

It doesn't pay to replant frost-damaged corn

WOOSTER, Ohio — Cornbelt farmers know that if they can get corn planted early in the season, it generally yields better than late-planted corn. Often, however, northern cornbelt farmers find their early-planted crop hit hard by late spring frosts.

An Ohio study now shows that even if the corn plant dies completely back after being frosted, it will not only recover, but will produce significantly more grain than the same hybrid replanted following frost damage to the emerged seedlings.

Results of the Ohio research were reported during the annual meeting of the American Society of Agronomy by Marshall Jones, a former graduate research associate at the Ohio Agricultural Research and Development Center and Ohio State University.

The growing point of corn remains below the soil surface — even when the corn is 6-8 inches tall. So the plant has a remarkable ability to recover. When a late spring frost wipes out an early-planted crop, the temptation is to get right into the field and replant.

Jones' study was designed to compare yields of grain and silage from early-planted corn undamaged by late frosts with those from moderately and severely damaged corn and yields from the same hybrid replanted immediately into a frost-damaged field.

The Ohio study was conducted on a highly fertile soil in central Ohio. A full season hybrid was planted April 7, 1980. Then the agronomists covered some plots with plastic when frosts were predicted. Other plots were left unprotected and exposed to frost. Recommended management practices were followed throughout the season and rainfall was normal and adequate for optimum yields.

A light but damaging frost occurred May 16, Jones reported. Approximately 50-60 percent leaf damage was observed on the unprotected plants. To simulate

100 percent damage, the Ohio agronomists mechanically severed plants in another plot.

The same day, after the frost occurred (May 16), adjacent plots were disked and replanted with the same full season hybrid. After the late-planted crop emerged, plants on half the plots were mechanically defoliated to simulate 100 percent damage and to observe regrowth of the later-planted corn.

The corn planted earlier produced higher grain yields. There was no significant difference in grain yields between the

protected corn and corn which had received natural frost damage or which had received the simulated 100 percent frost damage.

The late planted (May 16) corn produced higher silage yields (dry matter basis), Jones said. However, the corn planted May 16 yielded 14 percent less grain than the early planted frost damaged corn which had been left to recover.

Thus, farmers replanting the same hybrid on the same land after severe late spring frosts are not only going to unnecessary

labor and expense — they're actually losing money with lower grain yields. The Ohio study was conducted in a high yield environment with a final population of 26,000 plants per acre at harvest. The percent yield loss from later planting in a lower yield environment or from a lower plant population would likely be even greater.

Although the data have not been analyzed for 1981, the second year of the study turned out similarly to 1980 with one exception. The growing conditions through late May and early June following

replanting were so poor that the late planted corn germinated poorly and the losses of grain yield from late-planted corn will be much greater than in 1980.

On the basis of their study, the Ohio agronomists have one word of advice for farmers — who are tempted to replant corn damaged by late spring frosts: "Don't!"

Jones, now on active duty with the U.S. Army, conducted the study in cooperation with Dr. Paul Henderlong, professor of agronomy, as part of the requirement for the M.S. degree from Ohio State.

Can home grown oil stretch diesel?

WASHINGTON, D.C. — It isn't crude, but it is oil.

It's diesaveg (dee'-za-vej), a combination of diesel fuel and vegetable oil. And according to agricultural researchers, diesaveg is coming on strong as an alternative to conventional diesel fuel.

"By the end of this decade, diesaveg could become a fairly common farm fuel," says John Baldwin, professor of agricultural engineering at Louisiana State University. "With the right portable equipment to crush and filter the oil, farm energy needs could be met, at least partially, from crops."

Baldwin and colleagues Billy Cochran and Lawrence Daniel have focused their attention on soybean oil and diesel fuel combinations—they call it diesel—for farm energy. And other oilseed crops hold similar potential. In fact, diesaveg is the subject of study at several other universities and also at four USDA regional laboratories where new markets for farm commodities are researched.

Alternative fuels, primarily gasohol, have gotten a lot of at-

tention in recent years. But because of its alcohol base, gasohol can't be used in the diesel engines of most farm machinery. In 1980, farmers used 3.3 billion gallons of diesel fuel just to produce U.S. crops and livestock.

Cost is the biggest drawback to diesaveg. The price of a gallon of sunflower oil (\$2.24) or soybean oil (\$1.92) looks steep compared with diesel fuel at around \$1.20. But this may not always be the case.

"Trends, especially during the 1970's, points in a different direction," says USDA economist Ed Fryar. "The 5 years before the 1973 oil embargo, diesel fuel prices increased an average of 4.5 percent a year. But for the next 8 years, price increases averaged around 25 percent annually."

If these trends were to continue, prices for both diesaveg and diesel fuel would be about equal by the middle to late 1980's. However, energy analysts say diesel fuel prices in the next 10 years will probably not rise as rapidly relative to vegetable oil. If so, diesaveg might not be an economical substitute for diesel fuel until, perhaps, late this cen-

ture.

"If the two reach the same price, the cost of diesel fuel will serve as a floor price for vegetable oil," Fryar says. This means that if the price of vegetable oil starts to fall below the price of diesel fuel, more farmers will buy vegetable oil for their tractors, forcing vegetable oil prices back up to those for diesel fuel.

Does diesaveg have enough potential power to compete with conventional diesel fuel? According to Fryar, the answer is yes. BTU content and dynamometer tests prove him out.

Gallon for gallon, the potential power of a diesaveg mixture of 75 percent diesel fuel and 25 percent vegetable oil is only 1 to 2 percent less than conventional diesel fuel. The BTU content is #2 diesel fuel—commonly used to power farm equipment—is 140,000 per gallon. Diesaveg can vary between 137,000 and 138,000 BTU's. Ethanol (or ethyl alcohol), gasohol's base, comes in third at 85,000 BTU's per gallon.

Dynamometer tests (which measure the driving torque of machinery) haven't indicated any

significant power difference between engines running on a mixture of 75-percent diesel and 25-percent vegetable-oil and those using straight diesel fuel. In fact, some research tests showed virtually the same results for engines using even a half-and-half diesaveg mixture.

But other problems exist. Diesaveg is heavier than regular diesel fuel, so mixtures tend to jell. And most oil and diesel fuel mixtures don't burn completely, leaving carbon traces on engine parts.

The Louisiana State researchers are experimenting with chemical additives to eliminate or stabilize the carbon and jelling problems.

"Short-run tests have been promising," says Baldwin. "It's the longer-range use that needs more scrutiny."

But because of its availability and price, Baldwin sees diesaveg's use more as a supplement to rather than a substitute for diesel fuel. Especially during an oil crisis, diesaveg could help replace conventional farm fuel.

To make sure the fuel really works, the LSU researchers are experimenting with three State highway tractors which will use various mixtures of diesaveg this season and next.

Another problem is that the nation cannot produce enough additional vegetable oil to replace diesel fuel entirely.

"Vegetable oil cannot be considered a universal fuel substitute," says Baldwin. "It would be a small part of this country's total energy picture, but diesaveg could be an essential part as far as agriculture is concerned."

If cost is a problem, diesaveg has an alternative of its own: used vegetable oil, called waste-oil diesaveg, oil that has already been used in preparing food. Last year, Ohio State University ran a campus bus on a mixture of 80-percent diesel/20-percent waste-vegetable oil. The oil was collected from campus cafeterias and filtered, then mixed with the diesel fuel. No major mechanical problems occurred with the bus.

According to Fryar, the waste oil alternative holds a brighter future than fresh-oil diesaveg. "The price will always be less than the fresh-oil variety," Fryar. In fact, waste diesaveg is now selling for about the same price right as conventional fuel.

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