

# Here's why no-till corn needs extra nitrogen

**BELTSVILLE, Md.** — Why is no-till corn more susceptible to nitrogen deficiency than tilled corn? Because, as USDA scientists discovered recently, microorganisms hog the available nitrogen, causing leaves to yellow and yields to drop.

"When farmers use less than the optimal amount of nitrogen fertilizer on nitrogen-poor soil, the plants are competing with microorganisms that decompose the crop residue. In a sense, the microorganisms win out," says soil scientist George Stanford of USDA's Science

and Education Administration.

Stanford bases his statement on findings from a 4-year cooperative study between SEA soil scientists and University of Maryland agronomists. Until now, scientists had blamed the nitrogen loss on leaching.

The researchers apply five rates of inorganic nitrogen fertilizer, ranging from 0 to 160 pounds per acre, on no-till and conventionally tilled plots at two locations in Maryland.

One location had soil rich in organic matter while the other had nitrogen-poor soil. In fertile soil, yields of

corn (grain and stover) from no-till and tilled plots were about equal for all rates tested, but in nitrogen-poor soil, yields from no-tillage fell behind when less than 120 pounds of fertilizer was applied per acre.

The reduction in yield was about proportional to the reduction in nitrogen fertilizer, Stanford said.

He points out, however, that these and other tests show that no-till and conventional tillage require about the same amount of fertilizer nitrogen to produce top yields.

By using fertilizer containing labelled nitrogen the

scientists could trace the nitrogen's movement. They located about 80 percent of the nitrogen in both till and no-till plots, but found a difference in its distribution in the nitrogen-poor, no-till plots when fertilizer was suboptimal.

About half the nitrogen was in the soil, and half in the corn, at the 120-pound rate. At the 40-pound rate, however, fertilizer nitrogen was about three times higher in the soil than in corn grain, mostly tied up by the army of microorganisms decomposing the crop residue.

Microorganisms, which

contain about 5 percent nitrogen, begin multiplying in the early part of the growing season when corn seedlings don't require much nitrogen. These bacteria and fungi are a potential source of nitrogen for future crops, but during the first few years of no-till cultivation they immobilize the limited supply when the corn needs it most — after midseason, explained SEA's Joseph Legg.

The cure for nitrogen deficiency is simple — increase nitrogen fertilizer. How much? University of Maryland agronomy professor collaborating on the study, V.A. Bandel, recommends farmers in Maryland use 120 pounds per acre for a yield goal of 100

bushels.

"A farmer has to know his field," he adds. "If he has a highly fertile field due to manuring or rotation with legumes he can reduce nitrogen accordingly."

Acres under no-till cultivation has increased steadily over the last few years due to several advantages. Water infiltrates better, making crops more resistant to drought conditions. No-till reduces soil erosion, saves time and labor, and reduces fuel consumption.

However, SEA's John Meisinger says, savings in fuel costs may be offset by the cost of additional herbicides needed to control problem weeds in no-till cultivation.

## Sheep, lamb inventory up 6 percent in 1980

**HARRISBURG** — Inventory of sheep and lambs on Pennsylvania farms on January 1, 1980 at 85,000 head was up six percent from last year according to the Pennsylvania Crop Reporting Service.

Inventory value was \$5,185,000 compared with last year's value of \$3,720,000. Pennsylvania's 1979 lamb crop was estimated at 60,000 head, down three percent from 1978. The lambing rate was 102 per 100 ewes one year and older in 1979 compared with 103 per 100 in 1978.

Sheep and lamb number in the United States on January 1, 1980 totaled 12.5 million head, up two percent from the record low 12.2 million head a year earlier. The inventory value of all sheep and lambs on January 1, 1980 totaled \$974 million, up 11 percent from a year ago.

The 1979 lamb crop of 8.04 million head increased less than one percent from the crop of 1978. The nation's 1979 lambing rate was 98 lambs per 100 ewes, compared with 94 in 1978 and 97 in 1977.

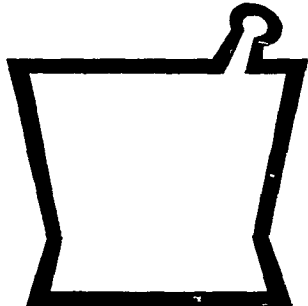
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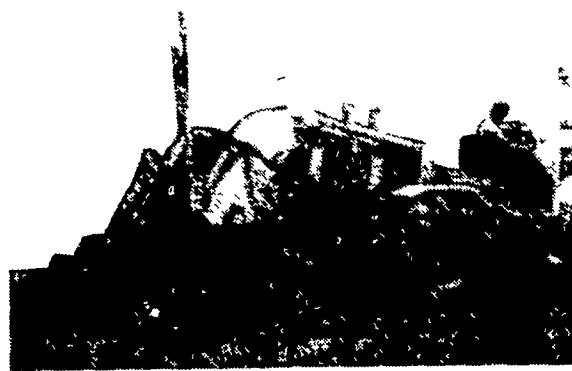
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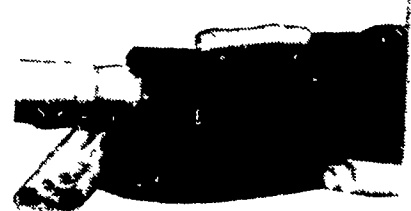
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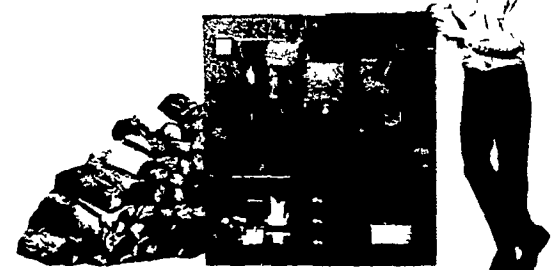
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