

# No-till doesn't cause disease buildup

**BY DORIS CROWLEY**  
**NEWARK, Del.** — When farmers across the nation began climbing onto the no-till handwagon a few years back, many scientists expressed concern that this time- and energy-saving production practice might favor the build-up of certain pest problems. Plant pathologists worried that the vegetative mulch which is no-till's most characteristic feature would harbor disease causing organisms and cause serious future crop losses.

Fortunately, those fears haven't been borne out by experience — at least not in Delaware, according to Robert B. Carroll, a plant pathologist at the University of Delaware Agricultural Experiment Station.

A careful scientist, Carroll shared the early concerns of his colleagues about no-till. Today, though he can't say this cropping system won't ever lead to disease build-ups, he's ready to give it the green light — at least for the pathogens he's studied. Several years of research on soybeans and recent work with corn have convinced him that the increase in diseases he's seen on these crops is due primarily to other causes.

**Disease concern**  
 "Most plant pathologists expected no-till to increase plant diseases," Carroll explains. "With no-tillage you permit crop debris to remain on the soil surface, rather than incorporating it, so we thought this practice would cause a build-up of many different pathogens — particularly those affecting root and basal stem tissues of plants."

Since sanitation — through burial of potentially diseased vegetation by plowing — has been a major

means of plant disease control for centuries, there was good reason for this concern.

Research into the relationship between no-till and plant disease has been going on for about 10 years, but pathologists are just beginning to feel comfortable with their findings. Not all agree about the results. And not all the results agree. Some studies do show increased problems with no-till under certain circumstances.

"But," says Carroll, "to a large degree our fears have not been justified. I think the encouraging thing is that the picture isn't all bleak."

**Helps plants**  
 Based on his observations, no-tillage may actually help plants overcome the effects of some diseases. This may be due to the moisture-holding benefits of no-till mulches. Since moisture stress contributes to the development of certain diseases, reducing stress on plants may counter the effect of a pathogen build-up in crop debris left on the ground.

Carroll has investigated the effects of no-tillage on two crop diseases which are a serious problem in Delaware — stalk rot of corn and Fusarium blight in soybeans. Both can cause heavy yield losses.

To determine the effect of no-tillage on stalk rot and standing strength of field corn, one of his graduate students, Ken Byrnes, conducted an experiment last summer at the university's Georgetown substation on both no-till and conventional corn. Plots were planted into a hairy vetch cover and irrigated at various rates over the growing season. Byrnes found that stalk standing

strength and yield increased significantly under no-till.

**Water makes difference**  
 He also found that stalk rot and lodging were not significantly different under the two tillage treatments, though adequate water did make a difference. Timely irrigation to minimize drought stress generally resulted in less stalk rot and greater stalk strength in both no-till and tilled plots.

Besides showing that corn plants may have better standability under no-till, this study promises to provide valuable information on irrigation scheduling to avoid lodging problems. It will be repeated this summer.

Carroll also has been investigating the possible effect of no-till on Fusarium blight in soybeans. Because Delaware farmers began having trouble with this disease at about the same time they started to increase their no-till soybean acreage, it looked like there might be a connection between the two events.

**Monocropping**  
 But after seven years of laboratory, greenhouse and field research, the plant pathologist no longer associates no-till with the spread of Fusarium blight. Instead, he blames faulty management practices like monocropping and the use of susceptible varieties.

"I'm fairly confident that a major factor in the spread of this disease is the continued cropping of soybeans in the same soils," he says. "Our observation and that of our county extension agents has been that Fusarium becomes a problem where a farmer continuously grows soybeans in the

same soil. It's the kind of pathogen that builds up large populations in the presence of a susceptible host when conditions are right."

He says the disease is less of a problem on heavier soils in the state. This may have something to do with moisture stress and the moisture holding capacity of the soil. It may also depend on the varieties grown. In a current experiment station project being funded in part by grants from the Delaware Soybean Board and Asgrow Seed Company, the pathologist is screening soybean varieties for resistance or tolerance to Fusarium blight.

**Leads nation**  
 Carroll's findings on the safety of no-till from a crop disease standpoint should please Delaware grain farmers; the state now leads the nation in percent of no-till acreage grown.

Despite his general optimism about this cultural system in terms of the diseases he has studied, however, the plant pathologist still feels it's unwise to say they may

never be disease problems related to no-tillage.

"Not enough studies have been done yet with specific disease/crop combinations to answer all the questions," he says. "Probably every major crop disease situation needs to be examined because there can be subtle differences which favor disease build-up in one case and not in another."

Such research could provide ammunition for disease pest management programs and be of great benefit to farmers, the scientist says. "If we had a good data base on various important disease/crop combinations, that information would fit very nicely into any package of recommendations for disease control."

Thanks to Carroll's work, Delaware extension specialists and county agents already can say to farmers, "Yes, it's safe to plant your soybeans no-till without fear of an increase in Fusarium blight." They can also advise growers on management practices which will reduce the incidence of this disease.

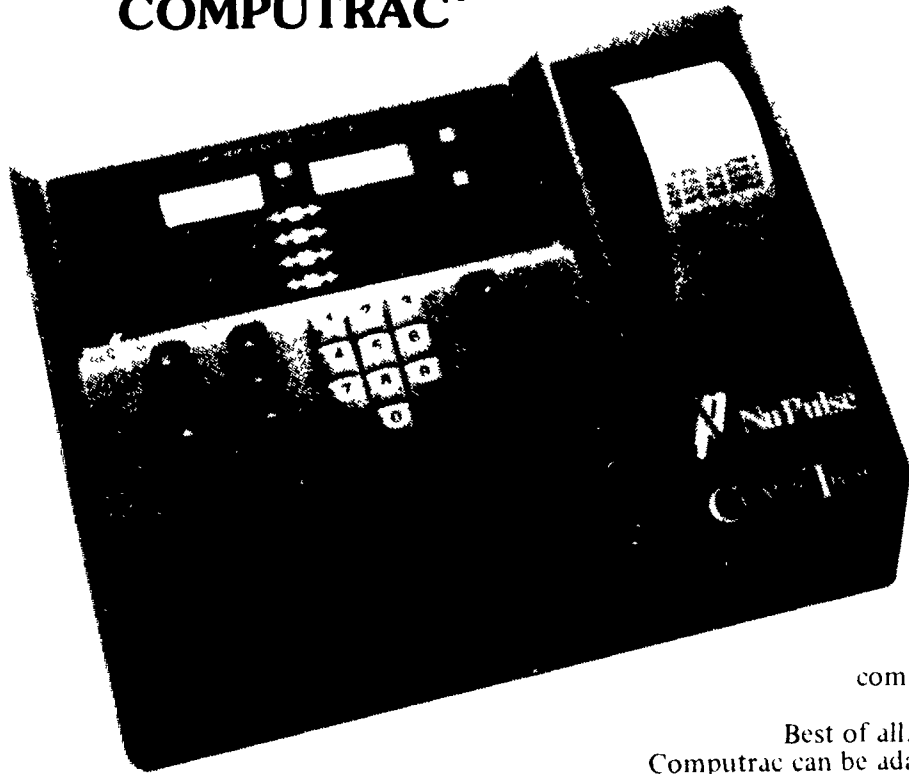
## Milk down one percent

**HARRISBURG** — Milk production in Pennsylvania during April totaled 768 million pounds, down one percent from last year according to the Pennsylvania Crop and Livestock Reporting Service. The number of milk cows in the commonwealth during April averaged 718,000 head, down 16,000 head from a year ago. Milk production per cow averaged 1,070

pounds in April, up 15 pounds per cow from a year ago.

United States milk production during April totaled 11.7 billion pounds, down two percent from the previous year. Total milk cows averaged 10.9 million head, 34,000 less than April 1983. Production per cow averaged 1,075 pounds, four pounds less than a year earlier.

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