DEPARTMENT OF
ENVIRONMENTAL
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Undergraduate Program	Graduate Program
Ecological Technology Design	Soil and Watershed Sciences
Ecosystem Health	Ecological Technology Design
Soil and Watershed Science	Wetland Science
Natural Resources Management	Ecosystem Health & Natural Resource Management

Advanced Cover Crop Systems to Build Soil Health, Reduce Nutrient Loss, and Cool the Planet

Professor Ray Weil and his team of graduate and undergraduate research assistants have been developing advanced cover crop systems that can help solve some of Maryland's most vexing environmental problems.

What Are Cover Crops?

Cover crops are plants grown to improve the quality and productivity of the soil, to fight global warming by increasing the amount of carbon sequestered from the atmosphere, and to protect water quality by preventing the loss of sediment and nutrients from farmland. The team is developing enhanced cover crop systems that included earlier than normal establishment in late summer, seeding plant species mixtures such as clover + rye + forage radish, termination simultaneously or after cash crop planting in spring, and minimal soil disturbance so the surface is covered with a thick organic mulch much like the leaves of a forest floor.

Multiple Benefits of Cover Crops

These systems provide benefits to the environment and society while also directly benefiting the farmer. The forage radish component can help save the Chesapeake Bay by capturing huge amounts of excess nitrogen from deep in the soil profile in the fall. It then winter-kills and releases plant nutrients in early spring so less fertilizer needs to be applied. The rye and clover survive the winter and grow vigorously in spring, drawing carbon and nitrogen from the atmosphere and leaving surface residues that protect the soil all summer.

The Enhanced Cover Crops Can:

- Clean up leftover nitrogen before winter leaching season
- Dramatically reduce nitrate loading to the Bay
- Triple the carbon removed from the atmosphere in spring
- Build soil organic matter to improve soil health
- Alleviate soil compaction to save energy and cost of deep tillage
- Suppress weeds to save on herbicides & reduce cultivation
- Increase topsoil fertility - save on fertilizers
- Control erosion to save our soil
- Reduce runoff and evaporation to conserve water

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