

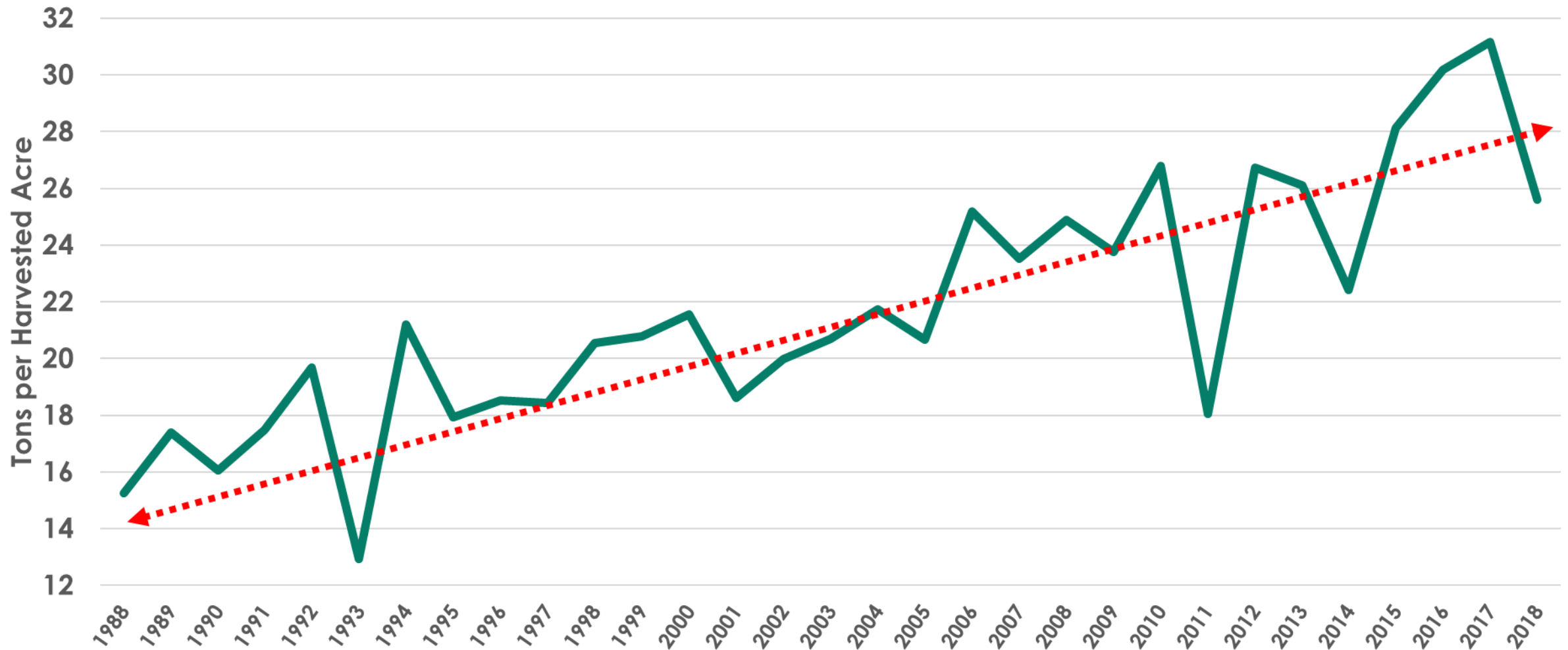
Utilization of Plant Growth Regulators for Suppression of Sugarbeet Root Yield

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Through the Years...



ACSC, MDFC & SMBSC Average TPA by Year



Method Behind the Madness...

- Trying to stunt/shut off the beet crop is a hard concept for a researcher/grower/agriculturist because we spend all summer doing just the opposite
- The idea is that something could be applied in a foliar fashion that would halt root growth without being detrimental to the quality of the crop
- Could potentially be applied over areas of commercial fields to avoid a Corral, At-Risk Acres, Set-Aside Acres, etc.

Plant Growth Regulators...

- A plant growth regulator (PGR) is an organic compound, either natural or synthetic, that modifies or controls one or more specific physiological processes within a plant
- Multiple PGRs have been tested on sugarbeets, but always have been applied & evaluated for specific crop enhancements:
 - Emergence rate
 - Drought stress
 - Frost tolerance
 - Storage enhancements
- PGRs have never been reported as being utilized to 'halt' the crop
 - Starting from square one

Selecting the Products...

- Ethephon is the most widely utilized plant growth hormone in the world
 - It is used extensively in cotton, wheat, coffee and rice.
 - When taken up by a plant, it is metabolized into ethylene, which is one of the main signal regulators of plant growth
- Atrimmec (dieregulac-sodium) works systemically to interrupt several pathways of hormone production that regulate plant growth
 - Reduces and/or breaks apical dominance and promotes lateral branching in its target crop



Materials & Methods

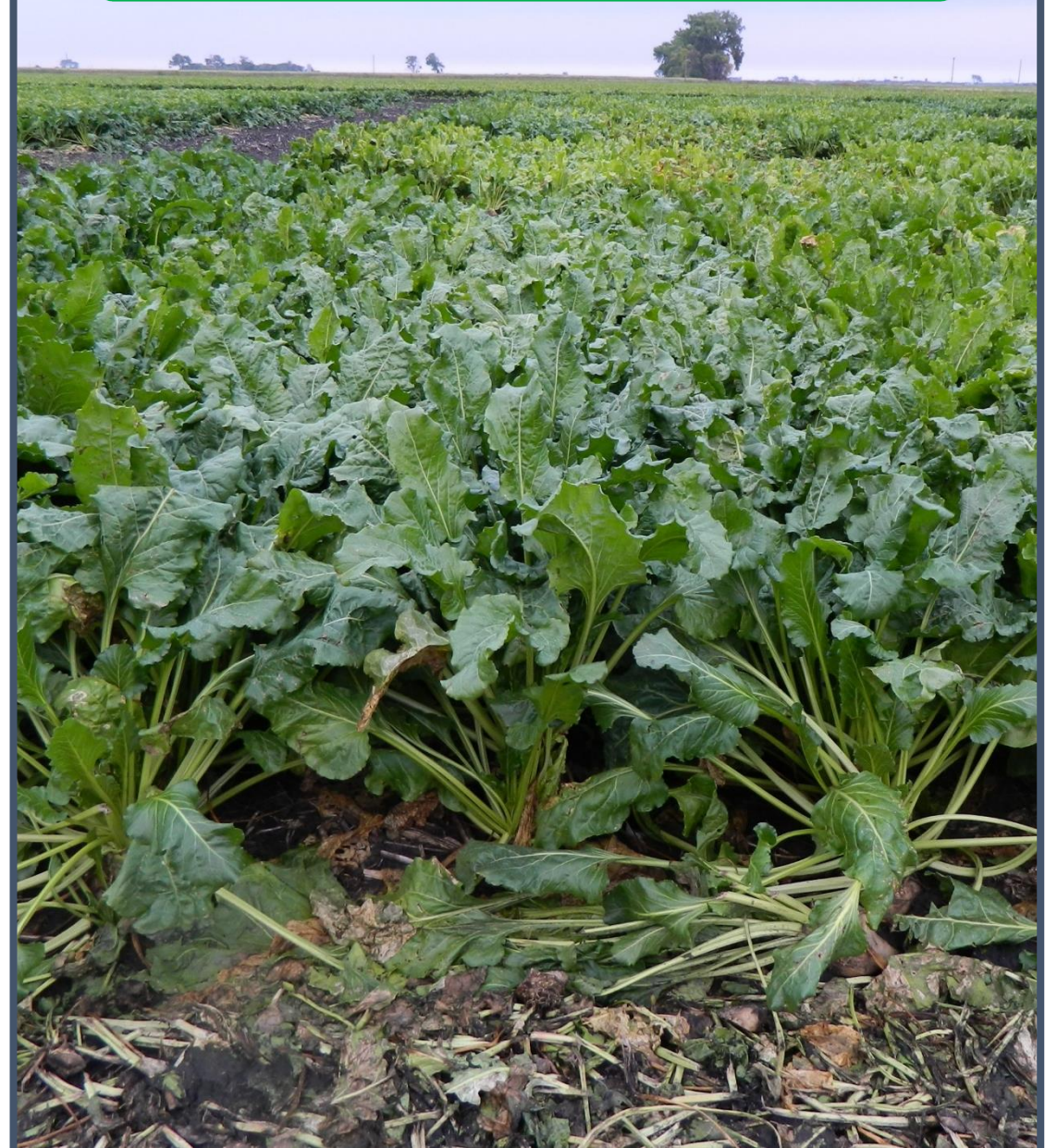
- Three-year study: 2016-2018
- Split-plot design with six replications
 - Whole Plots: Low / High rates of PGRs
 - Ethephon = 0.6 & 6 fl oz/A
 - Atrimmec = 2.5 & 25 fl oz/A
 - Sub-Plots: Variety
 - 4 different varieties were evaluated over the course of the study
 - ACH 352 / ACH 830
 - Hilleshög 4062 / 4302
- Applications took place ~30-days before main-harvest
 - Ag Staff yield estimates established
 - Pre-Harvest underway



Untreated – ACH 830



Untreated – HIL 4302



Atrimmec Low – ACH 830



Atrimmec Low – HIL 4302



Atrimmec High – ACH 830



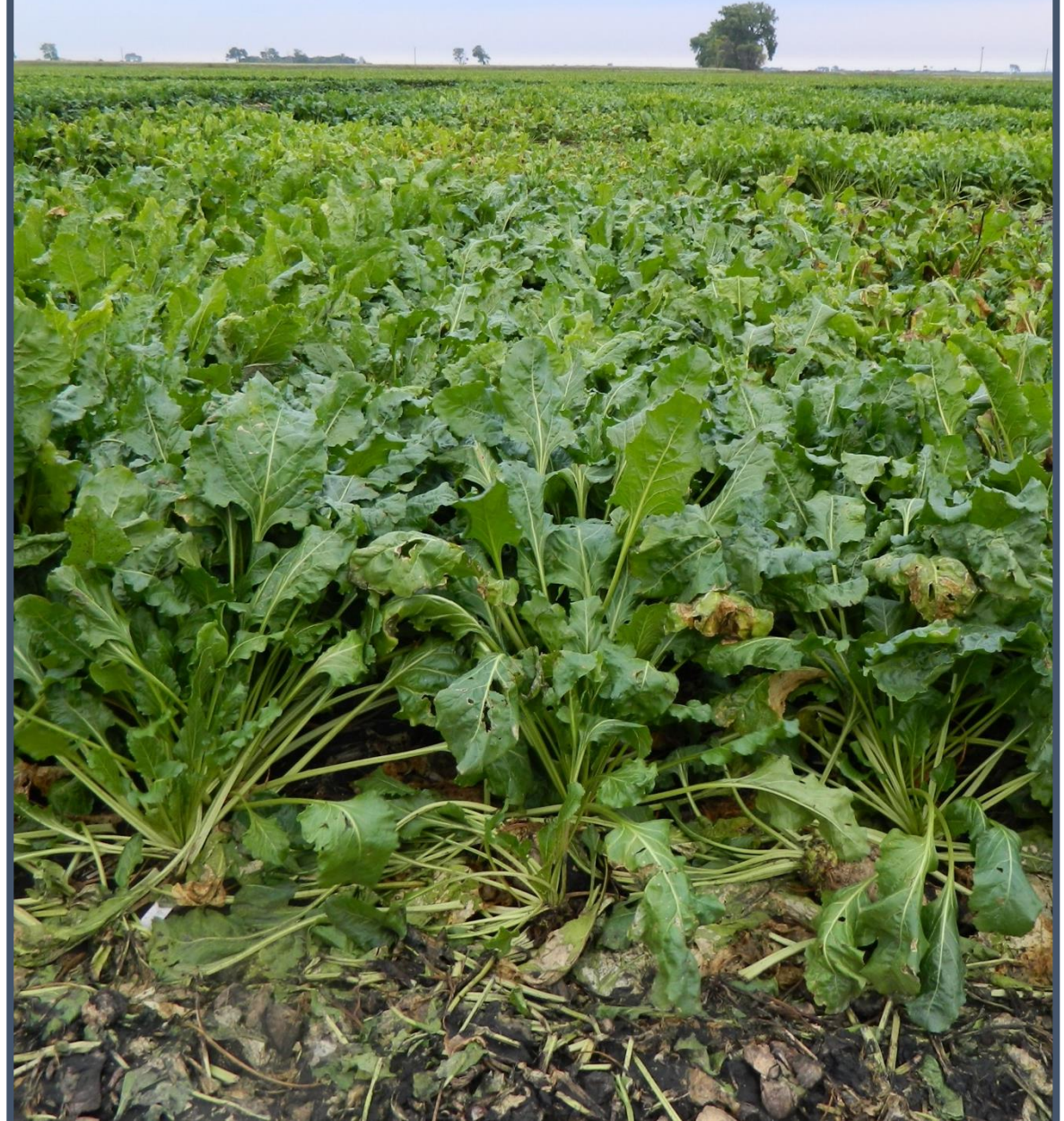
Atrimmec High – HIL 4302



Ethephon Low – ACH 830



Ethephon Low – HIL 4302

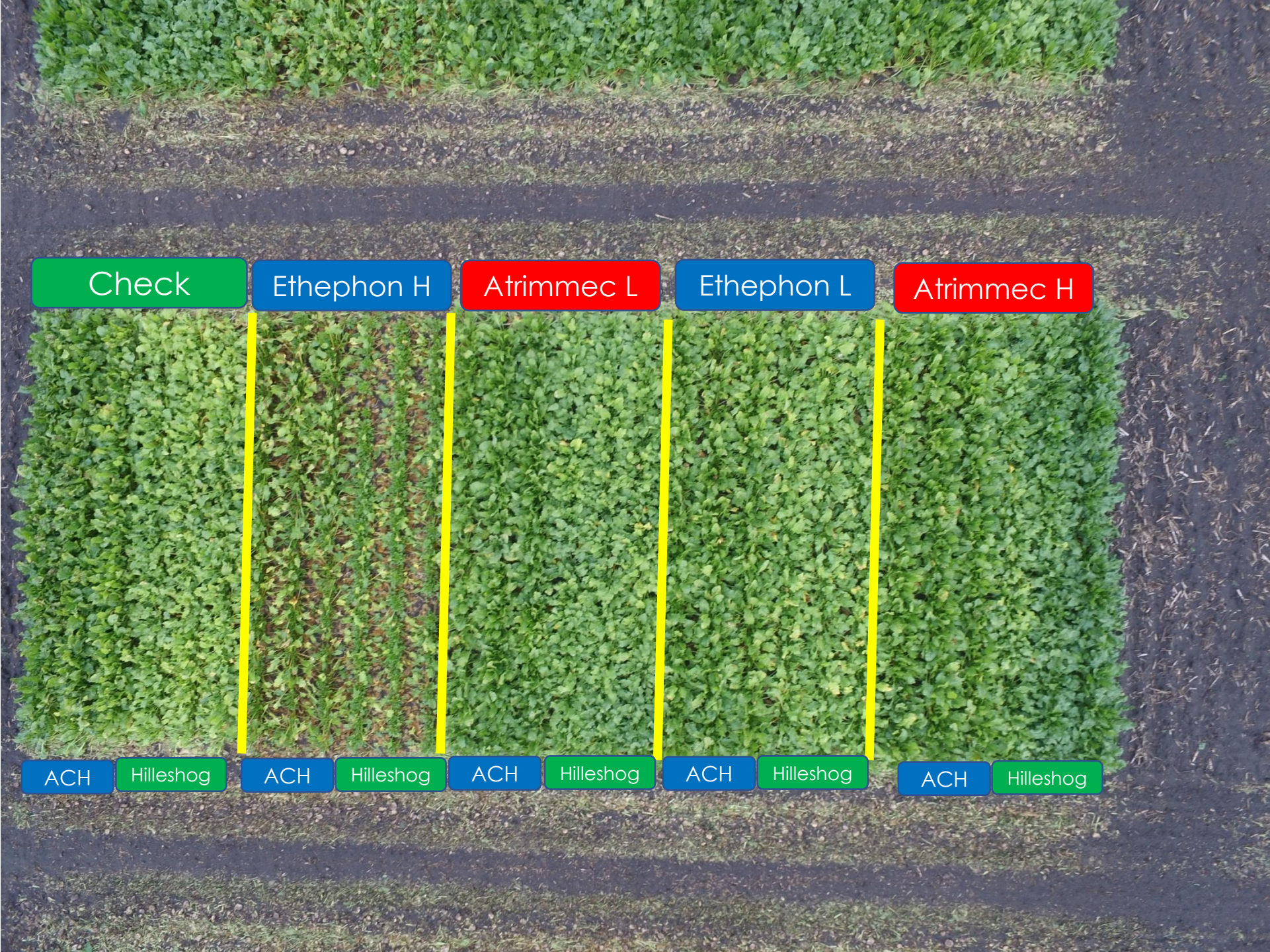


Ethephon High – ACH 830



Ethephon High – HIL 4302





Check

Ethephon H

Atrimmec L

Ethephon L

Atrimmec H

ACH

Hilleshog

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Hilleshog

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Hilleshog

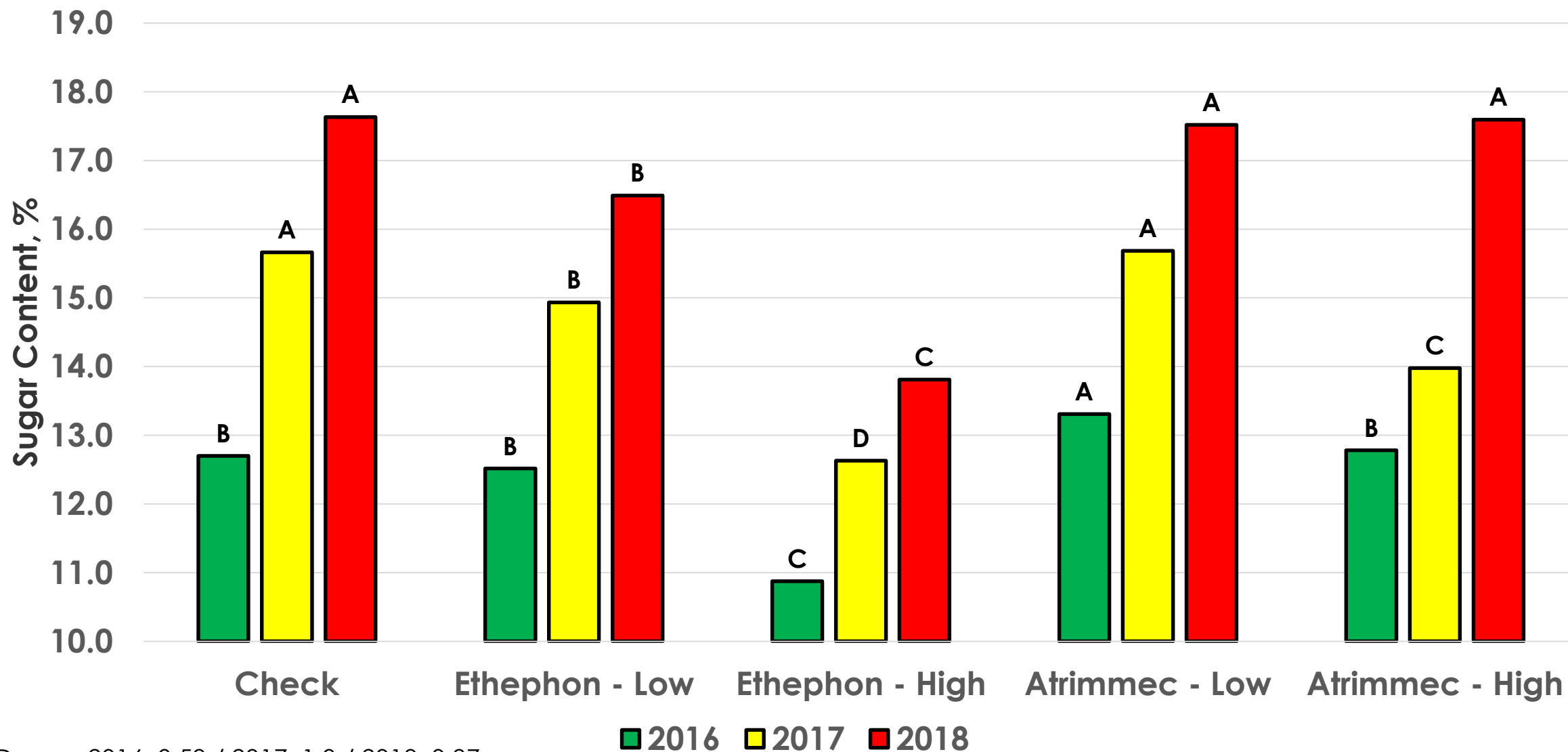
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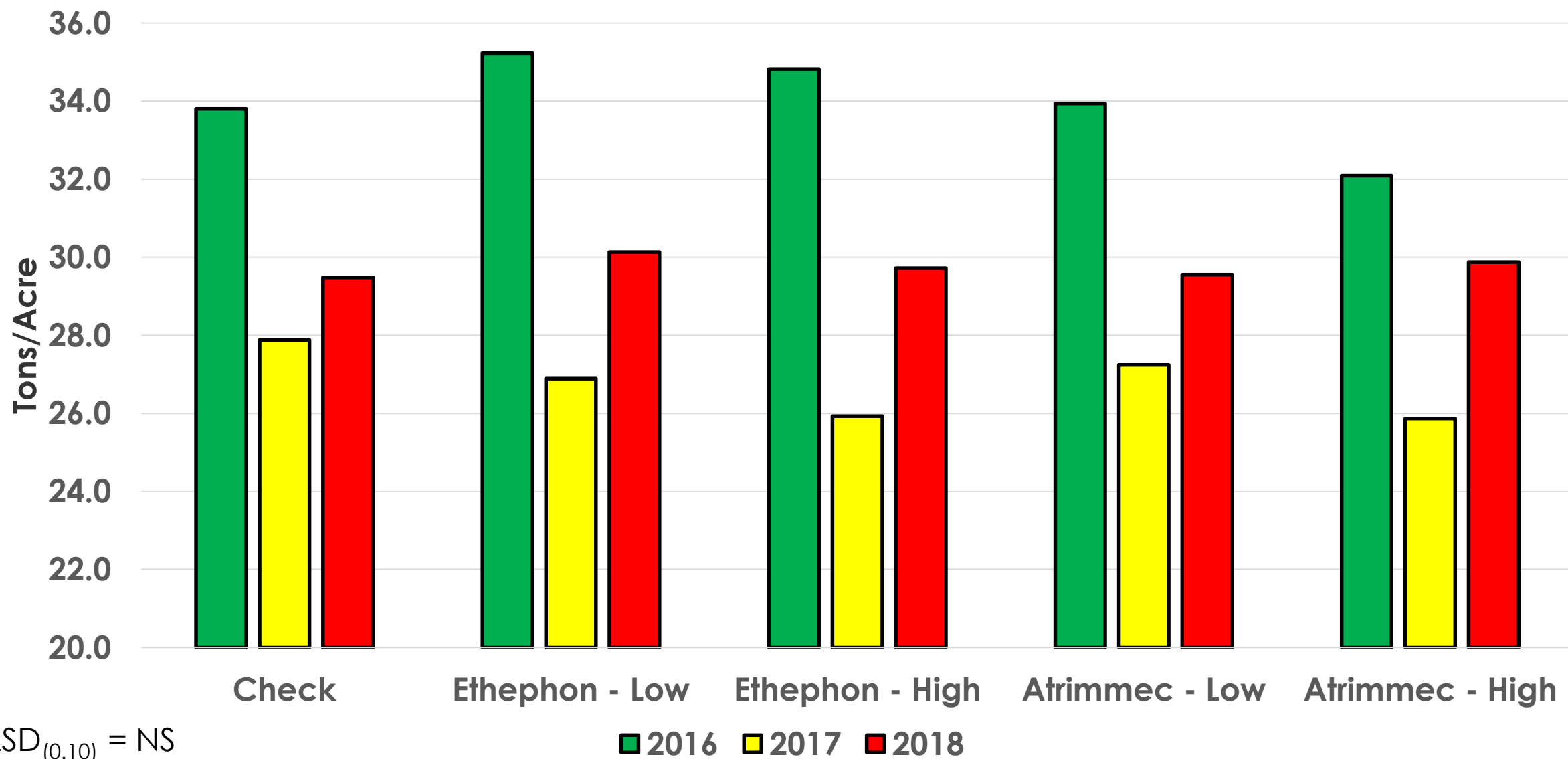
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2016-2018 – Percent Sugar

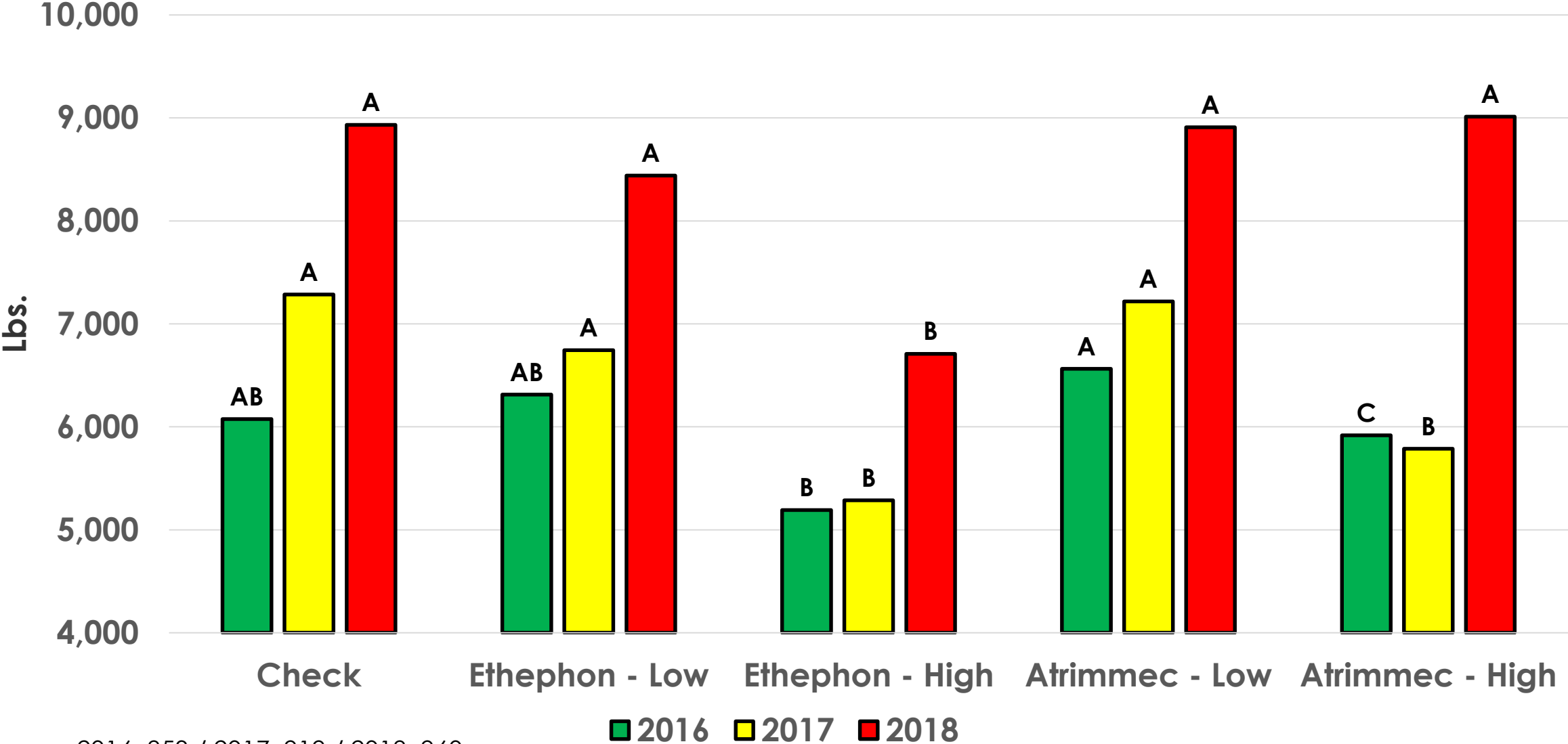


LSD_(0.10) = 2016: 0.59 / 2017: 1.0 / 2018: 0.87

2016-2018 – Tons per Acre



2016-2018 – Recoverable Sugar per Acre



LSD_(0.10) = 2016: 853 / 2017: 919 / 2018: 960

Putting It All Together...

- Data was variable in 2016 & 2018 – more consistent in 2017
- Atrimmec resulted in less sugarbeet injury than Ethephon
- Higher rates of PGRs can result in significant sugarbeet injury
- PGRs may be 'variety specific'
- We did manage to lower TPA, but this minor reduction appeared to have significant negative impacts to sugarbeet quality
- The concept of what we are trying to accomplish is solid - If at first you do not succeed, you continue to explore other PGRs in 2019 and beyond...stay tuned!!!