



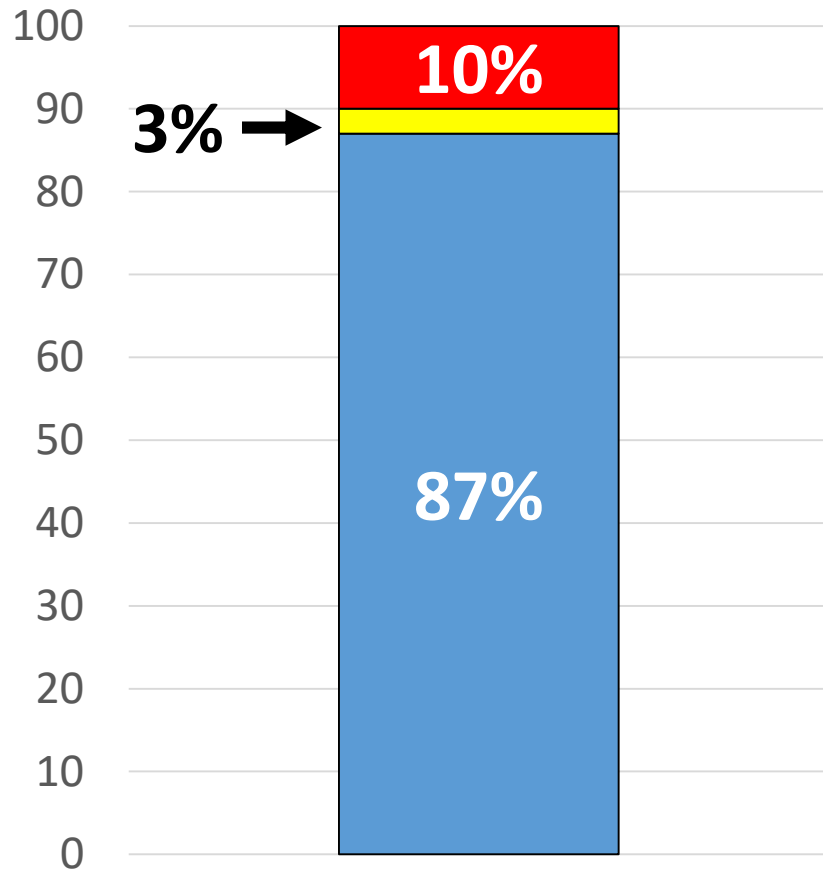
Improving Sugarbeet Quality

What is Beet Quality?

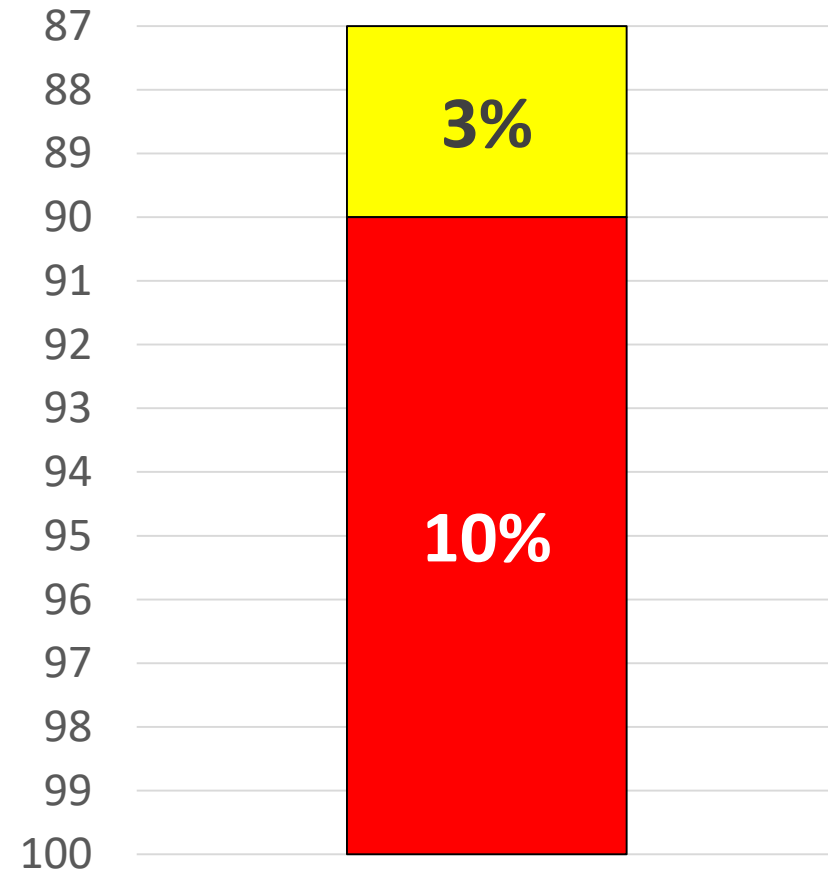


- Beet Quality = Sugar and Purity
 - It is the key to maximizing factory efficiency and cooperative profit
- Sugar is self-explanatory
- Purity is the ratio of sugar to impurities plus sugar
- Sugarbeets contain two general classes of impurities:
 - Those that are eliminated in the factory process
 - Those which cannot be eliminated in the normal factory process
 - It is the second class which causes the production of molasses
- It takes more energy and time to process a poor quality sugarbeet than it does for a high quality beet

Two Different Worlds...



Agriculture World
3% Decrease in Purity

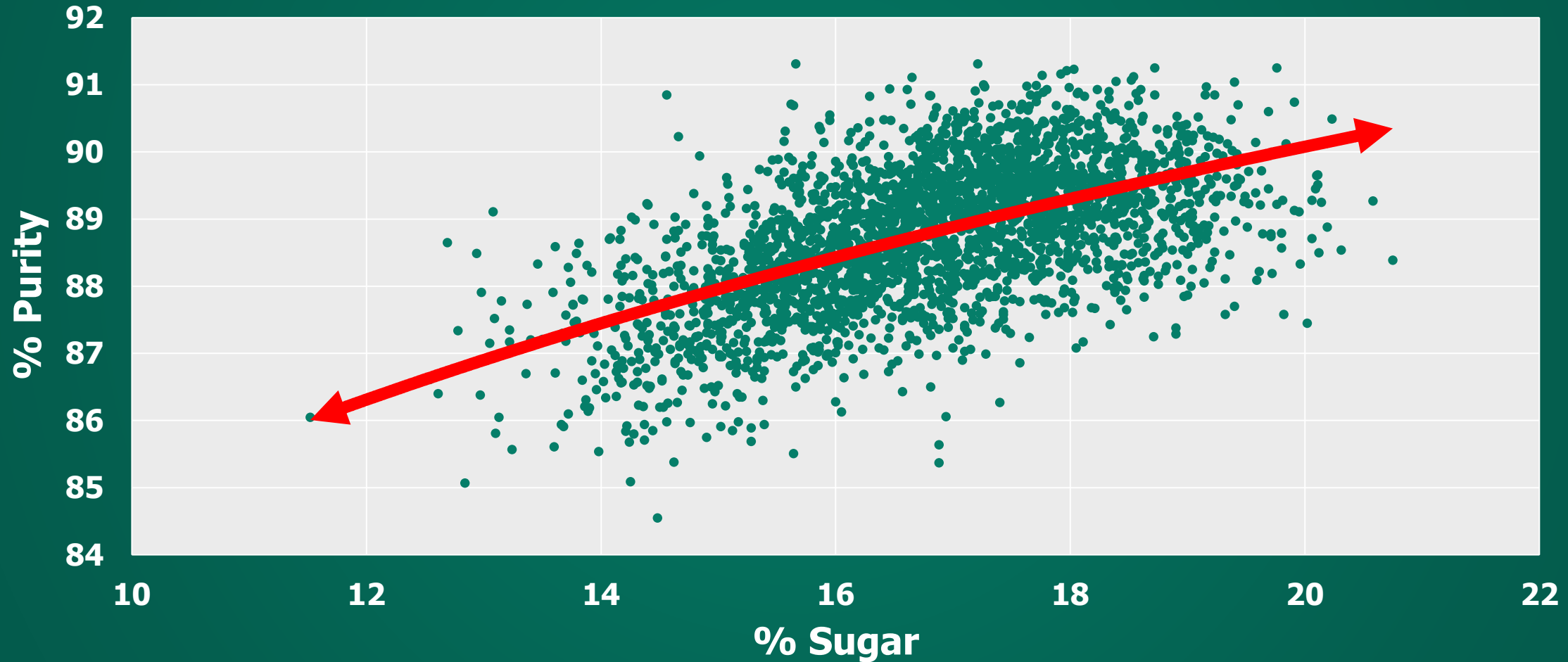


Operations World
30% Increase in Non-Sugars

What is the Relationship?



Sugar Content & Purity (2015-2017)





Major Factors Impacting Beet Quality...

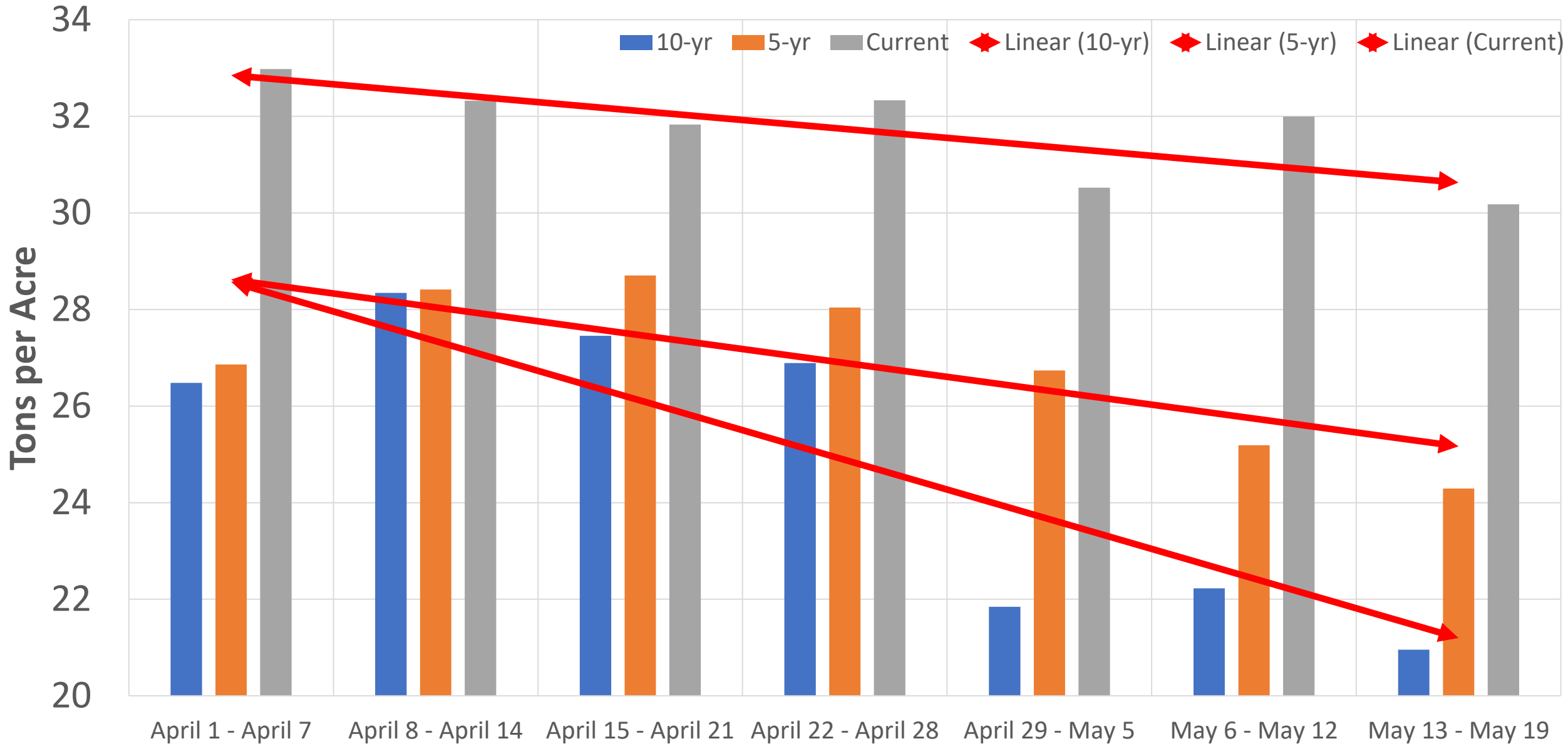
• Controllable:

- Variety Selection
- Planting Date
- Plant Population
- Row Spacing
- Rotation Management
- Fertility Management
- Disease

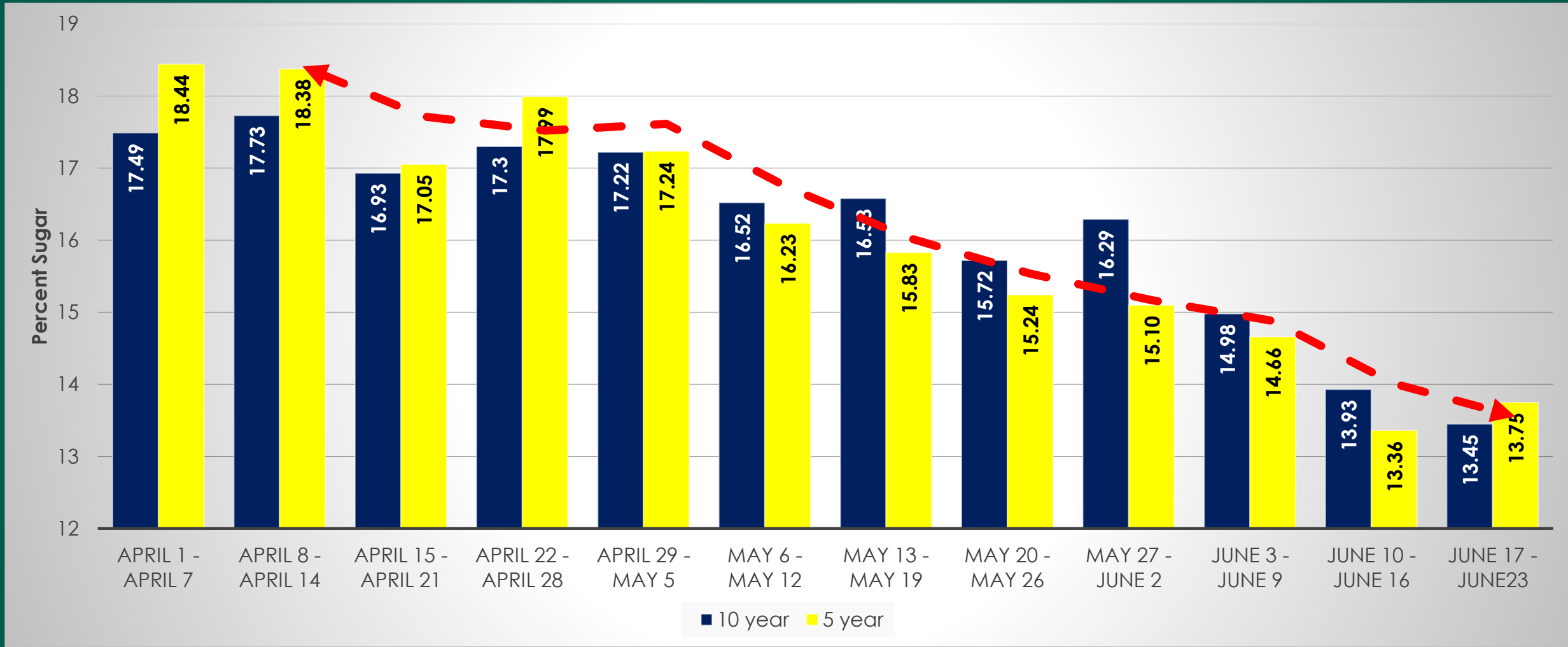
• Uncontrollable:

- Rainfall
- GDD's
- Length of Growing Season
- Amount of Sunlight Received
- Etc.

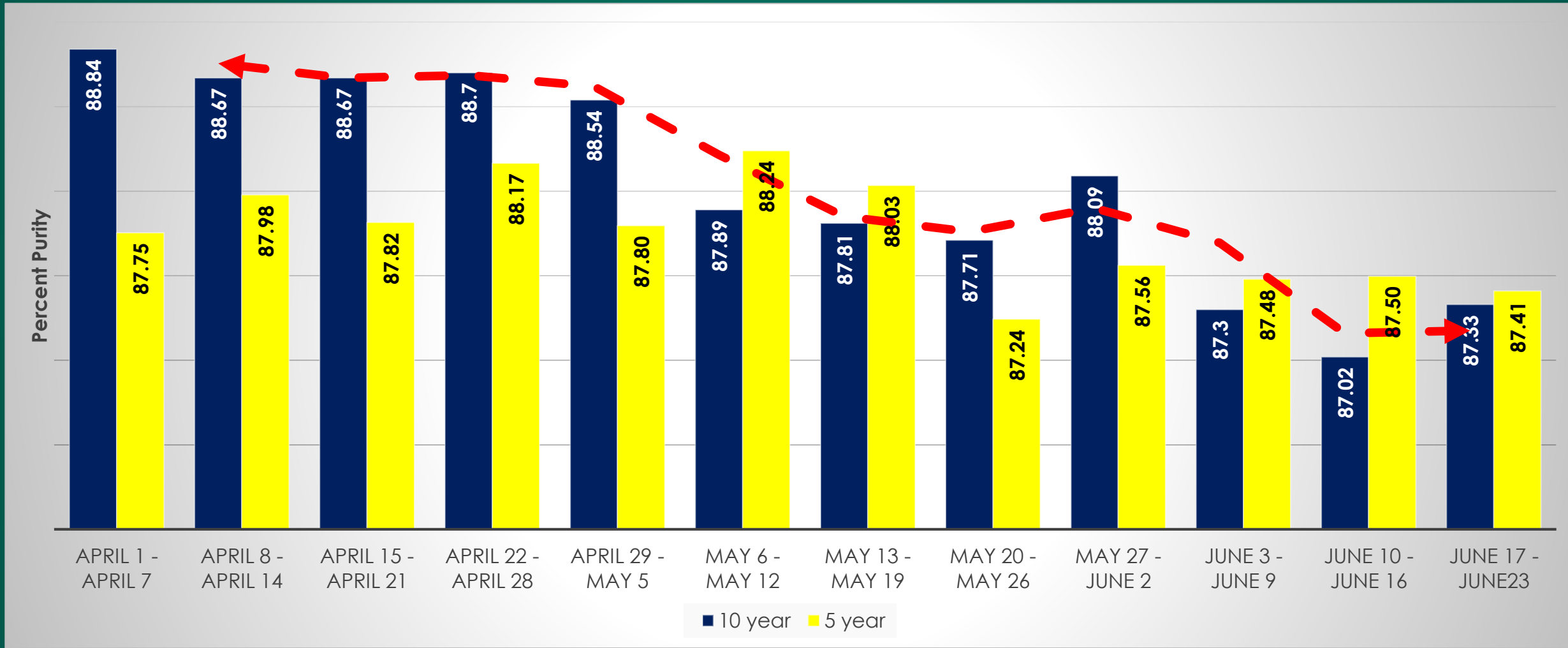
Tons per Acre by Planting Date



Sugar vs. Planting Date

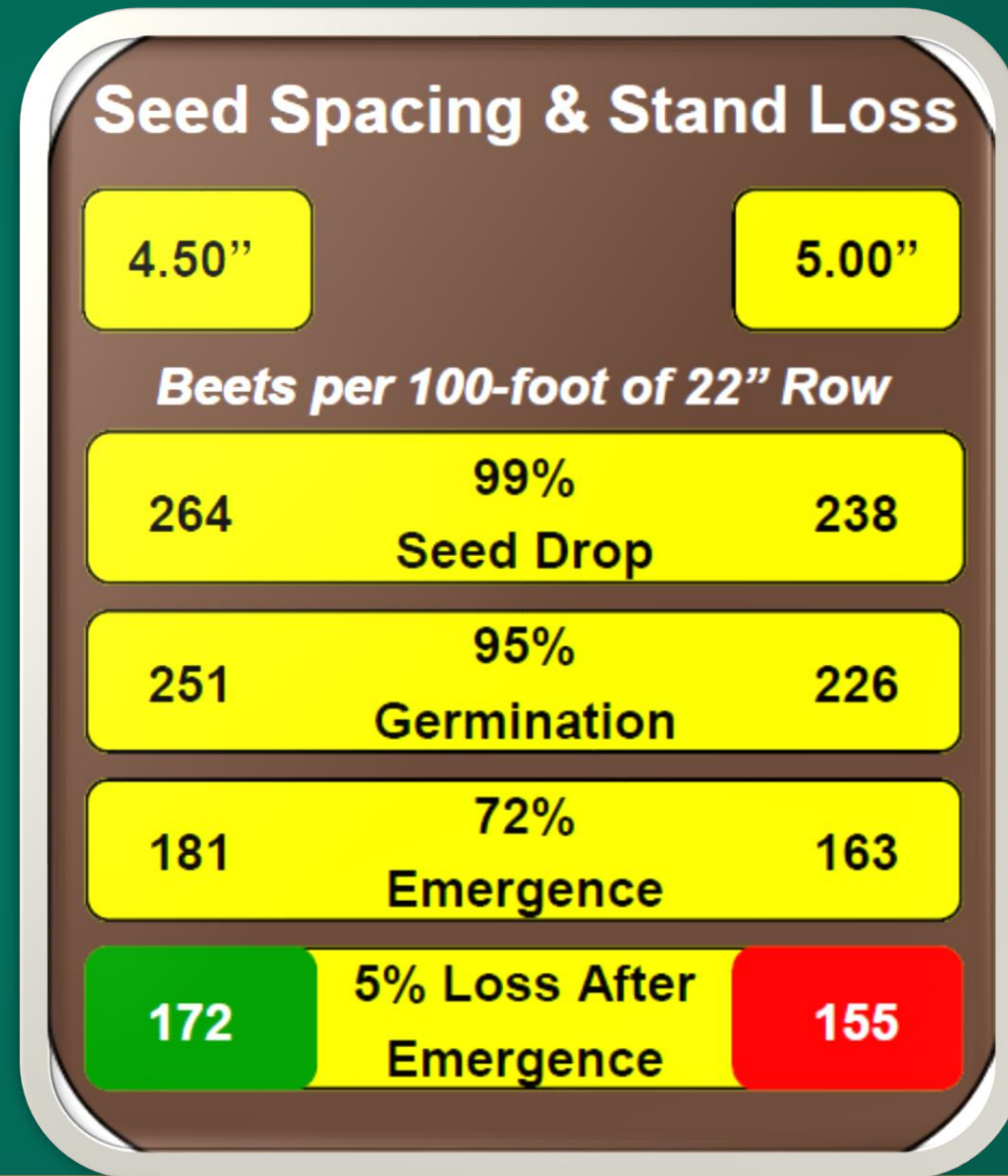


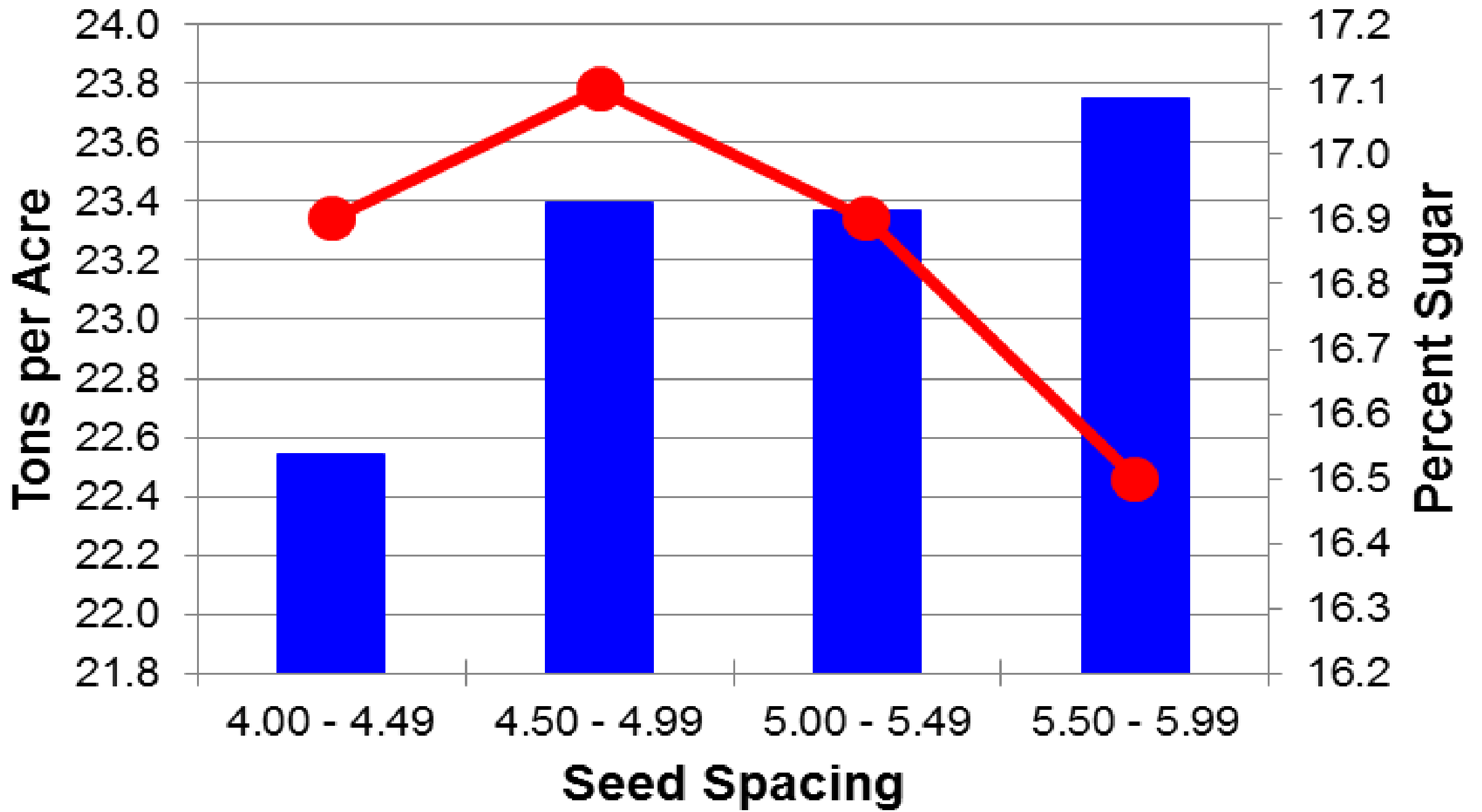
Purity vs. Planting Date



Seed Spacing & Stand Loss Effects

- Ideal Plant Populations:
 - 22" Rows
 - 5 yr = 74% of MDFC acres
 - Planting - 4.5 inches (63,360 plants per acre)
 - Harvest - 180 Beets per 100 Foot of Row (42,240 plants)
 - 30" Rows
 - 5 yr = 26% of MDFC acres
 - Planting - 3.5 inches (59,739 plants per acre)
 - Harvest - 210 Beets per 100 Foot of Row (36,363 plants)





Rotational Crops and Sugar per Acre



Crop Ahead of Sugarbeets	10-Year Average	5-Year Average	2017 Average
Small Grains	7,214 lbs.	8,000 lbs.	9,738 lbs.
Corn	6,646 lbs.	7,274 lbs.	9,224 lbs.
Soybean	6,552 lbs.	7,265 lbs.	8,785 lbs.



Row Spacing...

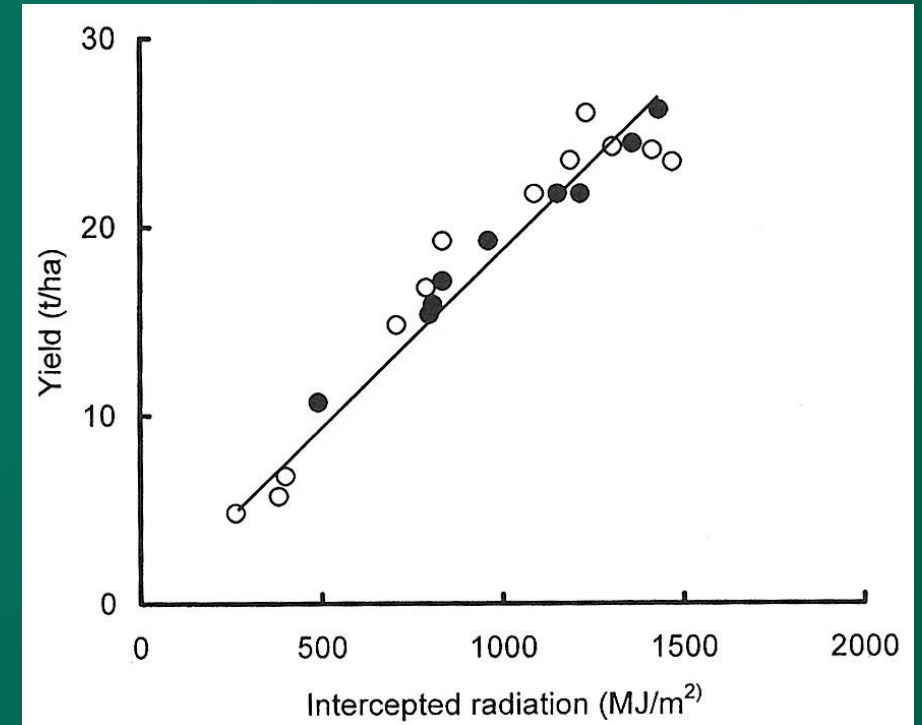
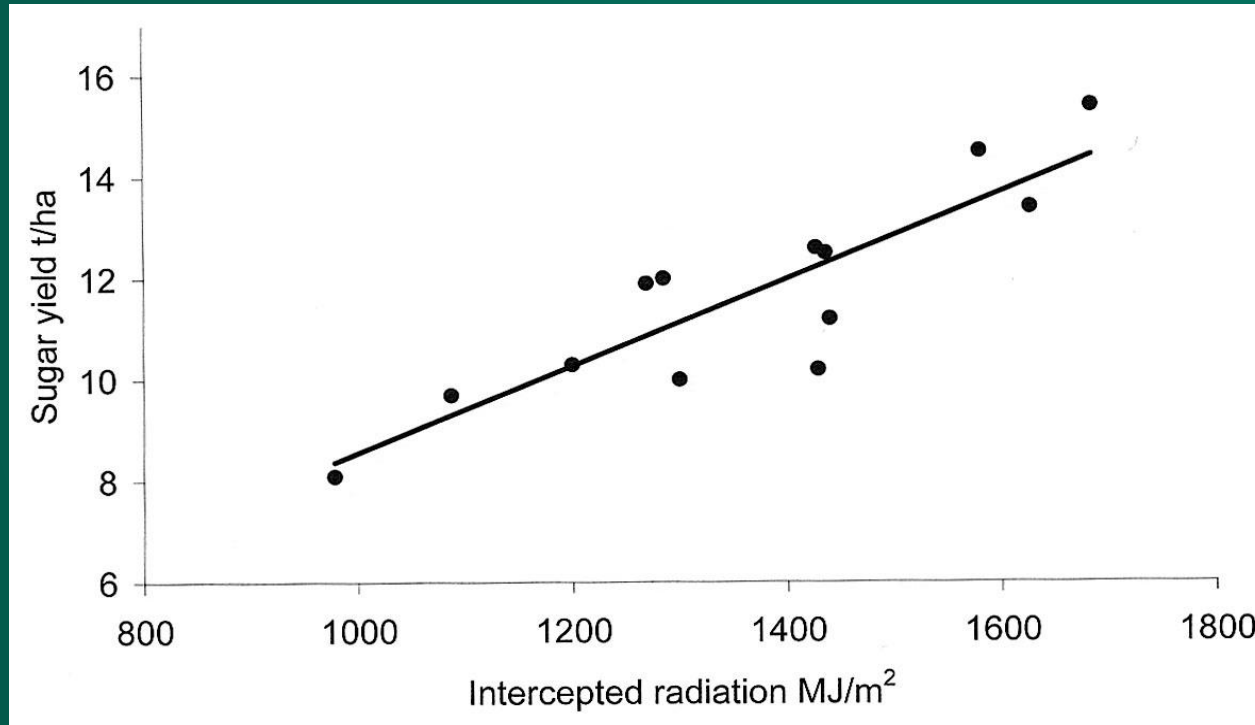
- Research in ND, MN, & MI has determined that wide rows (28-30 in.) result in a net loss of 400-600 pounds of sugar per acre compared to 22-in. rows.

Row Spacing	Percent Sugar	Percent Purity	Recoverable Sugar per Ton	Recoverable Sugar per Acre
22"	16.93	88.33	281	7,120
30"	16.55	87.98	272	6,827
Difference:	- 0.38	- 0.35	- 9	- 293

Why the Difference in Row Spacing?



- Yield and quality are directly related to the amount of solar radiation intercepted during growing season



Why the Difference in Row Spacing?



- Row spacing has a major effect on light interception
- 22" rows have 23,760 linear feet of row per acre
- 30" rows have 17,424 linear feet of row per acre



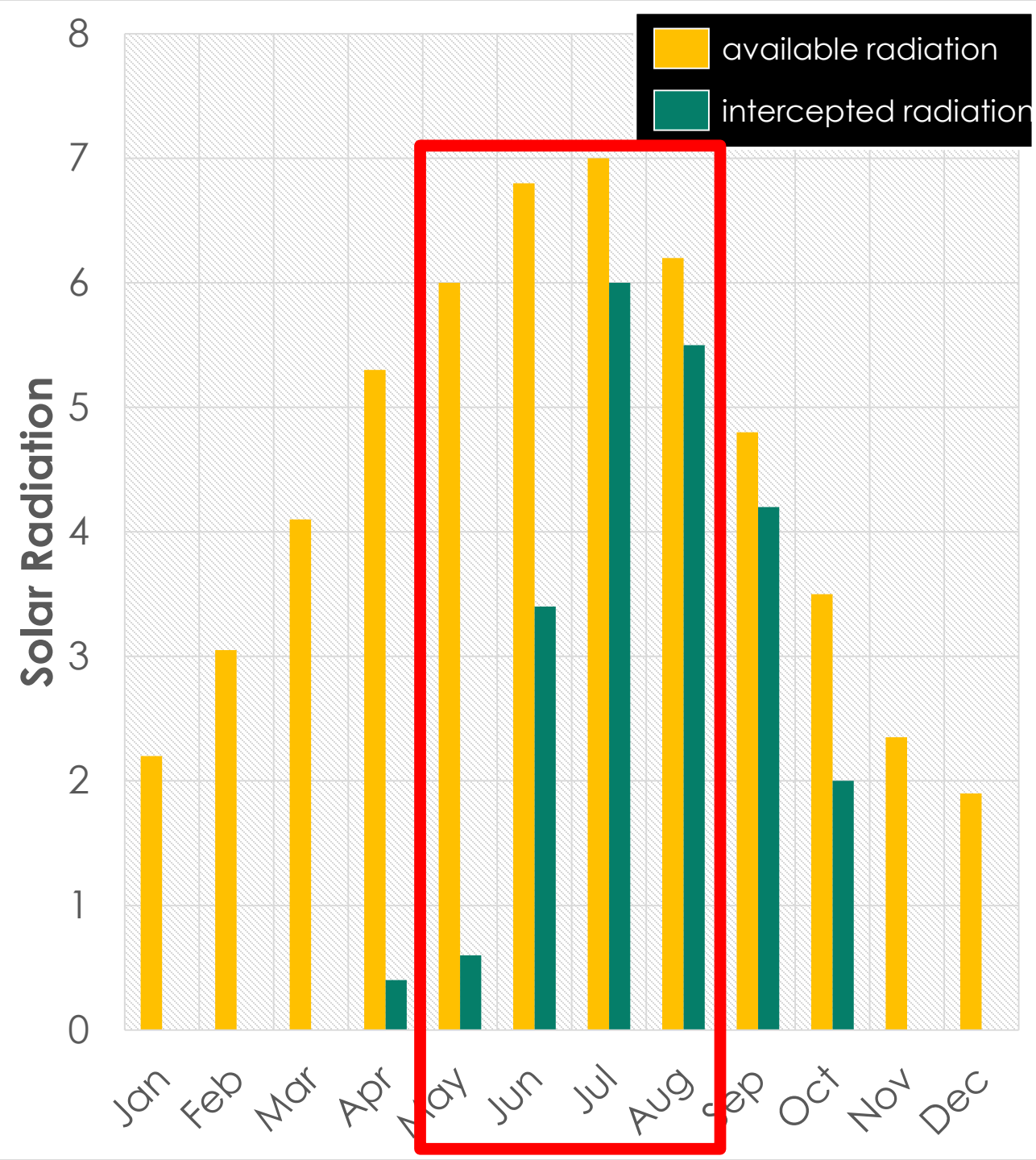
30" row spacing

22" row spacing

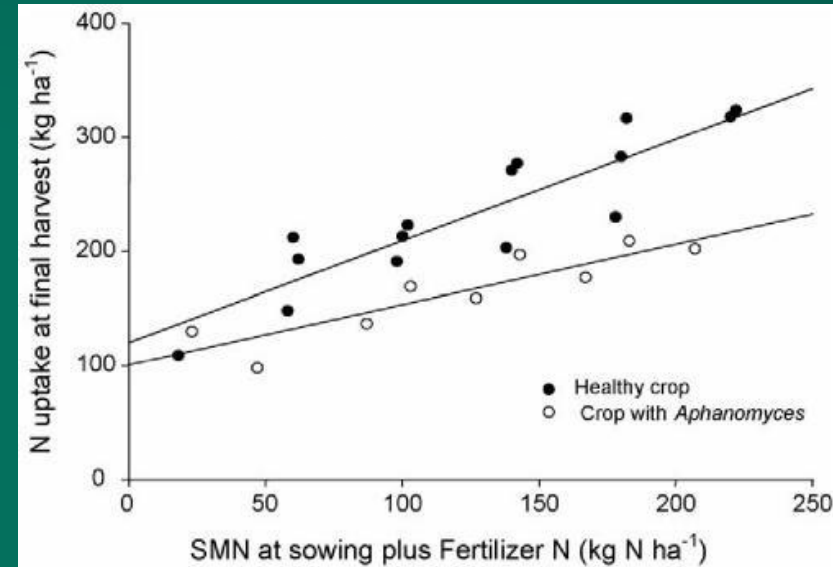
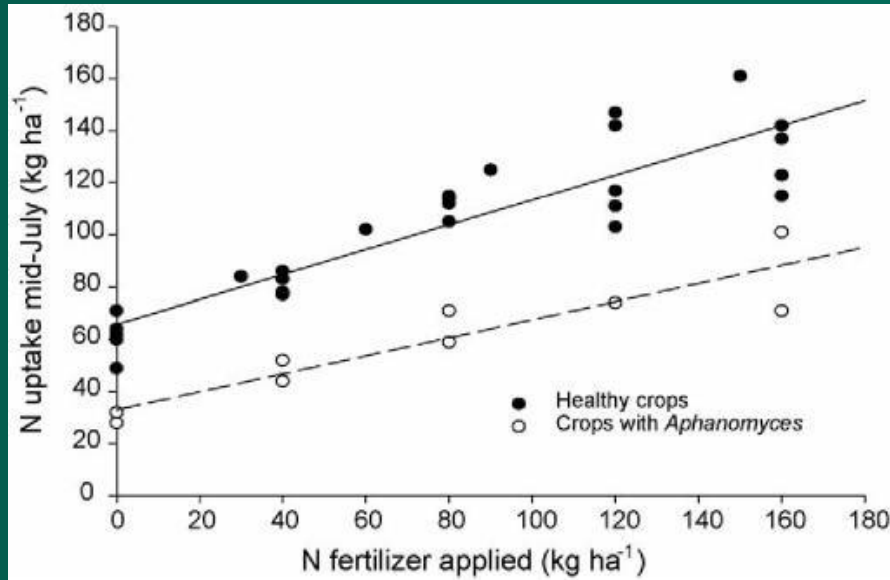


Fertility Management

- The main purpose of nitrogen is to increase foliage cover during early development to maximize light interception and photosynthesis
- Using nitrogen to promote additional leaf growth after canopy develops does not increase light interception



Nitrogen Uptake...



- Nitrogen uptake is linearly related to nitrogen supplied
- As long as nitrogen is available, plant will continue to take up N
- The plant doesn't sense what it needs; will take up excessive nitrogen if available

Nitrogen Use Through the Years...

