

# ***Agronomy 212 – Crop Growth, Productivity, and Management***

## **Corn - Stand Density**

Definitions

Goals and Considerations

Calculations

$$\begin{aligned} &= \left[ \frac{\text{seeds per acre}}{43,560} \right] \times \left[ \frac{\text{row spacing}}{12} \right] \\ &= \left[ \frac{43,560 \times 12}{\text{row spacing}} \right] \times \text{seeds/ft of row} \end{aligned}$$

## Calculating seeding rate from population goals

$$\text{Seeding rate} = \frac{\text{Desired plant population}}{\% \text{ stand}}$$

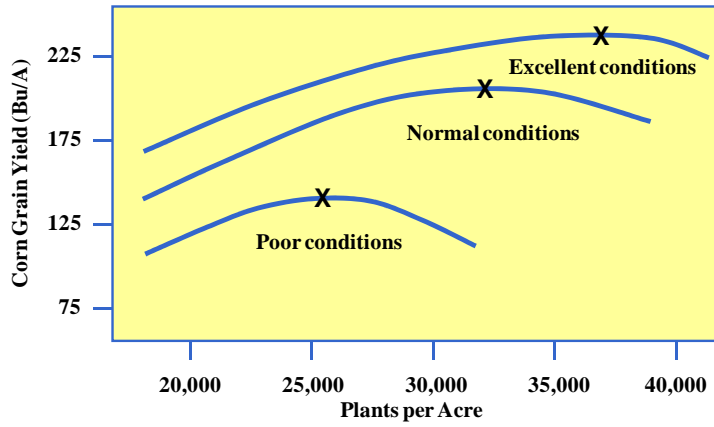
**And, % stand = 100% minus the assumed mortality based on planting date, soil conditions, and the weather forecast.**

Example:      Desired plant population = 32,000 plants/acre  
                 Assumed mortality due to planting conditions = 15%

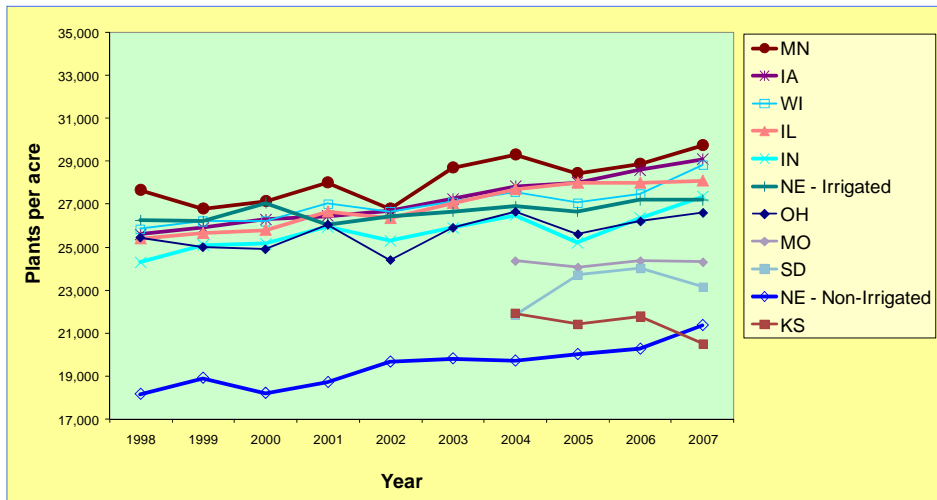
## Determining Stand Density

	Row Spacing (in)		
	20	30	38
Row length = 1/1000 <sup>th</sup> acre			

### Plant Density vs. Yield



### Corn Stand Density by State

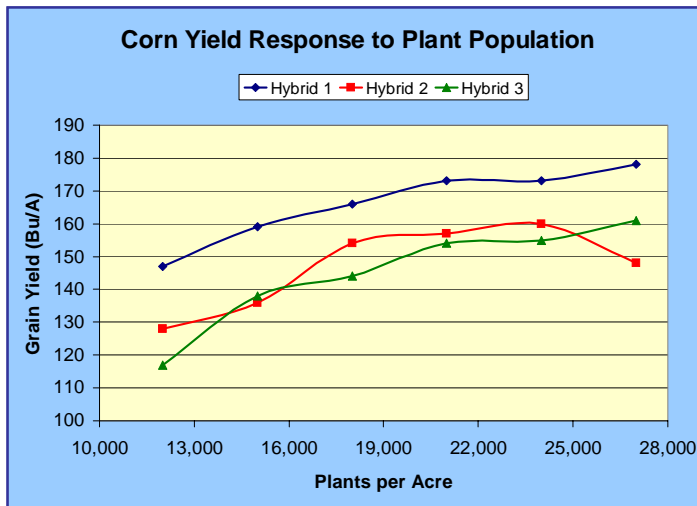


### Corn Populations – Iowa

Year	Plants per Acre	Ears per Acre	% Barren
2003	27,250	26,600	
2004	27,850	27,500	
2005	28,000	27,100	
2006	28,600	27,350	
2007	29,100	28,450	

# Adjustments

## Optimum Population Varies with Hybrid



## Corn yield response to plant population in Iowa

Final Stand	Years tested	NW	NC	NE	C	SW	SE	State Avg.
Relative yield potential (percent)								
44,000	1	90	90	93	99	86	-	
36,000	4	92	95	97	100	93	98	
32,000	4							
28,000	4	90	95	92	96	90	100	
24,000	4	95	95	92	92	73	97	
20,000	1	78	79	76	89	78	-	

Source: ISU Extension

## Target Corn Population to Yield Goal – Minimum final stand density

### Minimum final stand density based on yield potential

Yield Goal (Bu/A)	Population (Plants/A)
120	
140	
160	
180	
200	

Below these levels, risk more in yield loss than dollars saved.

## Other Considerations

## Corn Cost vs. Revenue

### Example of diminishing returns

Population	Yield	Difference	Added Cost	Added Revenue		
				\$2.50	\$3.00	\$3.50
28,000	171					
32,000	180		\$22.50	\$27.00	\$31.50	
36,000	182		\$5.00	\$6.00	\$7.00	
40,000	179		-\$5.00	-\$6.00	-\$7.00	

### Summary