

## Soil "air vents" reduce erosion

UNIVERSITY PARK — Bury pipe in fields to bleed off air?

Sounds crazy. But venting soil air promotes water retention and reduced erosion, increases local groundwater recharge, and boosts crop growth, says agricultural engineer Albert R. Jarrett, who explores with J.R. Hoover of the USDA's Northeast Watershed Research Center the interaction of rainfall and soil air pressure.

In Jarrett's laboratory, tended by graduate student Jeffrey Suhr, five trays about 3 feet long and 12 inches wide and deep grow lush with grass. All trays have small plastic drain tubes in the soil bottom; several have plugged tubes.

When water pours over the slightly sloping turf, three to nine times as much soil erodes from the surface of the plugged-tube box as from the open-tube one. Grass on the plugged-tube tray is thinner and less healthy in appearance. Air pressure keeps water from the roots.

Jarrett and Suhr await analysis of the final data, but they expect it to bear out their theories of soil air pressure as a factor in erosion and crop growth.

"In the Northeast, only about two to four hard rains each year would cause the kinds of soil air pressures and runoff that lead to

heavy erosion," says Jarrett.

"Whenever water ponds on the surface, soil air pressure works against seepage. Our figures show that soil might absorb a half inch of water in a slow, steady rain where soil air won't be trapped, but only about a quarter inch in a thunderstorm."

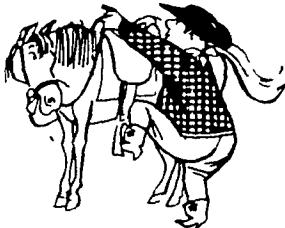
Former graduate student Bill Elliott and Jarrett looked at 14 methods of soil air venting. Vertical mulching, by a chisel plow tilling a 10-inch-deep slot propped open with corn fodder, worked best.

"Few tillage venting methods work well," explains Jarrett, "and they aren't permanent. Pipe drilled full of holes and set vertically in the soil works best, but that's not practical. We're trying to determine the optimum depth and patterns for buried pipe."

Jarrett, Hoover, and their students have examined soil air venting for the past six years. Some of Jarrett's theories are extensions of the work of Wischmeier of Purdue, and he mentions Dixon at Arizona State who has studied soil air movements in flooded fields.

"We routinely bury pipe to drain water from swampy fields," says Jarrett. "Maybe pipe installations to vent air and retain water will someday be as useful."

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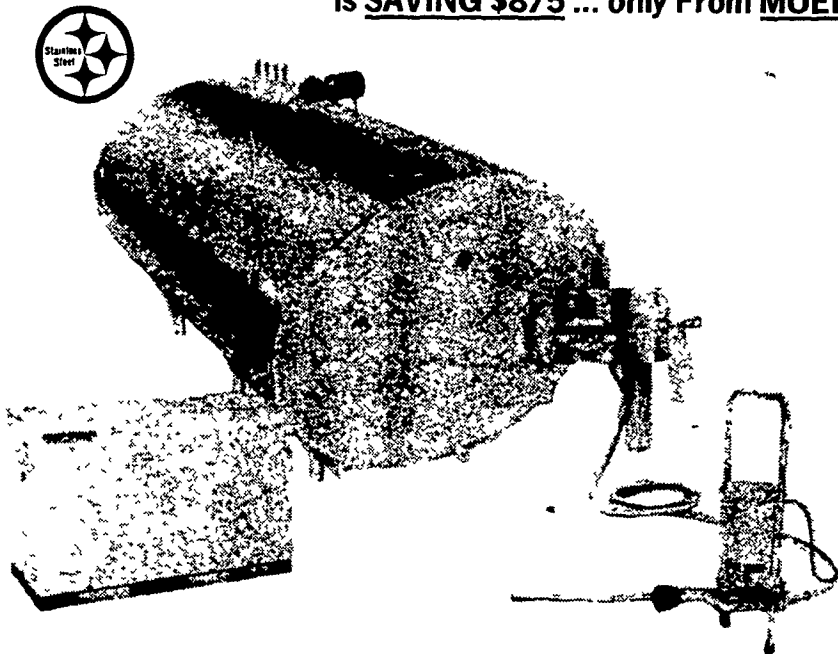
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