



**2023 Joint Conference of  
the Northern Nut Growers  
Association, Chestnut  
Growers of America, and  
Walnut Council**



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**CONFERENCE PROGRAM**

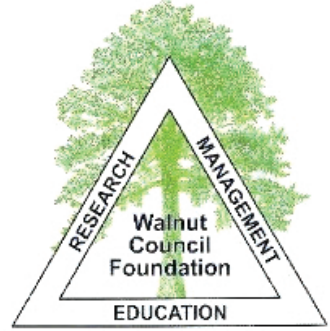
**July 23-26, 2023**

University of Missouri Center for Agroforestry  
Columbia, Missouri

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NORTHERN NUT GROWERS ASSOCIATION  
EST. 1910



*Building the Future  
for America's Finest  
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**MU** College of Agriculture,  
Food & Natural Resources  
University of Missouri

**MU** Horticulture & Agroforestry  
Research Farm  
University of Missouri



**MU** Center for Agroforestry  
University of Missouri



# Conference Schedule of Events

## Sunday, 23 July 2023

We will have organizational meetings throughout the day at the Anheuser-Busch Natural Resources (ABNR) building or the Columbia Hampton Inn. Please be sure to register between 3:30 – 7:00 pm in the ABNR lobby, where you will also be directed to pick up keys for on-campus residence hall lodging and set up posters, displays, and exhibits. In the evening, join us for a welcome reception, poster session, and the traditional Show and Tell program with lightning talks.

- 9:00 – 12:00      **NNGA Board of Directors Meeting**, 210 ABNR Building
- 10:00 – 11:30    **Walnut Council Foundation Board of Directors Meeting**, Hampton Inn Columbia at the University of Missouri
- 12:00 - 1:00      **Lunch on your own.** Suggestion: Student Center Cafeteria or Plaza 900
- 11:30 – 3:30      **Walnut Council Board of Directors Meeting**, Hampton Inn Columbia at The University of Missouri
- 1:00 – 3:30        **NNGA Board of Directors Meeting** (continued from morning to adjournment)
- 3:30 – 4:30        **Chestnut Growers of America Board of Directors Meeting**, 210 ABNR
- 3:30 – 6:00        **Set up** Posters, Exhibits, and Silent Auction, ABNR Lobby and Room 123
- 3:30 – 7:00        **Registration**, ABNR Lobby
- 5:30 – 7:00        **Welcome Picnic Dinner** with roast pork and vegan/gluten-free sides. Cash bar, ABNR Courtyard & Lobby.
- 6:00 – 7:00        **First Poster Session** concurrent with Reception, ABNR Lobby and ABNR 123

7:10 – 8:30

**Show and Tell with Lightning Talks**, ABNR  
Conservation Hall; Session Moderator, Mike Gold,  
University of Missouri Center for Agroforestry

- 7:10 Mike Gold, *Welcome to the University of Missouri Center for Agroforestry*
- 7:20 Charlie Novogradac, *Construction and Operation of a Low-Cost Air Cleaner for Small Chestnut Orchards*
- 7:30 Jeff Polfer, *Abundant Harvests, Soil Health, Nutrients and Plant Health*
- 7:40 Rick Hartlieb, *Setting Up a New Diversified Orchard with Hazelnuts and Chestnuts*
- 7:50 Bill Hammitt, *Establishing Clover Cover Crops in Black Walnut Plantations*
- 8:00 John Kelsey, *NNGA Cultivar Inventory Database*
- 8:10 Mike Gold, *Field Day Logistics*

**Notes:**

# Monday, 24 July 2023

Today includes a field trip to the MU Horticulture and Agroforestry Research Farm with an optional alternate afternoon trip to a local walnut planting for timber management. **PLEASE NOTE: You will need to use your own vehicle or carpool with others for the field tours. To get to the research farm, take I-70 west to exit 121, take US 40 west to Hwy 5, take Hwy 5 north into New Franklin. Turn left at the stop sign. At the High School, turn left onto Research Center Road until you see the research farm entrance.** The evening will include a poster session and the annual live auction hosted by NNGA. Proceeds go to support research grant programs.

7:30 – 8:45      **Travel to the Horticulture and Agroforestry Research Farm**  
10 Research Center Road, New Franklin, MO, 65274

8:45 – 9:00      **Welcome and Field Day Logistics**, Ron Revord  
Board wagons for Tour 1 or 2 or assemble for Tour 3 (walking tour)

9:00 – 11:00      **Tour 1 (Wagon Near Loop):** Chestnut Repository 1, Chestnut Cultivar Trial, and Chestnut Repository 2 (Gold and Meier)

9:00 – 11:00      **Tour 2 (Wagon Far Loop):** Black Walnut Mapping Populations, Walnut Selection Trial, and Hazelnut Breeding Block (Revord)

9:00 – 11:00      **Tour 3 (Walking):** Black Walnut Repository, Walnut Progeny Block; Swamp White Oak Planting; Hazelnut Selection and Cultivar Trials (Coggeshall, Lawson, and Webber)

11:00 – 12:30      **Demonstration stations near haybarn;** Chestnut, Pecan, and Walnut Harvesters; Electric Deer Fencing; Orchard Irrigation Considerations; Grafting and Control Pollination videos; Elderberry Culture and Weed Management Trial (Huchteman). **NOTE: Alternate timber tour participants must eat lunch early and leave the research farm by 12:15 pm. See directions on next page.**

**Afternoon Field Tour Schedules**  
**June 24, 2023**

<b>Horticulture &amp; Agroforestry Research Farm Field Tours</b>		<b>Alternate Timber Management Field Tour</b>	
		Address: 301 North Highway UU. From the research farm, crossover I-70 on Hwy 40 and take Hwy UU south ~1 mile.	
11:30 – 12:00	Continue haybarn demos	11:30 – 12:00	Lunch at the research farm
12:00 – 12:30	Lunch	12:15 – 1:00	Drive to alternate site.
12:30 – 2:30	Repeat research farm tours 1, 2, & 3	1:15 – 1:30	Welcome from Mike Trial, <i>Juglans Nigra Enterprises</i>
2:30 – 4:30	Repeat research farm tours 1, 2, & 3	1:30 – 4:00	Rotate among four field stops 1. Controlling Invasive Species (Stelzer) 2. Alternative Vegetation to Grasses (Renkowski) 3. Tree Spacing and Thinning; and Small Log Utilization (Trial, Butler) 4. Equipment Display
4:30 – 5:15	Return to Columbia	4:00 – 4:30	Return to Columbia

5:30 – 7:00     **Dinner on your own.** Check out options at [www.visitcolumbiamo.com](http://www.visitcolumbiamo.com) for restaurant list by cuisine types on the return from the field tours.

7:00 – 7:30     **Second Poster Session**, ABNR lobby & ABNR 123

7:30 – 9:30     **Live Auction** in ABNR Conservation Hall. Proceeds used to support NNGA or WC Foundation tree-related research grants and projects as designated by the donor.

## Tuesday, 25 July 2023

Today begins the technical side of the conference with concurrent sessions. At the end of the afternoon break, the Walnut Council Foundation will close the silent auction that supports several tree-related research grants and special projects programs per the wishes of the donor. In the evening, we will have our traditional banquet preceded by a social and group photo of conference attendees. Price of admission to social/banquet was included in the full or companion pass registration. We look forward to seeing you there!

### **Companion Program – Clydesdales Tour & Lunch**

8:30 am – 1:00 pm plus optional wine tasting to follow

Please meet in the Hampton Inn lobby at 8:30 am to carpool to the official home of the Budweiser Clydesdales at Warm Springs Ranch in Booneville. The tour will be followed by lunch at the A-Frame Winegarden on Bluffs overlooking the Missouri River, with an optional wine tasting. Please note that you must find your own transportation. Tour ticket and lunch is included with your companion pass registration.

- 7:00 – 8:00      Coffee available in ABNR Lobby
- 7:45 – 8:15      **NNGA Business Meeting**, ABNR 210  
7:45 – 8:15      **Walnut Council Business Meeting**, Ag Hall  
7:45 – 8:15      **Chestnut Growers of America Business Meeting**,  
ABNR 104
- 8:20 – 8:30      **Welcome and Announcements**, Mike Gold,  
ABNR Conservation Hall
- 8:30 – 9:15      **Keynote Presentation** – Ron Revord, *Updates on  
UMCA Chestnut and Other Nut Tree Research*,  
ABNR Conservation Hall
- 9:20 – 12:00      **Concurrent Technical Sessions** (see next page)
- 12:00- 1:00      **Box Lunch in ABNR lobby**
- 1:00 – 5:00      **Concurrent Technical Sessions** (see next page)  
Please note: Silent Auction closes at 2:20.

**Morning Concurrent Technical Sessions**

**Tuesday, June 25, 2023**

<b>Session A</b> <b>ABNR Conservation Hall</b> <b>Mike Gold, moderator</b>		<b>Session B</b> <b>Agriculture Sciences Building 2-16</b> <b>Hank Stelzer, moderator</b>	
9:20	Jeanne Romero-Severson, <i>AIMS: Update on Chestnut Ancestry</i>	9:20	Thomas Goff, <i>Black Walnut in the Eastern U.S. – Current Status and Trends Based on FIA Data</i>
9:40	Mike Nave, <i>Cross Species Breeding for Eastern Chestnut Growers</i>	9:40	Brian Brookshire, <i>Eastern Black Walnut, An Industry Perspective on Domestic and International Lumber and Log Markets</i>
10:00	Greg Miller, <i>Grafts vs Seedlings for Chestnut Production</i>	10:00	Q & A with Goff & Brookshire
10:20	Break (20 min)	10:20	Break (20 min)
10:40	Amy Miller, <i>Our Experience with Oak Wilt in Our Chestnut Orchards</i>	10:40	Tim Martinson and Greg Vogel, <i>Economics and the Walnut Council</i>
11:00	Seth Gillim, <i>Scaling Regenerative Agroforestry with Chestnut Trees</i>	11:00	Lenny Farlee, <i>Timber Basis and Taxation Considerations</i>
11:20	Lou Naeger, <i>Planning for Farm Succession</i>	11:20	Joe Alley, <i>Intro to USDA Programs for Tree Establishment and Management</i>
11:40	Charlie Novogradac, <i>Establishing Chestnut Orchards Organically</i>	11:40	Q & A with Martinson, Farlee, and Alley
Lunch 12:00 – 1:00 pm			



**Afternoon Concurrent Technical Sessions  
Tuesday, 25 June 2023**

<b>Session A</b>		<b>Session B</b>	
<b>ABNR Conservation Hall</b>		<b>Agriculture Sciences Building 2-16</b>	
<b>Ron Revord, moderator</b>		<b>Lenny Farlee, moderator 1:00-2:00</b>	
		<b>Jerry Van Sambeek, moderator 2:00-5:00</b>	
1:00	<i>Marketing Chestnuts Panel with</i> Mike Gold, moderator Amy Miller, Route 9 Cooperative Roger Blackwell Chestnut Growers, Inc. Roger Smith, Prairie Grove Chestnut Growers Debbie Milks, Chestnut Charlie's Organic Nuts Tom Wahl, Red Fern Farm	1:00	Shaneka Lawson, et al., <i>Growth Patterns and Soil Suitability Studies in Juglans nigra L. and Quercus rubra L. plantations</i>
		1:20	Jerry Van Sambeek, <i>Hardwood Fertilization for Timber and Nuts</i>
		1:40	Q and A with Lawson and Van Sambeek
2:00	Break (20 min)	2:00	Break (20 min)
<b>**Silent Auction closes at 2:20**</b>			
2:20	Thomas Molnar, <i>An Update on New Cultivars from Rutgers &amp; Strategies for Propagation</i>	2:20	Stephanie Adams & Fredric Miller, <i>Oak Decline &amp; Death in Illinois: What Role Does Phytophthora Play?</i>
2:40	Dan Jacobs, John Capik, & Thomas Molnar, <i>Making Informed Decisions on Pollinizer Selection and Distribution Throughout a Hazelnut Orchard</i>	2:40	Bruce Moltzan, <i>National Perspective on Developing Forest Health Issues</i>
3:00	Nick Meier and Ron Revord, <i>Breeding for Durable EFB Resistance Through the Hybrid Hazelnut Consortium</i>	3:00	Matt Ginzel, <i>Strategic Responses of the Hardwood Tree Improvement and Regeneration (HTIRC) to Forest Health Threats</i>

*Afternoon concurrent sessions are continued on next page.*

**Afternoon Concurrent Technical Sessions *Continued***  
**Tuesday, 25 June 2023**

<b><u>Session A</u></b> <b>ABNR Conservation Hall</b> <b>Ron Revord, moderator</b>		<b><u>Session B</u></b> <b>Agriculture Sciences Building 2-16</b> <b>Jerry Van Sambeek, moderator</b>	
3:20	Jason Fischbach, <i>Update on Hazelnut Germplasm and Industry Development from the Upper Midwest Hazelnut Development Initiative</i>	3:20	Q and A on Forest Threats with Adams, Moltzan, and Ginzel
3:40	Warren Chatwin, <i>Picturing Pecans: New Cultivar Releases and Modernizing the USDA ARS Pecan Breeding Program</i>	3:40	Ben Knapp and John Kabrick, <i>Contributions of Hardwood Forest Management to Climate-smart Forestry</i>
4:00	Dan Shepherd, <i>My Mistakes in 50 Years of Being a Pecan Farmer</i>	4:00	Hank Stelzer, <i>The White Oak Initiative Update</i>
4:20	Rodney Dever, <i>Who Needs Pawpaw Cultivars?</i>	4:20	Lauren Pile Knapp, <i>Controlling Invasive Plants and Grape Vines in Hardwood Plantings.</i>
4:40	Andrew Newhouse and William A. Powell, <i>Development and regulatory review of transgenic American chestnut trees for environmental restoration</i>	4:40	Q and A on Forest Management with Knapp, Stelzer and Pile-Knapp
5:00 – 6:15 Break before evening social & banquet			

## Tuesday Evening Activities

- 6:15 – 7:00     **Social** with cash bar, Brewer Field House (see map on back page)
- 6:30 – 6:45     **Group Photo**, Traditions Plaza (see campus map on back of program; *Conservation Hall in case of rain*)
- 7:00 – 8:00     **Banquet**, Brewer Field House
- 8:00 – 9:30     **Post Banquet Program**, Dusty Walter, moderator  
Brewer Field House
- 8:00     **Keynote Speaker**, Shawn Mehlenbacher, *Hazelnut as a Model for Tree Crop Breeding*
- 8:45     **Chestnut Growers of America**  
Announcements and overview of 2024 NNGA/CGA conference
- 9:00     **Walnut Council** Announcements, Walnut Achievement Award, Recognitions
- 9:15     **Northern Nut Growers Association**  
Announcements, Big Nut, Merit and Service Awards, Roll Call of States

### Notes:

## Wednesday, 26 July 2023

Today we conclude the conference with a joint session in ABNR Conservation Hall. We have asked poster presenters to leave posters up until after the break to give everyone another chance to view the posters as a concurrent activity. Optional post-conference tours are available. Please listen for announcements for more information.

- 8:00 – 8:15      Coffee available in ABNR lobby
- 8:15 – 8:30      **Welcome, Announcements, & Introduction to Session C Presentations**, Greg Miller, moderator, ABNR Conservation Hall
- 8:30 – 9:20      Mark Coggeshall, Ron Revord, and Nick Meier, *Past, Present, and Future of Black Walnut Breeding at the University of Missouri Center for Agroforestry*
- 9:20 – 9:40      Doug Wallace, *Using NRCS Web Soil Survey for Evaluating and Developing Hardwood Plantings*
- 9:40 – 10:00     Chung-Ho Lin, *Exploring the Economic Opportunities and Health Benefits of Black Walnuts (*Juglans nigra*)*
- 10:00 – 10:20     Break
- 10:20 – 10:40     Bill Stouffer, *Alley-cropping, Tree Management, and Nut Production*
- 10:40 -11:00     Josh Payne, *Cover Crops, and Soil Health Impacts for Orchards and Tree Plantings*
- 11:00 – 11:20     Samantha Bosco, *Updates on Efforts to Map the Demand for Agroforestry – Research Gaps, Bottlenecks, and Possible Solutions*
- 11:20 – 11:40     Brian Hammons and Pierce Hollingsworth, *Nut Markets for the ‘BOLD, WILD Walnut’ – Flavorful, Healthy & Sustainable.*
- 11:40 – 12:00     **Announcements, Wrap Up, and Closing**, Mike Gold, Ron Revord, and Greg Miller

## Poster Presentations

Posters will be displayed in the ABNR Lobby and ABNR 123 throughout the conference until the end of the break on Wednesday morning. Poster sessions with presenters will occur during the Sunday Welcome Reception from 6 – 7 pm and before the live auction on Monday from 7 – 7:30 pm. If you are a poster presenter, please try to be near your poster during these times.

Alyssa Dunnivan, et al., *Missouri's Thousand Cankers Disease Survey*

Amy Miller and Melanie L. Lewis Ivey, *Chestnut Anthracnose aka Blossom End Rot*

Andrew Newhouse and William A. Powell, *Development and regulatory review of transgenic American chestnut trees for environmental restoration*

Andrew Thomas, et al., *Shaking Black Walnut Trees for an Earlier and More Valuable Nut Harvest*

Aziz Ebrahimi, et al., *Conserving Threatened Butternut Trees Using a Multi-nomics Approach*

Benjamin Jablonski (Nolan Monaghan presenting), et al., *Quantitative Trait Loci Detected for Bearing Habit and Nut Characters in a 'Sparrow' x 'Schessler' Juglans nigra Mapping Population*

Caleb Kell, et al., *Mixed Nuts: Evaluating Field Performance and Improving Regeneration of Pure and Hybrid Butternut*

Caleb O'Neal, Patrick L. Byers, Christine Spinka, and Andrew L. Thomas, *Direct Field Propagation of American Elderberry*

Carrie J. Fearer and Anna Conrad, *Walnut Witches'-broom Disease: A Threat to Butternut Restoration*

Casey Calvert and Tim Martinson, *Forestry Co-ops: A Model to Consider*

James McKenna and Caleb Kell, *Blight Resistance of OxO American Chestnut in Indiana*

James McKenna and Hugh B. Pence, *Bark Cracking of Walnut Trees - a Tough Nut to Crack*

Matthew Huchteman, *Weed Management Trials in Elderberry*

Michele Warmund and Jerry Van Sambeek, *GA<sub>4+7</sub> Soak Before Stratification Enhances Walnut Seedling Production*

Rich Martin, *High Quality Nuts Grow High Quality Trees*

Sarah Phipps and Rosalee Knipps, *Have You Spotted This Invader? Spotted Lanternfly*

Shaneka Lawson, et al., *Precocity of Quercus bicolor – Does size matter? An Early Look*

Shaneka Lawson, et al., *Growth patterns and soil suitability studies in Juglans nigra L. and Quercus rubra L. plantations*

Stephanie Adams, *Oak Wilt and Chestnut Oak: What is going on?*

Sydney Moore, *A Genotype by Environment Study Incorporating Twelve Promising American Elderberry Cultivars*

Tim Martinson and Greg Vogel, *Walnut Council Impacts: Results of Survey of Number and Size of Walnut Plantation*



# CHESTNUT IMPROVEMENT NETWORK

a program of University of Missouri  
Center for Agroforestry

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# Center for Agroforestry

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NORTHERN NUT GROWERS ASSOCIATION  
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## **NNGA Membership Grants You:**

- Online access to *The Nutshell*, our quarterly newsletter, or a printed copy for an additional \$10.00 annually.
- Access to our members-only portal to view past issues of *The Nutshell* newsletter, video recordings, etc.
- Web access to science-based information on propagation, growing, and marketing of nut and select fruit trees.
- An invitation to our annual conference and the right to vote at our annual business meetings.
- Member rates when registering for our annual conference, usually held in August.
- Access to online indices for *The Nutshell* and the Annual Reports.
- Access to the NNGA Library to purchase copies of past articles or borrow reference materials.
- Access to the annual Stakeholder Report in the members- only portal of the website
- One free classified advertisement annually in *The Nutshell* newsletter.
- Access to a list of experts willing to answer your questions about growing and marketing nuts.
- Opportunity to apply for research grants for financial and technical assistance

To join go to <https://nutgrowing.org>. One year membership dues are \$40 per year for individual or family plus \$10 per year if you want a printed copy of quarterly *The Nutshell*.



### **Promoting Chestnuts and Connecting Chestnut Growers**

The purpose of Chestnut Growers of America is to promote chestnuts, to disseminate information to growers of chestnuts, to improve communications between growers within the industry, to support research and breeding work, and to further the interests and knowledge of chestnut growers. CGA advocates the delivery of only high-quality chestnuts to the marketplace. CGA began as the Western Chestnut Growers in 1996 in Oregon where about 30 or so chestnut growers understood the need to join forces to promote chestnuts in the U.S. Eventually they realized that they needed to be a national organization and solicited memberships from every grower in the country, which took the membership to over 100. The name of the organization changed to Chestnut Growers of America, Inc., and granted 501(c)(5) status. Annual meetings take place around the country to make it possible for a maximum number of people to attend. A newsletter, *The Chestnut Grower Newsletter*, is published quarterly and distributed by mail and/or email. CGA maintains an extensive resource site available only to members containing information helpful in growing and marketing. Visit [www.chestnutgrowers.org](http://www.chestnutgrowers.org) for more information.



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**Learn more about the  
Walnut Council at  
[www.walnutcouncil.org](http://www.walnutcouncil.org).**



# Presenter(s), Title, Abstract/Summary, Bios, Affiliations, and Contact Information,

(Listed alphabetically by the last name of the presenter)

## Stephanie Adams and Fredric Miller

### ***Oak Decline and Death in Illinois: What Role Does Phytophthora Play?***

**Abstract:** This presentation will summarize the findings of an ongoing three-year survey of declining white, bur, and red oaks across Illinois. The findings of this survey include above and below-ground symptoms of oak decline, what species of *Phytophthora* and related organisms have been identified, and site and environmental variables that have been consistently associated with declining trees.

**Bio:** Stephanie Adams, PhD, is a Tree Pathologist who works as the Plant Health Care Leader at The Morton Arboretum in Lisle, Illinois. She is a Board-Certified Master Arborist through the International Society of Arboriculture and has worked in the tree care industry for 23 years. Her work focuses on clinical tree disease identification and management, educating green industry professionals to enrich their plant health knowledge, and conducting tree disease-related research.

Stephanie Adams, Plant Health Care Leader and ISA Board Certified Master Arborist, Morton Arboretum, Lisle, IL; sadams@mortonarb.org; 630-719-2415 (office); 630-719-7939 (lab)

Fredric Miller, Walnut Council Protection Committee Chair, Illinois Forest Health Specialist; fmento84@gmail.com

## Stephanie Adams

### ***Oak Wilt and Chestnut Orchards: What is Going On?***

**Poster Abstract:** Oak wilt has been diagnosed in several fresh market chestnut orchards in recent years. This poster will highlight how to identify symptoms and signs of the disease in chestnut trees, how to manage the disease in orchards to prevent its spread, and how to promote health and vigor in trees to prevent disease and insect problems.

See bio & contact info above.

## **Joe Alley**

### ***Introduction to USDA Programs for Tree Establishment and the Management of Tree Plantations and Forest Stands***

**Abstract:** USDA Programs offer numerous opportunities for tree planting and the management of tree plantations and natural forest stands. However, the details and “alphabet soup” associated with USDA Programs are complex and can be intimidating to new participants. This presentation will give an overview of applicable Programs available from NRCS (Natural Resources Conservation Service) and FSA (Farm Service Agency), providing attendees with a general understanding of which programs are best suited to help them meet their objectives.

**Bio:** Joe Alley has over 20 years of forestry experience with USDA NRCS in Missouri and has served as the NRCS State Forester since 2018. His prior experience includes Forester/Urban Forester duties with the Missouri Department of Conservation, Assistant Manager for a Pine Seedling Nursery in Mississippi, and Research Specialist with University of Missouri Center for Agroforestry. Joe holds a BS in Forestry and a MS in Forestry with an emphasis in Agroforestry from University of Missouri – Columbia. In his spare time, he enjoys mountain biking, growing and pruning trees, dealing with a small flock of chickens, producing syrup from a handful of maples and walnuts on his home place, and chillin’ on the deck.

Joe Alley, Missouri NRCS State Forester, USDA Natural Resources Conservation Service, Columbia, MO; joe.alley@usda.gov; 573-876-9402

## **Roger Blackwell**

### ***Marketing Chestnuts at Chestnut Growers, Inc.***

**Summary:** CGI is a 22-year-old chestnut marketing co-op in Michigan with 40 member growers. Each member has equal ownership in sharing the processing facility. CGI sells on average 150,000 lbs. per year. Seventy-five percent is sold in the wholesale market. Twenty-five percent is sold retail on the website. CGI continues to add new customers and new growers. CGI website is [www.chestnutgrowersinc.com](http://www.chestnutgrowersinc.com).

**Bio:** Roger is the President of Chestnut Growers Inc., a Michigan chestnut grower co-operative; co-owner of New Era Chestnuts, LLC; and V.P. Business Development at Treeborn, Inc. Roger has a great deal of experience in chestnut production, processing, and sales. He is a dedicated supporter of the Michigan chestnut industry.

Roger Blackwell, Chestnut Growers of America President; President, Chestnut Growers, Inc.; and Owner, New Era Chestnuts, Milford, MI; rblackwel@comcast.net; 810 923-2954

## **Samantha Bosco**

### ***Updates on Efforts to Map the Demand for Agroforestry — Research Gaps, Bottlenecks, and Possible Solutions***

**Abstract:** Recognition of agroforestry's multiple roles in fostering sustainable and climate resilient food systems are driving an increase in the number and scale of planned and promised agroforestry plantings across the US. The success of efforts to scale-up agroforestry depends on the timely and sufficient availability of trees and shrubs from high quality and time-tested plant materials — and is limited by challenges facing nursery producers in meeting this demand. In response, the National Agroforestry Center is conducting a study to detail region-specific trends in plant material demands, research gaps limiting propagation efforts, bottlenecks limiting supply availability, as well as potential solutions to alleviate these challenges. This presentation is an update on this research, conducted by Oak Ridge Institute for Science and Education (ORISE).

**Bio:** Samantha Bosco is a Postdoctoral Fellow with the National Agroforestry Center working on detailing the bottlenecks and possible solutions facing the nursery side of the scaling agroforestry equation. She was the Agroforestry & Nut Cropping Planner at Cornell Cooperative Extension Tompkins County. The focus of her doctoral research was on the role of temperate nut trees in Haudenosaunee food sovereignty and climate smart agriculture in what is today known as New York State. Several of her featured past presentations include Haudenosaunee Agroforestry and Forest Relations, Cracking into NYS Nut Production, and Nut Production: Past, Present, Future.

Samantha Bosco, ORISE Postdoctoral Fellow, National Agroforestry Center; [samantha.bosco@usda.gov](mailto:samantha.bosco@usda.gov)

## **Brian Brookshire**

### ***Eastern Black Walnut, And Industry Perspective on Domestic and International Lumber and Log Markets***

**Summary:** Brian will speak about domestic and international markets of walnut lumber and logs and the issues facing the processing and manufacturing sector of that industry. Brian has travelled to China, Vietnam, India, Malaysia, Mexico and other parts of the world promoting walnut and he will reflect upon those experiences during his presentation.

**Bio:** Brian is the Executive Director of the AWMA and has served in that role for several years. He is also the Executive Director of the Missouri Forest Products Association. He has BS and MS degrees in forestry from the University of Missouri-Columbia.

Brian Brookshire, Executive Director, American Walnut Manufacturers Association (AWMA) and Missouri Forest Products Association (MFPA), Jefferson City, MO; brian@moforest.org; www.moforest.org; 573-634-3252; 573-690-0987

**Casey Calvert** and Tim Martinson

***Forestry Co-ops – A Model to Consider.***

**Poster Abstract:** Premise: Walnut Council members collectively can leverage economies of scale for the benefit of all members. Similar to the premise behind a cooperative, a purchasing alliance, or a collective, there are positives involved with mutual assistance in working toward a common goal. Under Timber Sale Optimization, we could coordinate harvests, aggregated together to achieve a large volume of logs that can result in selling power to achieve higher prices paid and increase volume/scale, i.e., Walmart vs mom and pop store. Under Purchasing Power, we could buy in bulk and pass along the savings to WC members. Examples include purchase of chemicals, seedlings, equipment, tree tubes, etc. Under Walnut Council branded/endorsed forestry consulting, we may have the ability to get quality consulting work from someone who has been vetted, for services such as: timber marking for sale, harvest management, thinning, pruning, planting, disease and pest control, etc. Likewise, we aggregated data such as prices being paid and market trends across WC members that can be shared for the benefit of all members. Finally, under value proposition to recruit new WC members we have opportunities to market our services and attract new WC members.

Casey Calvert, Walnut Council President and Landowner, Evansville, IN; swcrops@gmail.com

**Warren Chatwin**

***Picturing Pecans: New Cultivar Releases and Modernizing the USDA ARS Pecan Breeding Program***

**Abstract:** The USDA ARS Pecan Breeding & Genetics Program has utilized traditional field-based phenotyping methods for pecan breeding and improvement. The traditional breeding and evaluation process, which takes an average of 28 years, will be explained, and information about three recent pecan cultivar releases will be presented. In an effort to reduce this time window and increase the accuracy of selection, we are implementing high-throughput phenotyping and genotyping methods. These techniques will be combined with a multi-parent mapping population to enable the use of genomic selection for breeding in pecan trees. Implementing this method will allow, over time, for the prediction of mature

pecan traits in related juvenile seedlings and a reduction of up to 10 years in the pecan breeding and evaluation cycle.

**Bio:** Dr. Warren Chatwin is the Research Geneticist leading the USDA-ARS Pecan Breeding & Genetics Program in College Station, Texas. His work is focused on transitioning pecan breeding to incorporate technologies like image-based phenotyping and high-throughput genotyping to increase the efficiency and accuracy of selection in breeding. Outside of work, he enjoys mountain biking, long campaign dungeon-crawl board games, and playing with his two sons, Rowan and Rory.

Warren Chatwin, Research Geneticist, USDA ARS Pecan Breeding & Genetics Program, College Station, TX; Warren.chatwin@usda.gov

**Mark V. Coggeshall**, Ron Revord and Nick Meier

***Past, Present, and Future of Black Walnut Breeding at the University of Missouri Center for Agroforestry***

**Abstract:** A black walnut (*Juglans nigra*) breeding program at the University of Missouri Center for Agroforestry was initiated in 1996. A genetically diverse collection of nut cultivars was established in a germplasm repository at the MU Horticulture and Agroforestry Research Farm to serve as parents for a multi-generational breeding program. Based on a series of evaluations over multiple years, a subset of clones was hybridized using controlled pollinations to produce full sib seedling cohorts that, in turn, were evaluated over multiple years for their performance, based on a suite of commercially important nut traits. Additional breeding program activities during this period included confirmation of label identities of all individuals within this germplasm repository using both phenological data and microsatellite markers, studies related to pollen flow dynamics, and use of “breeding without breeding” approaches to gain efficiencies in producing additional full sib progeny using genetic markers. Current breeding program activities include development of additional full sib progeny, to both capitalize on promising initial selections, as well as diversification of the original founder parent population. Further, a robust ‘Sparrow’ x ‘Schessler’ F1 mapping population is now being used to discover those genetic regions and markers associated with commercially important traits of interest using quantitative trait loci (QTL) analysis. In addition, multivariate analysis techniques have been employed to further our understanding of the genetic diversity associated with important phenotypes in our germplasm repository. Future plans include production of new breeding generations (1,000-3,000 full sib offspring annually), adding more markers to our existing black walnut genetic linkage map to facilitate QTL analyses and, implementing marker assisted selection (MAS) techniques to streamline



the breeding program outputs. Lastly, new cultivar releases will be made available to growers.

**Bio:** Mark Coggeshall, PhD, served as UMCA Nut Tree Breeder (2000-2017); then joined the USDA Forest Service, Northern Research Station as Project Leader of the Hardwood Tree Improvement and Regeneration Center in West Lafayette, IN. He is now retired and currently serves as an Emeritus Scientist, USDA Forest Service, Northern Research Station, and Adjunct Faculty member in School of Natural Resources, University of Missouri, Columbia, MO.

Mark V. Coggeshall, Retired Tree Improvement Specialist, HTIRC and Center for Agroforestry, University of Missouri, Columbia, MO; [coggeshall@missouri.edu](mailto:coggeshall@missouri.edu)

## **Rodney Dever**

### ***Who Needs Pawpaw Cultivars?***

**Summary:** We are going to consider the background of pawpaw selection up to the modern era, who were the movers and the shakers of pawpaw breeding, and what is currently available in the nursery trade.

**Bio:** Rodney completed his graduate degree in evolutionary biology at West Virginia University researching wild onions (*Allium*). His focus is on that fine line between foraging wild edibles and incipient agriculture. These days Rodney works with Neal Peterson, creating new and improved pawpaw varieties and contributing to the pawpaw craze. He regularly leads nature walks as President of the Eastern Panhandle Chapter of the West Virginia Native Plant Society.

Rodney Dever; [rodneydever65@gmail.com](mailto:rodneydever65@gmail.com)

## **Alyssa Dunnivan and four others**

### ***Missouri's Thousand Cankers Disease Survey***

**Poster summary:** Thousand Cankers Disease (TCD) is a disease complex primarily of eastern black walnut where the fungus (*Geosmithia morbida*) is vectored by the walnut twig beetle (WTB, *Pityophthorus juglandis*). TCD has not manifested as a significant disease in the eastern U.S. as it did in the western states, and it is now accepted that the root causes of this disease are more complicated than simply the presence of the fungus and the insect. Missouri continues to survey the state for TCD to aid walnut lumber exports. To date, TCD has not been found in Missouri but the *Geosmithia morbida* fungus has been found on various species of beetles.

Alyssa Dunnivan, Missouri Department of Agriculture, Jefferson City, MO;  
Alyssa.Dunnivan@mda.mo.gov; 573-522-1159

**Aziz Ebrahimi**, Anna Conrad, Manuel Lamothe, Jim Warren, Martin Williams, Nicholas LaBonte, Carrie Pike, Keith Woeste, Nathalie Isabel, and Douglass Jacobs

### ***Conserving Threatened Butternut (*Juglans cinerea*) Trees Using a Multi-omics Approach***

**Poster abstract:** Genome-wide association studies (GWAS) have elucidated how genetic differences contribute to biotic and abiotic stresses in plant species. Since being identified in the late 1960s *Ophiognomonia clavignenti-juglandacearum*, the exotic pathogen responsible for butternut canker disease, has functionally eradicated and severely decimated North American butternut populations with no cure available or obvious genetically based resistance. This represents a critical threat to forest biodiversity, productivity, affects many food webs, and constitutes a fundamental challenge to land managers. Butternut can readily hybridize with Japanese walnut and identifying genome invasion (hybrids) through morphological characteristics is often impossible. Attempts to conserve and restore butternuts require accurate characterization of trees used in future breeding efforts. We describe the use of phenomics and genomics to evaluate remnant butternut populations in HTIRC plantings sites. We expect to identify marker-trait associations for disease-resistance and related traits in butternut. If successful, improved selections could provide germplasm to support conservation and restoration of the species.

Aziz Ebrahimi, HTIRC, Purdue Univ.; W. Lafayette, IN;  
aebrahi@purdue.edu

**Lenny Farlee**

### ***Timber Basis and Taxation Considerations***

**Summary:** This presentation will provide a brief overview of the calculation and use of basis when selling timber or planning to do so and also discuss some additional considerations tax implications of how timber is sold, and some resources to assist landowners with tax management related to timber sales, woodland management, and tree planting and regeneration.

**Bio:** Lenny Farlee is an Extension Forester in the Dept of Forestry and Natural Resources and the HTIRC at Purdue University since 2007, emphasizing the management of hardwood forests and the planting and management of hardwood trees. Previously he was a private lands forester and a nursery forester for the Indiana DNR Division of Forestry. He holds a BS and MS in Forestry from Purdue University. He is also a

private woodland owner and manages his property for a variety of objectives.

Lenny Farlee, Extension Forester, HTIRC and Dept. of Forestry & Nat. Res., Purdue Univ., W. Lafayette, IN; lfarlee@purdue.edu; 765-494-2153

**Carrie J. Fearer** and Anna Conrad

***Walnut Witches'-Broom Disease: A Threat to Butternut Restoration.***

**Poster Abstract:** Butternut (*Juglans cinerea*) is an endangered tree species found throughout the NE United States. While the major threat to butternut's survival is butternut canker disease (BCD), another lethal disease, walnut witches'-broom (WWB), also threatens its fate. Since butternut restoration efforts have primarily focused on identifying and breeding for BCD resistance phenotypes, WWB disease may compromise these studies if BCD resistant families are susceptible to WWB. This study sought to confirm the presence of the WWB phytoplasma, '*Candidatus phytoplasma pruni*,' and identify specific butternut families affected by the disease in butternut resistance screening plantings in Indiana using molecular methods. We also sought to better understand the incidence of the WWB's phytoplasma in asymptomatic trees and asymptomatic branches of symptomatic trees to better direct management decisions. Results confirmed the presence of the WWB phytoplasma in butternut restoration plantings, the first confirmation in Indiana based on sequencing, in both symptomatic and some asymptomatic trees. Concurrently, WWB phytoplasma was detected in asymptomatic branches of symptomatic trees, indicating that phytoplasma infection is not necessarily localized to symptomatic tissues. Trees with positive molecular confirmation of the WWB phytoplasma consisted of 24 different butternut families and one family of Japanese walnut (*J. ailantifolia*), which is considered one of the most susceptible species to WWB disease. These results indicate that butternut restoration efforts should prioritize identifying the hybridity and pedigrees of families and their susceptibility to WWB, and management efforts should be revised to address the cryptic nature of the WWB phytoplasma.

**Bio:** This research was completed while Carrie Fearer was a post-doctoral researcher in Anna Conrad's laboratory at the Hardwood Tree Improvement and Regeneration Center, Purdue University. Carrie Fearer is currently a post-doctoral researcher at the University of New Hampshire.

Carrie Fearer, Post-doctoral Researcher, UNH, Durham, NH;  
carrie.fearer@unh.edu

**Jason Fischbach**

## ***Update on Germplasm and Industry Development for the Upper Midwest Hazelnut Development Initiative***

Jason Fischbach, Center for Integrated Agricultural Systems, University of Wisconsin, Madison, WI; Jason.fischbach@wisc.edu; 715-373-3291

### **Seth Gillim**

#### ***Success, Challenges, and Opportunities of Scaling Regenerative Chestnut Agroforestry***

**Abstract:** What are some of the main obstacles to bringing regenerative chestnut agroforestry to scale? How do we achieve scale without resorting to 'business as usual?' What are opportunities to bring new participants to the chestnut world while still honoring the work of those who have gotten us where we are today? In this presentation, Seth Gillim from Propagate, PBC will share takeaways from its recent planting projects in Kentucky. Among those are the challenges of establishing resilient supply chains, finding partners that are a 'right fit' for your organization, and the critical importance of getting rural communities invested in agroforestry as a whole.

**Bio:** Seth Gillim is Director of Farm Services at Propagate, PBC. He has been working in the agriculture, horticulture, and nursery industries for over 20 years in the Northeast, Midwest and Caribbean. He holds an MBA from the Sustainable Innovation MBA Program at the University of Vermont. He lives in Cambridge, Vermont.

Seth Gillim, Director of Farm Services, Propagate, PBC, Cambridge, VT; seth@propagateag.com

### **Matt Ginzel**

#### ***Strategic Responses of the Hardwood Tree Improvement and Regeneration (HTIRC) to Forest Health Threats***

**Abstract:** Invasive plants, insects and pathogens are changing the ecological dynamics of forest environments throughout the Central Hardwood Forest Region. Ongoing research at the HTIRC is quantifying the impacts of these agents on the regeneration, health, and productivity of forests – knowledge critical to maintaining the economic and ecological services derived from them. Here, I will discuss the work of the Center to develop and demonstrate strategies to address the threat of Thousand Cankers Disease to black walnut. I will also outline research aimed at breeding disease-resistant butternut and American chestnut trees.

**Bio:** Matthew Ginzel is a Professor in Entomology and Forestry & Natural Resources at Purdue. He is currently Director of the HTIRC and served

as Co-Director from 2017-2020. The central focus of his career has been to advance the science of forest protection and develop tools to reduce the impacts of invasive insect pests and pathogens on native hardwood forests.

Matt Ginzel, Director, HTIRC, Purdue Univ., W. Lafayette, IN; mginzel@purdue.edu

## **Thomas Goff**

### ***Black Walnut in the Eastern U.S.--Current Status and Recent Trends Based on FIA Data***

**Abstract:** Black walnut (*Juglans nigra*) has an estimated population of more than 340 million trees and 4.9 billion cubic feet of net volume on forest land spread across the eastern United States. Over the past decade, the number and net volume of black walnut trees have increased by 11 percent and 23 percent, respectively. We examine the factors driving these increases as well as other important variables such as tree damage and regeneration using the latest data from the Forest Service's Forest Inventory and Analysis (FIA) program.

**Bio:** Thomas is a Forester with the USDA Forest Service, Northern Research Station, Forest Inventory and Analysis (FIA) Unit in Columbia, MO. Thomas spent 18 years collecting FIA data in the Midwest and Plains States and now serves as the analyst for Iowa and Missouri.

Thomas Goff, Forester, USDA Northern Research Station, Forest Inventory and Analysis, Columbia, MO; Thomas.c.goff@usda.gov

## **Bill Hammitt**

### ***Establishing Clover Cover Crops in Black Walnut Plantations***

**Show and Tell Abstract:** There are several potential benefits to establishing a clover cover crop that may serve as a green manure in walnut plantations. These benefits include added nitrogen, increased organic matter, cooler soil temperatures, increased moisture availability, better soil structure, and erosion control, to name a few. The purpose of this presentation is to report the failures and successes of establishing a clover cover crop in the understory of a mid-rotation (39 yrs.) black walnut plantation. The first attempt reports the failure to establish FiXatioN Balansa Clover in the plantation understory, while the second attempt reports the success of establishing a red and white clover mixture in the plantation. Possible reasons for the failure and success of establishing the clover cover crop in black walnut are presented...and recruited from the audience.

**Bio:** Bill Hammitt is past president of the Walnut Council and current president of the Ohio Chapter of Walnut Council. He has forestry training and owns a 56 and 39-year-old walnut plantation for lumber in Ohio.

Bill Hammitt, Past Walnut Council President and landowner, Clemson University, Seneca, SC; hammitw@clemson.edu

**Brian Hammons** and Pierce Hollingsworth

### ***Nut Markets for the 'BOLD, WILD Walnut' – flavorful, healthy & sustainable***

**Summary:** How are Black Walnuts different from common walnuts? Many consumers and nut buyers do not know the difference, which reduces the potential sales / consumption of Black Walnuts sold at a premium price (due to low yield/high cost). Much is being done to promote Black Walnuts as the “Bold, Wild Walnut” with health benefits that fit well with today’s consumer food trends (see [www.wildblackwalnuts.org](http://www.wildblackwalnuts.org)). With a brief discussion of how the nuts are gathered and processed, most of this talk will cover promotion through social media, dietitians, packaging, food shows, and other marketing methods. Hammons Products Company buys about 20 million pounds of wild Black Walnuts every year from people in 12 states, shelling them and selling the nutmeats as a food ingredient and the hard nutshells as an abrasive for machine cleaning, filtration, and oil drilling.

**Bio:** Brian Hammons is the third-generation leader of the company, which was started in 1946 and is the leading commercial processor of American Black Walnuts. Brian was named President of Hammons Products in 1997 when his father Dwain retired, and in July 1999 he was also named CEO of the company. Brian earned a BS in Marketing from Missouri State University in Springfield, Missouri and a J.D. (law degree) from Southern Methodist University Law School in Dallas, TX. He has been actively involved in the Black Walnut company since 1987. He also has experience with other tree nuts, having run the company’s Ellis Pecan Co. business in Fort Worth, TX in the mid-90’s before selling it successfully. Brian’s primary hobby is running, having completed 43 marathons including the Boston Marathon 13 times. He was named one of “50 Missourians You Need to Know” by Ingram’s Kansas City magazine.

Brian Hammons, President, Hammons Products Company, P.O. Box 140, Stockton, MO; [bhammons@black-walnuts.com](mailto:bhammons@black-walnuts.com); <https://black-walnuts.com>

**Rick Hartlieb**

### ***Setting Up a New Diversified Orchard with Hazelnuts and Chestnuts***

**Show and Tell Summary:** Castanea Farms LLC had its first sale of chestnuts in 2018. The farm grew in annual production, and picked up rented acres, established a buying station for folks to drop off nuts, and recently acquired a new farm, which is a blank slate to work with. This lighting talk will highlight the layout, planning, startup costs and time in designing a new farm. The trees are currently in our nursery, awaiting the end of the drought and planting in Fall of 2023 or Spring 2024. This new farm, referred to as Castanea Farms' "County Line location" is set up to be diversified with chestnuts, hazelnuts, elderberry, woody florals, and row cropping in the alley ways of trees.

**Bio:** Rick Hartlieb wears three hats involved with chestnuts and agroforestry in PA. As an Assistant District Forester with the PA Dept of Conservation and Nat. Res., Bureau of Forestry, he leads the technical assistance program with private forest landowners (and farmers interested in tree crops) in SE PA. He is also President of the PA/NJ chapter of The American Chestnut Foundation. At home, Rick and his wife Jen operate Castanea Farms, LLC., a diversified operation focusing on grass fed lamb and beef, produce, nuts, and woody florals. Recently, Castanea Farms expanded to a second (owned) farm in Bechtelsville, PA, where they will be growing 14 acres of chestnuts and an acre of hazelnuts. Between owned and leased acres, Castanea Farms manages close to 50 acres in Chestnut Production.

Rick Hartlieb, Assistant District Forester, Pennsylvania Department of Conservation and Natural Resources; rickhartlieb@gmail.com

## **Matthew Huchteman**

### ***Weed Management Trials in Elderberry***

**Poster abstract:** Following an increase in the scale of American elderberry production, growers have been presented with new challenges in weed management. Many of these challenges can be traced back to a lack of sufficient information concerning the effects of common weed control methods. The aim of this study is to conduct a comprehensive assessment of six methods of weed suppression in American elderberry, evaluating factors including effective weed control, elderberry plant performance, and economics associated with each treatment. Conclusions from this multi-year study will be instrumental in elucidating effective and practical weed management strategies for American elderberry growers.

Matthew Huchteman, University of Missouri Center for Agroforestry, Columbia, MO; mwhppq@missouri.edu

**Benjamin Jablonski** (Nolan Monaghan presenter), Benjamin Bishop, Elias Bunting, Mark Coggeshall, Jeanne Romero-Severson, and Ronald Revord

***Quantitative Trait Loci Detected for Bearing Habit and Nut Characters in a ‘Sparrow’ x ‘Schessler’ Juglans nigra Mapping Population***

**Abstract:** The nuts of eastern black walnut (*Juglans nigra*) support a regional industry of flavorful kernels, value added products, and industrial grits made from the shells. The commercial viability of black walnut is limited by the industry’s reliance upon a crop from unimproved, wild seedling trees, which is variable but reaches 16 million pounds in Missouri. Initiated in 2000, the Black Walnut Breeding Program at University of Missouri Center for Agroforestry seeks to improve the species for orchard nut/kernel production emphasizing spur-bearing and high kernel mass/percentage. In 2010, a mapping population, ‘Sparrow’ x ‘Schessler’ *Juglans nigra*, was established to study trait genetic control and facilitate the discover of DNA markers with potential to assisted in progeny selections. Using 248 individuals from this population, and the populations previously reported genetic map of 62 EST-SSR and 356 SNP markers, we report quantitative trait loci (QTLs) for yield and spur-bearing habit, nut dimensions, nut mass, kernel mass, and percent kernel - the first report of this kind for *J. nigra*. Three QTLs explaining the degree of spur-bearing were found on LG 8, LG 11, and LG 16 and are responsible for 7.2%, 8.7%, and 10% of trait variation, respectively. Two QTLs were detected on LG 5 for nut mass, explaining 24.8% and 21.2% of trait variation. These LG 5 QTLs co-locate with QTLs discovered for kernel mass and nut face area. Interestingly, nut length was explained by a QTL on LG 13, accounting for 19% of trait variation, and multi-variate analysis suggests this locus might provide a target to simultaneously improve both kernel mass and kernel percentage. We identified two QTLs for kernel percentage on LG 6 and LG 7, explaining 12.5 and 13%, respectively. Our research represents the first exploration into the genetic control of yield and nut quality characteristics in *J. nigra*. Building from the QTLs detected in this study, we plan to improve linkage map marker density and begin testing markers for assisted selection in the Black Walnut Breeding Program.

Benjamin Jablonski, Former MS Student, Center for Agroforestry, University of Missouri, Columbia, MO

**Bio:** Nolan Monaghan is studying competitive dynamics and competition under an alley cropping system focused on developing perennial polycultures. He has completed one year of his agroforestry MS. Before joining the University of Missouri Center for Agroforestry, Nolan obtained two Bachelor’s degrees in Horticulture and Global Resource Systems at Iowa State University. He also completed internships in agroecology at The Land Institute, and in organic agriculture at the University of



Hohenheim in Germany. After graduation, he hopes to work in international development to improve the productivity and resilience of agricultural systems globally.

Nolan Monaghan, MS Student, Center for Agroforestry, University of Missouri, Columbia, MO: ndmonaghan@missouri.edu

**Dan Jacobs**, John Capik, and Thomas Molnar

***Making Informed Decisions on Pollinizer Selection and Distribution throughout a Hazelnut Orchard***

**Abstract:** Hazelnut is a wind pollinated crop with a complex genetic self-incompatibility system. Conventionally, in clonal hazelnut orchards, trees are pollinated by designated pollen donors, called pollinizers, that are compatible with main production cultivars. When establishing an orchard, the selection of diverse and cross-compatible pollinizers is paramount for adequate pollination, and ultimately, nut yields. Hazelnuts also show wide variation in bloom phenology, further complicating pollinizer selection. Because hazelnuts bloom in the middle of winter, male flowers, called catkins, can become damaged by untimely hard frosts. Growers must take into account varietal catkin cold hardiness, coupled with a strategic orchard design in order to maximize the likelihood of successful pollination. This presentation will aim to inform growers on the importance of understanding the self-incompatibility and phenology of an orchard, while also discussing Rutgers' current recommendations for pollinizer selection and field layout.

**Bio:** Dan Jacobs is a PhD student at Rutgers University. His research focus is developing a better understanding of the relationship between European hazelnut and the fungal pathogen that causes eastern filbert blight, but he has become enveloped in all facets of hazelnut production and propagation. He is passionate about developing sustainable and nutritious perennial crops to feed our ever-changing world.

Dan Jacobs, Doctoral Student, Rutgers University, New Brunswick, NJ; d.jacobs@rutgers.edu

**Caleb Kell**, Douglass Jacobs, and Jim McKenna

***Mixed Nuts: Evaluating Field Performance and Improving Artificial Regeneration of Pure and Hybrid Butternuts***

**Poster abstract:** Butternut (*Juglans cinerea*) is a walnut species native to eastern North America historically valued for both nuts and timber. Since the discovery of Butternut Canker Disease in the 1970s, butternut populations have declined precipitously, causing the tree to be listed as threatened in multiple US states and endangered in Canada. Interspecific

hybrids between butternut and Japanese walnut (*J. ailantifolia*) are significantly more resistant to Butternut Canker Disease than butternut, providing a potential means to develop a disease-resistant butternut population for restoration use. Deployment of such a population requires improving the success of artificial regeneration, which is currently hampered by a dearth of information about proper silvicultural characteristics and site preferences. To evaluate the feasibility of using hybrids to restore the wild butternut population, and to improve the success of artificial regeneration of butternut, two types of hybrid butternut plantings were evaluated: private butternut plantings, and a series of HTIRC mixed species trials. These plantings provide the first evaluation of the feasibility of using hybrid butternuts for restoration; they also provide the first formal guidelines for site selection and management of butternut plantings.

Caleb Kell, Hardwood Tree Improvement and Regeneration Center; Purdue University, West Lafayette, IN: ckell@purdue.edu

**John Kelsey, Joe Hietter, and Bryan Dayton**

### ***NNGA Cultivar Inventory Database***

**Show and Tell Summary:** In 2013, The NNGA Nut Cultivar Inventory project sent out data entry forms to all members, and about 1/3 replied listing their growing nut cultivars. The data was hand entered by Joe Hietter that amounted to over 1400 individual entries. Brian Dayton made a user's interface for viewing and entering new data, which could be accessed by a link on the NNGA website. This user's feature was little used and was abandoned, due to separate hosting cost. Many members feel that the project has lasting value, should be expanded, and should not be allowed to just fade away.

**Bio:** John Kelsey is a retired engineer growing black walnut and hazelnuts on his farm in West Virginia. The Kelsey's have 5 acres of European hazels with some forty EFB resistant varieties of various ages. As a retired engineer, John designs and tests new equipment, especially equipment to process black walnuts. John also collects and analyzes tree data for himself and others. He serves on the Boards of the NNGA and Walnut Council and chairs the NNGA Cultivar Inventory Database Committee.

John Kelsey, Walnut Council Landowner Representative and NNGA Director, Southside, WV; jfknutz@gmail.com

Joe Hietter, NNGA Webmaster and Director, Pataskala, OH; joehietter@gmail.com

Brian Dayton, Plant Breeder, Dayton Genetics, Richmond, UT; daytongenetics@gmail.com

**Benjamin Knapp** and John Kabrick

### ***Contributions of Hardwood Forest Management to Climate-smart Forestry***

**Abstract:** Recognition of the importance of trees to terrestrial carbon dynamics has contributed to interest in developing 'climate-smart forestry' practices. A framework for managing for future climate uncertainty includes two main components: 1) adaptation approaches to maintain forest function through changing climatic conditions and 2) mitigation approaches to manage for greater sequestration and storage of carbon. Active forest management provides opportunities to address each of these broad objectives through manipulation of forest structure and composition. Agroforestry practices that integrate trees into production practices provide additional carbon storage potential. This presentation highlights important concepts and management examples for climate-smart forestry in the central hardwood region.

**Bio:** Ben Knapp is an Associate Professor of Silviculture and Interim Director of the Center for Agroforestry in the School of Natural Resources at the University of Missouri. He received his BS in forestry at Purdue University and his MS and PhD degrees in forestry at Clemson University. Through understanding ecological processes, his research seeks to refine silvicultural practices to address contemporary issues, often related to restoration or conservation objectives. Specific research topics include tree regeneration, fire ecology and the use of prescribed burning as a silvicultural tool, and understanding how disturbances, through management or natural, affect stand dynamics.

Ben Knapp, Associate Professor of Silviculture and Interim Director, Center for Agroforestry, University of Missouri, Columbia, MO; knappb@missouri.edu

**Shaneka Lawson**, Niall Lue Sue, John Kabrick, Mary Beth Adams, Jim Warren, Lenny Farlee, and Carrie Pike

### ***Growth patterns and soil suitability studies in *Juglans nigra* L. and *Quercus rubra* L. plantations***

**Abstract:** The growth patterns of native black walnut (*Juglans nigra* L.) and northern red oak (*Quercus rubra* L.) have been extensively studied but there are few studies documenting the field performance of families selected for rapid growth and high quality. Here we assessed the diameter and height growth of 954 selected individuals of black walnut and northern red oak grown for 5 to 16 years (eastern black walnut) and 8 to 11 years (northern red oak) in three locations each in Indiana and Michigan. Families were selected from progeny tests conducted at the Hardwood

Tree Improvement and Regeneration Center at Purdue University. Around each tree, soil samples were collected to measure soil nutrients (Ca<sup>2+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Na<sup>2+</sup>), cation exchange capacity (CEC), pH, soil texture (% clay, % sand, % silt), organic carbon, and the thickness of the surface soil horizon to determine if tree growth differences within sites were related to these properties. Findings indicated that growth differences among families were relatively small, but diameter growth of northern red oak increased with decreasing pH and decreasing clay content and increasing organic carbon and increasing surface horizon thickness. In contrast, black walnut growth increased with increasing pH, indicating its preference for nutrient-rich soil. Overall, satisfactory growth occurred on all sites, suggesting that selections were suitable for planting across a range of site conditions.

**Bio:** Dr. Shaneka Lawson is a Research Plant Physiologist with the USDA and a Maryland native. She earned a BS in Biology and Chemistry with minors in English, Spanish, and Latin from Morgan State University, an HBCU in Baltimore. She earned a MS in Biotechnology-Biodefense from Johns Hopkins University (JHU) before obtaining laboratory manager positions in human genetics and neuroscience at JHU studying genetic abnormalities. Seeking to gain experience in additional research models, she moved to Indiana to pursue a PhD in Tree Genetics and Physiology. After researching genetic modifications in plants and genetically engineering trees to be drought-tolerant and salt resistant for her PhD, she obtained a USFS research scientist position. She is primarily interested in abiotic stress in plants using NextGen sequencing and bioinformatics to research this topic. Recently, her focus has shifted slightly to encompass site suitability and its role in assisted migration of tree species whose populations are vulnerable to climate change. Despite the challenges and time demands of research, she often volunteers in the community with a variety of programs. Her experiences in various fields and with numerous research models have given her a solid background in all aspects of STEAM across a variety of distantly related fields. Those experiences are what drive her dedication to the field and her desire to help others.

Shaneka Lawson, Research Plant Physiologist, USDA Forest Service and Hardwood Tree Improvement and Regeneration Center, Purdue University; shaneka.s.lawson@usda.gov

**Shaneka Lawson, Niall Lue Sue, Jonathan Shimizu, Juan Frene, and Mark Cogeshall**

### ***Precocity of *Quercus bicolor* – Does size matter? An Early Look***

**Poster and Field Presentation Abstract:** Precocity is a trait that is revered throughout the agriculture and forestry industries. Accelerated maturation can propel genetics studies as new generations of trees can

be obtained much more quickly than traditional breeding methods. In addition, the presence of precocious individuals will help reestablish forest cover and provide a much-needed food supplement for wildlife species. This study evaluated acorn production in 91 swamp white oak (*Quercus bicolor*) progeny from 66 precocious parents. Hundreds of acorns were screened from each of 16 families for acorn length (AL), acorn width (AW), and acorn weight (AWT). In addition to acorns, leaf material was also collected from each of these trees with the goal of DNA extraction and subsequent sequencing to identify potential mutations in genes thought to be involved in precocity. Preliminary results show distinct differences in AL, AW, and AWT among each of the families studied.

**Bio:** See Lawson bio & contact info under previous abstract.

## Chung-Ho Lin

### ***Exploring the Economic Opportunities and Health Benefits of Black Walnut***

**Abstract:** Black walnut (*Juglans nigra*) is of the most economically valuable hardwood species for the agroforestry systems in the U.S. The walnut-rich diet has demonstrated a wide range of health-promoting beneficial effects related to hyperlipidemia, cardiovascular disease, type 2 diabetes and non-alcoholic fatty liver disease. The aim of this project is to explore the novel uses of black walnuts and their byproducts for the industries by systematically examining their health-promoting compounds. The specific objectives of the study include: 1) characterizing the health-promoting compounds through modern mass spectrometry, global metabolomic analysis and high-throughput screening bioassay protocol, 2) conduct market research to identify potential uses and formulation of the identified health-promoting compounds from black walnut kernels for cosmetic, personal care products and pharmaceutical industries; and 3) examine the niche market of the identified value-added products. We have identified more than 143 bioactive phenolics which have been previously reported as bioactive agents that are important to human health. The anti-microbial, antioxidant, and anti-tumor properties of each compound have been examined using high throughput screening assays. The anti-inflammatory properties of the extracts have been assessed in the human pro-monocytic cell line by evaluating the effects of the extracts on the expression of 13 human inflammatory cytokines/chemokines. A market guide has been compiled to provide information on health-promoting compounds from the plant materials and their potential uses in producing value-added products for industrial use. The findings will increase the overall incomes of the chain production and benefit all the participants involved in the supply chain of specialty crops in agroforestry operations.

**Bio:** Dr. Lin is the Research Professor and lead scientist for the natural products research programs at the University of Missouri Center for Agroforestry. He has been exploring the utilization of modern analytical and molecular techniques to identify the niche markets for the specialty crops in Missouri for the global nutraceutical and personal care products industries.

Chung-Ho Lin, Research Professor, Center for Agroforestry, University of Missouri, Columbia, MO; linchu@missouri.edu

## **Richard Martin**

### ***High Quality Nuts Grow High Quality Trees***

**Poster Abstract:** Nuts of five cultivars propagated by Archie Sparks grew superior trees with strong leaders and excellent horizontal lateral branching. The 20-acre planting isolated from other walnuts is located in southeast Missouri on loamy soils and receives on average 46 inches of rain annually. Nuts were sown on a 24 by 30 foot spacing. Diameter growth has 0.35-0.46 inches per year. Nuts have a high meat/shell ratio with the highest at 37 percent, A second planting of 32 acres was established on 45 foot rows sowing 3 nuts 1 foot apart every 15 feet. Over 90% of the planting spots have at least 1 seedling and often had 3 seedlings. Growth rate for the first 17 years averaged 0.40-0.54 inches annually. My conclusion -- superior trees can come from superior nuts which is cheaper and easier than planting seedlings or grafts.

Richard Martin, Cape Girardeau, MO; ramandsam9@gmail.com;

## **Tim Martinson and Greg Vogel**

### ***Economics and the Walnut Council: Results of a Survey on Number and Size of Walnut Plantings***

**Oral and Poster Abstract:** We received responses from Walnut Council members in a dozen different states ranging from Maine to Colorado, who in total own or manage 26,000 acres of plantations and 80,000 acres of woodlands which translates to 1.8 million current/future merchantable trees. We tallied the needs and wants of members to efficiently operate and manage their trees. Our goal is to provide members with additional benefits and resources to help them be successful at growing fine hardwoods. Our premise is that Walnut Council members collectively could leverage these economies of scale for the benefit of all members possibly as a cooperative, a purchasing alliance, or a collective.

**Martinson Bio:** Tim was born and raised in Illinois and briefly attended college in Illinois. Tim was hired as a field service engineer by Xerox Medical system. Tim moved to Florida and spent 7 years in the corporate

world before starting a medical imaging service company. Over the next 35 years, Tim founded, purchased, and sold over a dozen companies. In 2010 Cannon Medical System (The Camera Company) purchased Virtual Imaging, the parent company which Tim founded in the early 90's that grew to revenues of over a 100 million dollars. Upon retiring, Tim bought his parents tree farm and has been managing approximately 30,000 walnut and oak trees.

Tim Martinson, Walnut Council Economics Committee Chair, Victoria, IL; Martinson1959@gmail.com; 970-406-0644

**Vogel Bio:** Greg retired from State Farm Insurance after a 33-year career, primarily as a part of the leadership team for the Information Technology Department. Currently Greg works as a Financial Planner for Northwestern Mutual. In his spare time, he tends to the 10,000 plantation trees he has planted. Plantings have taken place across 8 different stands starting in 1999 and ending with a new planting in the spring of 2023.

Greg Vogel, Walnut Council State Chapters Chair, and Financial Planner, Northwest Mutual, Bloomington, IL; gvogel63@msn.com

**James R. McKenna** and Hugh B. Pence

### ***Bark Cracking of Walnut Trees - a Tough Nut to Crack***

**Poster Summary:** Walnut growers are often confronted with a variety of bark cracks on their trees. In this poster we will provide photographs of many such cracks and discuss their known causes and consequences. The worst bark cracks are caused on tall mature trees due to lightning strikes. Other common cracks are noted as "frost cracks" which occur on the southwest base of the tree trunks and can occur at ages from 10 to 50+ years. The most problematic group of bark cracks occur in other areas of the trunk and sometimes numerous cracks of various sizes are found. We speculate that some of these are caused by native pathogens such as fusarium and other fungi. Management has been linked to affecting some of these enigmatic cracks. While little direct studies have been conducted, we will present some of the data we have that implicates site effects and genetic effects. We will provide examples of best management practices that have been reported to minimize bark cracking and discuss the economic and management implications for growers.

**Bio:** James R. McKenna, retired from the USDA Forest Service and Purdue University's Hardwood Tree Improvement and Regeneration Center two years ago to found his own company "A Breed Above Timber." He began his career 30 years ago with the University of California Davis as a research assistant for the Walnut Improvement Program and the UC Cooperative Extension Service. Jim has worked in Indiana for over 20 years now and is an active member in many Indiana organizations working

on nuts, trees, and timber such as the Indiana Nut and Fruit Growers Association, the Indiana Chapter of the American Chestnut Foundation, the Northern Nut Growers Association, Indiana Chapter of the Walnut Council, and others. A Breed Above Timber specializes in genetic resource management, reforestation and orchard design, and forestry education and research programs. He has developed clonal disease resistant rootstocks for California walnut growers and continues breeding resistance in chestnut and walnut species to domestic and exotic pathogens for both timber and nut production.

Jim McKenna, Operational Tree Breeder, A Breed Above Timber, West Lafayette, IN; Mckenna3216@gmail.com; 765-775-6693

**James R. McKenna** and Caleb Kell

### ***Blight Resistance of OxO American Chestnut in Indiana***

**Poster Summary:** In 2019, under a USDA APHIS permit, we control pollinated Indiana American chestnut accessions with the 'Darling 58' OxO (oxalic acid oxidase) transgenic pollen developed at SUNY (State University of New York) and grew out the seedlings at Purdue University. Two different T1 pollen sources were used to cross pollinate ten clones in our "Duke Energy Foundation" grafted American breeding orchard that had been established in 2010. For each cross, 10% of bagged shoots were not opened or pollinated and served as cross pollination checks. Hand pollination of the receptive flowers was conducted with preloaded microscope slides prepared at SUNY. From 305 bagged shoots, we harvested 684 seeds. Very few nuts developed in check bags. Small cores of cotyledon tissue of all the nuts were tested for the presence of OxO by soaking the tissue from each seed in a solution containing oxalic acid and the staining agent 4-chloro-1-naphthol which stains hydrogen peroxide (a breakdown product of oxalic acid). A negative control solution without oxalic acid was used to rule out hydrogen peroxide production not associated with OxO activity. From this testing, we determined that 44% of the cross-pollinated seeds were positive and actively expressing the OxO gene. In the spring of 2020, we germinated these seeds and planted them in late May in a field plot (8-ft X 1.5-ft) starting with an OxO+ seedling and followed by an OxO- seedling, and we repeated this pattern down each row. In July of 2022 (3<sup>rd</sup> growing season), we inoculated each seedling with an agar plug of pure four-day old chestnut blight (*Cryphonectria parasitica* 'SG') cultures that we collected and purified from active cankers on BC3F2 seedlings where we had previously introduced this isolate. Of the 227 seedlings inoculated and evaluated four months later in November, 22 OxO+ seedlings were identified as highly resistant. All OxO- seedlings were severely cankered. Scion wood from the best seedling from nine of the ten crosses was collected last winter and grafted onto American chestnut seedlings. Our poster will detail the growth and



host-plant reactions we have observed and the overall breeding program underway with the Indiana Chapter of TACF to develop blight resistant American chestnut.

**Bio:** See McKenna bio & contact info after previous abstract.

**Shawn A. Mehlenbacher**

***Hazelnut as a Model for Tree Crop Breeding***

**Abstract:** Genetic improvement of European hazelnut has been ongoing at Oregon State University (OSU) since 1969 and a total of 12 cultivars, 12 pollinizers and three ornamentals have been released. Importations of seeds and scions significantly broadened the program's genetic base. The program has clearly defined objectives and procedures, uses diverse parents and makes many crosses, eliminates seedlings and selections that fail to meet the objectives, moves through the generations with dispatch, further evaluates selections in replicated trials, and delivers new cultivars. Most traits are highly heritable and the response to selection has been striking. DNA markers and genome sequences provide new opportunities. The success in hazelnut provides an example for improvement of other tree nut species.

**Bio:** Shawn is a Professor of Horticulture at Oregon State University. He earned a Bachelor of Science degree from Penn State University and a PhD in plant breeding from Cornell University. His first faculty position was at Rutgers University where he led the tree fruit breeding program for peach, apple, and apricot. He joined the Horticulture Department at Oregon State University in 1986 to lead their hazelnut breeding and genetics project. He has worked with the USDA to build the best hazelnut collection in the world. He is cooperating with Rutgers University to breed hazelnuts resistant to eastern filbert blight and with the Hybrid Hazelnut Consortium to develop American-European hybrids for the eastern United States (see abstracts by Molnar and Meier). He chaired the annual meeting of the Northern Nut Growers Association in 1991 and 2014 and the International Congress on Hazelnut in 2000 and 2022. After 37 years of teaching plant breeding (more than tree crop breeding), he is anticipating retiring in 2024.

Shawn Mehlenbacher, Professor of Horticulture, Oregon State University, Corvallis, OR; [shawn.mehlenbacher@oregonstate.edu](mailto:shawn.mehlenbacher@oregonstate.edu)

**Nick Meier** and Ron Revord

***Breeding for Durable EFB Resistance through the Hybrid Hazelnut Consortium***

**Abstract:** The causal pathogen of eastern filbert blight (EFB), *Anisogramma anomala*, is genetically diverse across its endemic range in the eastern United States. Efforts to develop durable resistance are now under consideration, including pyramiding single R-genes, enhancing quantitative resistance (QR), and breeding single genes into QR backgrounds. Fortunately, many new sources of QR are identified in *Corylus americana* and *C. avellana* at Oregon State University and Rutgers University to pursue the strategies. Here we present activities to support these efforts at the University of Missouri through the Hybrid Hazelnut Consortium.

**Bio:** Nick Meier completed a PhD in plant breeding and genetics at Virginia Tech working with soft red winter wheat and malting barley. He currently works in the Revord nut breeding lab managing nursery, orchard, and field experiment operations for the Center for Agroforestry's hazelnut, black walnut, and chestnut improvement programs.

Nick Meier, Center for Agroforestry, University of Missouri, Columbia, MO; Namvf6@missouri.edu

**Deborah Milks**

***Marketing Chestnuts at Chestnut Charlie's Organic Nuts***

**Panel summary:** At Chestnut Charlie's, we sell our chestnuts (and pecans when we have them) in almost every venue available. About half of our harvest is wholesale to grocers, the remainder a mix of retail both on-line and on-farm. One of our goals is to prioritize local customers and so to avoid the environmental cost of shipping.

**Bio:** Debbie Milks is the co-owner of Chestnut Charlie's. She is a CPA with a career in accounting systems with no background or education in agriculture. But after 28 years of learning from the NNGA, CGA, and other growers plus her own agricultural missteps, she is able to offer tips and techniques on chestnut marketing challenges and successes. She currently serves as the NNGA treasurer.

Deborah Milks, Chestnut Charlies Organic Tree Farm, Lawrence, KS; milksdeb@gmail.com; www.chestnutcharlie.com; 785-841-8505

## **Amy Miller**

### ***Our Experience with Oak Wilt in Chestnut Orchards***

**Abstract:** Oak wilt is not a new disease in North America, but disease incidence has been increasing on the landscape, affecting oaks in forests and chestnuts in cultivated orchards. Chestnut trees at Route 9 Cooperative have been affected since 2018, and we have tried several management strategies. Here we present our experiences with detecting and monitoring the disease, as well as management strategies including trenching, fungicides, and tree removal.

**Bio:** Amy C. Miller is the manager of Route 9 Cooperative in Ohio and recently completed her PhD in Plant Pathology at The Ohio State University studying nut and fruit diseases. She is committed to specialty crop research and continuing the family orchard legacy while focusing on long-term environmental and economic sustainability.

Amy Miller, Manager, Route 9 Cooperative, Carrollton, OH;  
route9cooperative@gmail.com

## **Amy Miller**

### ***Marketing Chestnuts at the Route 9 Cooperative***

**Panel Summary:** Route 9 Cooperative (<https://route9cooperative.com/>) has been growing and marketing chestnuts as a cooperative since 2010. We currently have 6 grower members, provide a marketing outlet for growers who aren't full co-op members, and handle approximately 100,000 pounds of fresh chestnuts annually at our main packing facility in Carroll County, Ohio. We market through four different methods: wholesale, online retail, on-farm retail, and on-farm pick-your-own. These different methods allow us to adjust to customer demands and market trends on an annual basis.

**Bio:** See Miller bio & contact info after previous abstract.

## **Amy Miller and Melanie L. Lewis Ivey**

### ***Chestnut Anthracnose aka Blossom End Rot***

**Poster abstract:** Chestnut anthracnose (formerly known as blossom end rot) has been a major economic issue in Ohio chestnut production since 2012, with devastating economic losses in 2018. Researchers Amy Miller and Dr. Melanie Lewis Ivey of The Ohio State University have been investigating the cause and disease cycle of chestnut anthracnose and potential resistance in chestnut cultivars and species. Results from 2019-2022 growing season reveal *Colletotrichum henanense* as the causal agent of anthracnose, *C. henanense* also lives as an asymptomatic

endophyte in chestnut, and there have been significant differences in disease incidence observed among cultivars and species of culinary chestnut. Planting resistant chestnut cultivars and managing for overall tree health appear to be the most promising disease management strategies.

**Miller Bio:** See Miller bio & contact info after previous abstract.

**Ivey Bio:** Dr. Melanie L. Lewis Ivey is an Associate Professor in the Department of Plant Pathology at The Ohio State University, College of Food, Agricultural and Environmental Sciences – Wooster Campus. She is also the OSU Extension Fruit Pathologist and Fresh Produce Safety Specialist. Her research focuses on the sustainable and safe production of fruit, nut, and hop crops.

Melanie Ivey, Associate Professor, Department of Plant Pathology, The Ohio State University, Wooster, OH.

## **Greg Miller**

### ***Graft vs Seedlings for Chestnut Production***

**Abstract:** Graft failure in chestnuts, especially Chinese chestnuts, has been a problem, and has hindered the development of the chestnut industry. Especially frustrating is delayed graft failure where grafts initially grow, but subsequently die weeks, months, or years later. Consequently, many growers have opted to grow seedlings instead of grafted trees for commercial production. The debate over seedlings vs grafted trees has been intense, while experimental data comparing seedlings and grafted trees have been lacking. In 2014, we planted alternate rows of seedling Chinese chestnuts and grafted Chinese chestnut cultivars to make a valid comparison. Of particular interest are 2 rows of full-sib progeny of the cultivars ‘Peach’ and ‘Qing’ planted alongside a row each of their grafted parents, ‘Peach’ and ‘Qing’. Now that the trees are in production, it has been found that the seedling trees are generally much larger than the grafted trees and survival has been better. While grafted trees tend to produce more nuts per branch, the larger size of the seedlings means that they produce more nuts per tree. Nut qualities and size from seedlings are variable, but nuts from many are equal to or better than the grafted trees. Overall, the seedlings have out-performed the grafted trees. Thus, it is concluded that for Chinese chestnuts, seedling orchards are more viable than grafted orchards with the caveat that seed for seedlings must be derived from good parents and be planted at high density and subsequently rogued to remove poorer performing individuals.

**Bio:** Since earning a Ph. D. in Forestry (tree breeding and genetics) from Iowa State University in 1983, Greg has been a full-time commercial chestnut grower in Carrollton, OH, having converted his father’s hobby

farm into an orchard and nursery operation, Empire Chestnut Company. In 2010, Greg and 4 other chestnut growers formed Route 9 Cooperative, an agricultural cooperative, to pack and market their chestnut crops. Greg is currently serves as President of the Northern Nut Growers Association and serves on the board of the Chestnut Growers of America.

Greg Miller, NNGA President and Owner, Empire Chestnut Company, Carrollton, OH; empirechestnut@gmail.com

## **Thomas Molnar**

### ***An Update on New Hazelnut Cultivars from Rutgers University and Strategies for Propagation***

**Summary:** This presentation will provide an update on the hazelnut cultivars released from Rutgers University and the Hybrid Hazelnut Consortium regarding availability and where they have been planted to date. It will also discuss new cultivars coming out from the program and various propagation approaches to expedite getting them to growers.

**Bio:** Thomas Molnar obtained his PhD from Rutgers in 2006 and today is responsible for the Rutgers' hazelnut breeding program. Tom has been working on developing eastern filbert blight (EFB) resistant trees since 1996. He has traveled widely across Europe and parts of the former Soviet Union in search of new hazelnut germplasm. Tom works closely with hazelnut breeder Shawn Mehlenbacher at Oregon State University. Through their collaboration, the first new Rutgers cultivars were released in 2020. Tom also collaborates with colleagues at the University of Nebraska, the University of Missouri, and the Arbor Day Foundation as part of the Hybrid Hazelnut Consortium whose goals are to develop improved hazelnut cultivars adapted to colder, more stressful regions.

Thomas Molnar, Associate Professor, Plant Biology Department, Rutgers University, New Brunswick, NJ; thomas.molnar@rutgers.edu

## **Bruce D. Moltzan**

### ***National Perspective on Developing Forest Health Issues***

**Abstract:** Non-native forest health threats cause significant ecological, economic, and social impacts each year in the United States. Recent examples include chestnut blight, white pine blister rust, Dutch elm disease, laurel wilt, thousand cankers disease, and sudden oak death. These seem to be increasing as global trade and travel continues. National response to new and developing pests illustrate the need for shared approaches to improve mitigation strategies.

Bruce D. Moltzan, USDA Forest Service, Forest Health Protection, State & Private Forestry, Washington Office; bruce.moltzan@usda.gov; 703-605-5336; 703-595-8261

## **Sydney Moore**

### ***A Genotype by Environment Study Incorporating Twelve Promising American Elderberry Cultivars***

**Poster Abstract:** A genotype by environment study allows for various environmental factors to be tested on differing cultivars to enlighten what variety is most suitable for a growing environment. This study aims to test twelve American elderberry cultivars from eight states in five varying locations. Plant success will be measured by growth measurements, disease and pest pressures, phenological measurements, yield data, as well as an economic analysis.

Sydney Moore, Center for Agroforestry, University of Missouri, Columbia, MO; sdmh5k@mail.missouri.edu

## **Lou Naeger**

### ***Planning for Farm Succession***

**Summary:** A succession plan is a plan to transfer ownership and/or management of a business to another individual or individuals. Three primary events that trigger the necessity of having a plan: permanent disability, unexpected death, or planned retirement. Ultimately all business owners will be faced with one of these events. Having a plan in place for the orderly transfer of the business is important to preserve the value of the business, make the administration of your estate easier, and probably help keep family peace. Key factor to a plan is finding the right individual who has the interest and ability to take over operating the business.

**Bio:** Lou Naeger is a chestnut grower with an orchard in Ste. Genevieve, Missouri.

Lou Naeger; ljnaeger@outlook.com

**J. Michael Nave**

***Cross Species Breeding for Eastern Chestnut Growers***

**Abstract:** The Chinese chestnut (*Castanea mollissima*) is widely cultivated in the eastern US for nut production. The primary reason that Chinese chestnuts are widely planted is their strong resistance to chestnut blight (*Cryphonectria parasitica*) and to phytophthora root rot, and their consistent production of high-quality nuts that peel well. The European chestnut (*Castanea sativa*) is widely cultivated in the western US for nut production but is not suitable for widespread planting in the eastern US because of its susceptibility to chestnut blight and phytophthora root rot. European trees and hybrids are often more productive than Chinese trees, more vigorous, better able to deal with drought, and also frequently produce larger nuts. A carefully designed breeding program has the potential to produce hybrid trees that contain the best qualities of both European trees and Chinese trees. In order to incorporate the best qualities of both species, it is crucial to understand how to transfer chestnut blight resistance from Chinese trees to European hybrid trees. This discussion will explain how such hybrids can most easily be produced for eastern growers by understanding the math of blight resistance.

**Bio:** J. Michael Nave has been a chestnut grower, collector, breeder, and explorer since 1990. He has evaluated chestnut trees in China, Europe, Australia, Canada, and all over the US. He has been a speaker before various organizations including the NNGA, CGA and CRFG, and has written a number of articles about chestnuts. Most recently he was a co-author of the article "Descriptions of Chestnut Cultivars for Nut Production in the Eastern and Midwestern United States" [HortScience (October 2021) 56(11)]. He has named more than 40 chestnut cultivars and shared his collection of very diverse chestnut genetics with many growers in the US, Canada, Europe and Turkey. He is the founder and administrator of the 3940 member Facebook group "Chestnuts as a tree crop" (<https://www.facebook.com/groups/272120753285618>).

J. Michael Nave; [michaelnave@comcast.net](mailto:michaelnave@comcast.net)

**Andrew Newhouse** and William A. Powell

***Development and regulatory review of transgenic American chestnut trees for environmental restoration***

**Poster summary:** Many attempts have been made to restore American chestnut trees after their near demise by chestnut blight. While some treatments are feasible for individual trees, and progress has been made with hybrid breeding and backcrossing, no efforts until now have been successful in allowing landscape-scale restoration of this majestic heritage species into our native forests. Our research team has enhanced blight

resistance while retaining all other traits of native American chestnut trees by engineering a single gene from wheat into an American chestnut line called Darling 58. This gene makes an enzyme called oxalate oxidase, which does not have direct fungicidal activity, but rather protects the tree by degrading a toxin (oxalic acid) produced by the blight fungus. Federal regulatory review for transgenic plants is underway, and when complete, will allow public distribution and initial production of seedlings toward forest restoration efforts. Research is ongoing to further refine blight tolerance in American chestnut, to address other pests and pathogens of chestnuts, and to potentially apply similar methods to other threatened tree species.

Andrew Newhouse, PhD, Director, American Chestnut Research & Restoration Project and Department of Environmental Biology, SUNY College of Environmental Science & Forestry, Syracuse, NY; aenewhou@esf.edu; www.esf.edu/chestnut/

### **Chestnut Charlie NovoGradac**

#### ***Practical Tips, Cautions, Observations, Tried, and Yet-to-be-tried Ideas about Establishing a Chestnut Orchard Organically***

**Abstract:** Drawing on 28 years of experience growing chestnuts, pecans, and walnuts, Charles will touch upon tree planting, weed suppression, cover crops, irrigation, mulches, and pest reduction within the toolbox of a USDA certified organic farm. Alternative weed and pest control should drive orchard design, fertility, and irrigation from the beginning, or even before the beginning.

**Bio:** Charles NovoGradac is a (non-farmer) retired professional who has planted and maintained since 1995 a USDA certified organic farm with chestnuts, walnuts, and pecans. The farm is on 20 acres in Lawrence, Kansas, (near Kansas City), and consists of roughly 1500 nut trees. Together with his partner, Deborah Milks, Charles does business as Chestnut Charlie's Organic Tree Crops selling chestnuts both wholesale to grocery stores and direct to consumer on farm and on the internet (www.chestnutcharlie.com).

Charles NovoGradac, Chestnut Charlies Organic Tree Farm, Lawrence, KS; chestnutcharlie@gmail.com; www.chestnutcharlie.com; 785-841-8505

### **Chestnut Charlie NovoGradac**

#### ***Construction and Operation of a Low-cost Air Cleaner for Small Chestnut Orchards***

**Show and Tell Abstract:** Charles NovoGradac will show his low-cost do-it-yourself air cleaner that separates chestnuts from fine and light field



debris, offered as appropriate technology for a small-scale (up to 30,000 pounds) chestnut harvest.

**Bio:** See NovoGradac bio & contact info after previous abstract.

**Caleb O’Neal**, Patrick L. Byers, Christine Spinka, and Andrew L. Thomas

### ***Direct Field Propagation of American Elderberry***

**Poster Abstract:** Production of American elderberry (*Sambucus nigra* subsp. *canadensis*) fruit is rapidly increasing in the Midwestern and Eastern U.S. for its use in dietary supplements. Many elderberry growers attempt to root dormant cuttings directly in the field to reduce establishment costs, but little or no data exist to guide their success. A significant experiment was established in southwest Missouri in 2022 to develop a better understanding of direct field propagation of elderberry cuttings. The study incorporated a total of 3,239 elderberry cuttings of three cultivars (‘Bob Gordon’ ‘Kelly 7-14’ and ‘Rogersville’), and was replicated at two sites: University of Missouri’s Southwest Research, Extension, and Education Center (SWREEC) at Mt. Vernon, and a private farm (O’Neal Farm) near Rogersville, MO. Dormant cuttings containing either two or four nodes were selected and their diameters measured between the lower two nodes. Untreated cuttings were pushed directly into the ground at both sites at four-week intervals: Feb. 1, March 1, March 29, and April 26. A control block of cuttings was also similarly propagated in a greenhouse in pots with commercial potting media. In late July, all cuttings were scored as alive / dead. We found statistical differences in survival between sites, among cultivars, among stem diameters, and among planting dates. Node number (two vs. four nodes) had little, if any, impact on survival. Generally, the earlier planting dates combined with larger diameter cuttings were the most successful. For example, the largest diameter ‘Bob Gordon’ cuttings planted at the O’Neal Farm Feb. 1 had 100% survival, whereas the smallest cuttings planted the same day and location had 24% survival. ‘Bob Gordon’ cuttings (across all diameters) planted at SWREEC on Feb. 1 had 62% survival whereas those planted on April 26, had 0.2% survival. The experiment will be repeated in 2023. These preliminary results suggest that direct field propagation of American elderberry is feasible, with early winter planting of the largest diameter cuttings providing the best opportunity for success.

**Bio:** Caleb O’Neal is a Research Specialist in the Division of Plant Science and Technology at the University of Missouri’s Southwest Research Extension and Education Center. His background is in Natural and Applied Science and integrating ecological principles into modern agricultural practices. His primary research efforts are directed towards American Elderberry production and other fruit/nut crops.

Caleb O'Neal, Research Specialist, University of Missouri Southwest Research Extension and Education Center, Mt. Vernon, MO; onealc@missouri.edu

## Josh Payne

### ***Cover Crops and Soil Health Impacts for Orchards and Tree Plantings***

**Abstract:** While cover crops are the new craze in regenerative agriculture, their use in orchards and tree plantings has been underdeveloped and largely anecdotal. After nearly a decade of using cover crops in a variety of agricultural contexts, Josh Payne will provide initial observations about using cover crops in an agroforestry context and areas of future research to benefit both the academic and the farming communities. Specifically, he will focus on three areas: (1) cover crops for site prep and soil improvement, (2) cover crops for establishment of trees, and (3) cover crops for cash flow opportunities.

**Bio:** Josh Payne is a Missouri farmer who has gotten deeply into agroforestry in the past 5 years including interplanting his young chestnuts with cover crops.

Josh Payne; jpayne.1111@gmail.com; <https://www.rustedplowshare.com/>

## Sarah Phipps and Rosalee Knipps

### ***Have You Spotted This Invader? Spotted Lanternfly,***

**Exhibit Poster Summary:** Spotted lanternfly (SLF), *Lycorma delicatula*, is a large planthopper native to Asia and is currently found in 14 states. This invasive insect feeds on the sap of over 100 different host plants, including grape, apple, oak, walnut, and maple. Tree of Heaven is a favored host of the SLF. Keep your eye out for this invasive pest. Stop by and pick up SLF leaflets to learn how to spot the different life stages of this invasive pest, how they move to new areas, and their current distribution and host list.

Sarah Phipps, Missouri Department of Agriculture, Jefferson City, MO: sarah.phipps@mda.mo.gov;

Rosalee Knipps, Missouri Department of Agriculture, Jefferson City, MO: Rosalee.knipps@mda.mo.gov; 573-751-9334

## Lauren Pile

### ***Controlling Invasive Plants and Grape Vines in Hardwood Plantings***

**Abstract:** Forests of the midwestern US have a high abundance of nonnative invasive species, with a large proportion of these representing transformative invasive shrubs and vines. Although not widely recognized as a threat to biodiversity and ecological goods and services until relatively recently, invasive woody plants are now some of the most conspicuous and damaging of alien flora globally. In North America, many of our invasive shrubs and vines were introduced and disseminated through the horticultural industry with many of the traits favored for in horticulture (e.g., long-lasting displays of flowers, fruits, and leaves) ultimately contributing to their invasive success. Abundant, persistent, and long-lasting fleshy fruits that are bird dispersed, have extended leaf phenology, aggressively sprout following top-kill, and are shade tolerant can quickly overwhelm the resources needed to control them. Further, without effective management, invasive plants can suspend tree growth, forest successional processes, or accelerate whole-scale transitions from woodlands to shrublands. I will review some of the common plant invaders in the midwestern US, traits that make them successful, and provide options and considerations for their control in hardwood plantings and natural forests.

**Bio:** Lauren Pile Knapp is a research ecologist with the USDA Forest Service, Northern Research Station located in Columbia, MO. Her research focuses on invasive plant science and management, disturbance ecology as it relates to plant communities, and applied forest ecology. Lauren has a BS in environmental science, and a MFR and PhD in forest resources from Clemson University.

Lauren Pile-Knapp, Research Ecologist, USDA Forest Service, Northern Research Station, Columbia, MO; lauren.pile@usda.gov

## Jeff Polfer

### ***Abundant Harvests, Soil Health, Nutrients and Plant Health***

**Show and Tell Summary:** Discuss the relationship between soil health and plant health and how natural ingredient intervention can be used as a maintenance tool to keep your plants (trees) healthy and producing. A DEAD, NUT-PRODUCING TREE CAN BE VERY EXPENSIVE. If time permits, might touch on how what we call conventional nutrients can actually negatively impact your plants or trees and what they produce.

**Bio:** Jeffrey J. Polfer was born in the 1960's into an agricultural lifestyle raising cattle, hogs and row crops on a 280-acre farm, started his own family farming operation (conventional and organic) at a very early age that included fur-bearing animals including Cougars. While farming, he attended Upper Iowa University in the 1990's to earn a BS degree in

Biology and Conservation management. In 2004 he became owner operator of Woodland Harvest, Trees, and Nursery assisting others in tree identification, planting and caring for trees, cover crops, wildlife management, nut harvesting and marketing, a natural extension of similar work he did for the Iowa Department of Natural Resources. In 2019 he became owner operator of Earth Brew for Life to assist plant producers in analyzing their soils, especially the microbial organisms, and use of composting and biochar to grow healthier plants.

Jeffrey Polfer, Postville, IA; jpolfer@acrec.com; (563)568-7258; earthbrewforlife.com

## Ron Revord

### *Update on UMCA Chestnut and Other Nut Tree Research*

**Abstract:** Chestnut research began at the University of Missouri Center for Agroforestry in the late 1990s with germplasm curation via the help of NNGA colleagues. Over the ensuing decades, cultivars were evaluated in replication to provide adoption recommendations. Seed from the collection was also distributed widely to facilitate adoption from preferred maternal parent in regions where seedling orchards are chosen by growers over grafted cultivars. Today, long-term cultivar evaluation is ongoing at the Horticulture and Agroforestry Research Farm (HARF). Additionally, on-farm evaluations have been implemented to identify improved seedlings trees in diverse on-farm environments. Here, we present updates on these studies, starting with yield (kg/tree) and kernel weights (g) data from the cultivar trials, collected 11 times over a period of 16 years (2007-2011, 2015, 2017, and 2019-2022). ‘Qing’ produced the highest yields during 9 of the 11 years that data was collected. We also present data from on-farm evaluations conducted on 471 accessions, representing 12 US states, from 2020-2022 for 35 traits relevant to commercial production. Average kernel weights ranged from 3.0-25 g both years, and defects ranged from 0-80%. Over 40 preliminary selections were made based on 2-year data and thresholds for nut size (>11 g), defect rate (<5%), and visual assessment of crop load. In 2022, the ~40 preliminary selections were conserved via grafting and field establishment at HARF, along with relevant checks, in a trial with five replications. Efforts to carry systematic breeding forward through the Chestnut Improvement Network will also be discussed.

**Bio:** Ron Revord, PhD, is an Assistant Research Professor, School of Natural Resources, University of Missouri, Columbia, MO. Ron’s primary research advances applied breeding programs for black walnut, Chinese chestnut, and northern origin pecan within the University of Missouri Center for Agroforestry. He also collaborates with the Hybrid Hazelnut Consortium on their mission to broaden the cultivated range of hazelnut.

Ron Revord, Tree Improvement Specialist, Center for Agroforestry and School of Natural Resources, University of Missouri, Columbia, MO; r.revord@missouri.edu

## **Jeanne Romero-Severson**

### ***AIMS: Update on Chestnut Ancestry***

**Bio:** Jeanne Romero-Severson's research program is focused on the development and deployment of stress resistant forest trees through the integration of tree breeding, quantitative genetics, and genomics. As part of a Specialty Crops Multi-State Initiative, she uses ancestry informative genetic markers to detect the interspecific ancestry and pedigrees of elite parent trees and selected progeny trees for a participatory breeding program focused on the improvement of chestnut cultivars for North American chestnut growers.

Jeanne Romero-Severson, Professor, Department of Biology, University of Notre Dame; Jeanne.Romero-Severson.1@nd.edu

## **Dan Shepherd**

### ***My Mistakes in 50 Years of Being a Pecan Farmer***

**Summary:** Over the past 50 years, we have made many mistakes along with many good ideas from starting the orchards to having them in production. It has been a steep learning curve, as back when we started, there wasn't really any good information for establishing and managing northern pecan plantings. Thanks to my dad for his insistence that I plant the nuts which got the whole thing started.

**Bio:** Dan Shepherd is the owner and operator of the 4,000-acre Shepherd Farms that has a 300-acre alley-cropping agroforestry practice with mature pecans in NC Missouri. We market most of our crop thru an on-farm retail and wholesale store.

Dan Shepherd, Shepherd Farms, Inc., Clifton, MO; dan@cvalley.net; <https://shepherdfarms.com/>

## **Roger Smith**

### ***Marketing Chestnuts at the Prairie Grove Chestnut Growers***

**Panel summary:** The Prairie Grove Chestnut Growers marketing company started by Roger Smith in 2013 is located in Columbus Junction, SE Iowa. We buy chestnuts from over 60 growers in the midwestern states that meet our standards. We do not buy any weevil infested chestnuts unless they have been heat treated and deemed clean. We employ 7

people for 6 weeks in the fall. We sort, clean, bag, refrigerate, and then market the chestnuts in 46 states. We only sell fresh chestnuts and are sold out by November 1st. We merchandize three ways: 1) our website (prairiegrovechestnutgrowers.com), 2) out the door customers, and 3) deliveries from Chicago to Atlanta.

**Bio:** Roger Smith runs the Prairie Grove Chestnut Growers marketing company, located in Columbus Junction in SE Iowa. A 1974 graduate of Iowa State, Roger worked for Pfizer Pharmaceuticals and retired in 2007. In 2003, he planted his first chestnut trees and now he and his wife have 1,800 chestnut trees on 20 acres of well drained Iowa soil. It has become our passion.

Roger Smith, Prairie Grove Chestnut Growers, Columbus Junction, IA; gsons3@aol.com; 563-260-6333

## **Hank Stelzer**

### ***White Oak Initiative Update***

**Abstract:** Founded in 2017, the White Oak Initiative (WOI) brings together industries, universities, state and federal agencies, nonprofits, private landowners, conservation organizations and trade associations committed to ensuring the long-term sustainability of America's white oak forests. In 2021, the WOI released "Restoring Sustainability for White Oak and Upland Oak Communities: An Assessment and Conservation Plan", a science-based report that detailed the current state of America's white oak forests and recommended a practical plan of action to avoid their decline. Jason Meyer serves as first WOI executive director bringing over 20 years of experience in conservation and nonprofit management to the role. Dr. Stelzer will share the latest developments as the WOI moves from planning to on-the-ground implementation, education and advocacy.

**Bio:** A native of St. Louis, Dr. Stelzer is an Associate Professor of Forestry in the School of Natural Resources and serves as the Natural Resources Education Director for MU Extension. In the School, Dr. Stelzer teaches dendrology, forest utilization, and forest management. His Extension responsibilities include educating private landowners in all aspects of woodland management and conducting tree care workshops for homeowners in communities across the Show-Me State.

Hank Stelzer, Assoc. Prof., School of Natural Resources, University of Missouri, Columbia, MO; stelzerh@missouri.edu

## **Bill Stouffer**

### ***Alley Cropping, Tree Management, and Nut Production***

**Summary:** Lessons learned after 10 years of experience managing trees and alley crops. What works, what doesn't, and things to consider when choosing a cropping system.

Bill Stouffer, Cedar Hill Farms, Marshall, MO; [stoufferbill@gmail.com](mailto:stoufferbill@gmail.com);  
<https://www.cedarhillfarms.com/>

**Andrew Thomas**, Jay Chism, Caleb O'Neal, Adrienne Ohler, Robert Balek, Mallory Rahe, and Brian Hammons

### ***Shaking Black Walnut Trees for an Earlier and More Value Nut Harvest***

**Poster Abstract:** Black walnuts (*Juglans nigra*) are primarily harvested from wild trees by small-scale gatherers for extra income. Hammons Products Co. (Stockton, MO) is the primary purchaser of these nuts through an extensive network of regional buyers. Attention to nut quality among harvesters is typically lacking, resulting in low yields of marketable kernels. An experiment was initiated in 2021 to determine if shaking nuts from trees early in the harvest season might result in higher quality nuts and a price premium. Thirty-six mature black walnut trees growing at the MU SW Research, Extension, and Education Center (REEC), Mt. Vernon, MO were studied. Trees grafted to 'Emma K' and 'Sparrow', along with unimproved trees (three tree categories) were shaken with a mechanical cable tree shaker approximately 10 days before expected natural nut fall. All shaken nuts, along with all subsequent naturally fallen nuts were harvested, with 100-nut samples collected from both harvest treatments per tree. More than 144 twenty-nut sub-samples were cracked, with percent marketable kernel and visual quality determined. Results from the first harvest did not support our hypothesis that early shaking of black walnuts would result in improved nut quality and thus market value. Within all three tree categories, shaking removed the majority of nuts; for example, an average of 145 lbs. of 'Sparrow' nuts per tree were shaken down, leaving 61 lbs. to fall naturally. Kernel quality ratings for 'Emma K' and 'Sparrow' were not improved by early shaking. Slight numerical increases in percent kernel and final dollar value (based on Hammons' purchasing guidelines) were shown for 'Emma K' and 'Sparrow', but these values were not statistically different between harvest methods. For example, shaken 'Sparrow' nuts (30.3% kernel) were valued at \$ 0.748 / lb, whereas naturally fallen 'Sparrow' nuts (27.0 % kernel) were valued at \$ 0.667 / lb. More data are needed to determine early black walnut harvest is economically viable. Experimental results, repeated in 2022, to be available by summer 2023.

Andrew Thomas, SW REEC, Mt. Vernon, MO; [thomasal@missouri.edu](mailto:thomasal@missouri.edu)

## **Mike Trial**

### ***Utilizing Small Diameter Walnut Logs from Thinning Operations***

**Field Stop Summary:** Many of the walnut trees on our farm are now 40 years old so as we thin tree plantations we are cutting down trees that are 10 to 18 inches in diameter. In 2016 we bought a Timberking 1220 sawmill to saw thinned stems into boards which we sell to local woodworkers. Limbs from the thinned trees are cut into firewood or mulched and spread in the tree plantations.

**Bio:** Mike Trial and Yolanda Ciolli, current owners of Juglans Nigra Enterprises Tree Farm manage 1,400 black walnut trees planted by Mike's father, George Trial, in the early 1960's. George was the first president of the MO Chapter Walnut Council (1984-1992) and named MO Tree Farmer of the year in 1990. In 2018, Mike was selected as the MO Tree Farmer of Year and also the Central Region Tree Farmer of the Year.

Mike Trial, Juglans nigra Enterprises Tree Farm, Columbia, MO;  
m.trial2@gmail.com

## **J. E. 'Jerry' Van Sambeek**

### ***Hardwood Fertilization for Timber and Nuts***

**Abstract:** Recommendations on when and how to fertilize hardwood trees vary widely. Nutrient deficiencies are identified from changes in size, shape, and color of foliage; however, the need for fertilizer existed much earlier than any visual symptoms. Soil analyses reveal which nutrients are most likely to cause nutrient deficiencies; however, midsummer analysis of foliage reveals which are missing. Foliar sufficiency ranges for essential macro- and micro-nutrients are available for walnut, pecan, and red and white oaks with nitrogen (N) deficiency most common. Over 60 publications give fertilization recommendations for hardwoods in the absence of foliar analysis for forest, arboreta, urban, and nut orchard trees. Rates are typically given in lbs./N per inch of stem diameter for individual trees and lbs./N/acre for well stocked plantings or stands. On average, in less than fully stocked stands recommended fertilization rates for hardwoods are 0.2 to 0.3 pounds N per inch DBH for large saplings to small veneer-sized trees every three to five years to the area 0.5 to 1.5 times the width of the tree's canopy as trees are flushing. If harvesting nuts or the ground cover apply N annually to match estimated amount of N removed (typically 100 lbs./N/acre for walnut and pecan). For fully stocked stands est. avg. tree stem diameter. Use stocking or crown competition factor tables to determine theoretical number of free-to-grow trees/acre of that size. Calculate lbs. of N/tree from stem diameter and multiply by the number of free-to-grow trees/acre to estimate lbs./N/acre to apply.



**Bio:** Jerry Van Sambeek is a retired USDA FS Research Plant Physiologist with over 40 years' experience including over 20 years as an adjunct with UMCA. His research interests were hardwood propagation, seedling establishment, and ground cover management using legume cover crops. He has served on the Walnut Council (WC) Bd. of Directors for over 40 years in multiple capacities and WC Foundation Research Committee Chair for over 20 years. He currently serves as Publications Editor and Chair of the Publications Committee for the NNGA.

Jerry Van Sambeek, Retired Research Plant Physiologist, USDA Forest Service and Center for Agroforestry, University of Missouri, Columbia, MO, now Frederick, CO; [ib4walnut@gmail.com](mailto:ib4walnut@gmail.com); [editor@nutgrowing.org](mailto:editor@nutgrowing.org)

## **Tom Wahl**

### ***Marketing Chestnuts at Red Fern Farms***

**Panel summary:** At Red Fern Farm, more than 99% of our produce sales is by pick-your-own, and all by appointment. We maintain lists of U-pick customers for each crop, and when the crop is ready, we contact the customers by phone or e-mail, and invite them to make an appointment to come and pick. We estimate the number of pounds of each crop we expect to harvest on a given day and schedule enough customers to get it all picked. Our advertising is mainly by word-of-mouth among our customers. U-pick reduces or eliminates the costs of harvesting, sanitation, sorting, packaging, refrigeration, shipping, and advertising.

**Bio:** Tom Wahl, a native Iowan, graduated from Iowa State University in 1984 with a degree in Fisheries and Wildlife Biology. For 16 years he worked for various government agencies in wildlife research, wildlife management, forestry, and park management. He and his wife, Kathy Dice, created Red Fern Farm in Southeast Iowa where they grow high value tree crops including chestnuts, heartnuts, persimmons, pawpaws, and honey berries. They also offer consultation on tree crops.

Tom Wahl, Red Fern Farms, Wapello, IA; [tom@redfernfarm.com](mailto:tom@redfernfarm.com); [www.RedFernFarms.com](http://www.RedFernFarms.com)

## **Doug Wallace**

### ***Using NRCS Web Soil Survey for Evaluating and Developing Hardwood Plantings***

**Abstract:** Where to get information about how and where to develop a hardwood tree planting can be challenging sometimes for land users. There are many sources of excellent information from state and federal forestry agencies, the internet, and even private individuals. One source that land users may overlook is the NRCS Web Soil Survey. Used

properly, land users can access site specific information about black walnut site suitability, generate a soils map, get guidance on land management, develop suitability ratings, review soil health properties, and obtain a detailed soil report on the information just reviewed.

**Bio:** Doug Wallace has a BS and MS degree in Forestry from the Univ. of Illinois. From 1975 to 1978, Doug was a field ecologist for the IL Natural Areas Inventory. Doug began work for the USDA NRCS and served throughout IL, MO, and NE including state Staff Forester in Columbia, Missouri and NRCS National Agroforester in Lincoln, Nebraska. Upon retiring he returned to Columbia and worked for 8 years as a contract ecologist for NRCS on the MO Ecological Site Classification project.

Doug Wallace, Retired NRCS National Agroforester, Lincoln, NE, now St. Louis, MO; Wallace2905@gmail.com

**Michele Warmund** and Jerry Van Sambeek

### ***GA<sub>4+7</sub> Soak Before Cold Stratification Enhances Juglans nigra Seedling Production***

**Poster abstract:** Eastern black walnut (*Juglans nigra* L.) seeds typically require a long period of stratification with low germination. A study was conducted to evaluate the effect of three formulations of gibberellic acid at 250 mg/L or tap water as a 24-hour soaking treatment for 'Thomas' black walnut seeds before stratification for 30, 45, 60, 75, or 90 days. GA treatments included 1) GA<sub>3</sub> (ProGibb®); 2) GA<sub>4+7</sub> (Provide®); and 3) 6-benzyladenine (BA) + GA<sub>4+7</sub> (Promalin®). Walnut shoot % emergence 60 days after planting, days to 20% and 80% shoot emergence (E20 and E80), and early seedling growth from black walnut seeds were evaluated. Shoot emergence % was always higher for seeds soaked in GA<sub>4+7</sub> or BA + GA<sub>4+7</sub> when compared with other treatments. Shoot emergence for some seeds soaked in GA<sub>4+7</sub> and BA + GA<sub>4+7</sub> occurred with only 30 d stratification and % emergence increased with longer stratification periods. Seeds soaked in GA<sub>3</sub> had higher % shoot emergence than those soaked in tap water only. Also, seeds soaked in GA<sub>3</sub> had fewer days to 20% shoot emergence when stratified for 45 or 60 days than those soaked in tap water and stratified for the same period of time. Addition of BA at 250 mg/L had no positive benefits. With timely harvest, hulling, seed selection, and soaking walnuts with 250 mg/L GA<sub>4+7</sub> followed by 90 days stratification, 82% shoot emergence (i.e., germination) was attained.

**Bio:** Dr. Warmund has a research and extension appointment at MU with statewide Extension responsibilities for fruit and nut crops. Recently, she has focused on pest management strategies, the impact of herbicide drift on horticultural crops, self-incompatibility in elderberry, and low-temperature survival of fruit crops. Dr. Warmund also contributes monthly

articles in the MU IPM Missouri Environment and News and The Garden Spade newsletters.

Michele Warmund, University of Missouri Extension Horticulturalist,  
warmundm@missouri.edu

**Notes:**

A detailed campus map with various buildings and areas labeled. Eight specific locations are circled in red and labeled with letters A through H. A large red rounded rectangle in the upper right corner contains the text 'ON-CAMPUS CONFERENCE LOCATIONS' in white. The map shows streets like University Ave, Hitt St, College Avenue, and Rollins St, along with numerous buildings such as Hitt Street Parking Structure, Traditions Plaza, Brewer Field House, Ag Sciences Building, ABNR Building, Plaza 900, and College Ave Hall.

# ON-CAMPUS CONFERENCE LOCATIONS

- A - Traditions Plaza (group photo on Tuesday)
- B - Brewer Field House (social & banquet on Tuesday)
- C - Hitt Street Parking Structure for non-ADA parking
- D - Ag Sciences Building (technical sessions on Tuesday)
- E - ABNR Building (Sunday reception, Tuesday sessions & more)
- F - Plaza 900 (dining hall)
- G - College Ave Hall (residence hall)
- H - AV8 Parking Lot (for those with lodging in College Ave Hall)