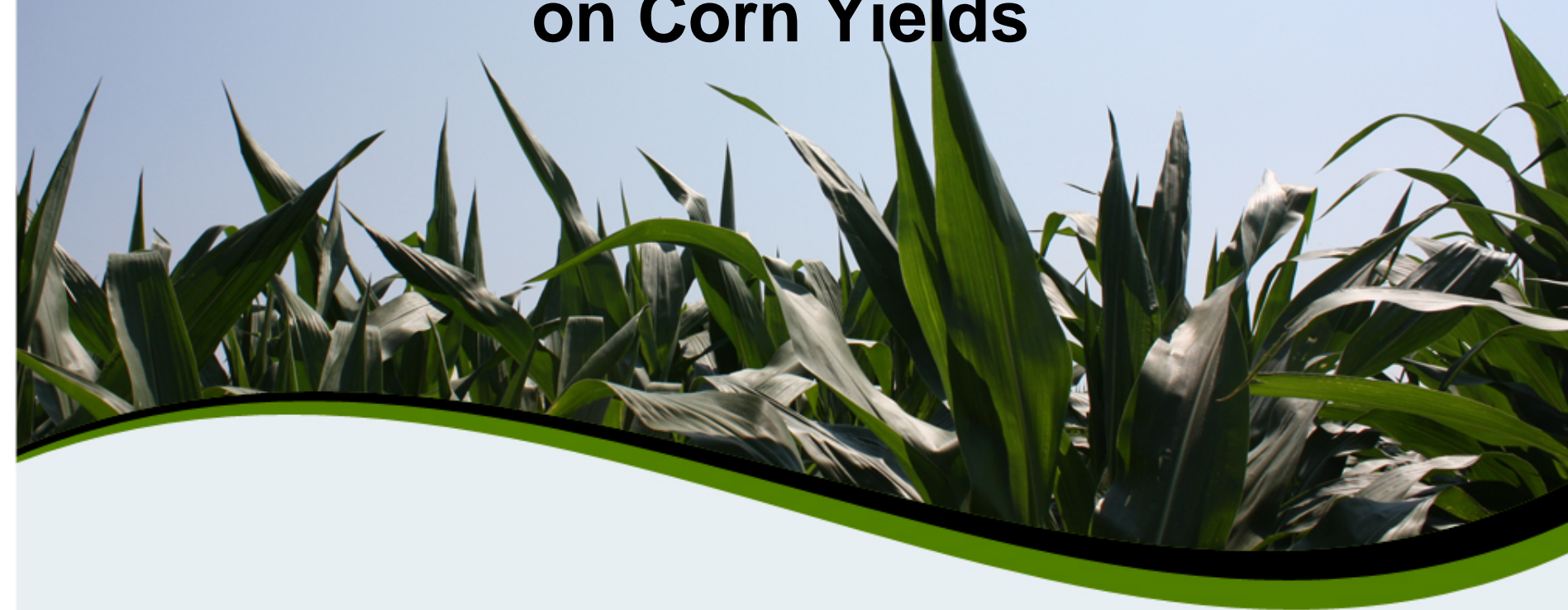


Impact of Stand Uniformity and Emergence on Corn Yields



Dan Fromme

Associate Professor-Corn, Grain Sorghum & Cotton Specialist

Dean Lee Research & Extension Center

LSU AgCenter

Alexandria Louisiana




Background

✿ After plant population, potential yield benefits from improving within-row spacing and plant emergence variability in corn production are often questioned by growers.




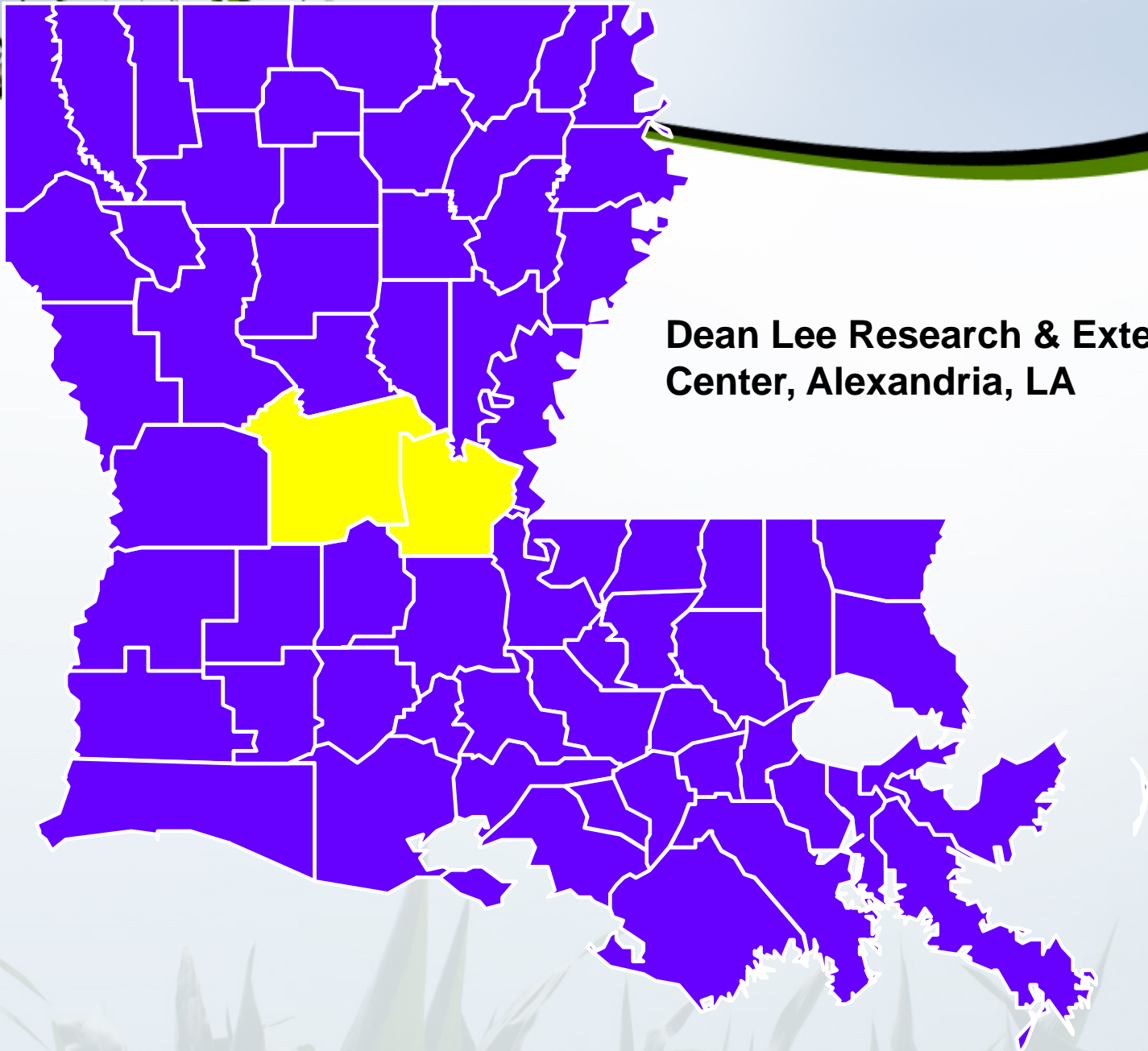
Causes

- **Spacing variability**
 - 90 to 95% germination
 - Misadjusted or malfunctioning planter mechanisms
 - Weather or pest related damage
 - **Emergence variability**
 - Soil moisture
 - Seed to soil contact
 - Soil temperature
 - Soil crusting
 - Herbicide
 - Insect
 - Soil borne diseases
- 



Studies

- **Plant Spacing Variability Study**
 - **Plant Emergence Variability Study**
 - **Impact of Cone Planters on Corn Yields in Small Plot Trials**
 - **Plant Spacing Variability in Commercial Corn Fields**
- 



**Dean Lee Research & Extension
Center, Alexandria, LA**



Plant Emergence Variability

Plant emergence variability

Treatment	Plant 1	Plant 2	Plant 3
0 Leaf Delay	X	X	X
2 Leaf Delay	X	X	X
4 Leaf Delay	X	X	X

For the 2 leaf delay, plant 2 was planted when plants 1 and 3 emerged. For the 4 leaf delay, plant 2 was planted when plants 1 and 3 reached the two leaf stage.

Hand planted at 34,000 plants per acre.

Hand planted



Treatments

2 leaf delay



39 Subplots

4 leaf delay



39 Subplots

0 Leaf Delay

0

0

0



2 Leaf Delay

0 2 0



4 Leaf Delay

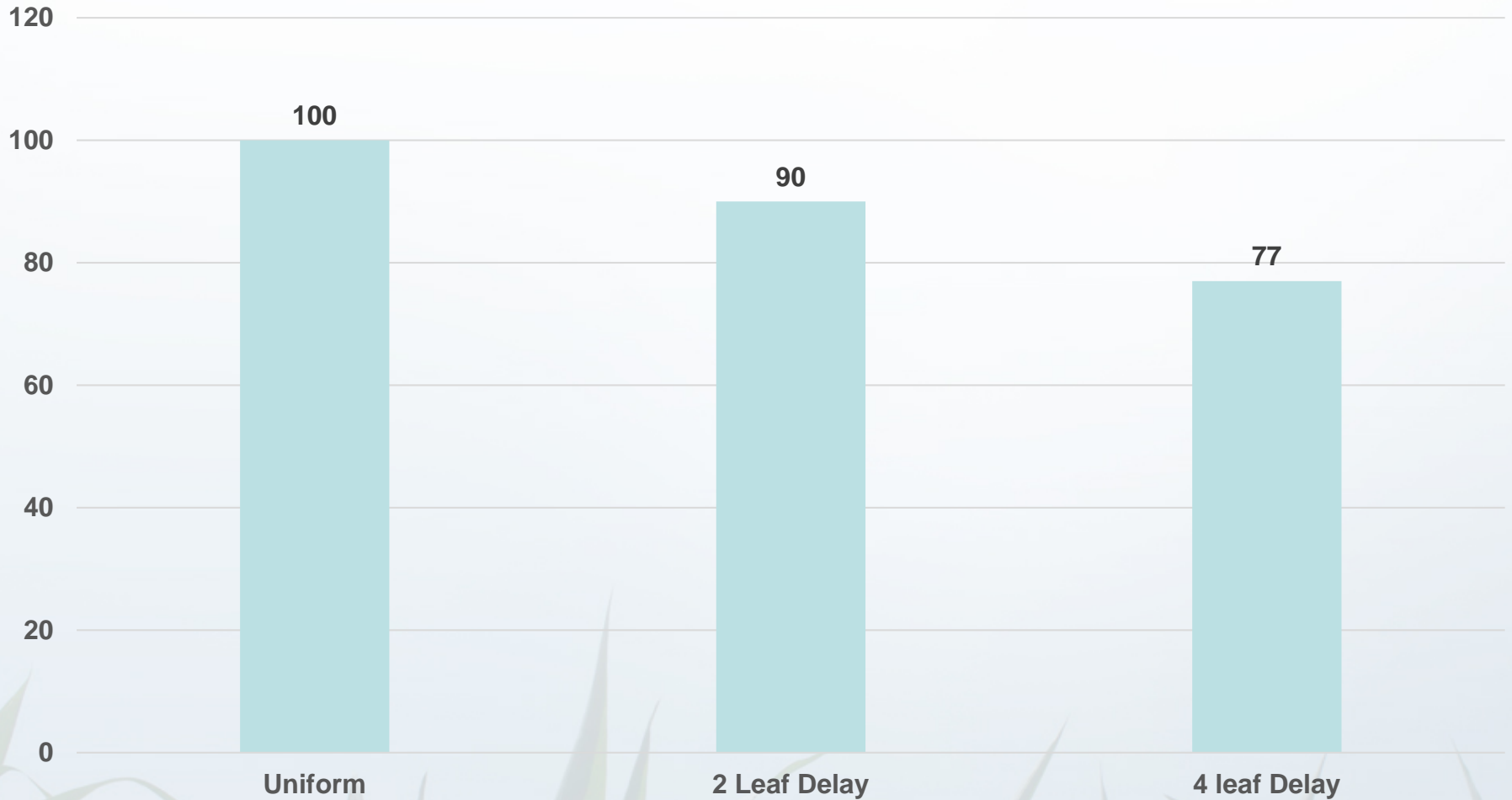
0

4

0



Percent of Yield at Uniform Emergence





Plant Spacing Variability



Plant spacing variability

Planting Outcome	Plant 1	Plant 2				Plant 3
Perfect Spacing	X	X				X
Seed No. 2-Skip	X					X
Seed No. 2-double planted	X	XX				X
Seed No. 2-misplaced by 1/4	X		X			X
Seed No. 2-misplaced by 1/2	X		X			X
Seed No. 2-misplaced by 3/4	X	X				X

Planted at 90,000 seed per acre and hand thinned to 34,000 plants per acre with a precision planter.

Perfect Spacing

- Percent of yield at perfect spacing:
 - 100%



**Two subplots, three ears per subplot
48 total subplots**

Skip

- Percent of yield at perfect spacing:
 - 76%



**Two subplots, two ears per subplot
48 total subplots**

Double

- Percent of yield at perfect spacing:
 - 111%



**Two subplots, four ears per subplot
48 total subplots**

Seed misplaced by 1/4

- Percent of yield at perfect spacing:
 - 100%



**Two subplots, three ears per subplot
48 total subplots**

Seed misplaced by 1/2

- Percent of yield at perfect spacing:
 - 100%



**Two subplots, three ears per subplot
48 total subplots**

Seed misplaced by 3/4

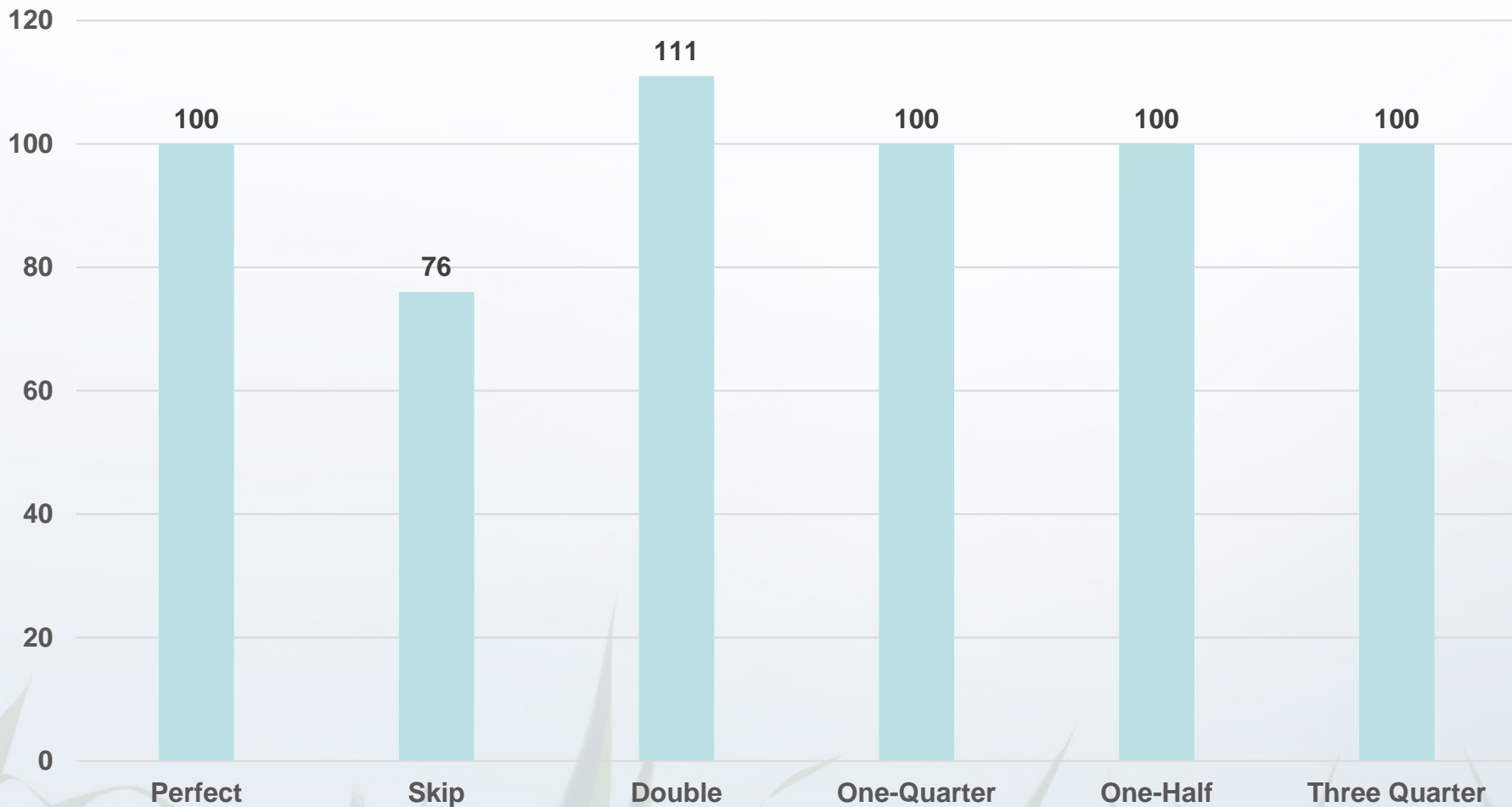
- Percent of yield at perfect spacing:
 - 100%



**Two subplots, three ears per subplot
48 total subplots**

Grain Yield

% of Yield at Perfect Spacing





Impact of cone planters on corn yields in small plot trials



Planters

- Cone planter
- Max-E-Merge planter
- Precision planter

34,000 seed per acre



Cone Planter

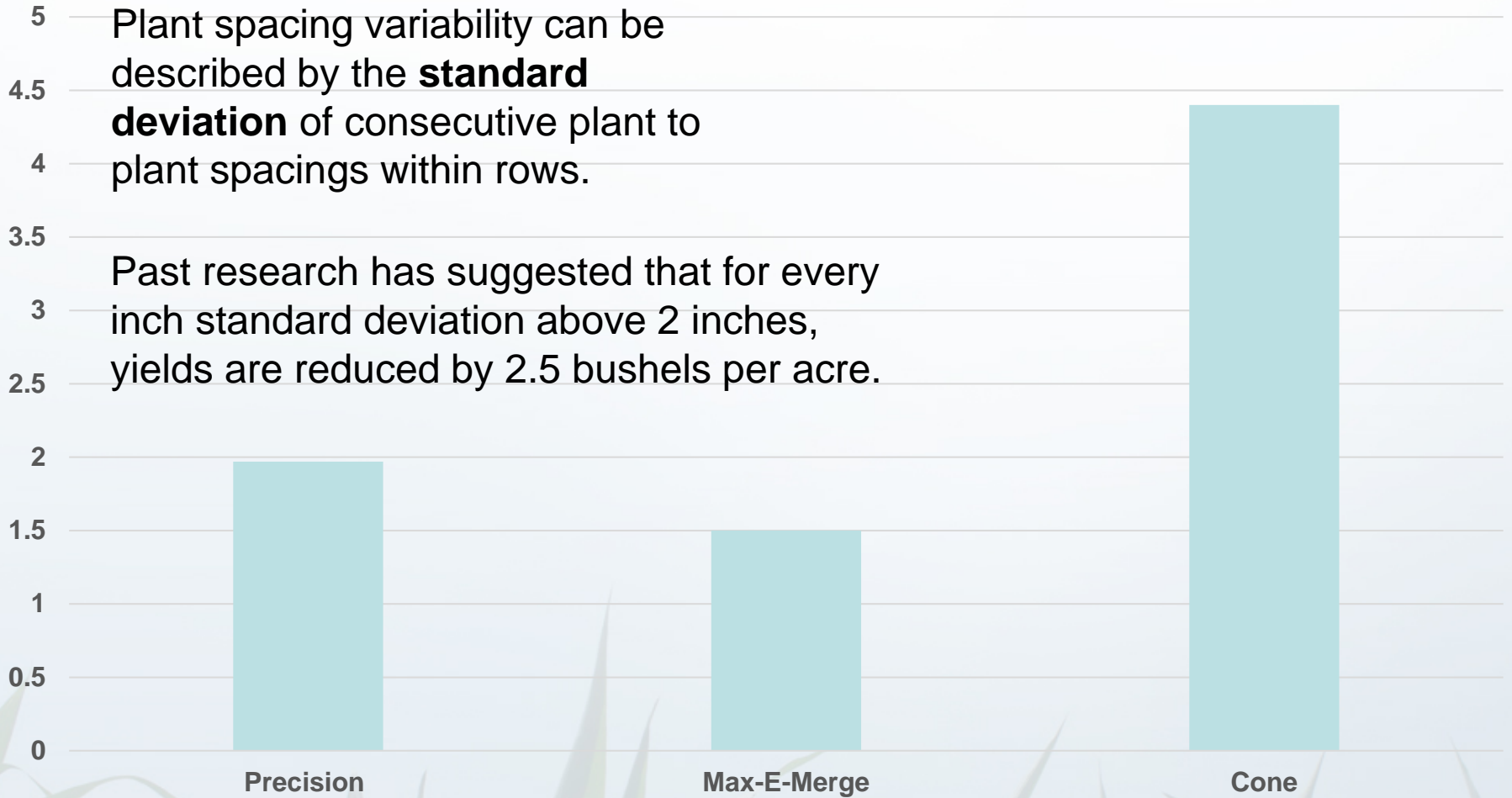


Standard Deviation (inches)

Plant No.	1	2	2	3	3	4	4	5
Example 1	3		5		2		1	
Example 2	2		2		2		2	

Lower the standard deviation the better.

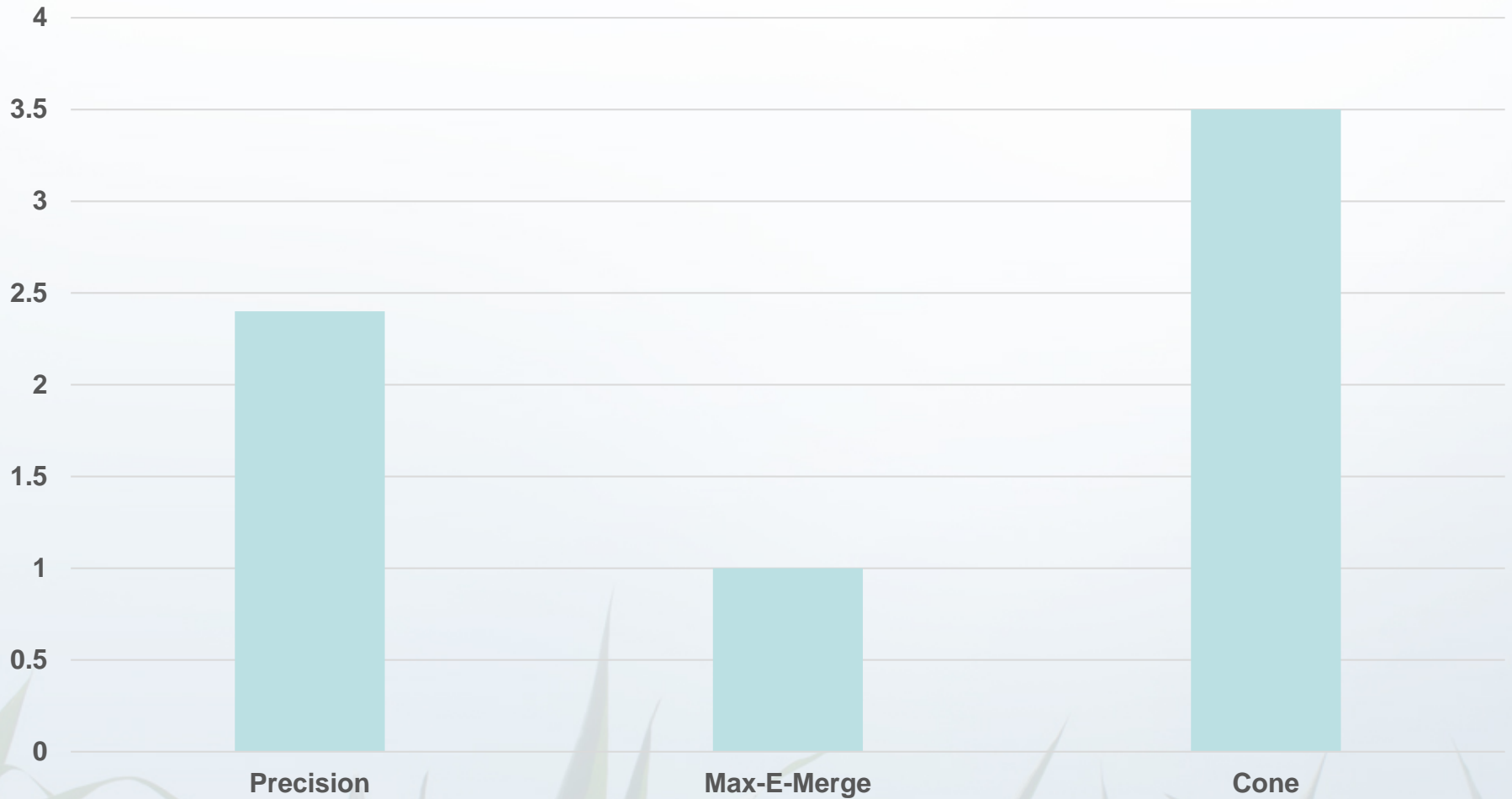
Standard Deviation (inches)



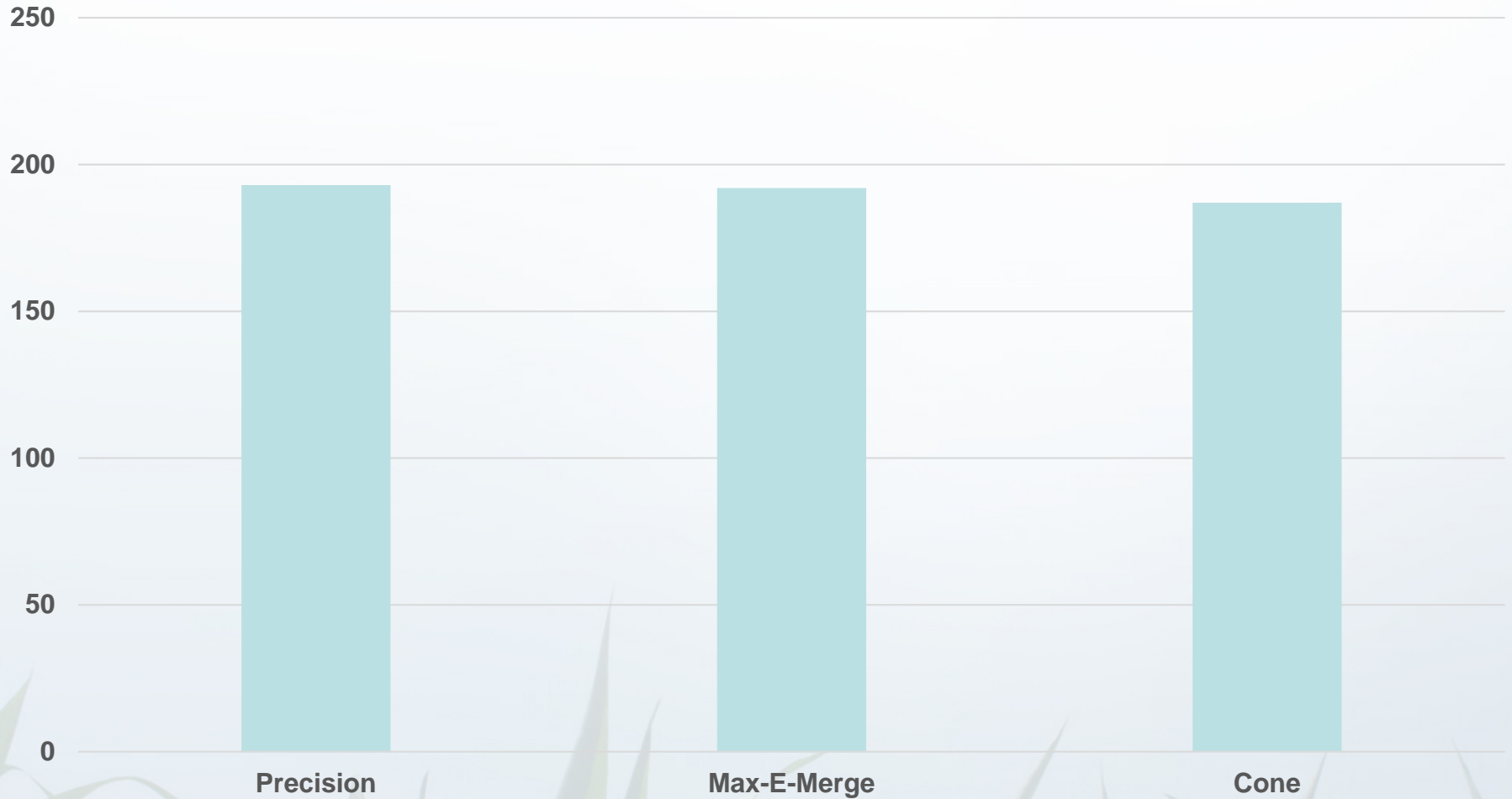
Plant spacing variability can be described by the **standard deviation** of consecutive plant to plant spacings within rows.

Past research has suggested that for every inch standard deviation above 2 inches, yields are reduced by 2.5 bushels per acre.

Lodging (%)



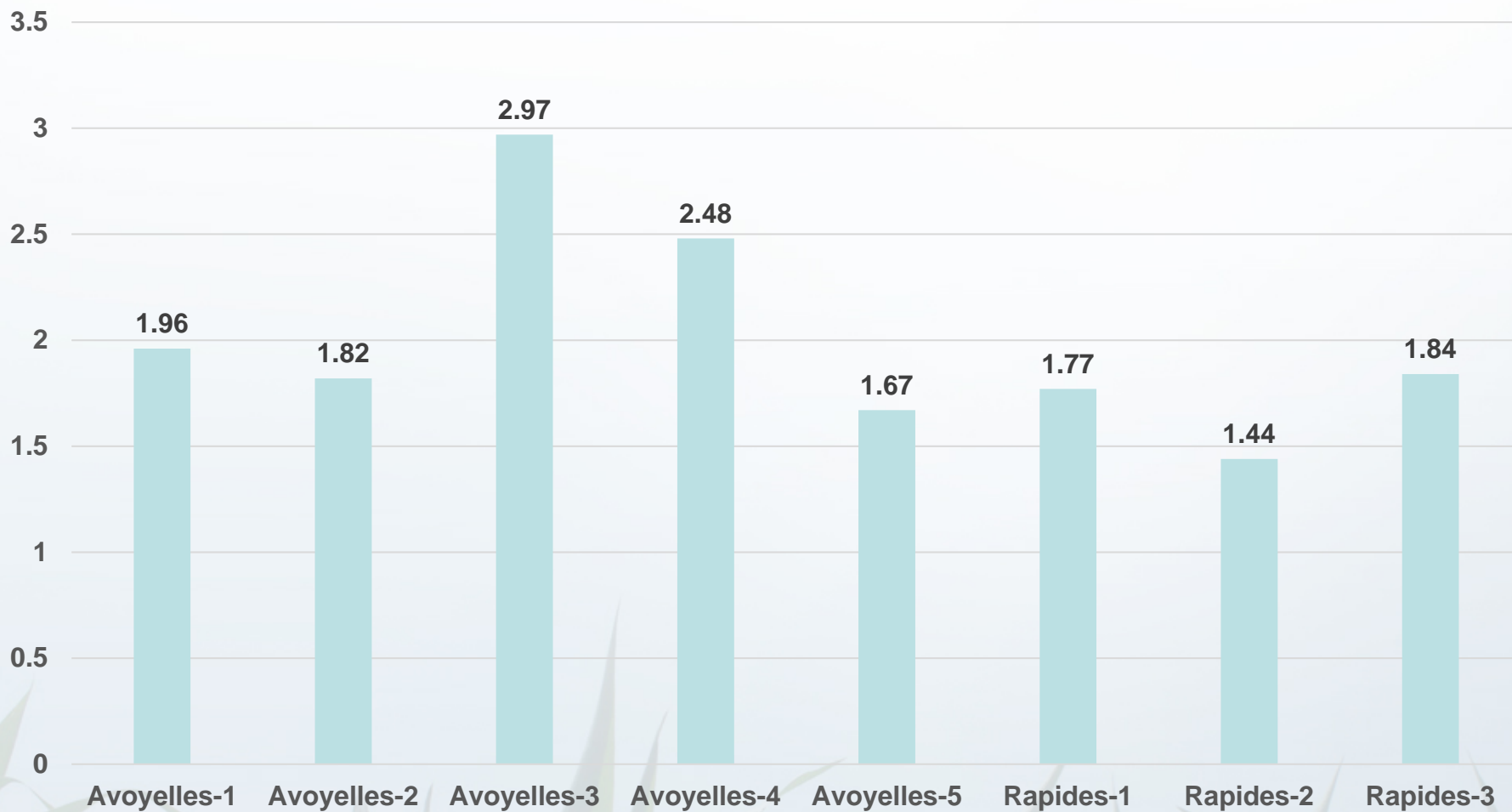
Yield (Bu./Ac.)





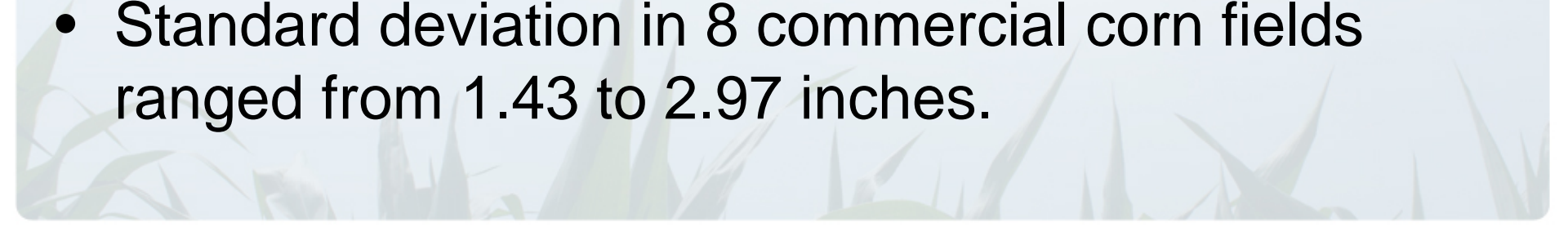
Plant spacing variability in commercial corn fields

Standard Deviation





Summary

- No differences in yield when comparing the perfect spacing to the 25, 50, and 75% misplace spacing.
 - One seed skip reduced yields by 22% and one double planted increased yields by 11%.
 - Two and four leaf delay in emergence reduced corn yields by 10 and 23%, respectively.
 - Corn yields were not impacted by the type of planter used in small plot replicated trials.
 - Standard deviation in 8 commercial corn fields ranged from 1.43 to 2.97 inches.
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Acknowledgements

- **Louisiana Soybean and Grain Board**





Thank You



Questions

Dan Fromme

dfromme@agcenter.lsu.edu

Office: 318-473-6522

Cell: 318-880-8079