

# Can in-row tillage help boost yields?

NEWARK, Del. — No-tillage has many advantages for crop production, but getting good emergence and uniform stands in early plantings can sometimes be a problem, especially in cold, wet springs such as last year.

Surface plant debris — so valuable later in the season as a moisture-holding mulch — shades the ground and keeps the soil from warming as fast as it would under conventional tillage. As a result, seeds germinate slowly and unevenly. In the cold ground seedlings also have trouble getting the nutrients they need, especially phosphorus, which favors early plant development. The result often is poor stands and subsequent yield losses, especially in corn. Soil compaction is another potential problem.

University of Delaware extension agronomist Frank Webb is investigating the use of in-row subsoilers to till the seedbed in no-till fields. This treatment appears to improve early soil conditions and thus improve stands and yields in no-tillage plantings. Webb calls the practice in-row tillage, to distinguish it from regular subsoiling which uses a different type of machine.

**Adjust subsoilers**  
In-row subsoilers can be adjusted to desired row width as well as soil depth. Their coulters cut through surface trash within the seedbed, while powerful steel shanks cut into the soil underneath, breaking up any compaction without disturbing the surrounding soil or surface mulch. The shanks can be set to a maximum depth of 16 inches. A specially designed coulters and press wheel assembly mounted behind each shank prepares a 4- to 6-inch wide clean-tilled surface down each row which is ideal for early soil warming and rapid plant growth.

Accurate placement of planter fertilizer has been another problem in the no-tillage system — primarily because most no-till planters lack adequate placement equipment. The in-row subsoiler solves this problem, too, making it possible to deliver the fertilizer where needed without resorting to additional equipment and energy expense.

Except for use of the in-row subsoiler, in-row tillage plantings are managed like regular no-till crops.

Webb is comparing the performance of no-till corn and soybeans in-row tilled at 0-, 8- and

16-inch depths with regular no-till plantings of both crops. Over the past two years he has conducted extensive field demonstrations with two prototype machines on various soil types at 14 locations throughout the state.

**Response seen**  
"We've seen a response to in-row tillage," he reports, "with earlier emergence and much more vigorous growth compared to regular no-till checks. You could see the difference over the rest of the growing season, too, with subsoiled plants looking much better."

In 1982, in-row tillage corn treatments in six demonstration plots ranged from 0 to 16 bushels an acre higher than regular no-till. And in 1983, plantings at four locations gave a 5- to 23-bushel increase over regular no-till. These increases seem to relate closely to soil type, with heavier, poorly drained soil benefiting the most. This summer Webb hopes to

confirm these observations and determine where in-row tillage is most likely to have economic value in a no-till program.

For one thing, it takes about 30 horsepower per shank to in-row subsoil to a depth of 16 inches, so the energy cost is higher. Even so, the agronomist says the energy used with this equipment is less than with conventional tillage.

Webb and his colleagues in the Delaware Cooperative Extension Service plan to conduct extensive field trials throughout the state during the 1984 growing season. Many local agribusiness firms and growers have agreed to support the demonstration project. A 4-row machine has been purchased from the Kelly Manufacturing Company. Case Equipment Company, along with a local dealer, is supplying a new \$54,000 tractor to pull it. The Delaware Technical & Community College (southern campus) is supplying a lowboy trailer to haul the equipment. And

the Sussex County Vocational and Technical School is providing a truck to tow the trailer.

Other financial support is coming from the Delaware Soybean Board, Delmarva Poultry Industry, and 40 different cooperating farmers.

"This is a large project, but the need for this new technology is urgent," Webb says. "Justification to recommend this practice will depend on its ability to increase yields on various soil types. Because of its energy, moisture, labor and soil conservation traits, no-tillage has been well accepted on Delmarva. But the no-till problems of cold soil, delayed planting dates, compaction and poor fertilizer placement still need attention. This new approach could be the answer to most of them."

Delaware farmers interested in cooperating with this project are encouraged to contact their county extension agent for further information.


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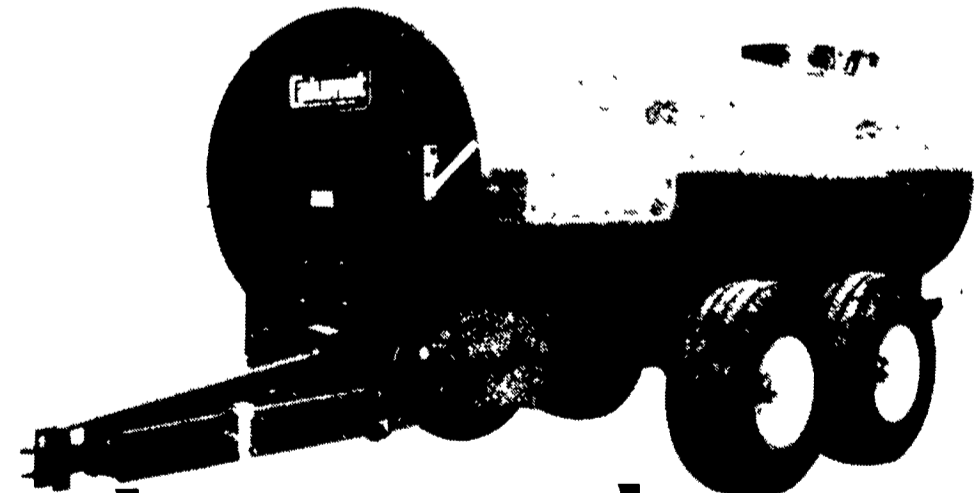


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