

# Diverse Forests Create a Healthier Environment





Understanding **differences in tree species** could lead to **cleaner air and soil**.

**Different trees affect the environment in different ways.** They have different lifespans, shade tolerances, growth rates, leaf traits, root traits, and more. More than 25 years ago, scientists planted 16 different tree species common to U.S. Northeastern forests in a "common garden" in Pennsylvania, and it has since become a powerful tool for asking questions about these species.

Current research is examining how trees trigger changes in soil biology and chemistry that can then lead to differences in how greenhouse gases are released. By understanding this relationship, scientists can better understand gas emissions and open the possibility of selecting tree species that improve soil and air quality.

*The scientists use automated chambers to collect long-term, continuous observations of gases moving from forested soils to the atmosphere. By monitoring these gases every hour, they can explore how the quantity of gas changes across a day and how gases respond to short-term disturbances, like rainfall. Credit: Marissa Kopp / Penn State.*




**Team**  
Marissa Kopp, Jason Kaye

**Participating Departments**  
Ecosystem Science and Management

**Partner**  
Russell E. Larson Agricultural Research Center

**Funding**  
USDA NIFA Predoctoral Fellowship  
USDA NIFA Hatch Federal Appropriations  
Pennsylvania Agricultural Land Scrip

*This research is currently underway at the Common Garden, located at the Penn State Russell E. Larson Agricultural Research Center where scientists have been testing the effects of tree species on soil chemistry, root and microbial activity, and soil gas fluxes for 25 years. Credit: Marissa Kopp / Penn State.*



**PennState**  
College of Agricultural Sciences