

Mitigating tropical cyclone susceptibility in pecan (*Carya illinoensis*) orchards

While distinct from the natural and managed forests we often study, pecan orchards are a widespread and ecologically relevant land cover in the Southeast—supporting rural economies and contributing to regional carbon and water dynamics. In Georgia alone, recent storms have caused over \$1.2 billion in losses to this sector, which plays a vital role in the region’s rural economy, comprising 25% of the global production of pecans. To date, very little empirical evidence is available to inform decision-making about wind risk in pecan, and guidelines for mitigating hurricane risk primarily rely on anecdotal evidence.

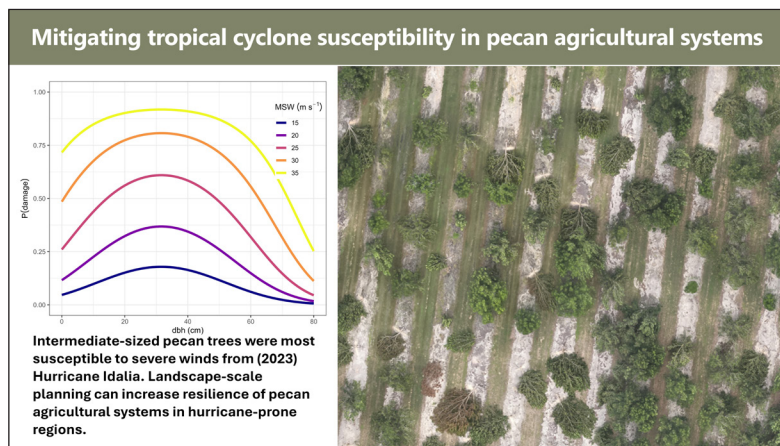
considered. We recommend that pecan growers consider age and size structure in their orchard planning with orchards of different ages that balance maximizing production and reducing wind risk. Prior research also suggests that mechanical hedge pruning increases wind firmness. Climate-smart practices can enhance resilience and sustainability in pecan orchards in future climates where increases in severe hurricanes are expected.

MORE INFORMATION

Cannon, J.B., A.W. Whelan, A.S. Johnson, and M.L. Wells. 2025. Mitigating tropical cyclone susceptibility in pecan (*Carya illinoensis*). *Scientia Horticulturae*. doi.org/10.1016/j.scienta.2025.114236

CONTACT

Jeffery Cannon, jeffery.cannon@jonesctr.org
Lenny Wells, lwells@uga.edu



Left: Intermediate-sized pecan trees sustained the most damage from severe winds from Hurricane Idalia in 2023. Right: aerial image of a pecan grove with overturned trees from recent hurricane damage.

Understanding hurricane mortality for a range of wind speeds and tree sizes can help assess hurricane risk in real time and help decide whether mitigation measures are warranted. To provide foundational knowledge on wind susceptibility in pecan trees, we reconstructed hurricane damage to 1,142 trees from 11 pecan orchards through rapid surveys after 2023’s Hurricane Idalia.

We found that damage to pecan increased from 15-40% for tropical storm winds and rose to 70-80% for Category 1 hurricane winds and damage was highest for intermediate size classes—peaking at 35 cm (14 in) diameter at breast height. We developed a conceptual model for assessing hurricane risk on crop yield which illustrates how consideration of age-structure can influence expected profits when extreme winds are

KEY POINTS

Recent hurricane damage greatly impacted major pecan producing regions, including Georgia which has experienced over \$1.2 billion in pecan loss

We surveyed 1,142 trees in wind-damaged orchards after 2023’s Hurricane Idalia

Our findings demonstrate that wind damage risk is highest for medium-sized trees (35 cm dbh) and suggest strategies like hedge pruning and age diversification improve resilience

Our future research will examine how broad landscape scale factors such as soil type, topography, and landscape configuration influence wind susceptibility in pecans