



THE OHIO STATE UNIVERSITY

YIELD IMPACTS OF LARGE CENTRAL FILL PLANTERS AND TRACTORS ON PINCH ROWS

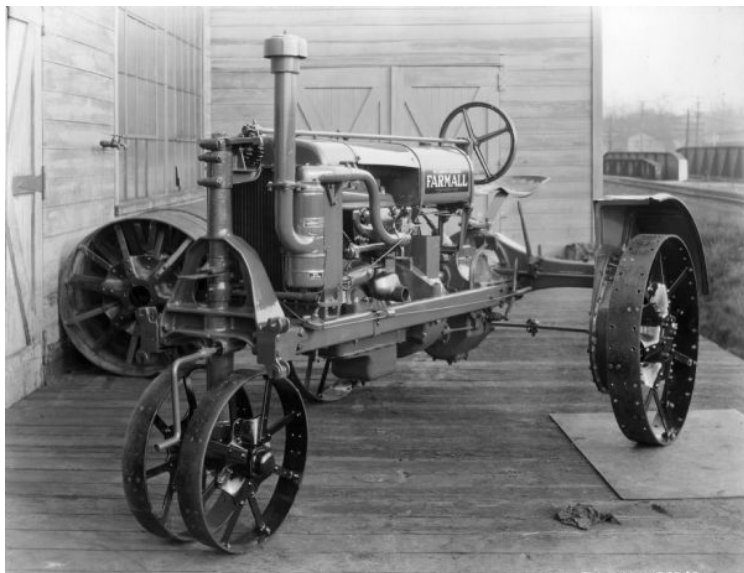
2018 ASABE Annual International Meeting

July 31, 2018

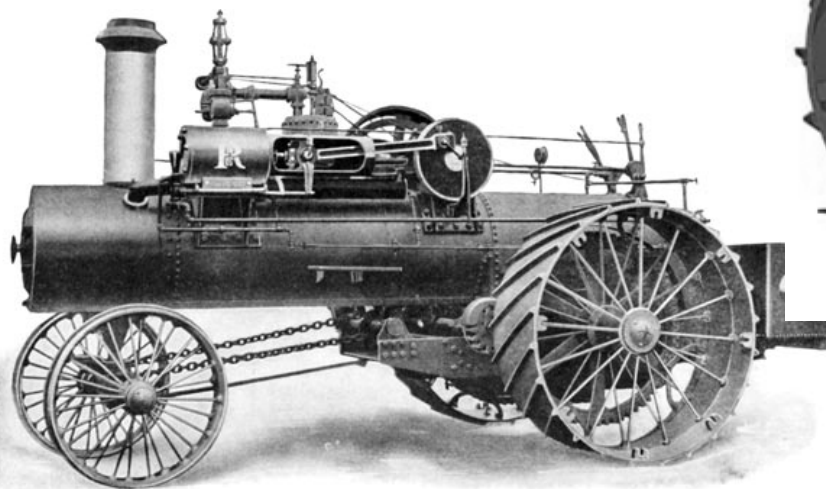
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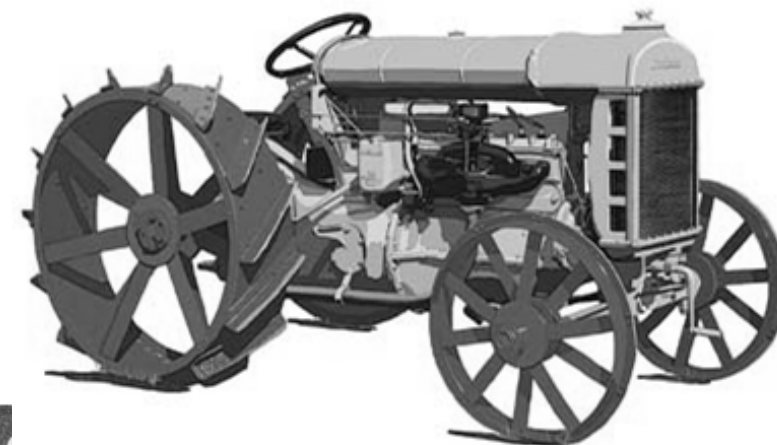
Remember these concepts?



<http://www.redpowermagazine.com/>



<https://www.farmcollector.com>



<http://www.motorstown.com>



Planter History



http://www.plantcitymarket.com/uploads/1/4/9/9/14991428/6088580_orig.jpg



<https://i.pinimg.com/originals/4f/41/a9/4f41a9a4ccba97d3d9b36a70c14521d3.jpg>



<http://www.tractorbynet.com/forums/files/attachments/137128d1250066992-40-2-row-corn-planter-jan1dogs-046-jpg>



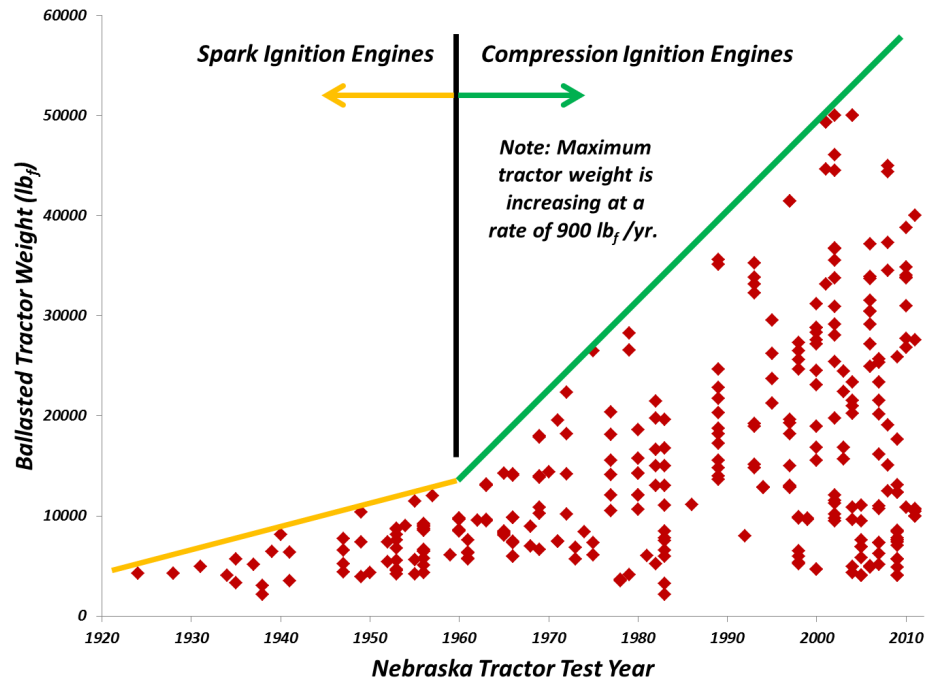
<https://i.ytimg.com/vi/0vUzrIQhE/maxresdefault.jpg>



**Machine keep getting bigger
and bigger...**



Trend in Ballasted Tractor Weight



<http://farmindustrynews.com>



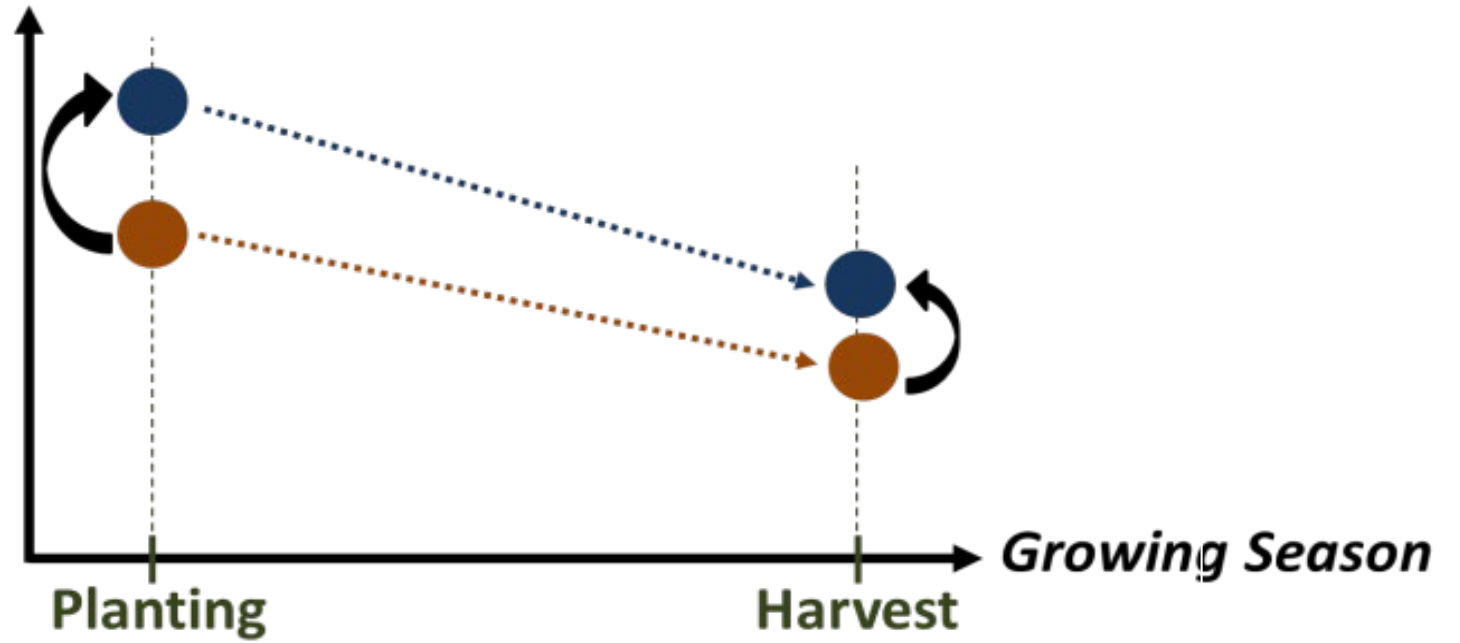
<http://www.bauerbuiltmfg.com>

Your decision on field operations / practices:

Right decision...

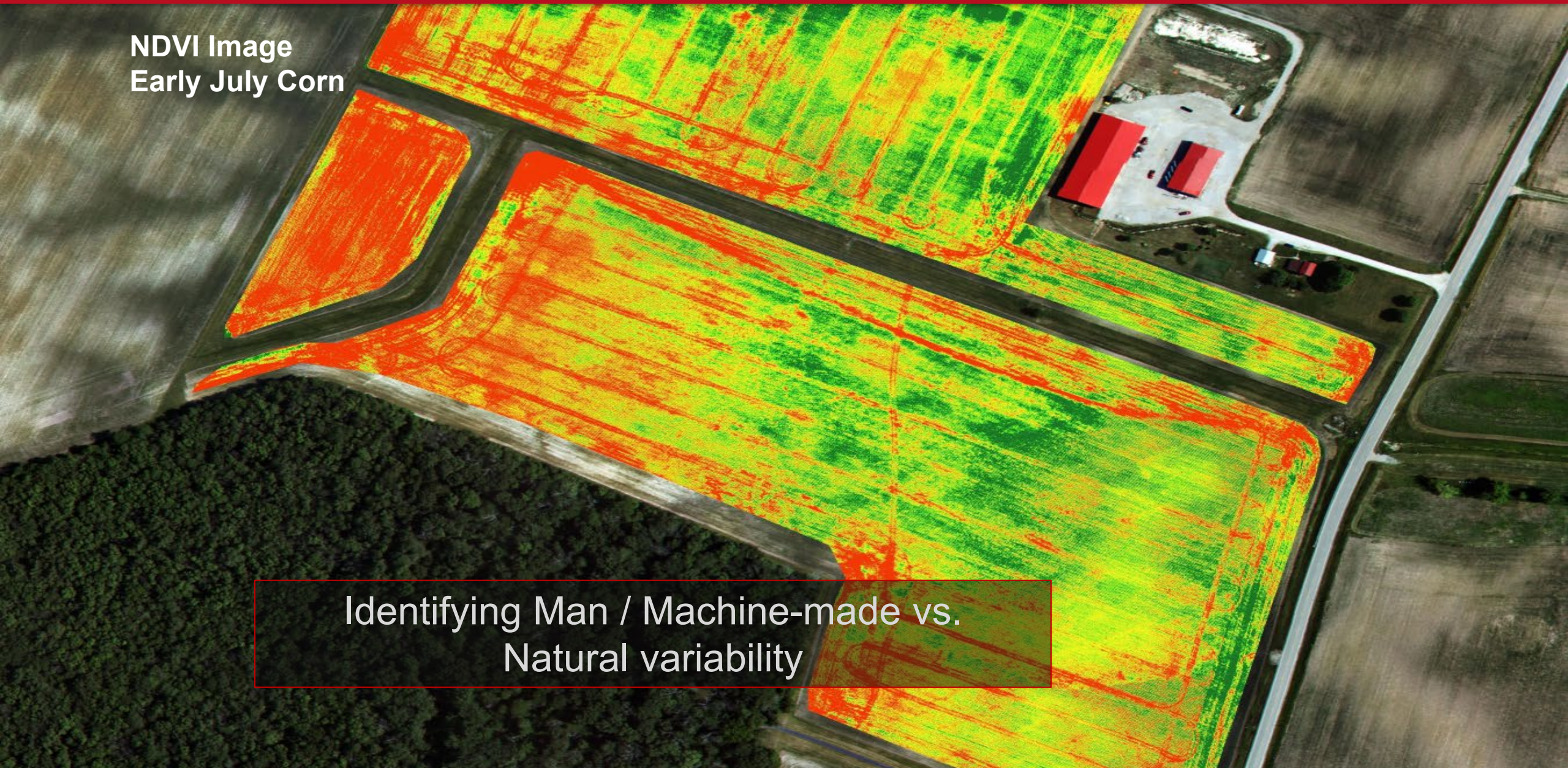
Wrong decision...

Yield Potential





NDVI Image
Early July Corn



Identifying Man / Machine-made vs.
Natural variability



Project Objectives

1. Evaluate the use of tracks on a John Deere 1775NT CCS (16-row) central fill planter;
2. Evaluate the use of tracks on a John Deere 8R row crop tractor;
3. Evaluate the use of wing downforce on a Case IH 2150 planter; and
4. Quantify the yield advantage of tracks versus tires to mitigate “pinch row” compaction.





What is pinch row compaction?





Planter Track Installation



Planter Specifications

- 1775 NT 16-row ExactEmerge John Deere
- Martin floating row cleaners
- Factory 2x2 coulters
- Ground drive fertilizer (2016)
- Hyd. drive fertilizer (2017)
- Yetter fertilizer cart

Conversion

- Installed tracks on planter using forklift and four people
- 2x2 coulters had to be removed to put on inside tracks b/c pin interference
- Ground drive adapter kit installed for starter (2016)



Planter Track Installation





In-Field Images - 2016

Half Load



Full Load





In-Field Images



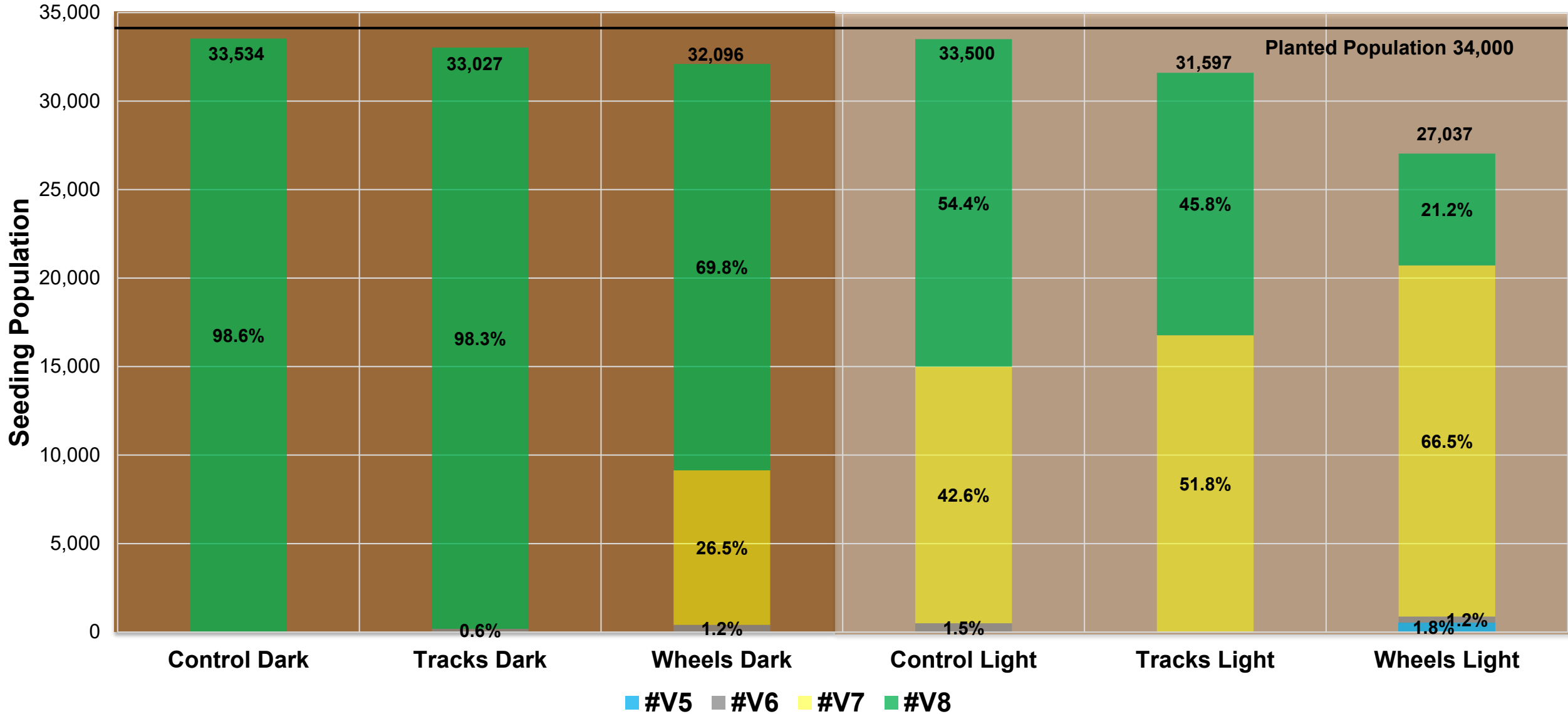


Pinch Row Compaction - Root Mass





Emergence, Growth Stage, and Population vs Wheels and Tracks By Soil Color





2016 Pinch Row Results – Tracks vs. Tires

Treatment	Load	Light Soil	Yield Advantage	Dark Soil	Yield Advantage	Whole Field	Yield Advantage
		Avg Yield (bu/ac)	(bu/ac)	Avg Yield (bu/ac)	(bu/ac)	Avg Yield (bu/ac)	(bu/ac)
Tires	50%	190.0	10.4	206.0	3.5	196.7	7.4
Tracks	50%	200.4		209.5		204.1	
Tires	100%	190.9	6.3	203.2	2.2	196.8	3.9
Tracks	100%	197.2		205.4		200.7	
Control		192.9		210.3		200.7	





But what about . . .



Tracked Planters



Tracked Tractors



Active Wing Downforce





2017 Pinch Row Study





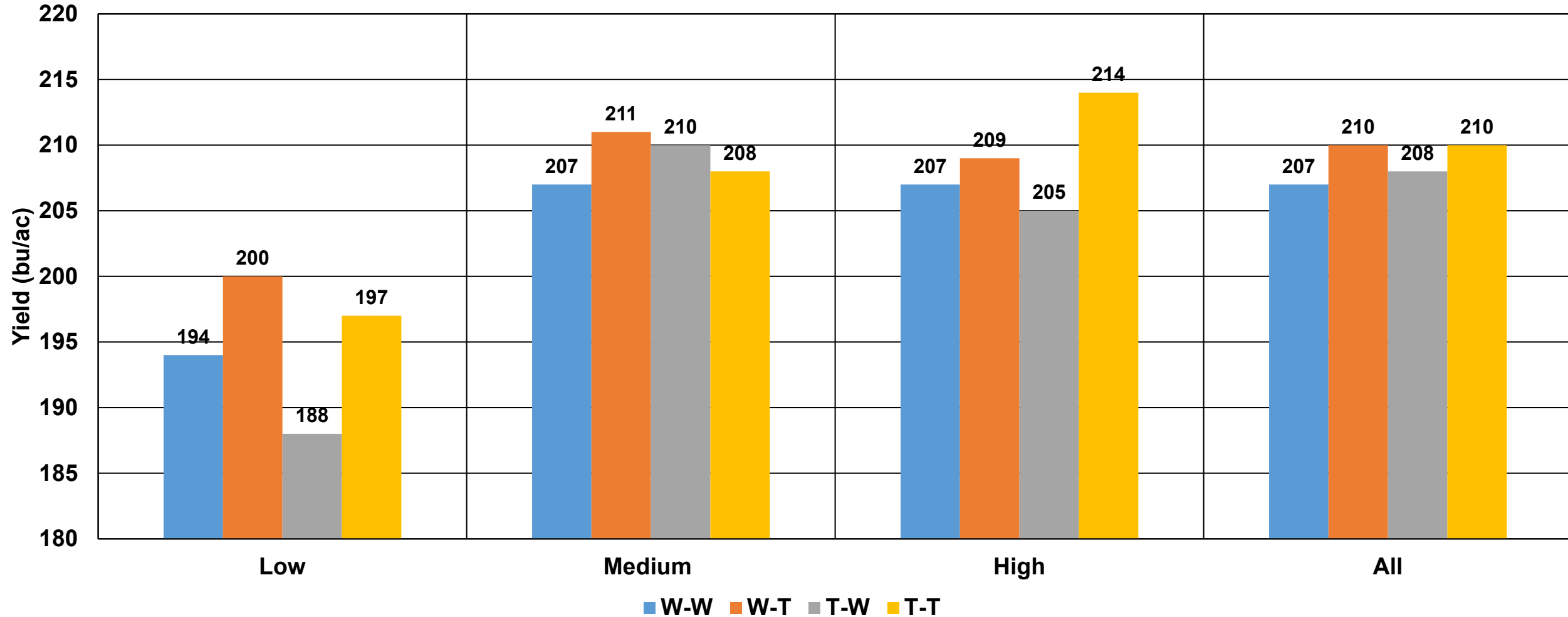
2017 Pinch Row Study





2017 Pinch Row Results – Tracks vs. Tires

Pinch Row Results - Yield Monitor





2017 Pinch Row Results Corn – Tracks vs. Tires

Treatments	Yield - All Soil CPUs (bu/ac)	Yield - High Soil CPUs (bu/ac)	Yield - Medium Soil CPUs (bu/ac)	Yield - Low Soil CPUs (bu/ac)
Wheeled Tractor, Wheeled Planter	207 a	207 a	207 a	194 a
Wheeled Tractor, Tracked Planter	210 a	209 a	211 a	200 a
Tracked Tractor, Wheeled Planter	208 a	205 a	210 a	188 a
Tracked Tractor, Tracked Planter	210 a	214 a	208 a	197 a
Treatment Means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1.	LSD: 4.7 CV: 2.23%	LSD: 7.9 CV: 3.75%	LSD: 4.1 CV: 1.95%	LSD: n/a CV: n/a



2017 Pinch Row Results Corn – Tracks vs. Tires

Treatments	Yield (bu/ac)
Wheeled Tractor, Wheeled Planter	222 a
Wheeled Tractor, Tracked Planter	222 a
Tracked Tractor, Wheeled Planter	218 b
Tracked Tractor, Tracked Planter	224 a
Treatment Means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1.	LSD: 2.90 CV: 1.16%



2017 Pinch Row Results Soybeans – Tracks vs. Tires

Treatments	Moisture (%)	Yield (bu/ac)
Tracked Tractor, Wheeled Planter	10.5	64 a
Tracked Tractor, Tracked Planter	10.3	64 a
Treatment Means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1.		LSD *not significant CV: 2.12%



2017 Pinch Row Results Soybeans – Tracks vs. Tires

Treatments	Yield (bu/ac)
Wheeled Tractor, Wheeled Planter	81 ab
Wheeled Tractor, Tracked Planter	82 a
Tracked Tractor, Wheeled Planter	81 ab
Tracked Tractor, Tracked Planter	79 ab
Treatment Means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1.	LSD: 2.39 CV: 2.63%



Managing Compaction

1. Controlled traffic (GPS guidance)
2. Bigger tires, lower inflation pressure
3. Variable inflation pressure
(correct psi for in-field and on road)
4. More axles, less weight/axle
5. **Rubber tracks**
6. Continuous no-till
7. Cover crops



Conclusions

- Need more observations given within field soil variability
- Comparisons across more field conditions and tractor/planter combinations
- While we had excellent planting conditions in these past seasons, we remain interested in tracks vs. tires under less than optimal conditions
- ROI on tracks with planter
 - 6 bu/ac at \$3.68 per bushel
 - Tracks cost \$40,000
 - ~1800 acres
- To see more results see eFields report pages 14-15, 32-35, 66-69



eFields represents an Ohio State University program dedicated to advancing production agriculture through the use of field-scale research.

www.OhioStatePrecisionAg.com

Click on the **eFields** tab



THE OHIO STATE UNIVERSITY

FOOD, AGRICULTURAL AND
BIOLOGICAL ENGINEERING

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