

# OARDC Research Enhancement Competitive Grants Program

 SEEDS  
Number 10



## Soil Management Regimes for Plant Health Care and Integrated Pest Management Programs in Ornamental Landscapes

Daniel A. Herms and Benjamin R. Stinner, Department of Entomology  
Harry A. J. Hoitink, Department of Plant Pathology  
Mary Ann Rose, Department of Horticulture and Crop Science

**Using composted yard waste as mulch can quickly and dramatically enhance soil quality and plant health in ornamental landscapes**, thereby decreasing the need for pesticides and fertilizers in urban environments while diverting a valuable natural resource from landfills.

The production and maintenance of ornamental plants is a \$2.5-billion industry in Ohio, yet very little research has addressed plant health care for ornamental landscapes. Soils in commercial and residential landscapes are frequently degraded when topsoil is removed and subsoil compacted during construction. Consequently, landscape plants are often severely stressed. Although the use of inorganic fertilizers and pesticides can alleviate some stress, in an urban setting their use can create the potential for environmental contamination and exposure to humans and pets.

This project focused on how mulches derived from composted yard waste and from recycled wood pallets affect soil quality and the health of river birch, rhododendron, and taxus, which are among the most highly valued ornamental plants in Ohio. Both mulches increased soil organic matter and microbe activity, but the effect of composted yard waste was most beneficial. Mulching with composted yard waste also increased soil composition and fertility, as well as plant growth and flower production, while decreasing the incidence of root rot disease. ►

More than two million tons of yard waste is generated in Ohio each year. This research demonstrates that when composted and used as mulch, yard waste can restore biological processes to degraded soils and provide plants with an ideal source of organic nutrients, thereby enhancing their growth, health, and appearance. Many landfills no longer accept organic waste, so using composted yard waste has the added benefit of diverting a valuable natural resource from landfills.

On the other hand, mulching with recycled ground wood pallets induced nutrient deficiencies and decreased plant growth. The high carbon content of the ground wood stimulated the growth of soil microbes that compete with plants for the limited nutrient supply. Rhododendrons mulched with ground wood also had a much higher incidence of root rot disease.



## OBJECTIVES

- ▶ Compare composted yard waste and recycled wood pallets used as mulch in ornamental landscapes.
- ▶ Compare effects of composted yard waste and recycled wood pallets on soil quality,

## CHALLENGES

To decrease the use of pesticides and inorganic fertilizers while enhancing soil quality, plant health, and appearance by developing ecologically sound management practices for plants in ornamental landscapes.

## ACHIEVEMENTS

OARDC scientists demonstrated that mulching with composted yard waste quickly and dramatically increased soil organic matter, microbial activity, and soil fertility. As a result, the health and growth of ornamental trees and shrubs were significantly increased while the need for fertilizer and pesticide applications was decreased.

## THE FUTURE

As a result of this study, OARDC researchers received \$205,000 in external funding to continue studying the effects of mulch on soil health, as well as soil management as a component of integrated pest management programs for ornamental landscapes.

This research was funded through the OARDC Research Enhancement Competitive Grants Program, which receives funding from dollars appropriated by the state of Ohio.

