NMSP's Double Crop N Rate Study at Joleanna Holsteins Has Local Impact

By Lisa Fields

Farming in Delaware County, New York means working with micro-climates and soils that vary widely in their ability to host crops. Paul Cerosaletti grew up with that reality on his family's 60-cow dairy. Currently he's Cornell Cooperative Extension of Delaware County's Nutrient Management Team Leader for the New York City Watershed Agriculture Program. Cerosaletti and his team colleagues Dale Dewing and April Lucas share the belief that soil health is integral to producing high quality forage and successful dairy farming. The three were intrigued when Dr. Quirine Ketterings of the Cornell Nutrient Management Spear Program (NMSP) sought farm sites for the statewide Double Crop N Rate study.

Cerosaletti said, "We've been encouraging the adoption of winter grains as cover crops for soil health benefits. The NMSP study highlighted a double-crop rotation of fall-planted winter grains harvested as forage in the spring followed by short season silage corn. He added, "I had prior experience with double-cropping in our region. We saw good forage quality and yield from winter rye harvested or grazed in the spring followed with brown mid-rib sorghum sudangrass or clover-grass seedings. The NMSP study gave us the opportunity to revisit double crops with a focus on determining N needs of winter grains grown in rotation. It's exciting to contribute to a statewide on-farm research initiative and bring it to the local level."

Located in a Susquehanna River Valley close to major roads, Joleanna Holsteins, LLC in Unadilla was an excellent fit for the Double Crop N Rate Study in Delaware County. Two generations of the Johnson family have successfully marketed the genetics of their 100-cow herd as part of the farm enterprise. Vegetables are produced for retail sale at the farmstead and baled hay is also sold. Forages and grains are grown on a mix of owned and rented land. Brothers Luke and Derek, along with their spouses Janette and Erin, currently manage the farm.

Derek, Joleanna's crop manager, explained why winter grains are grown. "We've made a lot of changes since I started managing the crops in 2008. Building healthier soil is a main goal, and expanding the use of winter cover has been part of that. We switched from conventional tillage to a strip tiller on most of our rotated cropland. It was a positive move, but having that un-tilled soil in between the rows challenged our weed control. We had been growing winter rye and some wheat for straw and used rye a few times as heifer silage to stretch forage inventory. Expanding winter rye acres strictly as a cover crop has helped out-compete weeds along with a two pass herbicide program. We aim for rye burn-down from mid to late April, or when the weather is right, and strip till into the stubble. We plant in a separate pass, and after the corn emerges we can apply a post-emergent herbicide that fits the weeds we see coming up."

Derek Johnson of Joleanna Holsteins (left top) participated in the statewide Double Crop N Rate study with Paul Cerosaletti and Dale Dewing (right insert) of Cornell Cooperative Extension of Delaware County.

The straw production meets the need for high quality bedding in Joleanna's tie-stall barn. Add the economics of growing it at home, and winter grains double-cropped for straw are a sound choice. Flexibility is also a key management tool as Johnson explained, "We sold 60 acres of ryelage this spring to a

farm that needed the forage. We view it primarily as a cover crop, but like to keep our options open for other uses. It's here and growing in the early spring. This year we had the opportunity to sell it, but we can also choose to use it ourselves should we need to fill a forage gap until the main crop is ready."

"The rye was planted on September 5th after sweet corn harvest and the light rate of manure we usually apply there," Johnson said. On April 11th at a crop height of 4-5 inches, N was applied as urea to the study plots in four replications each of 0, 30, 60, 90, and 120 lbs N per acre. Agrotain® was used to reduce risk of N volatilization. Johnson noted, "I could see larger and denser leaves in the higher N plots. We had high rye yields in other fields that had received manure and no added N."

Plot harvest was on May 12th. Ketterings elaborated, "At this location, a 93 lbs per acre N rate yielding 2 dry matter tons per acre gave the best economic return, given an N cost of 70 cents per pound and a forage value of $250 per dry matter ton." To develop N guidelines for winter grains harvested as forage a large 2-year dataset is needed. Ketterings added, "Joleanna Holsteins hosted one of 54 on-farm research trials we completed in the past two years. We are now compiling the forage quality and soil fertility analyses of the 2014 trials and expect to have a final report with the statewide summary this fall. This should include recommendations for N management as a function of field history, including soil types, soil fertility status and manure management."

Johnson commented, "Participating in a project like this is really worthwhile. In a year when we opt to harvest or sell some of the winter rye as silage, we benefit from knowing the N rate that provides the best economic return. Whether it is from fertilizer or manure previously applied, we'd just be guessing on the N needs without research like this."

In April the Johnsons hosted about 70 farmers at a field day to showcase the project. "We saw the perfect opportunity to do some education about soil health," Cerosaletti said. "With the farm's conversion to strip-tillage, it was a great fit. We had field demonstrations including Derek's strip tiller and an AerWay® shallow tillage tool. The local NRCS [Natural Resources Conservation Service] and SWCD [Soil and Water Conservation District] staff worked with us at stations to demonstrate the effect of healthy soil organic matter levels on aggregate stability and soil drainage. The visual contrast, from poor to excellent, between conventionally tilled soil, strip tillage in rotated crops with rye cover, and untilled hay land had a big impact. I got several follow-up phone calls from people expressing their enthusiasm for what they learned."

Cerosaletti noted the barriers to adoption of double-cropping in Delaware County. "Labor resources are tighter here than in other parts of the state. That factor along with the weather makes timely crop planting and harvest a big challenge. Add in the pressure of getting a spring cover crop off in time for a productive corn crop to follow, and farmers hesitate to take the risk."

Johnson also noted a risk of double-cropping. "In a dry spring, on fields with low organic matter, we see moisture stress in the corn if the rye is grown for silage or straw."

The NMSP study was an opportunity for local farmers to learn firsthand about soil health management and N response in winter grains. Cerosaletti remarked, "It helped build understanding of the value of cover crops for soil health and the impact on the soil resource. Having the rye plots at a progressive farm like the Johnsons' where people can see what works right here in their backyard is Extension outreach at its very best."

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To learn about the New York Double Crop N Rate project: http://nmsp.cals.cornell.edu/NYOnFarmResearchPartnership/index.html.

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.