



When is it Profitable to Double Crop Corn Silage and Winter Grains for Forage?

By Lisa Fields

Double cropping of silage corn with winter (cereal) grains is gaining popularity among dairy farmers across New York. The practice differs from using winter cereals as cover crops following corn silage. Unlike cover crops that are tilled-in or chemically killed before corn silage is planted, fall-planted, double-cropped winter cereals are harvested for forage in May. The forage is often used to fill a feed gap before spring haylage is ready, or fed to heifers to save forage for the dairy herd.

As part of the Cornell On-Farm Research Partnership, a project is ongoing to determine winter cereal yield, quality, and nitrogen management. A recent article ("[Double Cropping Winter Cereals for Forage Following Corn Silage, Cost of Production and Expected Changes in Profit for NY Dairy Farms](#)") reported on the results of a study that examined profitability of the practice. The study was authored by Hanchar, Ketterings, Kilcer, Miller, O'Neil, Hunter, Verbeten, Swink and Czymmek.

Dr. Kitty O'Neil, Cornell Cooperative Extension Regional Field Crops and Soils Specialist in Northern NY, spoke about the motivation for the economic assessment. "Double cropping of cereal (winter) rye and corn silage has been adopted by several farmers in our region, who are committed to the management needed and sold on the benefits. But many others aren't convinced that double-cropping is a good choice. Our short growing season here requires timely planting of corn to achieve decent yields. Farmers worry that spring harvest of cereal rye could delay corn planting and result in reduced corn yield. That concern was expressed by a dairy farmer on our region's Farmer Research Advisory Panel, a group that helps guide Extension's choice of research topics. He felt that double-cropping wouldn't pay as the risk of yield loss in the corn crop couldn't be compensated by the rye forage."

Professor Quirine Ketterings, who leads the Cornell Nutrient Management Spear Program

(NMSP) and the [Cornell On-Farm Research Partnership](#), initiated the economic assessment studies. Ketterings explained, "We frequently were asked what the economic returns were for including a forage double crop in corn silage rotations. Feedback from across the state indicated an interest in enhancing per acre productivity with double-cropping. Farmers also recognized the benefits of a winter crop for soil erosion reduction, nutrient management, and overall soil health. I contacted John Hanchar, Cornell University, NWN Dairy, Livestock, and Field Crops Program, about conducting the economic assessment. John took the lead, working with Extension educators, consultants, farmers, and our campus team."

The economics study sought to answer three critical questions: the costs of production of double cropping, expected changes in profit associated with this practice, and the yield levels that ensure double cropping will be profitable. Surveys completed by 30 farmers from across New York that participated in on-farm research provided key information for Hanchar's economic assessment. The scenarios used in the partial budget analysis examined five tillage and harvest regimes based on the farmer surveys. For each tillage regime, expected change in profit was calculated assuming an average winter cereal yield of 2 tons of dry matter per acre and silage corn yields as either stable (i.e. not impacted by having the winter cereal in the rotation) or with a 1 ton DM per acre decrease from the farm average. Late planting of full season corn varieties is a yield loss risk, and shorter season corn varieties (recommended in double crop rotations) may yield less than full season ones. Fertilizer input was nitrogen applied at green-up to the winter cereals at either 0 or 75 pounds actual N per acre. Typical weather at the farm site dictated whether winter triticale or cereal rye was grown. The study concluded that a positive economic outcome can be achieved with double-cropping (Table 1). Break-even

yields on a dry matter per acre basis averaged 0.75 tons when no N was needed and corn silage yield wasn't impacted to 2 tons when 75 lbs N per acre was needed and corn silage yield was reduced by up to 1 ton of dry matter (about 3 tons of silage at 35% dry matter) per acre.

Table 1: Expected change in annual profit and minimum winter cereal (rye or triticale) forage yield that returns an expected change in profit greater than or equal to zero. Results reflect averages for three farm sizes (100, 500 and 1000 cow dairies), assume nitrogen (N) fertilizer cost of \$0.57 per pound of N, value winter cereal forage at \$180 per ton of dry matter (DM), and include various tillage options. The expected change in profit assumes a 2.0 ton DM per acre winter cereal yield.

	Same corn silage yield	1 ton DM/acre less corn
	Expected change in profit (dollars/acre)	
No nitrogen needed for winter cereal	217	52
75 lbs N/acre at green-up for winter cereal	163	-2
	Break-even yield (tons DM/acre)	
No nitrogen needed for winter cereal	0.7	1.7
75 lbs N/acre at green-up for winter cereal	1.0	2.0

"All the factors used for the analyses are subject to variability," Hanchar noted. "This means that the outcome changes along with a change in forage value, yield, fuel or fertilizer costs, and choice of tillage and harvest method. Management factors present many variables and underscore the need for producers to know the steps they need to take to achieve yields that make double-cropping viable. If all of that's kept in mind when looking at the study results, the breakeven yields and net dollar returns per acre can provide a guideline to help farmers decide if the practice can work for them."

Producers who have adopted double-cropping state that the added inventory of high quality forage, soil erosion prevention and boost in soil organic matter, are well worth the management effort. "It's viewed as an important risk management strategy," O'Neil said. "The practice gained traction in this area

after a very dry summer hurt yields, resulting in low inventories of both haylage and corn silage. That can take a few years to recover from as farmers must play catch-up to build a safe margin of forage reserves."

Hanchar concurred. "Risk management is repeated by farmers statewide as a reason to initiate double cropping. In my region in western New York, producers also note that double-cropping allows them to gain efficiency from the land resource with a practice that's environmentally beneficial."

O'Neil commented, "The farmers who have committed to double-cropping manage cereal rye as a main crop. They don't wait until the corn is all harvested to plant it. Labor is allocated to plant the rye on fields close to the farm in time for good fall growth, and spring harvest is timely so they get decent quality and yields." O'Neil added, "Double-cropping can provide great soil health benefits. It's an investment, so it will take time to see those benefits pay, as the organic matter levels build from having soil cover and aeration and drainage improve. Those factors contribute to improved yields in the long-term."

Outreach to communicate the results from the Double-Crop Economics study is on O'Neil's agenda. "There's a lot of solid information there. My next step will be to bring it to the local level," she said. "That way, farmers who aren't familiar with the practice or are hesitant to try it can learn that it works here and hear how those who've adopted double-cropping locally make it successful."

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To learn about the New York On-Farm Research Partnership and/or participate in trials, see: <http://nmsp.cals.cornell.edu/NYOnFarmResearchPartnership/index.html>. We welcome farmers and farm advisors to work join the program and help us set research priorities!



The **Nutrient Management Spear Program (Nmsp)** is an applied research, teaching and extension program for field crop fertilizer and manure management on dairy and livestock farms. It is a collaboration among faculty, staff and students in the Department of Animal Science, Cornell Cooperative Extension, and PRO-DAIRY. Our vision is to assess current knowledge, identify research and educational needs, facilitate new research, technology and knowledge transfer, and aid in the on-farm implementation of strategies for field crop nutrient management including timely application of organic and inorganic nutrient sources to improve farm profitability while protecting the environment. An integrated network approach is used to address research, extension and teaching priorities in nutrient management in New York State. For more information on Nmsp projects and extension/teaching activities, visit the program website (<http://nmsp.cals.cornell.edu>) or contact Quirine Ketterings at qmk2@cornell.edu or (607) 255-3061.