Shallow incorporation shaves costs

By **KARA LYNN DUNN**

RICHARD and Martha Place were interested in ways to reduce fertilizer and fuel costs while maintaining crop yields. Their farm, Hohl Acres, proved a good proving ground for comparing an aerator tool, a chisel plow and surface-applied manure for conserving nitrogen.

The rocky, hilly terrain of their 95-acre farm at Oxford, N.Y., necessitates reduced-till and no-till for corn and hay production. So testing out shallow incorporation of manure as part of a 10-farm research trial looked to be a sound idea. The project, funded by New York Farm Viability Institute and the Northern New York Agricultural Development Program, proved to be a good move for the Places.

Liquid manure trucked in from a neighboring farm was applied at about 8,000 gallons per acre and incorporated within one hour of application with either the aerator or a chisel plow.

"A large farm about three miles away supplied the liquid manure, as we don't have storage," reports Martha. "Because of the nutrient benefit of last year's application and the application this spring, we didn't need to buy fertilizer. That saved us about $1,000," she adds.

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EASY PULLING: Richard Place incorporates liquid manure with an aerator tool on a Hohl Acres test plot.

Key Points

- The Places found that manure could be incorporated on rocky no-till.
- An aerator tool proved to be more efficient than a chisel plow.
- Three tests this fall will help determine next year's nitrogen needs.

Machinery a boon for small farms

The aerator tool used was twice as wide as a chisel plow, and incorporated manure at the same time — without aggressive tillage.

"We realized cost savings through using the manure as a nutrient resource and by discovering our 100 horsepower tractor was sufficient to pull the aerator," notes Richard.

"Quantifying potential savings is hard," he acknowledges. "We haven't used conventional tillage for a while now. However, the aerator pulls easier than the chisel ,plow so it takes less fuel per hour to operate."

"As a small farm, we cannot afford to maintain large equipment," Martha adds. "But aeration is certainly something we would contemplate in the future. The more you can do at the lowest cost to save time and fuel, and not lose yield, makes sense to do."

Measuring manure credits

A manure value calculator, developed by Cornell Nutrient Management Spear Program researchers, was used to figure application rates and manure values. See it online at *nmsp.css.cornell.edu/software/manure_nutrient_credits.xls*.

"The calculator uses values from the manure nutrient analysis plus the application rate to provide nitrogen, phosphorus and potassium estimations for different manure application methods and timings," says Quirine Ketterings, the Cornell project leader. "This can be used in combination with soil test results to help determine optimal manure management on a field-to-field basis."

Ketterings notes, "The basic soil test [the Illinois Soil Nitrogen Test] and end-of-season corn stalk nitrate test are the best indicators of soil N supply. They'll help determine the need for extra N, or not, for next year's crop."

For more details, contact Ketterings at 607-255-3061. Or e-mail her at *qmk2@cornell.edu*.

Dunn writes from her farm in Mannsville, N.Y.

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NYFVI is a farmer-led nonprofit that invests in innovative projects to increase the success of ag production enterprises, protect farm-based natural resources and produce measurable farm-level results. For more information, visit the Web site, *www.nyfvi.org*.

Pitless plums goal of biologists' research

HOW great would it be to sink your teeth into a perfectly ripe plum without having to worry about how to inconspicuously dispose of that pit?

Molecular biologists Chris Dardick and Ann Callahan and Prunus breeder Ralph Scorza are looking for the genes that control pit formation in plums — the first step in blocking their development. The research team works at the Agricultural Research Service's Appalachian Fruit Research Station in Kearneysville, W.Va.

Fruit pits consist of the seed and hard woody material, or stone, surrounding the seed. The stone is considered a nuisance by consumers and processors. "Pitless fruit varieties would be a premium product that could provide higher income for growers and could increase consumption of these nutritious foods," says Dardick. It could also save fruit processors money, because pit removal and disposal are costly practices.

The idea of pitless, or stoneless, fruits is not new. In the early 1900s

Key Points

- Pitless fruit could provide a higher income for growers.
- The stone is considered a nuisance by both consumers and processors.
- Pitless fruit consumption could increase, while saving processors money.

Luther Burbank, a prolific horticulturist, crossed a partially stoneless wild plum with California French prune varieties. These crosses led to commercial-quality fruit that almost completely lacked the stone, but still contained the seed. Burbank's work demonstrates that stoneless fruit can still hang onto the tree, reach appropriate size and attain commercial quality.

"Since Burbank's death in 1927, we've only been able to find three sources of his stoneless plums in germplasm repositories, and it's not yet clear if they are all the same," says Dardick. "Most of Burbank's stoneless varieties have been lost, but we have some of the trees growing in our orchard."

Dardick, Callahan and Scorza initiated crosses with these trees to start a new breeding program, but the trees are still immature and do not produce fruit.

"In addition, we engineered Burbank's stoneless variety with an early-flowering trait that will greatly speed up the breeding program. The resulting fruit has remarkably little stone tissue, but further improvements are still needed to make it edible," Dardick adds.

Look to the future

To create truly pitless fruit, it is necessary to eliminate both the stone and the seed inside. "We have begun projects to address both issues. These take advantage of both traditional breeding — using Burbank's plums — and genetic engineering," says Dardick.

"Our group discovered that a set of genes necessary for production of lignin, a material for stone formation, is rapidly turned on specifically in stone tissue — not the flesh or skin — just before hardening, and then quiets down just as quickly after the stone hardens," says Dardick. "The goal is to establish techniques to stop the genes' activity and prevent hardening."

In 2008, another team member, Chinnathambi Srinivasan, a plant transformation specialist, genetically engineered early-flowering plums that produce fruit in six months instead of the usual four to five years. "If it's successful, we hope the research can be applied to other stone fruits, such as cherries, peaches, nectarines and apricots," Dardick says.

The study of plum stones may have key implications for forestry or biofuel crops, in which lignin is a key source of fiber strength and energy storage. Manipulating lignin levels in plants has proven difficult. New studies suggest that plum stones contain extremely high levels of lignin. Understanding how they accumulate so much lignin may open up new opportunities for enhancing wood properties in trees or developing high-energy-density biofuel crops.

Source: Sharon Durham, Agricultural Research Service