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## Introduction

- Grain yield potential of corn hybrids has increased over the last 50 years due to improvements in breeding techniques and hybrid development
- Growers are increasing plant populations to maximize corn grain yield per hectare
- Information on the effects of high plant populations and hybrid maturity on secondary plant characteristics is limited
- Increasing plant populations may affect ear height, plant height and ear orientation differently by maturity group

## Objectives

- Investigate plant population effects on ear and plant height and ear orientation for different maturity groups
- Determine relative maturity and plant population influences on corn grain yield and grain moisture

## Materials and Methods

- Field study conducted in 2010 and 2011
  - 2010: S. Charleston and Hoytville, OH
  - 2011: S. Charleston, Hoytville, and Wooster, OH
- 8 m x 3.1 m plots, 4 rows at 0.76 m spacing, 3 replications per site
- Planted at five target populations
  - 44,000, 59,000, 74,000, 89,000, and 104,000 plants ha<sup>-1</sup> in 2010
  - 44,000, 64,000, 84,000, 104,000, and 124,000 plants ha<sup>-1</sup> in 2011
- Fifteen Pioneer brand hybrids examined with maturities from 102-114 day (Table 1)
  - Five early-maturing hybrids (102-106)
  - Ten late-maturing hybrids (108-114)
- Measured plant growth parameters at R6
  - Ear and plant height
  - Ear orientation (percent erect ears)
- Measured grain yield and moisture at harvest

## Statistics

- Split-plot randomized complete block
  - Whole plot: Population
  - Sub-plot: Hybrid
- Averaged across sites because the interaction was not significant ( $\alpha = 0.05$ )
- Data analyzed using contrasts in SAS 9.2
- Years are presented separately because weather was variable

## Acknowledgements

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## Results and Discussion

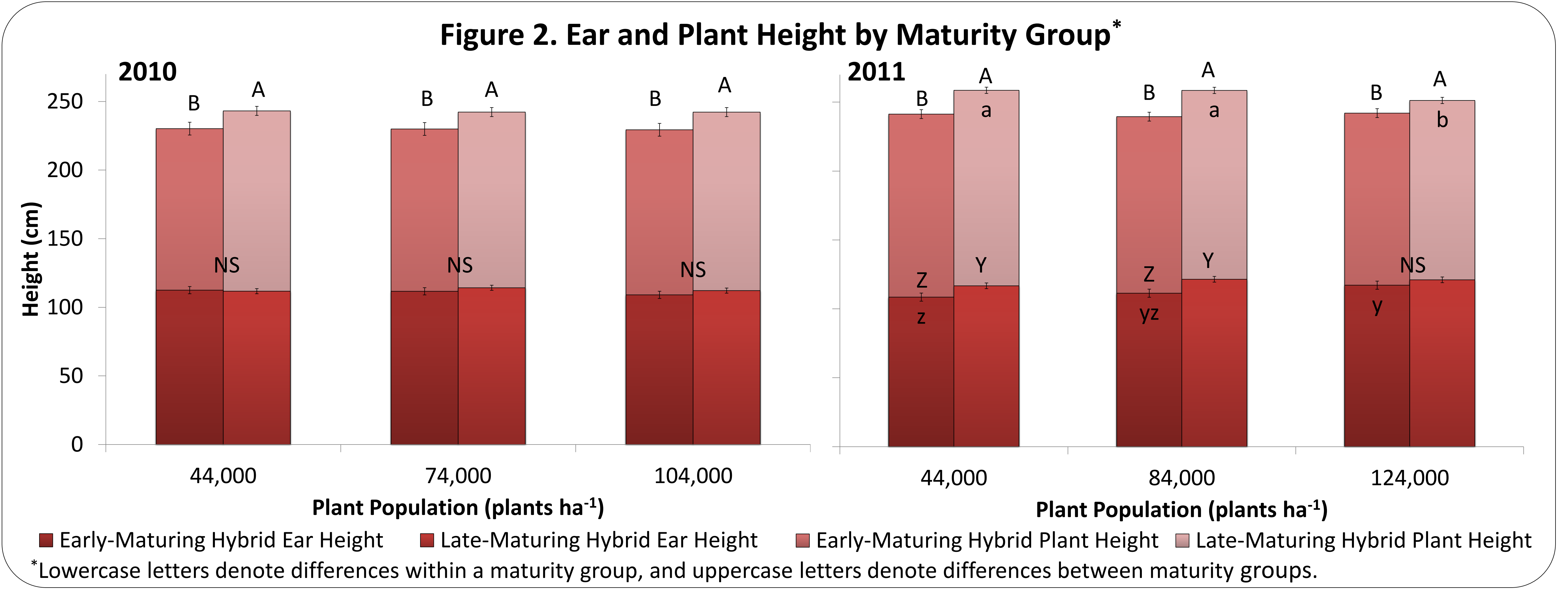
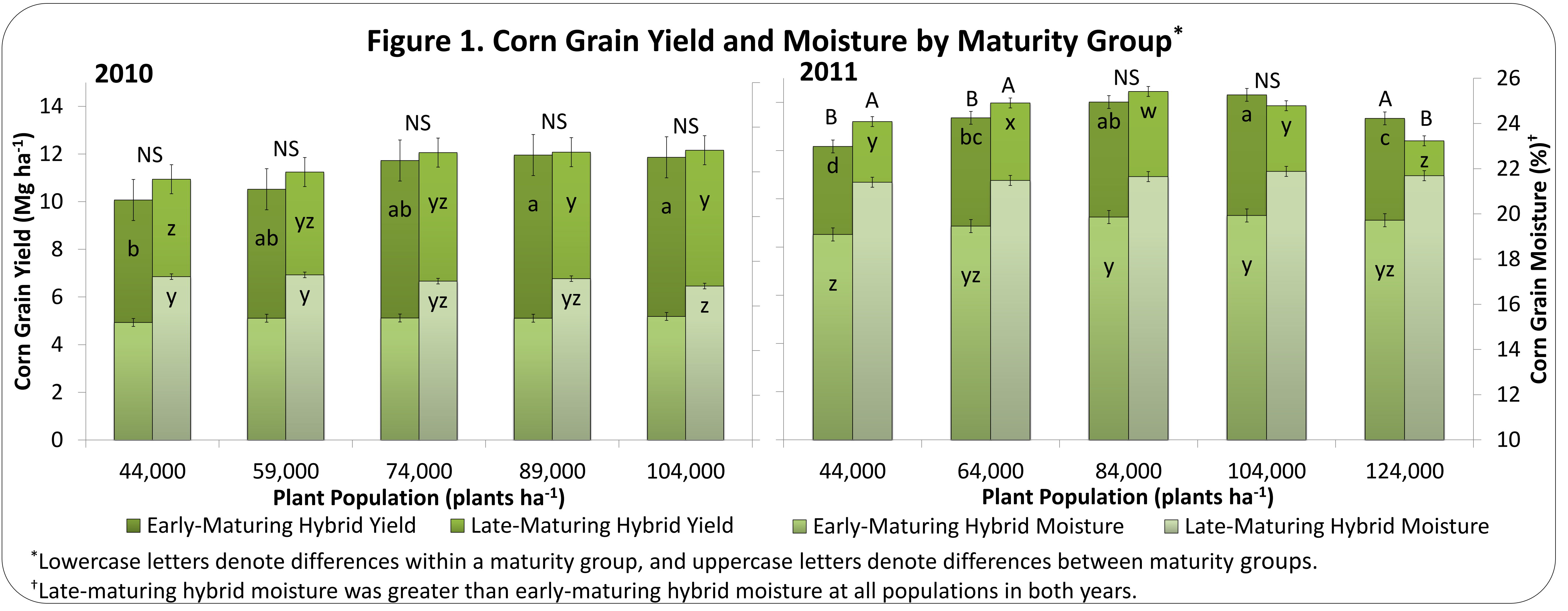


Table 1. Hybrids and relative maturity used in each year.

Maturity Group	2010		2011	
	Hybrid	Relative Maturity	Hybrid	Relative Maturity
Early-Maturing Hybrids	P0377XR	103	P0210HR	102
	P0413XR	104	P0413AM1	104
	P0448XR	104	P0448AM1	104
	P0463XR	104	35F48AM1	105
	P0518XR	105	35K09AM1	106
Late-Maturing Hybrids	P0891XR	108	P0832AM1	108
	P0902XR	109	P0891AM1	108
	P0916XR	109	P0912HR	109
	P1011XR	110	P0965AM1	109
	P1018XR	110	P1018AM1	110
	P1162XR	111	P1184AM1	111
	P1184XR	111	P1292AM1	112
	P1253XR	112	P1360HR	113
	P1314XR	113	P1395XR	113
P1395XR	113	P1498HR	114	

- Optimum yield varied by year and maturity group (Figure 1)
- Grain moisture was greater in late-maturing hybrids in both years (Figure 1)
- Percent erect ears decreased at populations >84,000 plants ha<sup>-1</sup> (Table 2)
- Ear height was similar between maturity groups in 2010, but was greater at lower populations for late-maturing hybrids (Figure 2)
- The high population raised ear height for early-maturing hybrids and decreased plant height of late-maturing hybrids in 2011 (Figure 2)
- Plant height was greater for late-maturing hybrids across populations in both years (Figure 2)

Table 2. Ear orientation as affected by plant population.

	Early Hybrids	Late Hybrids	P-value
<b>2010</b>			
—% Erect Ears—			
44,000	94 a	89 a	0.185
74,000	86 a	80 b	0.106
104,000	69 b	69 c	0.938
<b>2011</b>			
44,000	41 a	47 a	0.375
84,000	24 b	34 b	0.155
124,000	20 b	23 b	0.739

## Conclusions

- Plant population can affect plant height
- Increasing plant density can decrease the percent erect ears
- Optimum population for maximum yield is variable by year
- Yield advantage of late-maturing hybrids over early-maturing hybrids is less consistent at high populations (2011)