Ohio Agricultural Drainage Field Studies

Research from two long-term field studies documents significant corn and soybean yield increases with subsurface drainage on poorly drained soils compared to no subsurface drainage on these same soils.

Studies conducted on Toledo silty clay at the North Central Branch Station of the Ohio Agricultural Research and Development Center (OARDC) in Sandusky County evaluated crop yields, soil physical properties, and water quality parameters over a 20-year period for undrained conditions compared to surface drained, subsurface drained, and combination conditions. Yields increased and variation in yield decreased as drainage intensity increased (see graphs).
Research conducted on Hoytville silty clay at the Northwest Branch Station of OARDC in Wood County (near Hoytville) evaluated the effects of drainage, rotation, and tillage practices on corn and soybean yield. Results from the 11-year study indicated that subsurface drainage improved corn yields by 20 to 30 bu/acre and soybean yields by 7 to 14 bu/acre, on both plow and ridge tillage treatments regardless of tested crop rotation. Crop rotation treatments included continuous corn, continuous soybean, and corn-soybean rotation.

**Soil Conditions**

Soil conditions evaluated after 16 years of research on Toledo silty clay, comparing surface and subsurface drained conditions, indicated that subsurface drainage promoted better movement of water through the soil, mellower soil conditions, less crusting and cracking, more drainable porosity, and a better environment for soil-improving crops such as alfalfa and grasses, resulting in greater yields.

**Water Quality**

Drainage water quality evaluated over a 14-year period on Toledo silty clay, indicated that subsurface drainage reduced the losses of sediment, phosphorus and potash by 40, 50, and 30 percent, respectively, compared to surface drained cropland. However, nitrate-N losses increased by 40 percent. Over a 17-year period, runoff from land that was...
subsurface drained was lower than that from land that was not subsurface drained, and peak runoff was reduced by about 32 percent.

Educational efforts have increased awareness, demonstrated new and improved technologies and strategies, and encouraged adoption of practices that reduce nonpoint source impacts on water resources.