Angular Leaf Spot (ALS) Tolerance in US Dark Tobacco

A. Adams; C. Kudithipudi; W. Morris; E. Brown

CORESTA AP 2025 Surabaya, Indonesia

Agenda

- What is Angular Leaf Spot (ALS)?
- Genetic Resistance to ALS
- Trial Results of Altria Dark Hybrids With Genetic ALS Resistance
- Conclusion

What is Angular Leaf Spot (ALS)?

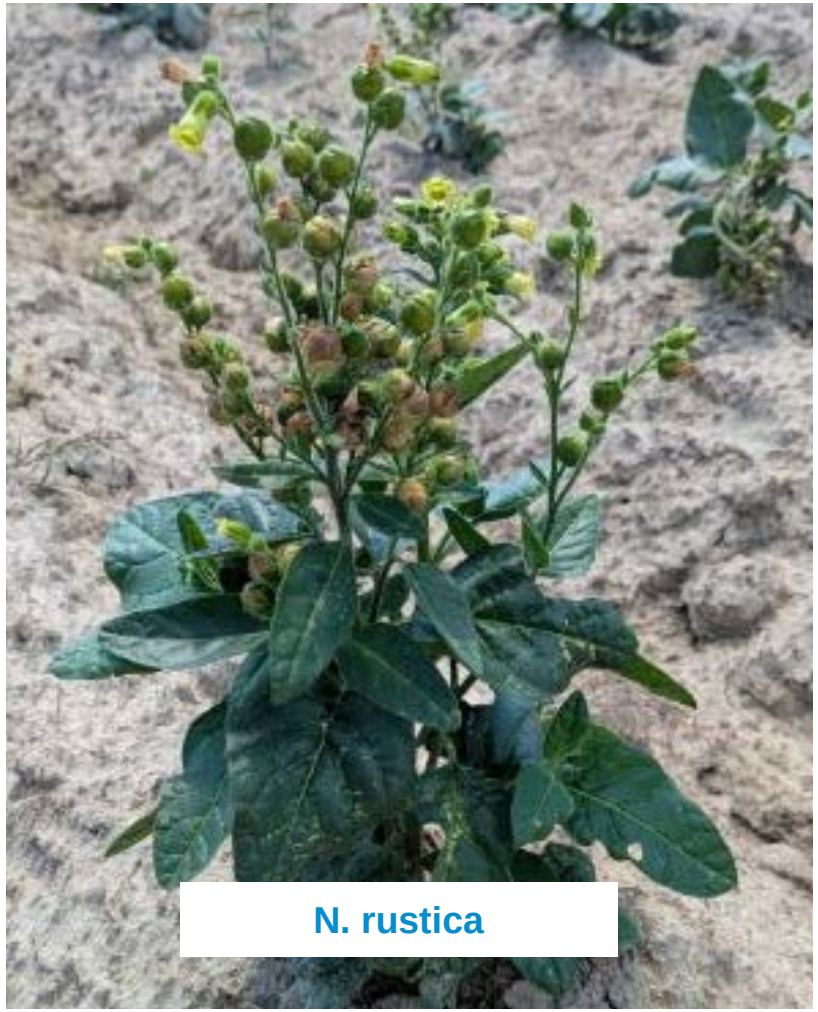
ALS is a bacterial disease (*p. syringea* pv. *angulata*) that affects tobacco leaves causing irregular brown lesions

Historically not an economic issue in US dark tobacco production

Outbreaks of ALS can impact **crop value** & in some cases, cause **total crop loss**

Currently all US dark commercial varieties are susceptible to ALS & no chemical treatments available

ALS Genetic Resistance, “N rustica WZ gene”



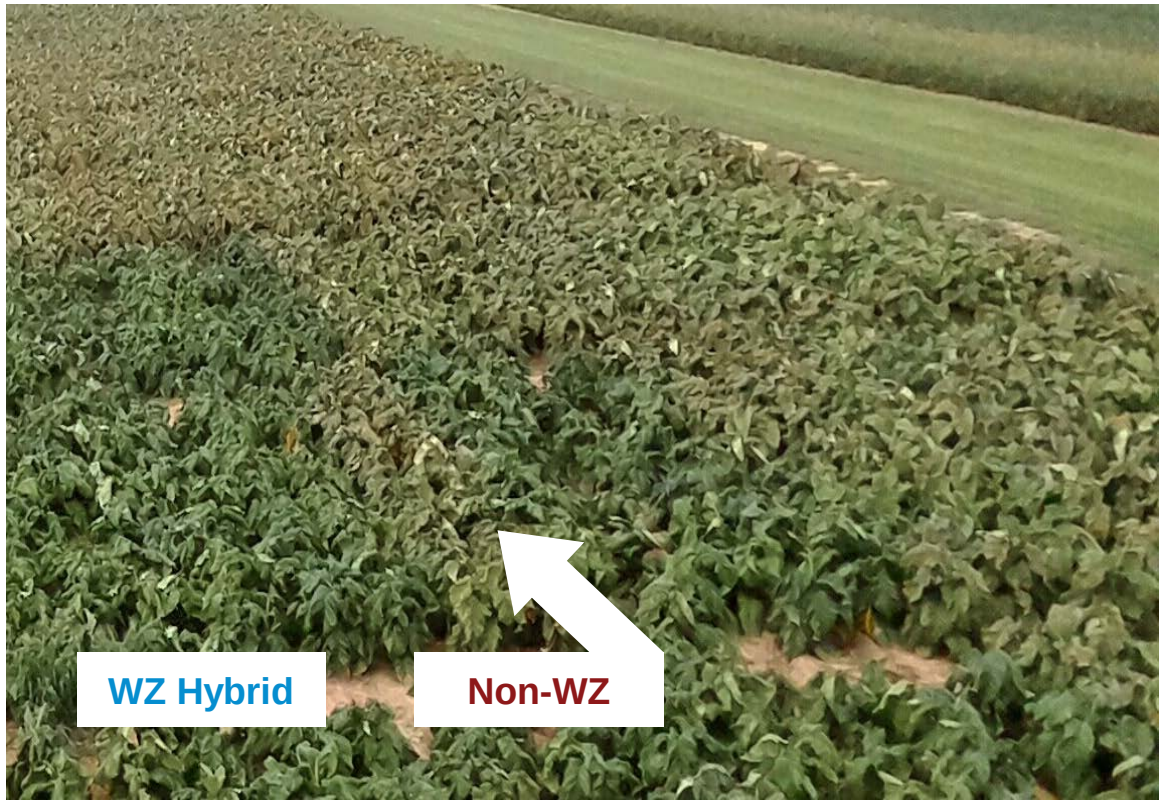
WZ is a dominant gene from N. rustica Brasilea

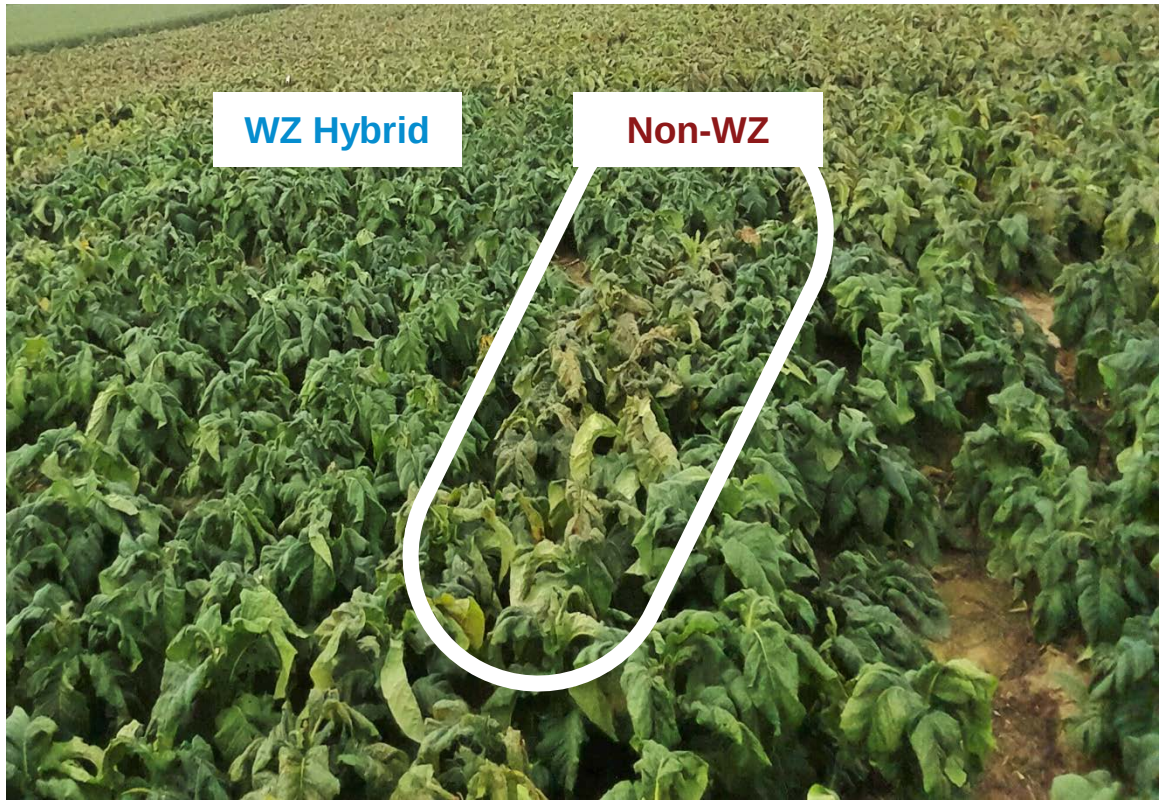
Successfully transferred into flue cured tobacco to confer resistance to

- Both races of *P. syringea* pv. *tabaci* (wildfire)
- ALS strain *P. angulata*
  (*Woodend & Mudzengerere, 1992*)

Altria has transferred the WZ gene into dark tobacco varieties designated as **ALCS-1 through 9**

2023 Dark WZ Variety Evaluation: ALS Outbreak Murray, KY

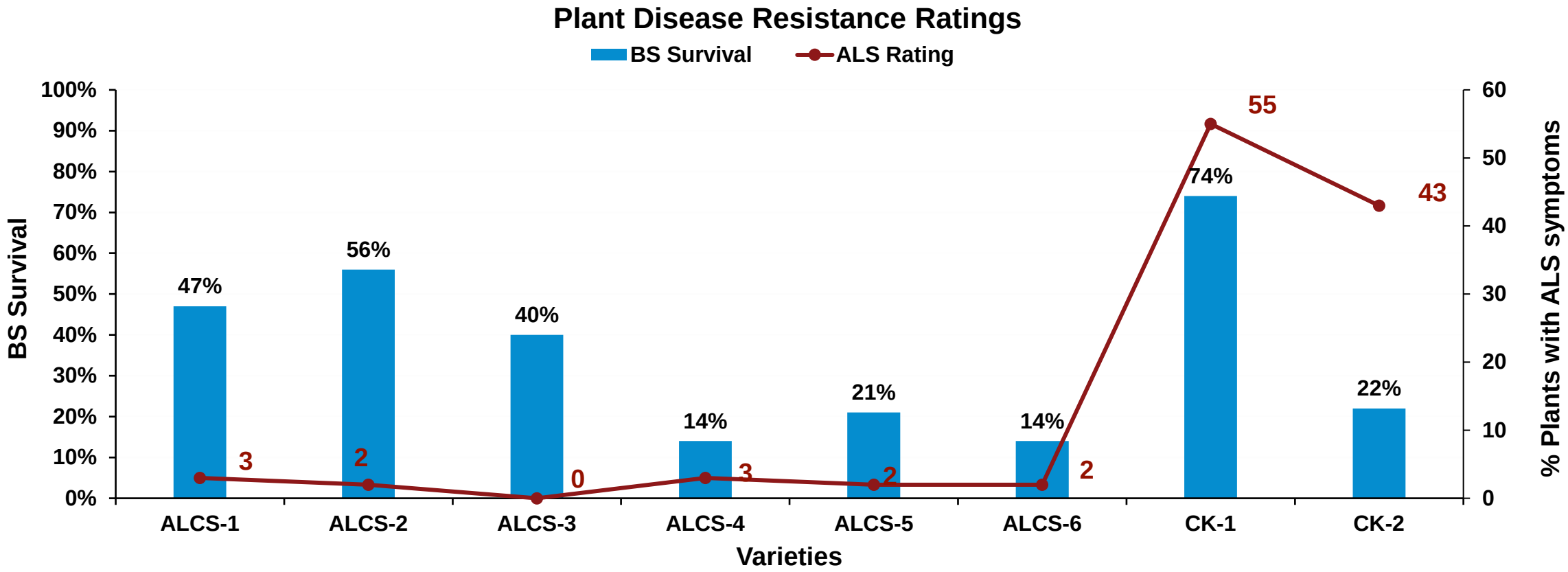




Variety yield & quality replicated trial at Murray, KY during an ALS outbreak

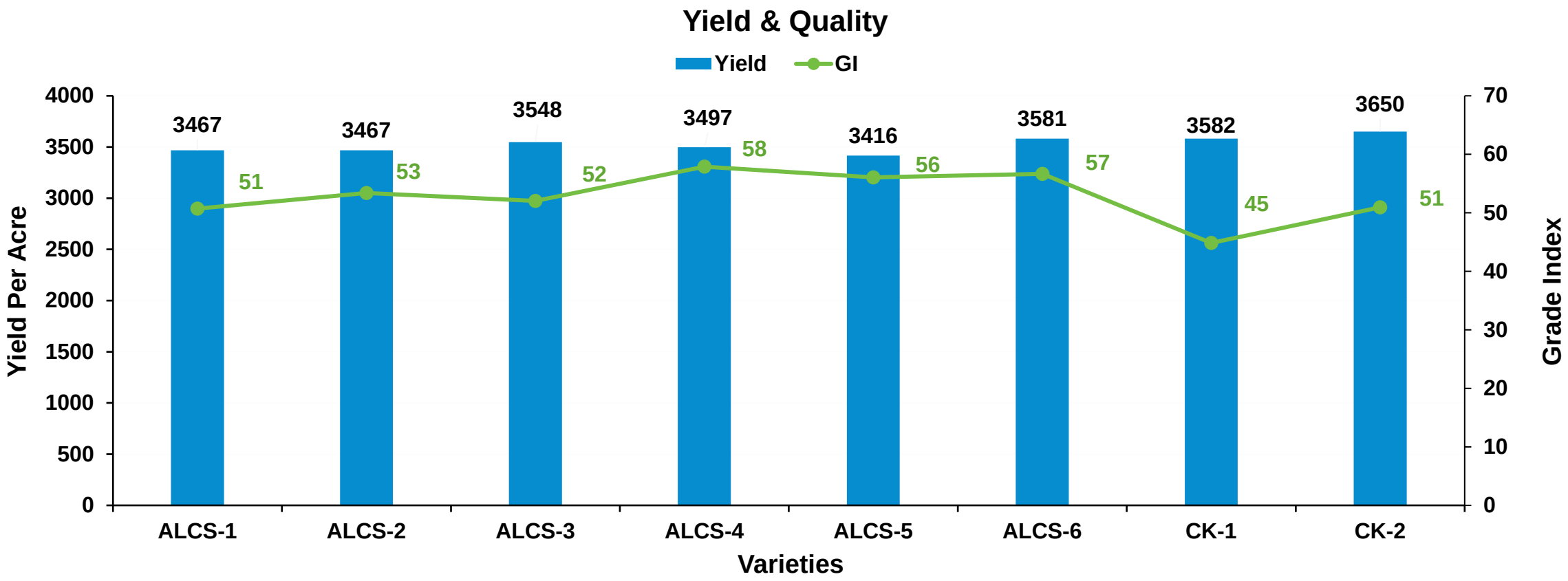
Surrounding the trial are **commercial varieties that were heavily affected highlighting the effectiveness of WZ** against ALS

2024 Replicated Trial Results of Dark Tobacco WZ Hybrids



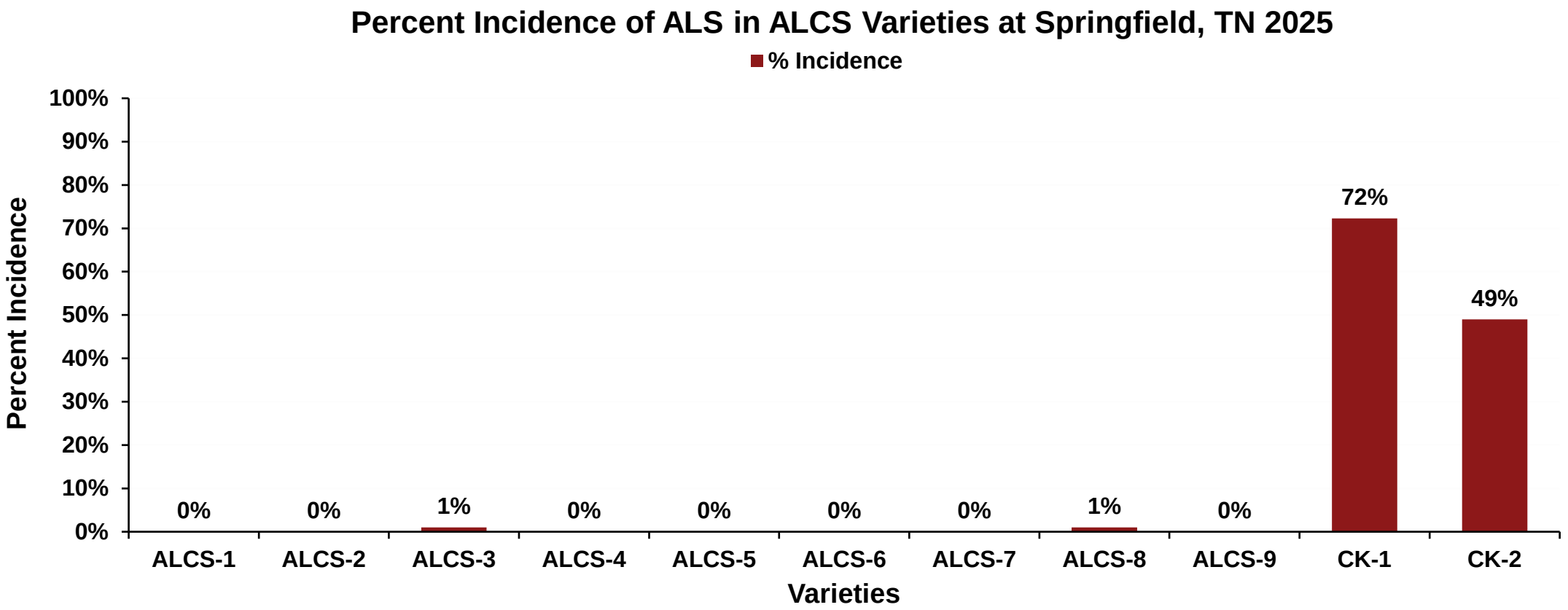
Average black shank (BS) survival replicated trials in three locations and ALS ratings from 2024

2024 Replicated Trial Results of WZ Dark Tobacco Hybrids



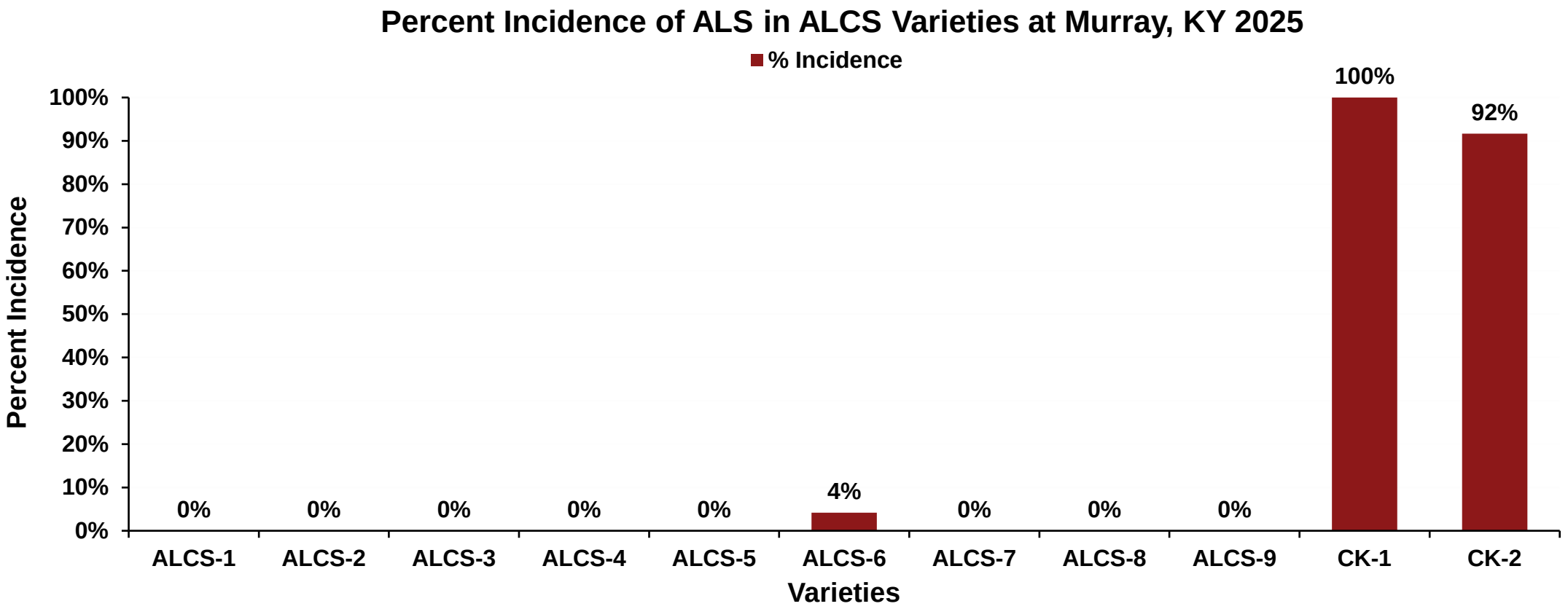
Average yield and grade index (GI) from replicated trials in three locations

2025 Preliminary Trial Results of WZ Dark Tobacco Hybrids



Preliminary results from inoculated ALS trial in Springfield, TN USA

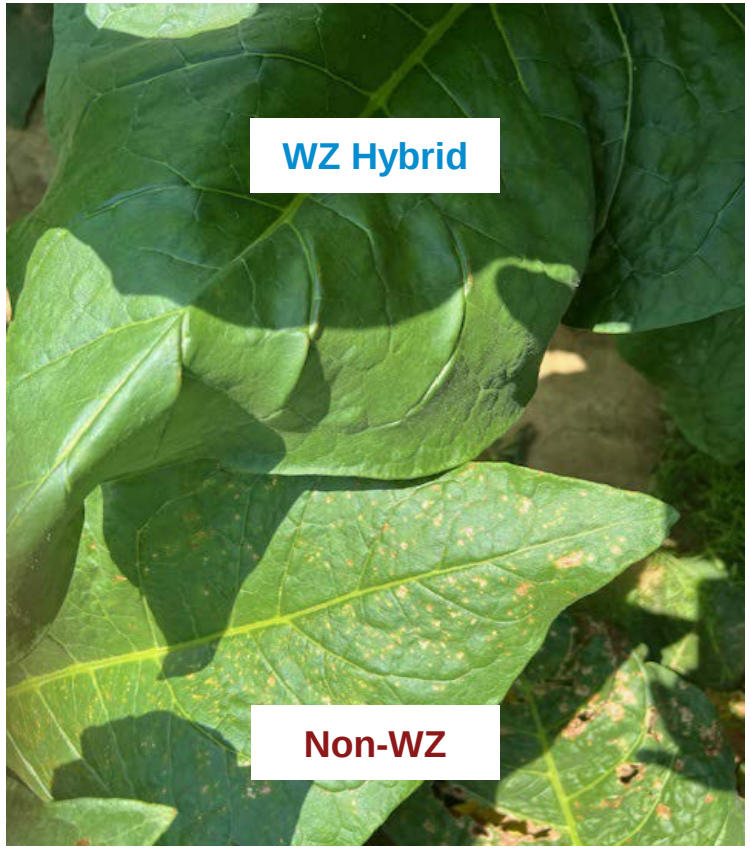
2025 Preliminary Trial Results of WZ Dark Tobacco Hybrids

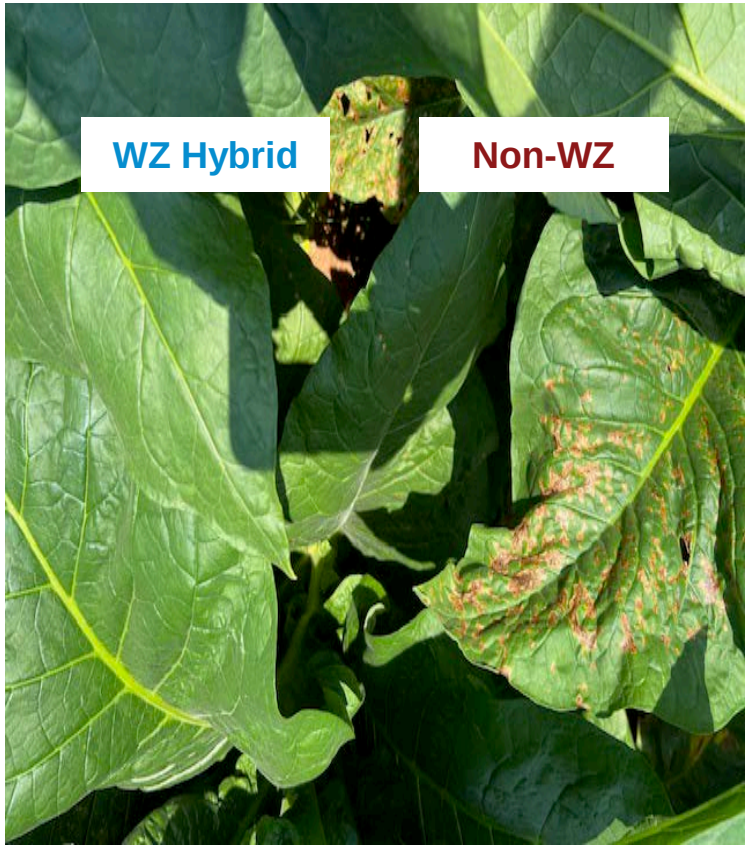


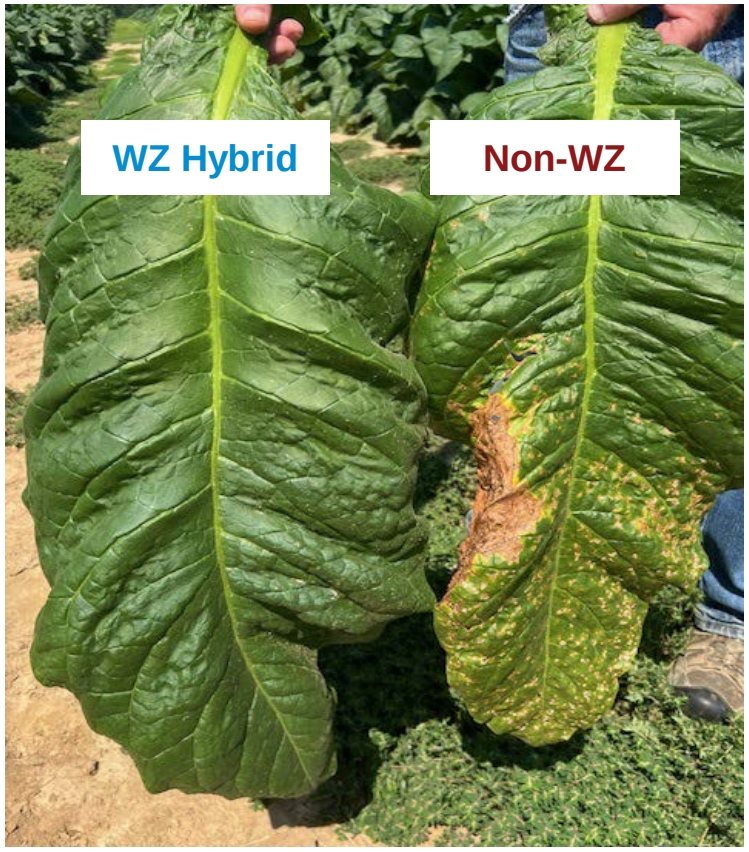
Preliminary results from inoculated ALS trial in Murray, KY USA

2025 Large Scale Farm Trials of WZ Dark Hybrid ALCS-1

ALCS-1 **WZ hybrid** versus **non-WZ** control at flowering stage







Conclusion

The WZ trait provides substantial **protection against ALS, offering a promising solution for producers** of US dark tobacco

<1% of plants with WZ gene showed signs of **ALS infection**

WZ also **provided an additive increase** to the multi genic black shank **resistance** in the hybrids

Acknowledgements and References

Altria Agronomy Team

Dr. Andy Bailey
Extension Coordinator – Department of Plant & Soil Sciences
University of Kentucky, Research & Education Center

Dr. Mitchell Richmond
Tobacco, Hemp & Specialty Crops Extension Specialist
University of Tennessee Institute of Agriculture
Department of Plant Sciences

Tobacco Production, Chemistry and Technology
D. Layton Davis and Mark T. Nielsen (1999)

Nicotiana: Procedures for Experimental Use
Disease Resistance
J.R Stavely
Technical Bulletin 1586, U.S. Dept. of Agriculture

THANK YOU!