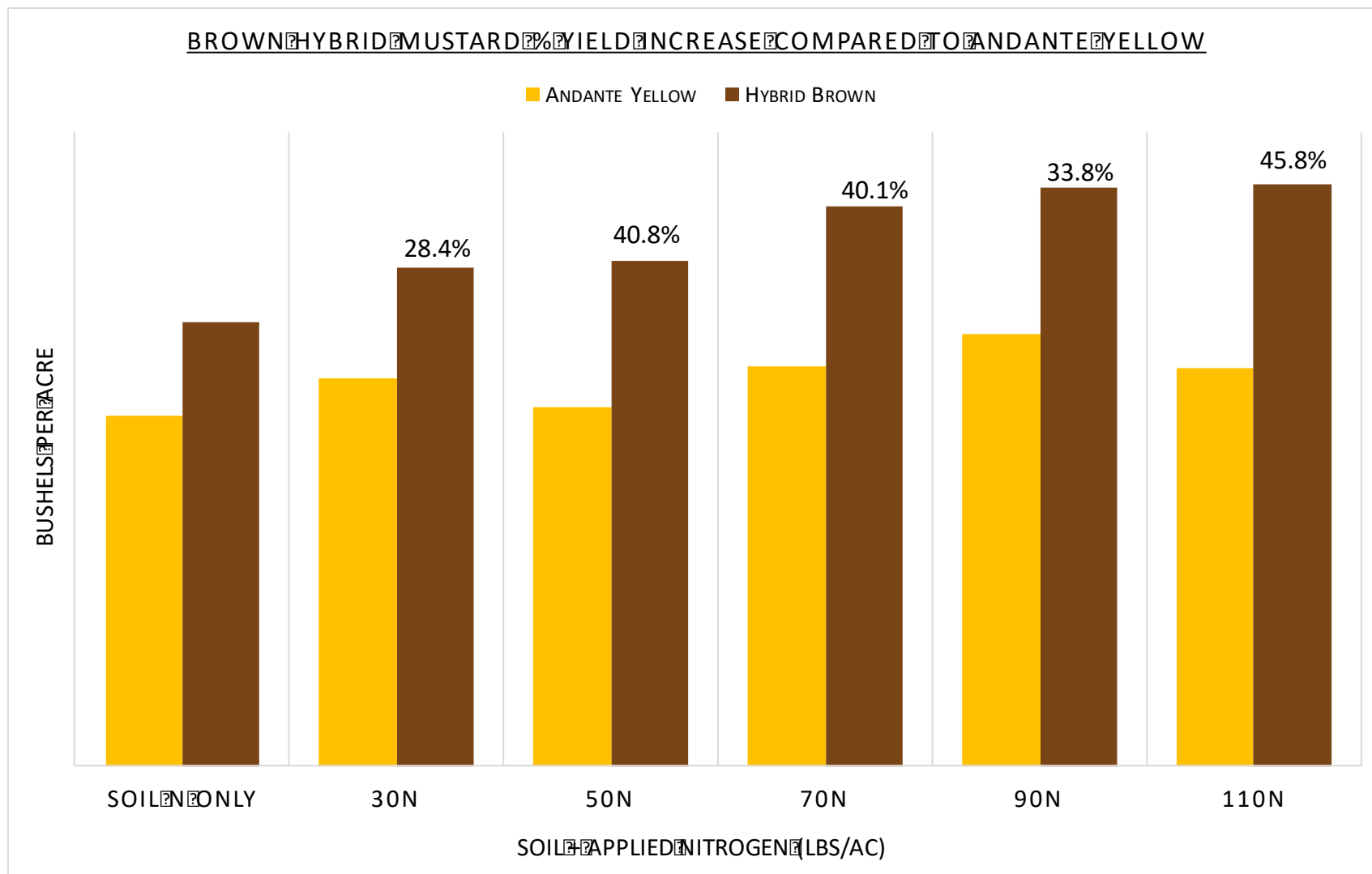


Treatment #3  
50lb/ac  
total N

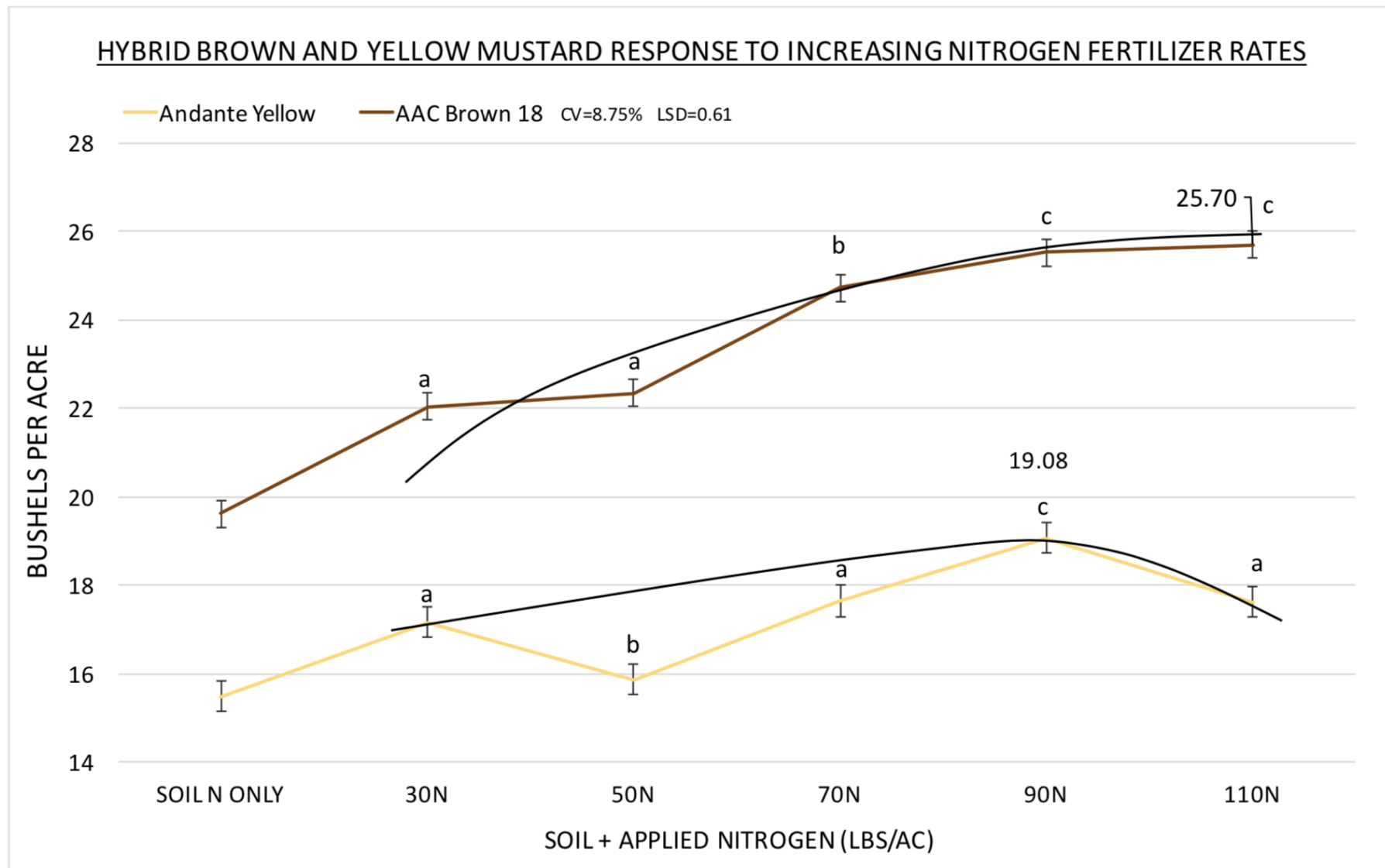
Treatment #6  
110lb/ac  
total N







Brown Hybrid Mustard percent yield increase over Andante yellow mustard at increasing rates of nitrogen in lbs/ac



Brown Hybrid Mustard and Andante yellow mustard yield in bushels per acre in response to increasing rates of nitrogen fertilizer. (CV=8.75%, LSD=0.61,  $P < 0.05$ )

Table 1. Percent yield relative to 30 # of Nitrogen.

<u>Percent Yields relative to 30 #N</u>						
<u>Andante Yellow Yield</u>				<u>Hybrid Brown Yield</u>		
	<u>% yield of 30 #N</u>		<u>bus/ac</u>	<u>% yield of 30 #N</u>		<u>bus/ac</u>
SOIL N ONLY	N/A		15.50	N/A		19.63
30N	100%	a	17.18	100%	a	22.05
50N	92%	b	15.88	101%	a	22.35
70N	103%	a	17.65	112%	b	24.73
90N	111%	c	19.08	116%	c	25.53
110N	103%	a	17.63	117%	c	25.70



# Plant Height



Brown Mustard

Treatment #10  
70lb/ac  
total N

70#N

110#N

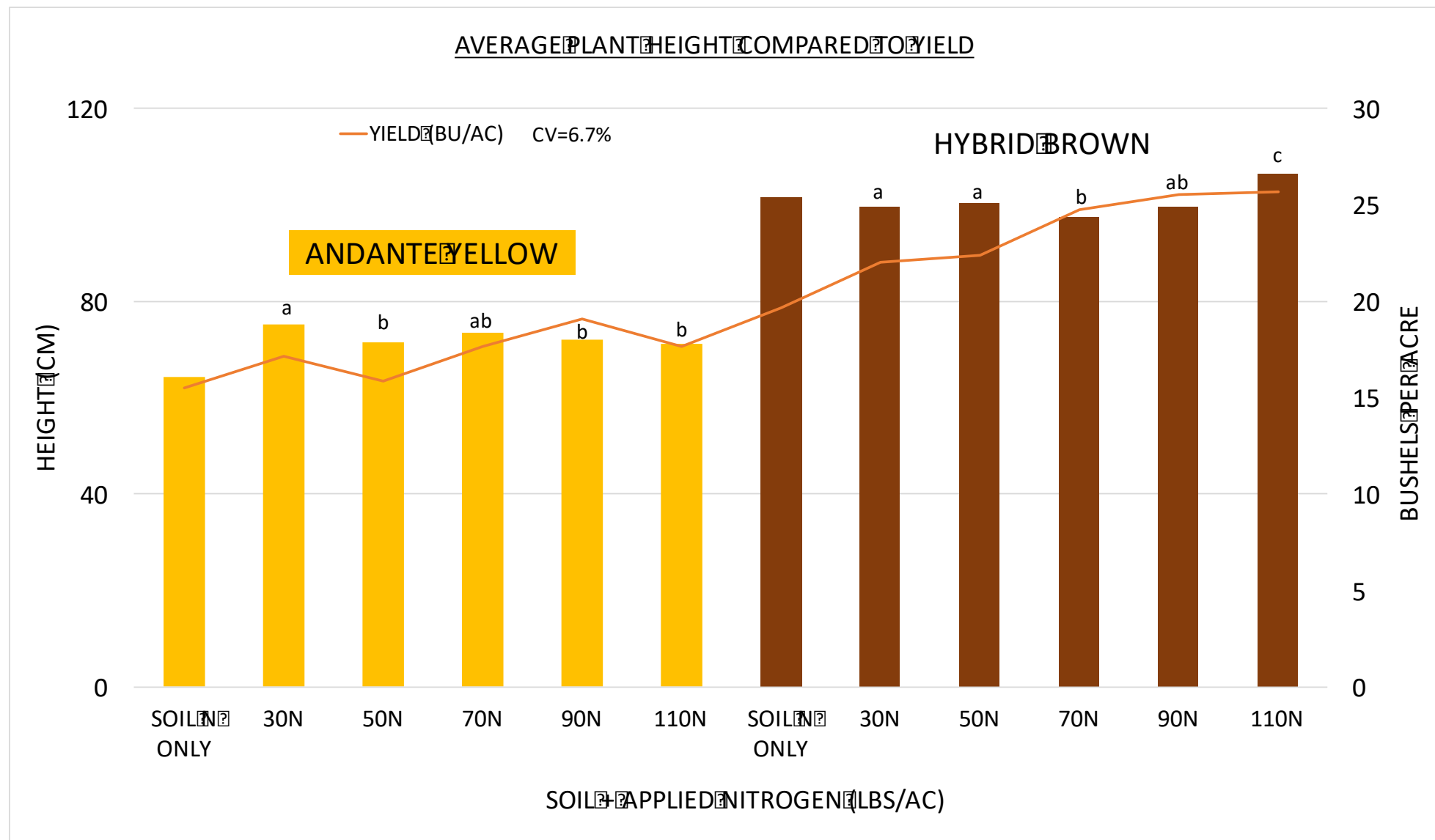
50#N

Soil N

90#N

30#N



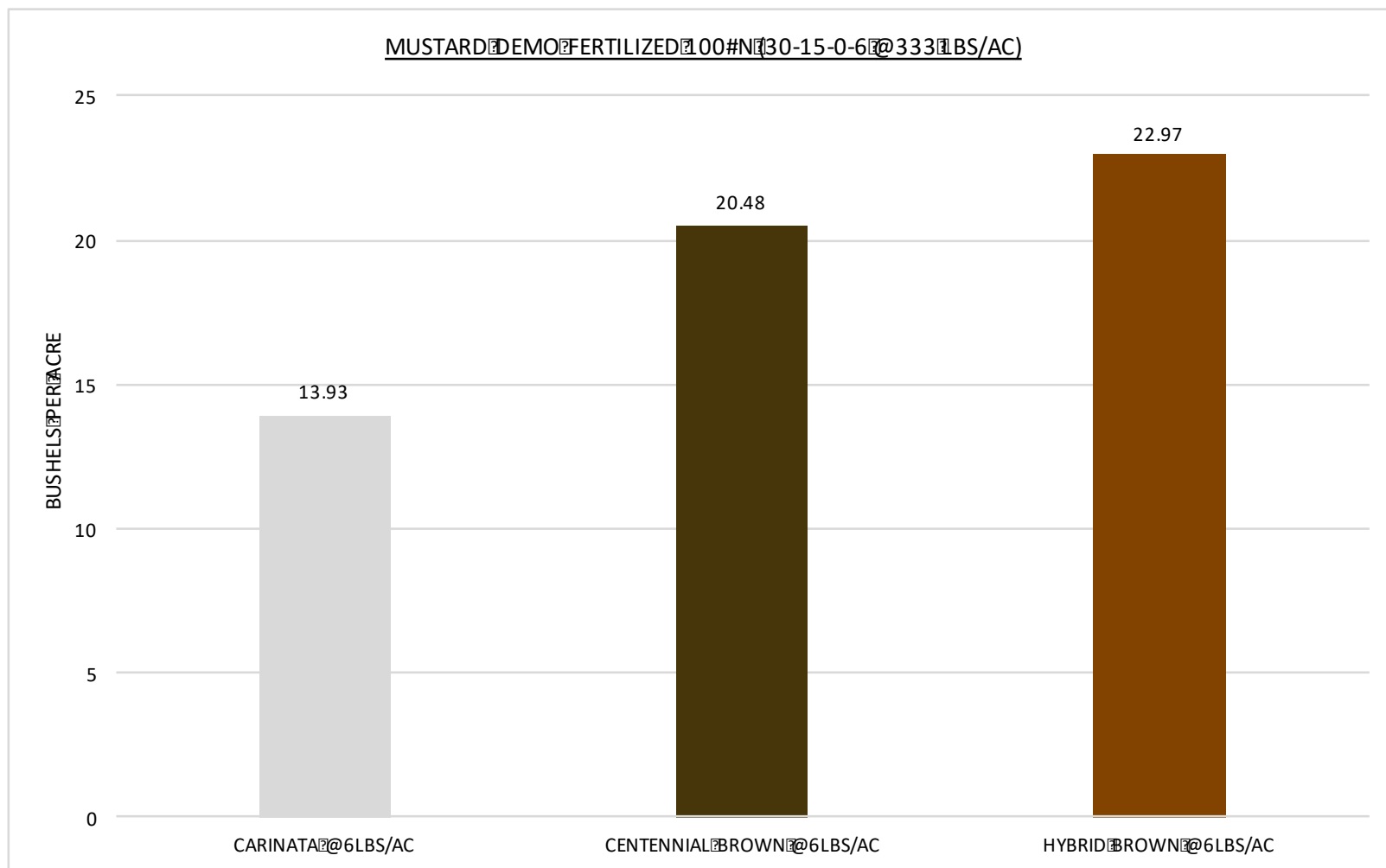


Brown Hybrid Mustard and Andante yellow mustard height in centimeters in response to increasing rates of nitrogen fertilizer. (CV= 6.7%, LSD=0.97, P<0.05)



# Mustard Demo



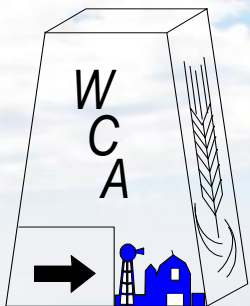


Yield shown in bushels per acre resulting from a mustard demo involving Carinata, Centennial brown, and AAC Brown 18.

# Summary

- ▶ Hybrid brown performance
- ▶ Mustard is responsive to fertilizer inputs
- ▶ Important for growers to have a nitrogen response curve
- ▶ As nitrogen uptake is directly correlated SSM and Nitrogen, response may have been more effective in a greater precipitation year
- ▶ Future Demonstrations







Thank you!

2019 Croportunities Conference March 13th  
2019 Wheatland Annual Tour July 18th  
[www.wheatlandconservation.ca](http://www.wheatlandconservation.ca)

