

*Forest Health Center research update:*  
**Ash endophytes may provide a new biocontrol option for fighting the emerald ash borer**

The invasive emerald ash borer (*Agrilus planipennis*) has decimated ash trees in eastern North America since its introduction in 2002. Unfortunately, there are few options available to stop this deadly insect, as insecticide prices are prohibitively expensive for treating forest trees and must be reapplied every few years.



*The emerald ash borer, an invasive beetle that has killed millions of ash trees.*

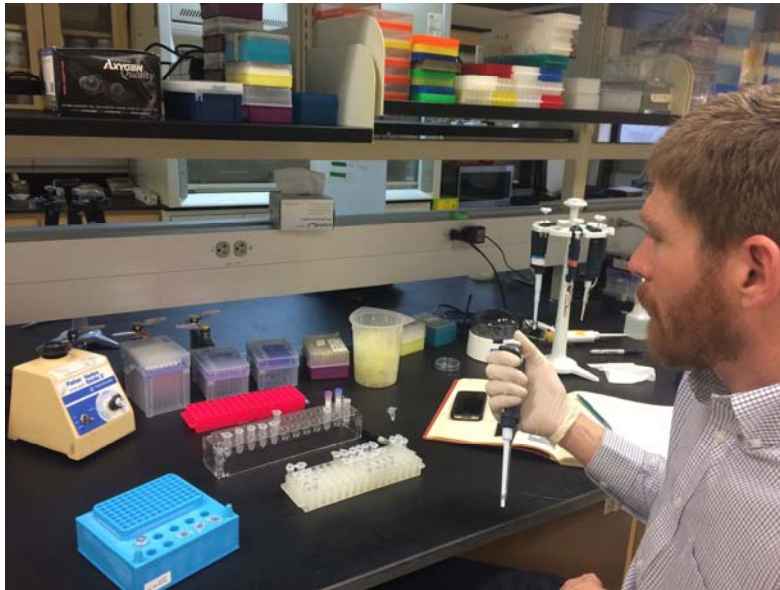
To help fight the emerald ash borer, scientists are looking to a wide variety of biological controls (called biocontrols). One example currently being explored by US Forest Service and Forest Health Research and Education Center scientist Dr. Tyler Dreaden is the potential for endophytic fungi to protect trees from emerald ash borer attack. Endophytes are organisms, often fungi and bacteria, which colonize their host plants but don't cause disease. While most plants are known to have some kinds of endophytes, some endophytic fungi give plants defenses to insects and pathogens. For example, one endophytic fungus of white spruce is known to give the tree resistance to the spruce bud worm by producing chemicals that are toxic to the insect. Because of this, the fungus has been used successfully as a biocontrol and has been found to effectively protect the tree for at least 11 years after initial fungus exposure.



*Dr. Tyler Dreaden, scientist and plant pathologist working with the US Forest Service and the Forest Health Research and Education Center*

Stemming from this successful endophytic biocontrol, Dr. Dreaden and his collaborators are hoping to find an endophyte that gives ash trees resistance to the emerald ash borer. To do this, they are looking at “lingering” ash trees that have remained alive many years after other ash in their area have been killed by

the emerald ash borer. While there are many different reasons why these trees might be more protected from the insect, Dr. Dreaden and his colleagues are investigating whether protective endophytes may be one of the factors and if they can be used to protect other ash trees.



*Dr. Dreaden will characterize the fungal endophytes present in green ash with hopes of finding some fungi that protect trees from the emerald ash borer.*

To do this, Dr. Dreaden is working with other scientists to survey the fungal endophytes of ash (green ash in particular) and compare the endophytic communities of lingering ash trees with those that are susceptible to the emerald ash borer. Through this process they hope to identify fungi that can then be tested in trees and hope to find ones that give the trees additional defenses against the emerald ash borer. If successful, their work could provide a new approach to protecting ash trees and restoring their place in our forests.

### **About Dr. Tyler Dreaden**

Dr. Tyler Dreaden is a research plant pathologist with the USDA Forest Service Southern Research Station, an adjunct faculty in the Departments of Plant Pathology and Forestry at the University of Kentucky, and an active member of the Forest Health Research and Education Center. His research interests include a wide range of forest pathology and tree disease resistance-related topics.

Dr. Dreaden completed his undergraduate degree in Forest Resources and Conservation and his masters in Forest Pathology at the University of Florida. He completed his PhD in Forest Pathology at the University of Florida with a dissertation focused on two emerging diseases: laurel wilt and diplodia canker of oak. He also spent three months working at the Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa, while completing his PhD.