Accuracy of Round Module Harvester Handlers and Minimizing Plastic Contamination

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Current Situation

- Cotton Modules are currently weighed in the field using large truck style scales to weigh the round bales from the John Deere Cotton Pickers.
- However, JD 7760 (CP/CS) and CP/CS 690's have the option to add an on-board module weighing system.

Question

- Can the on-board module weighing system be utilized to weigh trial data eliminating the need to have additional large flat scales present during harvest?
  - The advantages of having this system are:
    - Simplicity
    - Elimination of scale maintenance and transportation
    - Shorten time and increase effectiveness of On-Farm trials
    - Reduce equipment requirements during harvest

Objectives

- The main objectives of this study were to:
  - Determine the reliability and accuracy of John Deere's on-board module weighing system compared to traditional trial evaluation methods.
  - Evaluate the potential of the on-board system to be utilized for on-farm research trial evaluation.

2018-2019 Georgia Comparisons

- **2018 Colquitt County On-Farm Variety Trial (42)**
- **2019 Colquitt County Fungicide Trial (9)**
- **All Data from 7 on farm trials (112 comparisons)**

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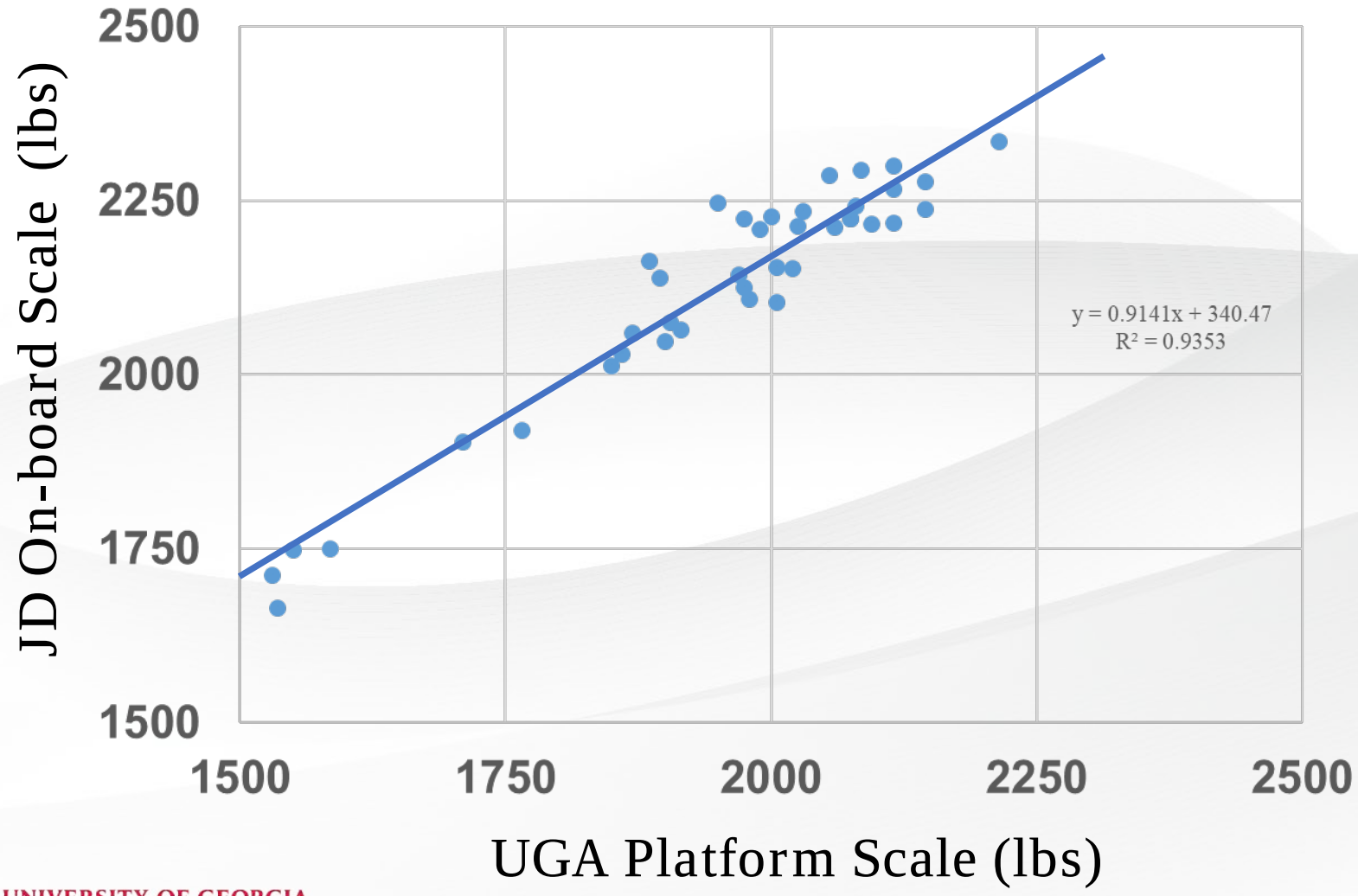
Results: 2018 Colquitt County OFT



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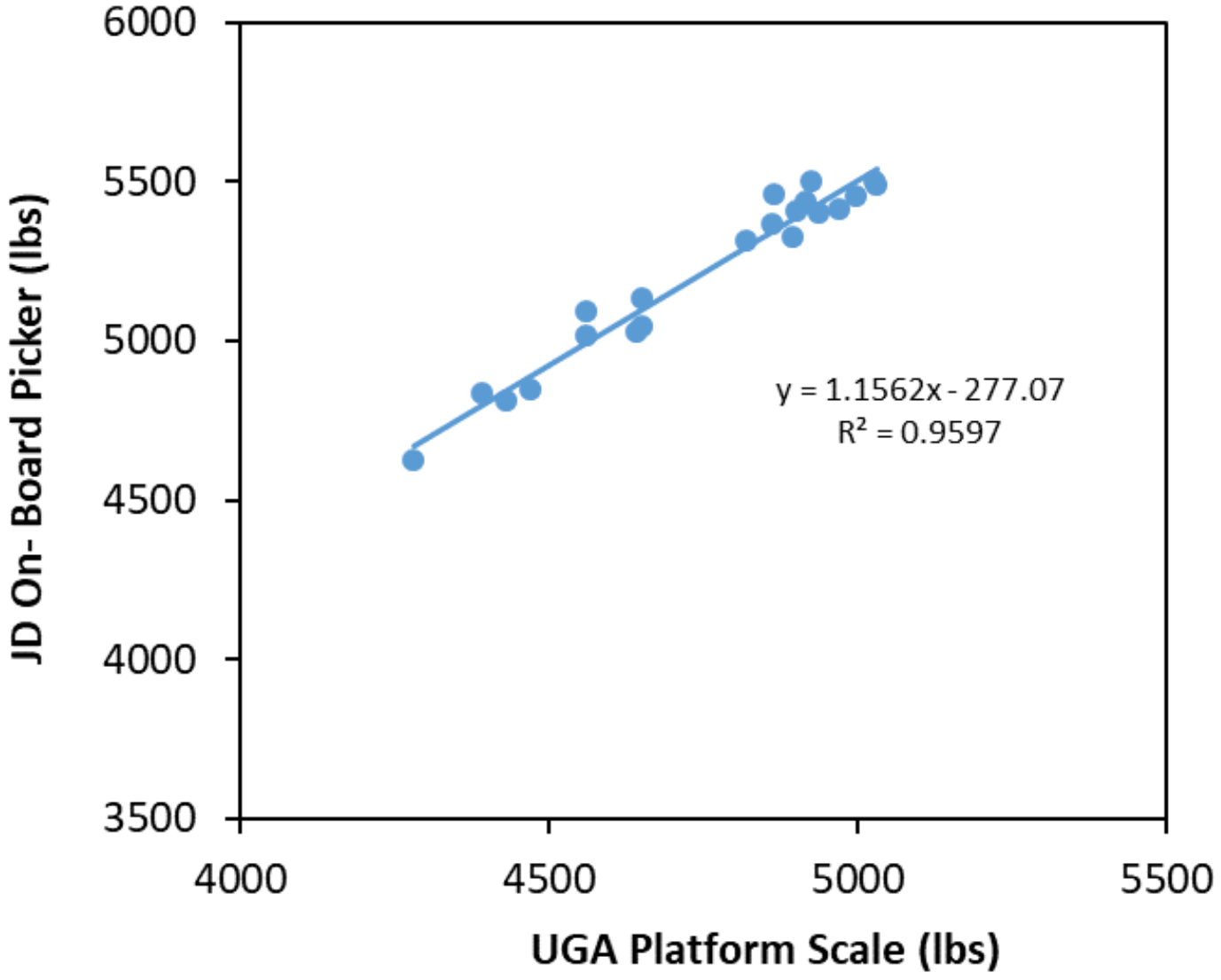
Results: 2018 Colquitt County OFT

Variety	UGA Platform Scale Weight		On-Board Picker Weight		Significance between PF Scale on JD On-Board System
	Mean Yield	Statistical Significance within Platform Scale Alpha = 0.10	Mean Yield	Statistical Significance within On-Board System Alpha = 0.10	
ST 5471 GLTP	2112	A	2246	A	
DP 1538 B2XF	2082	A	2225	A	*
DP 1646 B2XF	2015	A	2213	A	*
DP 1840 B3XF	2012	A	2153	A	
ST 5818 GLT	1983	A	2199	A	*
PHY 430 W3FE	1945	AB	2088	AB	*
CG 3885 B2XF	1930	AB	2085	AB	
DP 1851 B3XF	1923	AB	2093	AB	
PHY 480 W3FE	1888	AB	2067	AB	*
ST 6182 GLT	1842	AB	2015	AB	
NG 5711 B3XF	1838	AB	2035	AB	
NG 5007 B2XF	1837	AB	2038	AB	
DG 3605 B2XF	1833	AB	2069	AB	
PHY 440 W3FE	1682	B	1850	B	

Results: 2019 Colquitt County Fungicide



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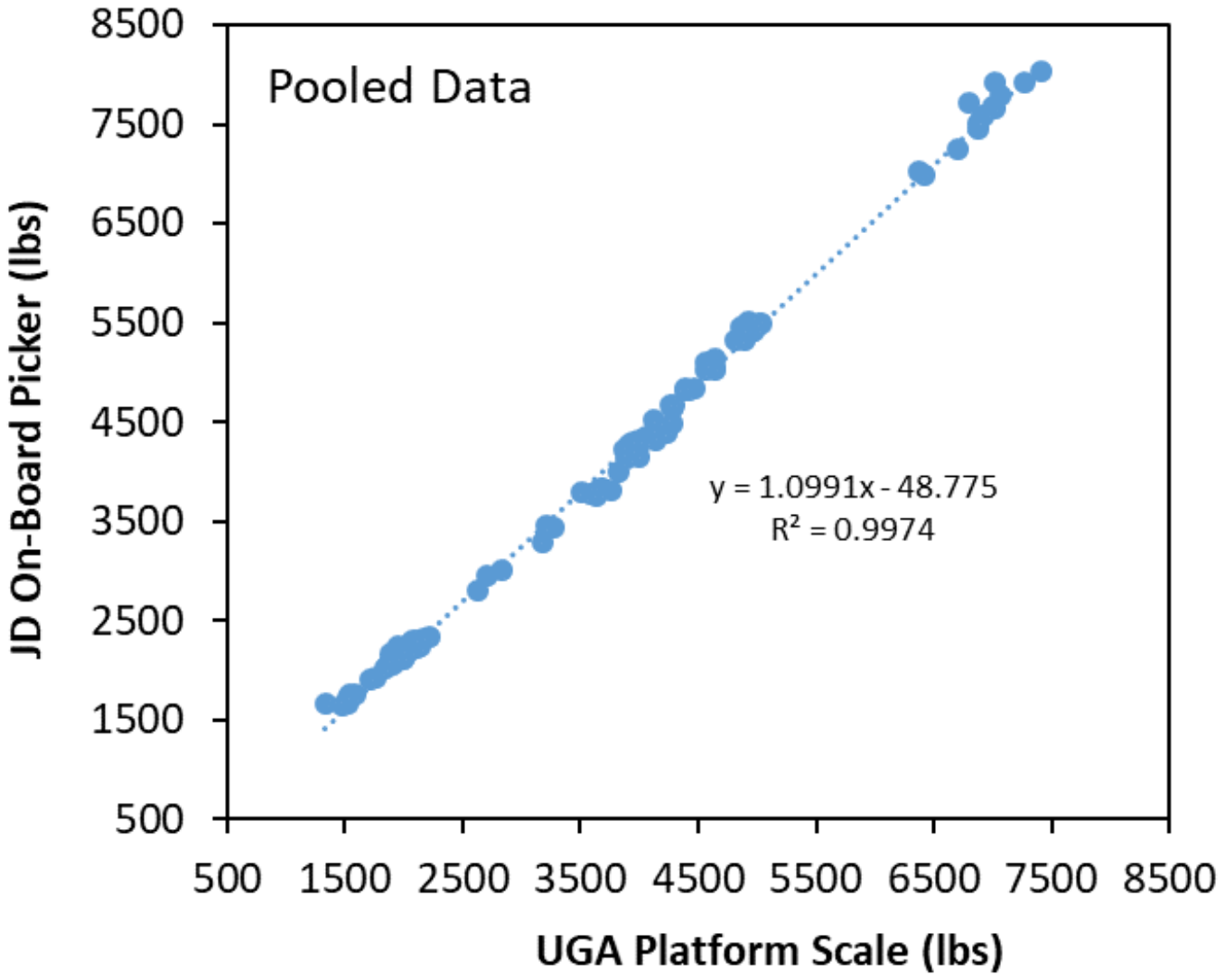
Results: 2019 Colquitt County Fungicide

Treatment	UGA Platform Scale Weight		On-Board Picker Weight		Significance between PF Scale on JD On-Board System
	Mean Yield	Statistical Significance within Platform Scale Alpha = 0.10	Mean Yield	Statistical Significance within On-Board System Alpha = 0.10	
Untreated	4937	A	5452	A	*
Priaxor	4942	A	5456	A	*
Miravus	4930	A	5397	A	*

2018-2019 Georgia Data Pooled



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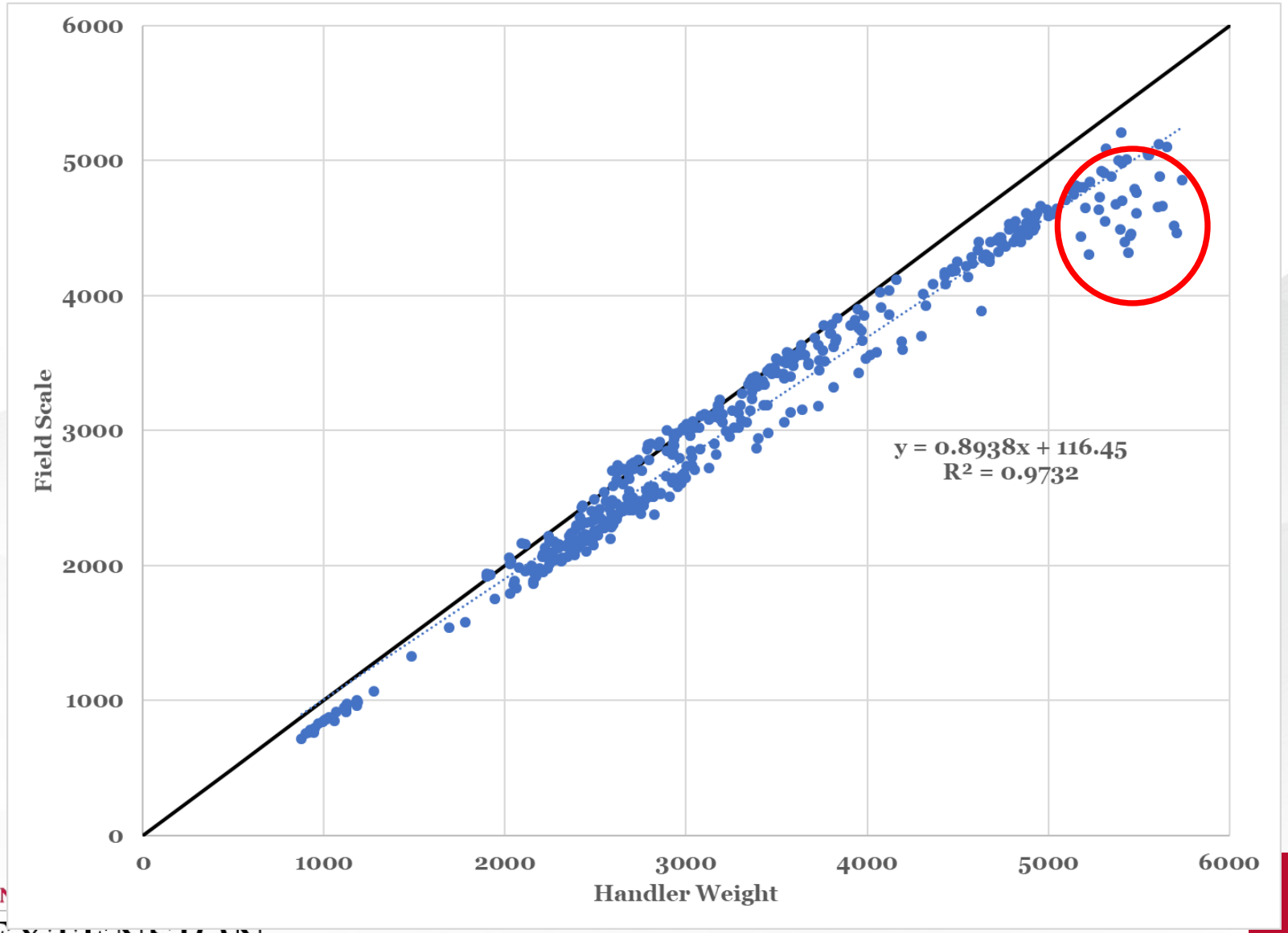
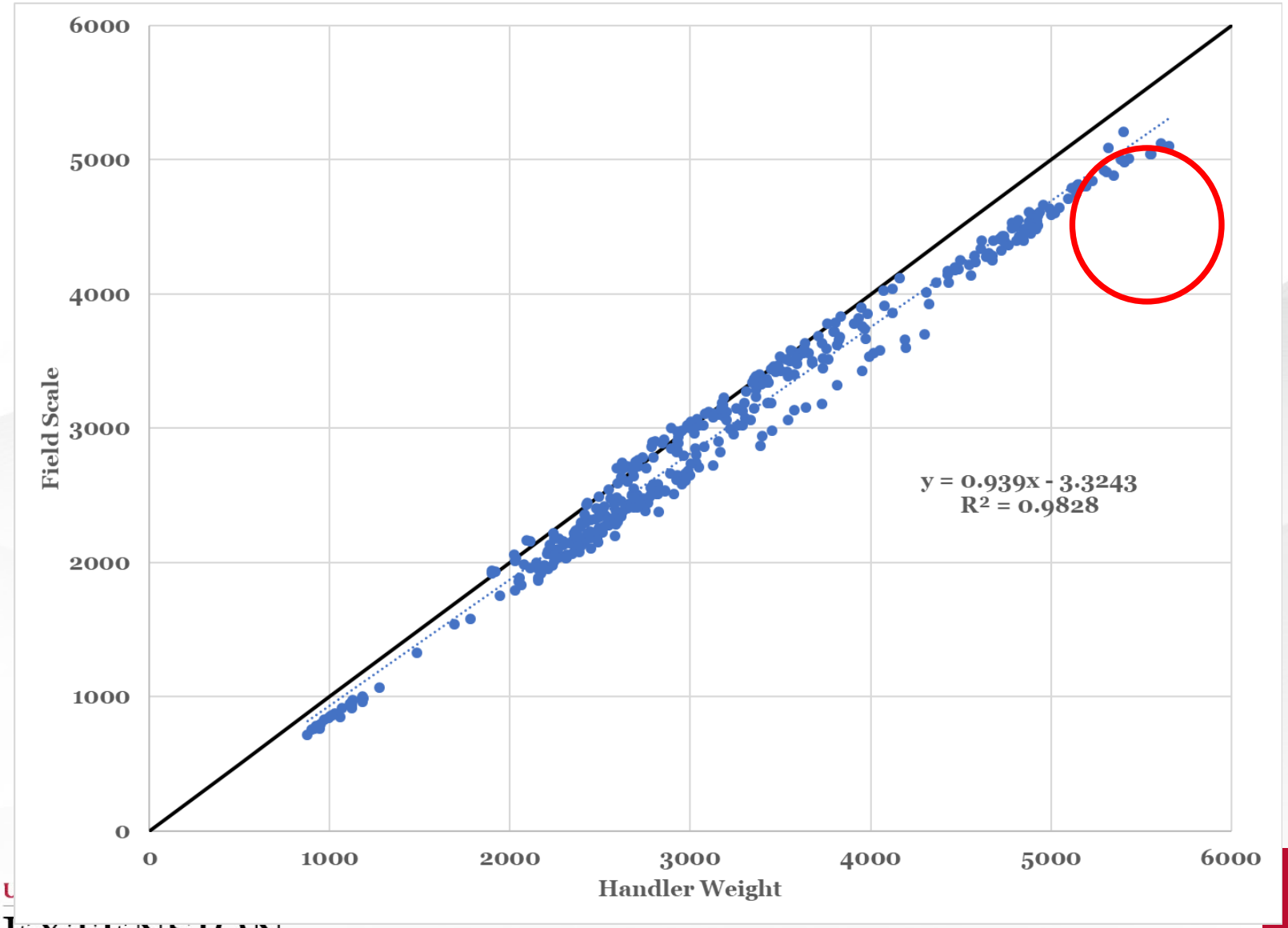
2020 AZ, GA, MS, NC, OK, Pooled Data



2020 AZ, GA, MS, NC, OK, Pooled Data



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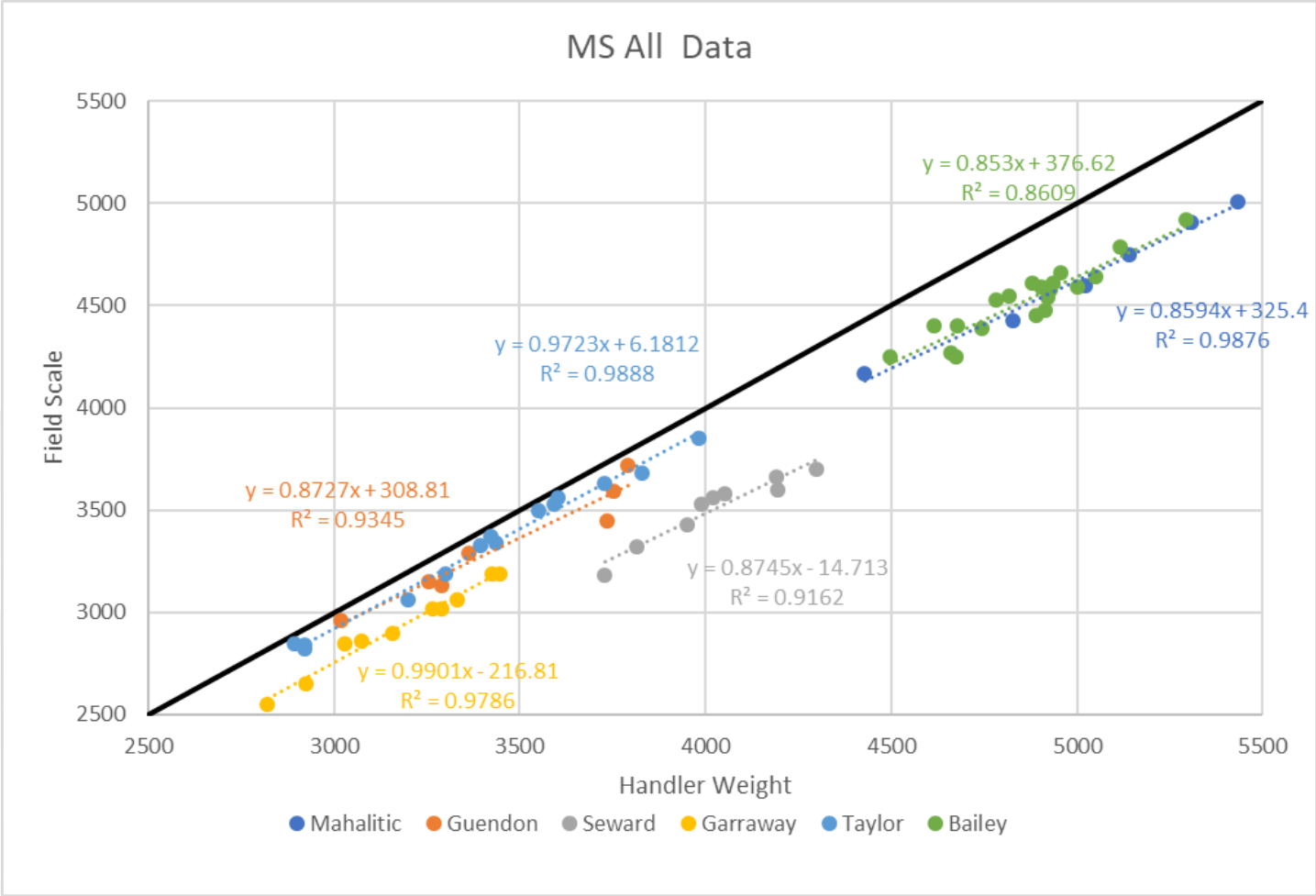
Results: Multiple Sites



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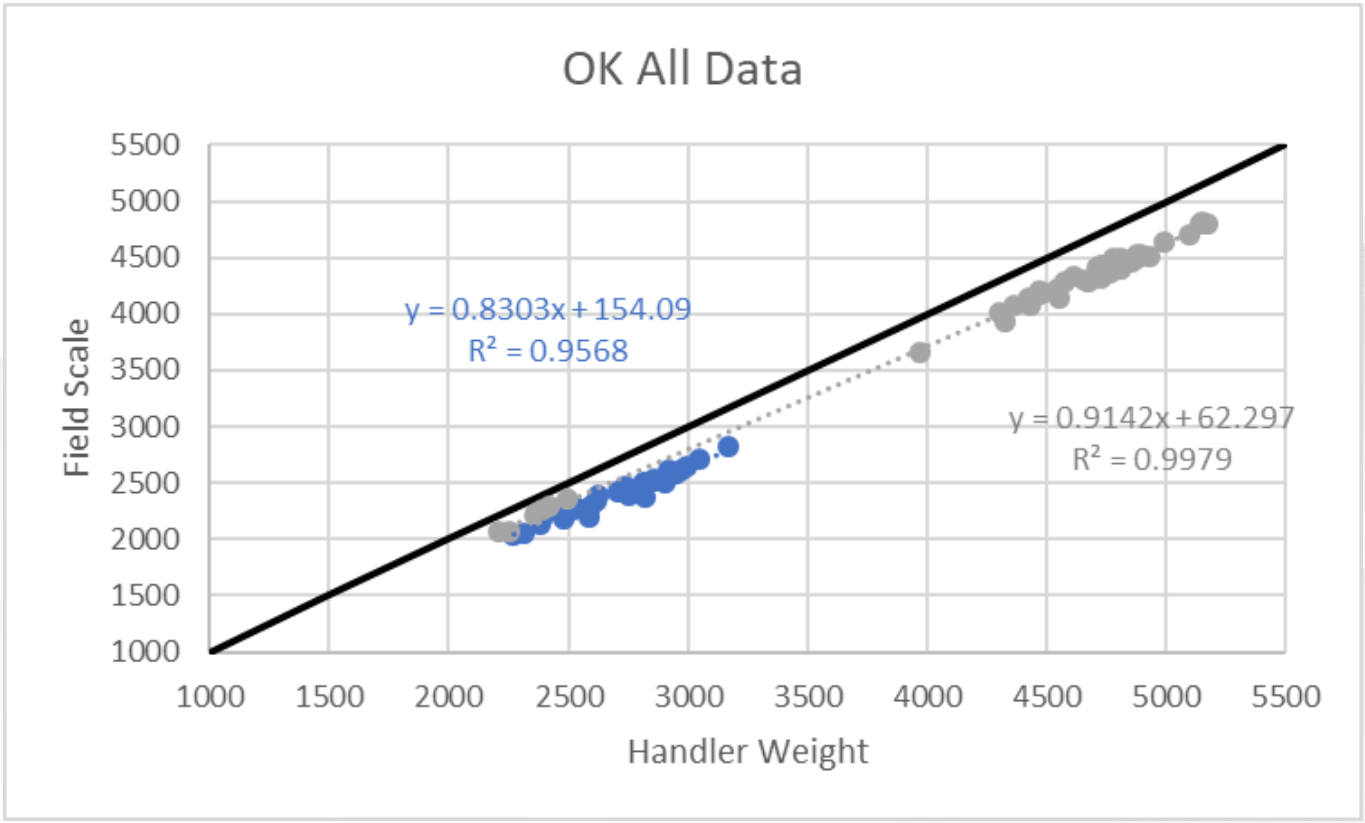
Results: Multiple Sites



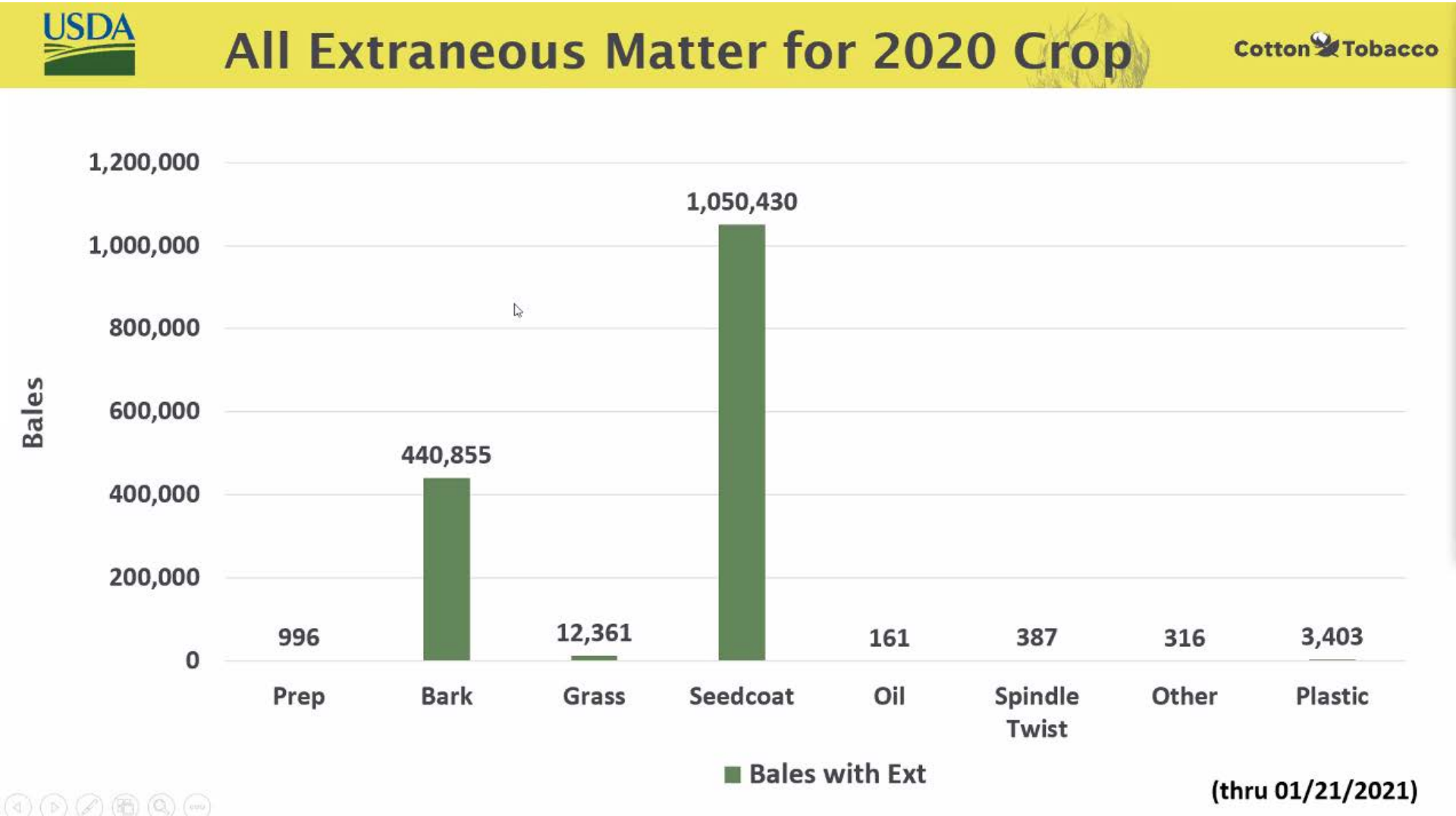
Conclusions

- With over 415 different loads collected from multiple states, harvesters and harvester types (CP vs. CS) the John Deere On-Board weighing system had a strong correlation to a calibrated platform scale system (R^2 = 0.97).
- In one trials with replicated data, the On-board system was statistically similar to the platform scale in 9 of the 14 treatments.
  - Additionally the On-board system was able to accurately determine significant differences between treatments even if it's weight predictions were not the same as the platform scale.

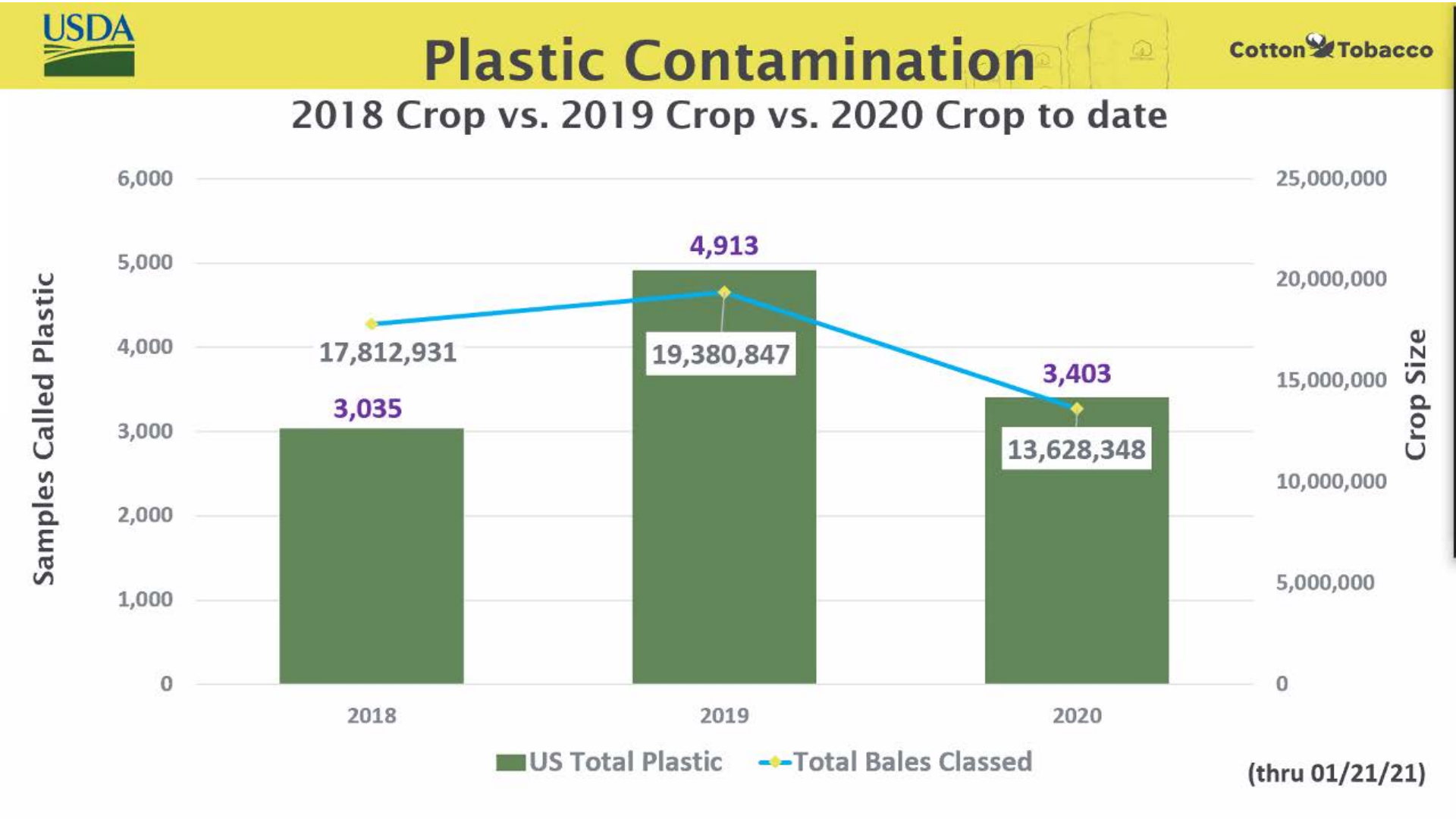
Conclusions

- Based on these observations the John Deere On-Board module weighing system can be used as a viable option for determining treatment differences for On-Farm trials.
- However, if the system has not been calibrated and the data require high accuracy, a field scale is suggested.
- The system accuracy can be increased via applying a calibration equation because it has a strong enough correlation to a calibrated platform scale that it can be utilized for accurate weight predictions.

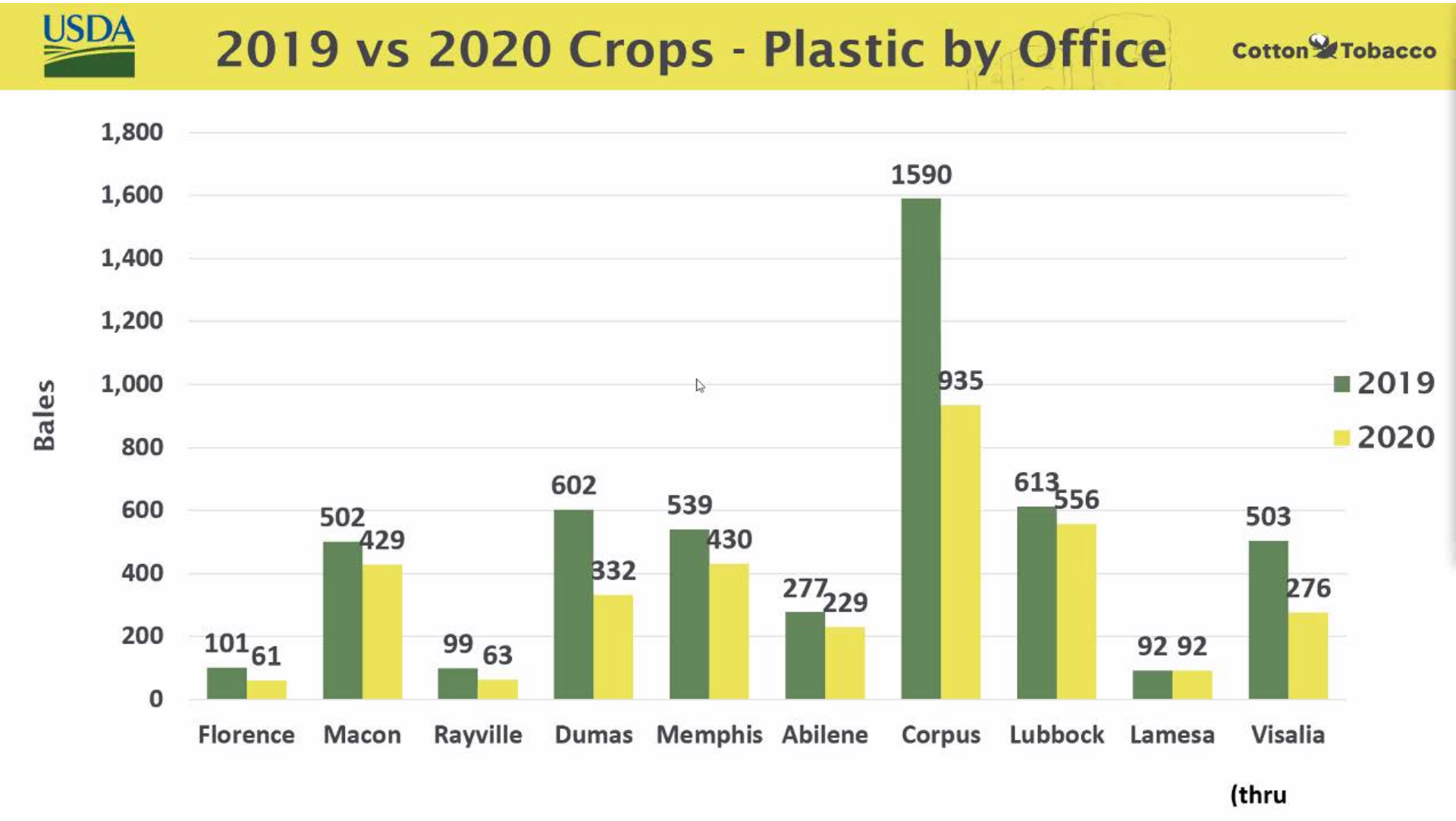
Plastic Contamination



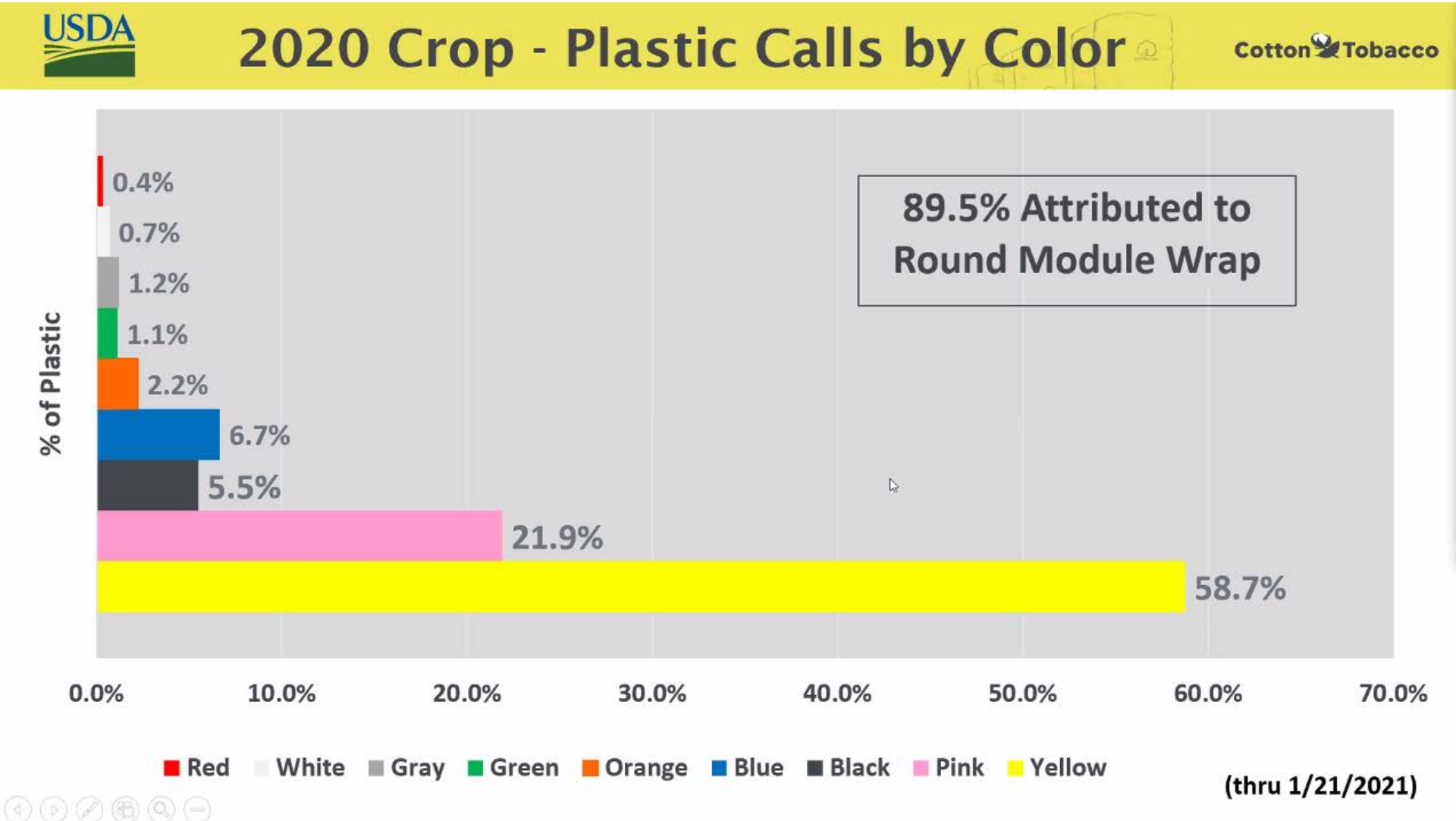
Plastic Contamination



Plastic Contamination



Plastic Contamination



Issues with Plastic Contamination

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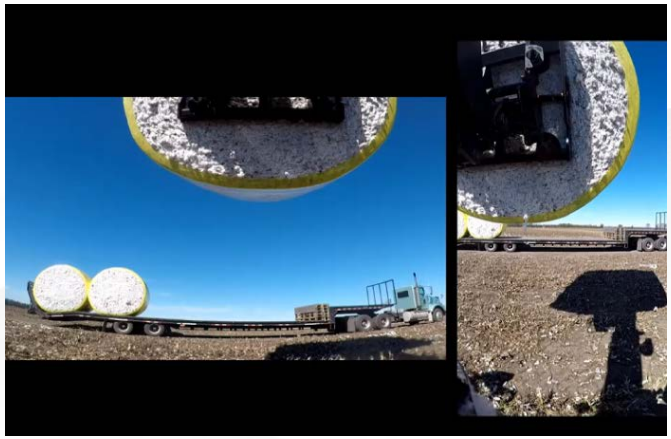
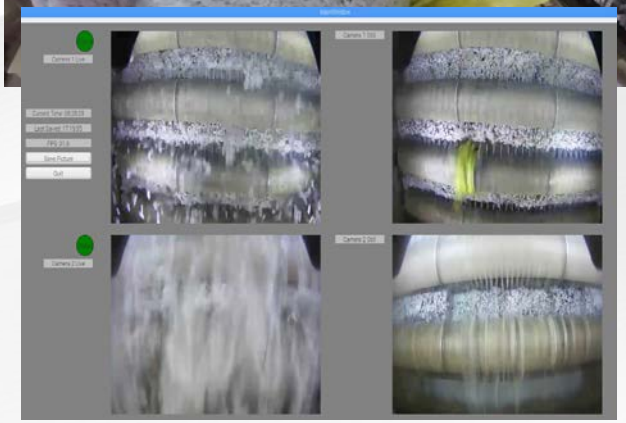
Foreign Material

Feeder House at the Gin

Identifying Module Damage

Field → **Gin Yard** → **Module Feeder**

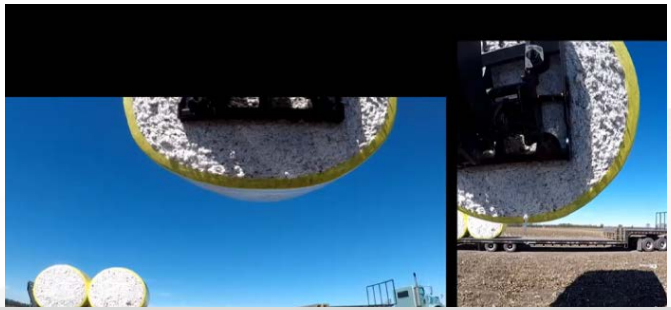




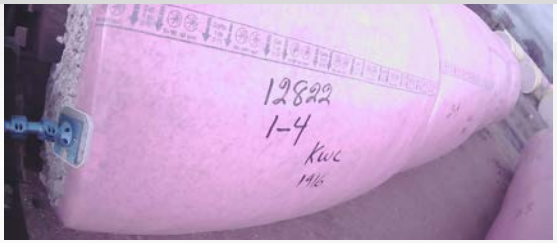
Jason Ward – NCSU; Bobby Hardin – Texas A&M; Lubbock Gin Lab

Identifying Module Damage

Field → **Gin Yard** → **Module Feeder**



Anticipated Outcome – Identification of sources of module damage followed with educational materials to prevent in future.



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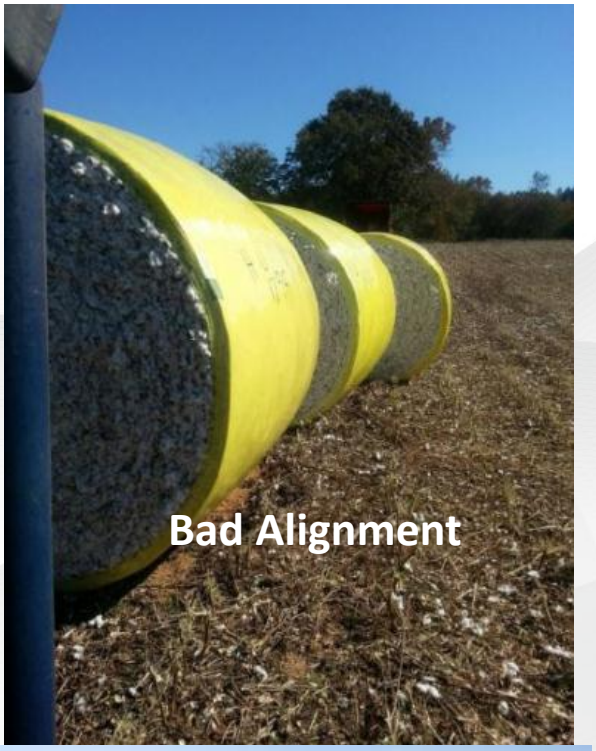
Placement and Field Handling of Modules

- Repair wrap tear prior to pickup
- Don’t attempt to slide modules with loader
- Lift the module 12 inches or more above the ground when transporting in the field

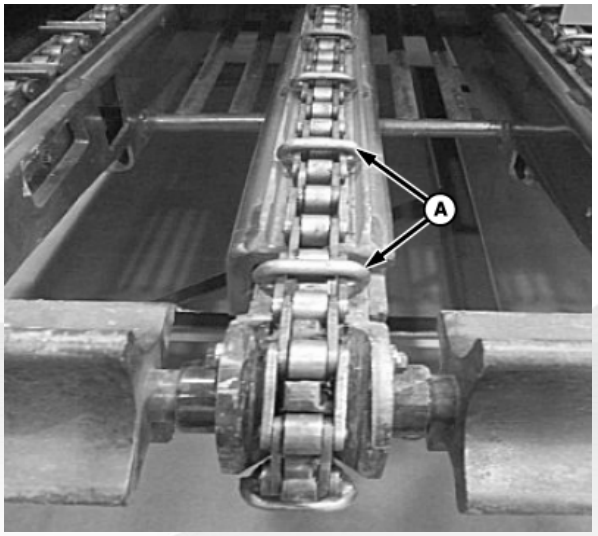
Staging Modules in the Field

- Stage only in well drained areas, such as turn-rows
- Space 4-8 inches apart to allow air circulation, drying and loading into module trucks (accounts for tipping angle)
- Align modules to facilitate loading

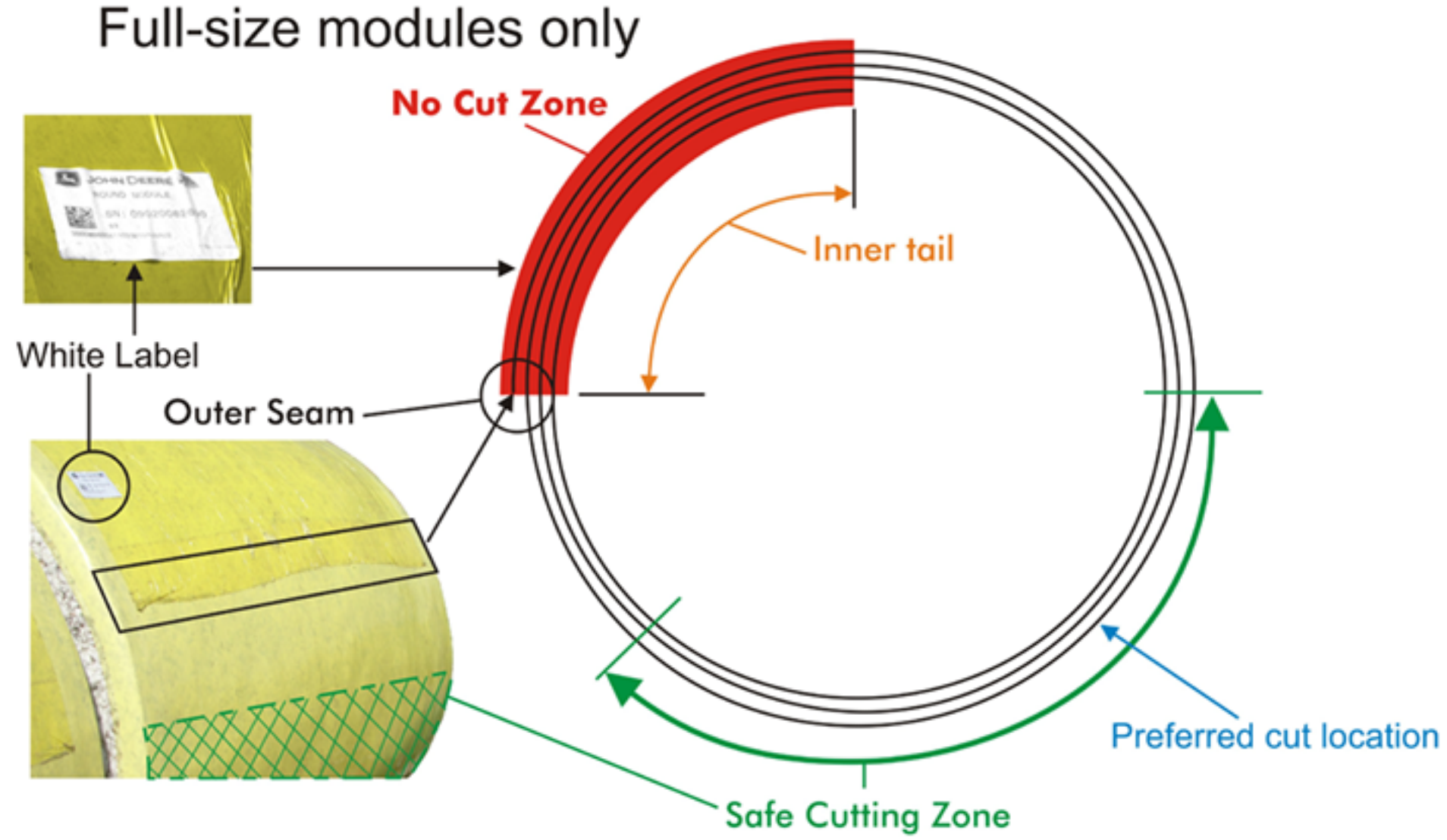


Transportation to Gin

- When Using Module Truck:
  - Modify bed chain with smooth lugs
  - Modify chain tail wheel lugs to smooth paddle style
  - Don't run modules into truck headboard
  - Synchronize chain speed with ground speed
  - Operator training is essential



Opening Round Modules



Acknowledgements and Additional Resources

- We would like the acknowledge all (Las Cruces, Lubbock, Stoneville) of the USDA-ARS Gin Labs for the hard work they are doing to help the gin be able to better remove plastic if it does make it into the module feeder.

- For additional resources on how to reduce plastic contamination during the harvest, transport and ginning processes please go to the following sites:
  - https://www.cotton.org/tech/quality/contamfree.cfm
  - https://cottoncultivated.cottoninc.com/wp-content/uploads/2020/08/PreventionOfContamination-HaulingModules-19Aug2020.pdf

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QUESTIONS?

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