SCHOOL OF AGRICULTURE

MIDDLE TENNESSEE STATE UNIVERSITY

INTERNATIONAL GINSENG INSTITUTE

FALL 2021 NEWSLETTER

Photo by Caleb Trivett

HIGHLIGHTS

- High temperatures negatively impact ginseng
- USDA-NIFA grant funding obtained
- Hiking through the forest yields wild ginseng
- A visit to the nation's largest ginseng producer
- Mother, triplets persist in their search

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Figure 1: Leaf spot symptoms on American ginseng leaves. Photo by Eleanor Lopez

Figure 2: Leaf spot symptoms on American ginseng leaves. Photo by Eleanor Lopez

Disease on American ginseng

Root rot of American ginseng is a common and often devastating problem for producers worldwide. There is not a single fungus that causes root rot, which can further complicate pathogen identification and management. For example, fungal pathogens *Alternaria*, *Colletotrichum*, and *Fusarium* were all isolated from a single diseased American ginseng root and stem (Figure 1).

Alternaria will first be visible as dark brown spots and cankers on the lowest part of the stems. *Alternaria* is typically first noticed after the stems have been infected and the leaves begin to have water-soaked spots. The water-soaked spots eventually become necrotic and dry. *Colletotrichum*, the causal agent of Anthracnose, will appear as both round or irregular shaped necrotic lesions on the leaves and stems of American ginseng, eventually leading to wilt. *Fusarium* is especially frustrating. This pathogen causes damping off of roots early in the season, leaving brown and black water-soaked lesions on roots that can result in loss of marketability.

High daytime temperatures (77–95 degrees) combined with high relative humidity are prime conditions for foliar infection by fungal pathogens causing leaf spot (Figure 2). Unfortunately, Tennessee has observed weather perfect for the infection and proliferation of this pathogen in both June and July (Figure 3).

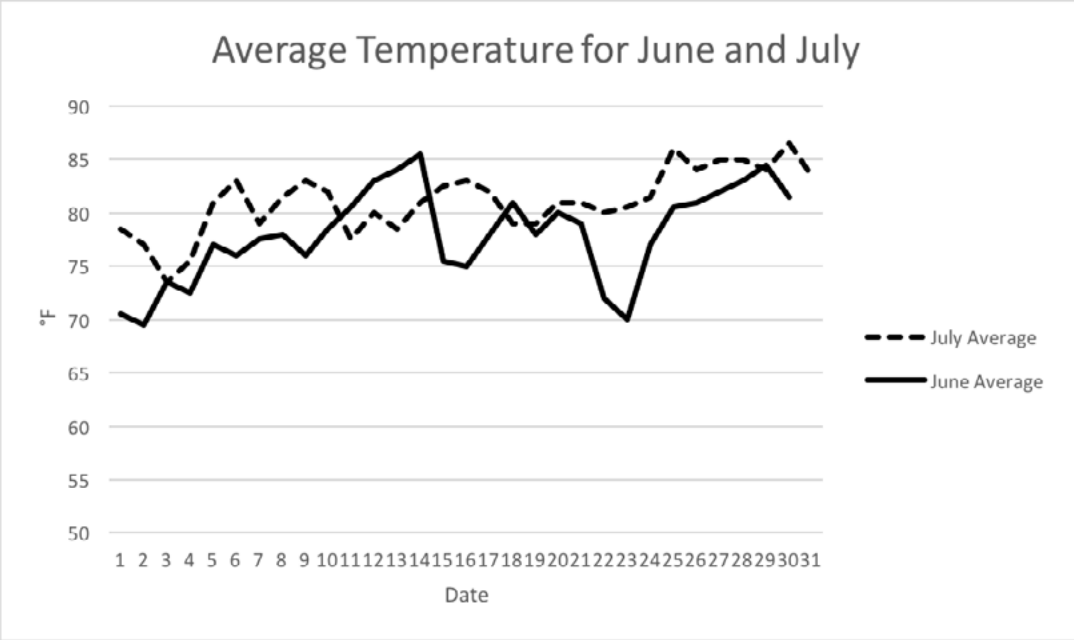


Figure 3: Average daily temperatures for June and July. Data obtained from the National Weather Service.

Grant funding obtained

The International Ginseng Institute has been awarded an exciting grant from the U.S. Department of Agriculture's National Institute of Food and Agriculture (USDA-NIFA) to investigate organic methods of protecting your ginseng investment!

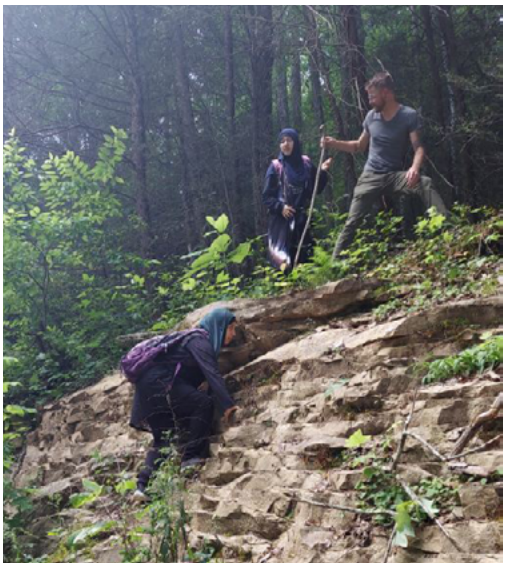
Overall we will develop scientific solutions for sustainable organic production of American ginseng and promote organic production. Specifically, we will be testing the use of bacterial antagonists on fungal diseases, with the aim to prevent infection before it occurs. This project brings together knowledgeable scientists from across the country, including **Bruce Cahoon** from the University of Virginia, **Eric Burkhart** from Pennsylvania State University, **Susan Leopold** from the United Plant Savers and the Center for Medicinal Plant Conservation, **Jim Hamilton** from North Carolina State University, **Eleanor Phillips** from the University of Tennessee, and **Caitlin Elam** from the Tennessee Division of Natural Areas. From Middle Tennessee State University we have **Song Cui**, **Samuel Haruna**, **Seockmo Ku**, **Nate Phillips**, **Ethan Swiggart**, and the director of the IGI, **Iris Gao**.

This diverse group of talented scientists will bring a new perspective and passion as we work together to solve this very important problem.

Playing in the woods

This summer was filled with many wonderful field trips both locally and out of state. We quickly learned that if you want to find wild ginseng, then you are going to have to literally climb into the forest. We did just that! Our rock scrambling paid off and we found **WILD GINSENG**!

Our group hiked and scrambled through 2,000 acres of beautiful, forested land in Eastern Tennessee managed by TennGreen Land Conservancy. This amazing habitat holds many medicinal plants including black cohosh and goldenseal. The IGI is looking for avenues for it to become endowed and preserved specifically for research.



Ahmed, Fatimah, and Zaynab Alnassari, Iris Gao, and Ethan Swiggart looking for wild gensing

Trip to Harding's Ginseng Farm

The back-roads drive through the deep woods to Friendsville, Maryland, must be one of the most scenic journeys in the nation. While we were enjoying the sights of grain barns, picturesque lakes, mountain vistas, and wind generators on the skyline's ridges, we could not help but think about how ginseng has been growing here for hundreds of years as a hidden treasure to the local community. For us the town's slogan, "You've got a friend in Friendsville," turned out to be the theme of the day.

Eric Burkhart, ecologist from Penn State University, and **Iris Gao** from Middle Tennessee State University were both in field visiting Harding's wild-simulated ginseng farm there in July. A master at coaxing ginseng from the Maryland understory, this three-generation operation is the largest wild-simulated ginseng farm in the United States. After a very thorough tour and discussions about the problems facing the operation, **Larry Harding** graciously furnished many plant and soil samples for Burkhart and the IGI to use in furthering research into the factors surrounding ginseng plant health and growing conditions.

Collecting fresh samples and understanding the microbiologic characteristics of their soil setting is integral to the research necessary to protect the plant from fungal pathogen attack. If successful, the path to less pesticide and fungicide use in the cultivation of ginseng may finally have a good starting point. We are continuing to collect fresh plant and soil samples with particular emphasis on diseased plants to research and better understand the causes of and solutions to the environmental losses all wild-simulated growers experience.

Please let us know if you too can share diseased samples with us.

With the generous sharing of his time and patience with our sampling, Larry Harding is truly a friend to all of us dedicated to improving the ginseng germplasm and growers' harvest success. Thanks, Larry, for a great day and for helping move our research forward!

Iris Gao and Larry Harding

Eric Burkhart, Larry Harding, Iris Gao, and Cassie Stark

Mother and her triplets persist in hunt for ginseng

Khadijah Alnassari and her triplets, Fatimah, Zaynab, and Ahmed enjoying a wonderful day hunting for American ginseng

In June 2021, Iris Gao went in search of wild ginseng in the Appalachians with a group of charismatic researchers—Khadijah Alnassari, an MTSU undergraduate student majoring in Biology and Sociology, and her 14-year-old triplets, Ahmed, Fatimah, and Zaynab Alnassari, dual enrollment students who also are majoring in Biology.

After three days of hiking, they were empty handed. The discouraged team headed back to Murfreesboro with a disheartened outlook for the species; overharvesting and poaching had left most areas stripped of the native species.

They did not give up! Fortunately, we had another trip planned to Blount County. There, after hours of searching, they spotted a small patch of ginseng nestled between two indicator plants, goldenseal and black cohosh. After photographing and documenting the find, the team took valuable samples of the leaves for future DNA testing, and these samples will be compared with genetic profiles of other ginseng plants in the state.

Ethan Swiggart of the International Ginseng Institute has been awarded a Digital Seed Grant from the Walker Library to produce educational videos about micropropagation of American ginseng. This project will run through June 2022, when it will be housed online with open access. The Walker Library describes digital scholarship as interdisciplinary, collaborative, and committed. As a method, it emphasizes the use of interactive technologies to expand the participation, modes of access, diversity of analysis, and the dissemination and preservation of scholarship. Digital scholarship is changing the nature of how research is conducted, produced, and shared. The frequently used term digital humanities (DH) is a subset of digital scholarship (DS)—the larger umbrella of all scholarship including the arts, sciences, and everything between.

As always, remember that the International Ginseng Institute is your resource for all things ginseng. Don't hesitate to contact us with your thoughts or concerns. We will keep you connected with the community and continue to make this a better experience for all.

Visit us at **mtsu.edu/ginseng**, and write to us at **ginseng@mtsu.edu**

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