AUBURN UNIVERSITY- FOREST HEALTH COOPERATIVE

FY 2022 PROPOSED WORK PLAN

As presented to the Forest Health Cooperative Advisory Committee

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AUBURN UNIVERSITY - FOREST HEALTH COOPERATIVE

FY 2021 WORK PLAN

GOAL A: RESEARCH

Objective 1. Identify research projects

Proposed FY2022:

1. Pine needle mortality survey – USFS-STDP for travel, supplies, and graduate student $120,000 –*Will also submit if suitable RFP is released to* NIFA-AFRI or APHIS.
2. Mitigating Needle Blight: A growing Economic Threat to Pine Forests – NIFA-AFRI for travel, supplies, graduate students, and post-doc $500,000
3. Novel analytical tools for the selection of superior loblolly pine genotypes for improved plant health, fuels, and chemicals – NIFA-AFRI for travel, supplies, graduate students, and post-doc $494,377 – *Reviewed as high priority with good reviews. Wanted more preliminary data, asked to resubmit. More preliminary data acquired by the Forest Products Development Center.* W*ill resubmit with modifications when a suitable RFP is released.*
4. Identifying volatile chemicals of *Amylostereum areolatum* and ophiostomatoid fungi to develop of highly novel lures for monitoring and evaluating *Sirex noctilio* populations in the United States – USFS-STDP for travel, supplies, and graduate student $120,000

Submitted FY2022:

1. Mitigating Needle Blight: A growing Economic Threat to Pine Forests – Senate Appropriations – Proposal requested by Senator Shelby's office. $3,000,000
2. Sudden Oak Death (*Phytophthora ramorum*) Detection Survey (Stream Sampling) in AL and MS – FHM, USFS for all travel, supplies and laboratory technician $42,000
3. Collaboration between SFWS and FABI – University of Pretoria South Africa to work on *Pinus* related diseases and molecular aspects. $5,000 per participant
4. Wood chemistry and disease resistance – SFWS and Forest Products Development Center $5,000

Funded FY2021:

1. Sudden Oak Death (*Phytophthora ramorum*) Detection Survey (Stream Sampling) in AL and MS – FHM, USFS for all travel, supplies and laboratory technician $42,000
2. Collaboration between SFWS and FABI – University of Pretoria South Africa to work on *Pinus* related diseases and molecular aspects. $5,000 per participant

3. Wood chemistry and disease resistance – SFWS and Forest Products Development Center $5,000

Objective 2. Recruit graduate students

1. We would like to hire several graduate students to work on the needle blight. Proposal to be discussed in the business meeting.

Objective 3. Initiate and continue research projects: Determine location, cooperators, and set up research plots dependent upon projects chosen by the membership.

Quantifying the impact of pine decline in the southeastern United States

1. Completed 2 Master's theses and 1 Ph.D. dissertation
    a. Shrijana Duwadii - Impact of tree inoculation by *Leptographium terebrantis* on soil microbial communities in commercial loblolly pine stand
    b. Jessica Ahl - Ophiostomatoid fungal infection and insect diversity in a mature loblolly pine stand
    c. John Mensah - Influence of *Leptographium terebrantis* S.J. Barras and T.J. Perry on *Pinus taeda* L. physiology, growth and productivity

2. Manuscript published, in preparation and revision
    a. Devkota, P., Mensah, J. K., Nadel, R. L., Matusick, G., & Eckhardt, L. G. (2019). *Pinus taeda* L. response to differential inoculum density of Leptographium terebrantis colonized toothpicks. *Forest Pathology*, 49 (1), e12474
    b. Mensah, J. K., Sayer, M. A. S., Nadel, R. L., Matusick, G., & Eckhardt, L. G. (2020). Physiological response of *Pinus taeda* L. trees to stem inoculation with *Leptographium terebrantis*. *Trees*, 34:869-880
    c. Mensah, J. K., Sayer, M. A. S., Nadel, R. L., Matusick, G., Fan, Z., Carter, E.A. & Eckhardt, L.G. (2021) *Leptographium terebrantis* inoculation and associated crown symptoms and tree mortality in *Pinus taeda.* Fungal Ecology 51:000-000. Available Online First: https://www.sciencedirect.com/science/article/pii/S1754504821000192?via%3Dihub
    d. Stephanie Siegel (2021) New sapwood challenges "Perfect Storm" of pine fungal infection. CompassLive https://www.srs.fs.usda.gov/compass/2021/09/16/new-sapwood-challenges-perfect-storm-of-pine-fungal-infection/

e. Ahl, J.B., Eckhardt, L. G. (Submitted) Identifying fungal spores on the pine bark beetle with hyperspectral interferometry. Microscope Research and Technique – Under Review
f. Mensah, J. K., Sayer, M. A. S., Nadel, R. L., Matusick, G., & Eckhardt, L. G. (Submitted) L. Sapwood growth and tolerance of *Pinus taeda* trees to *Leptographium* inoculation. Forest Pathology
g. Mensah, J. K., Sayer, M. A. S., Nadel, R. L., Matusick, G., & Eckhardt, L. G. (In preparation) Foliar nutrients response of *Pinus taeda* L. to *Leptographium terebrantis* infection.
h. Mensah, J. K., Sayer, M. A. S., Nadel, R. L., Matusick, G., & Eckhardt, L. G. (In preparation) Effect of *L. terebrantis* on the production of defensive chemical compounds.

Characterization of pine needle mortality and associated fungal pathogens.

1. Continue to collect samples from sites across AL and other southeastern states. Culture samples and extract DNA, confirm with sequencing.
2. Develop inoculation protocol for resistance screening tests.
3. Develop system using remote sensing to map needle blight.
4. Complete extension publication with ACES.

Identifying volatile chemicals of ophiostomatoid fungi to develop of highly novel lures for monitoring and evaluating bark beetle populations in the United States.

1. Complete GCMS output analysis for novel chemical compounds and prepare manuscripts.

Ecology of siricids and fungal associates in southeastern pine forests: potential for biological control and competition.

1. Manuscript "*Deladenus* species associated with native siricid woodwastps in Alabama" submitted – working on revisions.
2. Manuscript "Effect of growth rate on *Amylostereum* spp. Fungus by terpenes" submitted – working on revisions.

Identification of cogongrass effects on microbial symbionts and physiological vigor of loblolly pine.

1. Manuscript "Growth rate of soil fungi *in vitro* is influenced by common rhizosphere interactions" submitted – working on revisions.

Blue-stain fungi associated with wild pigs causing rooting damage in longleaf and loblolly pine stands.

1. Manuscript “Two new ophiostomatoid fungi found in association with soil on wild pig snouts trapped at Fort Benning Georgia” submitted – working on revisions.

GOAL B: TECHNOLOGY TRANSFER

Objective 1. Serve as a clearinghouse of information related to forest health issues.

Maintain and Update Forest Health Cooperative Web Site

The Forest Health Cooperative Staff will continue to update the Forest Health Cooperative website for use by Forest Health Cooperative Members. (Staff - Baldwin)

Leveraging Forest Health Cooperative Data

The Forest Health Cooperative staff will continue to stress the importance of the Cooperative membership and when possible, leverage Cooperative information for grant proposals. (Staff)

Objective 2. Efficiently and regularly transfer the results of cooperative research to the membership.

Research Reports (Staff)

We plan on producing Research Reports and Technical Notes in FY22.

Newsletters

Newsletter distribution will be planned for Spring 2022. Members are encouraged to submit articles.

Objective 3. Provide a limited consultancy function to the membership in the area of forest health.

Individual and Organized Contacts

An on-going activity and is handled as individual situations as cases arise. (Eckhardt)

Short Courses

The Forest Health Cooperative will offer a Forest Health Short Course in Auburn for member personnel in July 2023. We need a minimum of 20 attendees and will survey the membership in January 2023 for interest.

GOAL C: COOP DEVELOPMENT

Objective 1. Provide for the continual relevancy and efficiency of the Cooperative research and technology transfer programs.

Advisory Committee Meeting

The FY23 Advisory Committee Meeting will be held on June 22-23, 2020. A 2-day meeting will be planned. If there are any meetings that conflict with this time frame, let us know and we can try and accommodate Advisory Members. (Eckhardt/Bowersock)

Forest Health Cooperative Membership

The Forest Health Cooperative staff should make an effort to recruit new members. (Staff)

Update the Cooperative Membership Directory

An on-going activity with an updated directory distributed annually. (Bowersock)

Objective 2. Increase the visibility and effectiveness of the Cooperative as a source of information on issues related to forest health.

Presentations at Meetings

Forest Health Cooperative staff will continue to be encouraged to participate as a speaker or attendee in regional and national meetings. (Staff)

Publications

Forest Health Cooperative staff are encouraged to publish research results in scientific journals. (Staff)

Extramural Funding of Forest Health Cooperative Projects

Forest Health Cooperative staff will continue to be encouraged to locate and generate extramural funding opportunities directly related forest health.

Interaction with other Research Cooperatives

The Forest Health Cooperative staff will make efforts to interact, attend, work with other regional and national forest research Cooperatives in an attempt to broaden and strengthen research ties that can benefit forest health.