



Northern NY Agricultural Development Program 2022 Project Report

Cereal Rye Cover Crops for Northern New York: Variety Selection and Research Needs

Project Leader(s):

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Cooperating Producers

- Happy Haven Farm, Andrew Menard, Mooers, NY (Clinton County)
- Dyer Farm, Sam Dyer, Plattsburgh, NY (Clinton County)
- Pominville Farms, Terry Pominville, NY (Lewis County)

Background

Fall-planted cover crops serve several important purposes on farms. They help reduce soil erosion and nutrient runoff, filter surface and groundwater, add organic matter to the soil, reduce weeds and pests, and sequester carbon in the soil. Cereal rye is the most common cover crop due to its unparalleled biomass production, weed suppression, and growth under cold conditions. While rye is a popular cover crop of northern regions, challenges for farmer adoption of cereal

rye remain, including a short planting window after fall harvest, inconsistent spring growth for forage harvest (double cropping), and limited availability of regionally adapted varieties. The goal of this research proposal is to begin to address these challenges in the use of cereal rye as a cover crop for farmers in northern New York (NNY).

A few breeding programs have bred rye for grain or forage in the past, but no breeding programs are currently active in the US. Dr. Virginia Moore at Cornell University is currently leading a national [Cover Crop Breeding \(CCB\) Network](#) and has recently initiated a rye breeding program in New York. Due to the regional climate and soil variability within New York State, it will be critical to expand cereal rye variety development and trials to NNY where fall and spring growing conditions vary from other parts of the state.

Previous and ongoing related work

In prior research in Wisconsin, Dr. Moore led farmer focus groups on cover crop use and participatory, on-farm cover crop interseeding trials. She also was the project manager for the CCB Network while in Wisconsin and conducted rye breeding to improve weed suppressive ability in rye cover crops. In Dr. Moore's new research program at Cornell, focused on breeding for sustainable cropping systems, she is focused on cover crop breeding and regional adaptation in New York State, so research in NNY is a priority. In fall 2021, Dr. Moore's lab planted a cereal rye cover crop nursery in Ithaca, NY, representing the first effort focused on adaptation to northern locations. Dr. Moore is also participating in a cereal rye trial in locations throughout the Northeast focused on planting date, coordinated through the Northeast Cover Crop Council.

This project will help NNY farmers take advantage of programs, such as funding through State and USDA sources that allow farmers to implement cover cropping with assistance from the federal Natural Resource Conservation Service and County Soil and Water Conservation Districts (SWCD), and improve farm nutrient management, profitability, and sustainability.

Methods

Focus group

A focus group was held virtually (via Zoom) on March 29, 2022. The focus group was planned and facilitated by Dr. Moore and Emily Fratz (communications assistant, Moore Lab) using semi-structured questions on topics including:

1. cover cropping objectives,
2. current use of cereal rye and other cover crops,
3. use of variety-not-stated (VNS) or named cover crop varieties,
4. species, variety selection, and cost considerations,
5. ongoing challenges associated with cover cropping,
6. variety development goals and research questions of interest, and
7. willingness to participate in cover crop trials and/or on-farm plant breeding in fall 2022 or in the future.

The focus group was audio recorded, transcribed, and coded to uncover major themes (see Results).

Cereal rye planting date & variety trial

The planting date trial was conducted at Miner Institute in Chazy, NY, and at the Extension Learning Farm (ELF) in Canton, NY, in coordination with a trial planted at the Homer C. Thompson Vegetable Research Farm in Freeville, NY. The trial was planted on up to four dates between September 25 and October 25, 2022 (Table 1). Six varieties were planted at each location (Table 2). Plots were drill seeded at a rate of 112 lb/acre. Baseline soil samples were

taken and seedling emergence and plant vigor were recorded approximately every 2 weeks after each planting date. Emergence was assessed visually on a percentage basis, and vigor was evaluated on a 1 to 9 scale, with 1 as the least vigorous plot and 9 as the most vigorous.

Table 1: Experimental locations and planting dates, NNYADP Cereal Rye Cover Crops for Northern New York: Variety Selection and Research Needs project, 2022.

Location	Planting Date 1	Planting Date 2	Planting Date 3	Planting Date 4
William H. Miner Agricultural Research Institute (Chazy, NY)	25 September	5 October	13 October	25 October
Extension Learning Farm (Canton, NY)	12 October	26 October	--	--
Homer C. Thompson Vegetable Research Farm (Freeville, NY)	30 September	12 October	20 October	25 October
Andrew Menard, Happy Haven Farm (Mooers, NY)	3 October	--	--	--
Sam Dyer (Plattsburgh, NY)	12 October	--	--	--
Terry Pominville, Pominville Farms (Croghan, NY)	6 October	--	--	--

Table 2: Cereal rye varieties planted, NNYADP Cereal Rye Cover Crops for Northern New York: Variety Selection and Research Needs project, 2022.

Variety	Seed Source
AC Hazlet	Albert Lea Seed
Aroostook	Albert Lea Seed
Danko	Albert Lea Seed
Elbon	Seed World USA
Guardian	La Crosse Seed
ND Gardner	Albert Lea Seed



Photo 1: Plots 11 days after first planting date of September 25, 2022, at Miner Institute, Chazy, NY, NNYADP Cereal Rye Cover Crops for Northern New York: Variety Selection and Research Needs project, 2022. Photo by Mike Davis.

On-farm cereal rye variety trial

Variety trials were planted on three farms in NNY in fall 2022 (Table 1), including the same varieties evaluated in the research station trial (Table 2). The trials were planted by SWCD personnel in strip plots following cash crop harvest on each participating farm. On-farm data collection will include seedling emergence, plant vigor, winter survival, and biomass.

Results:

Focus group

The focus group included fourteen (14) participants (farmers, Extension, SWCD staff, and agronomists working for other regional organizations). Participants described both the cover crop practices they use on their own farms and perceptions about the practices currently used in the region. Major themes that emerged included:

- need for more cover crops that can survive the winter in the NNY region,
- need for more cover crops that can fit into short planting windows in the region (e.g., later fall planting or earlier spring growth),
- current use of varieties vs. variety-not-stated (VNS) seed, and
- trend towards reducing tillage and use of chemical and roller crimper termination methods.

Cereal rye planting date & variety trial

The fall of 2022 in New York State was extraordinarily mild, and the trial plots at all three research station locations showed excellent emergence. Within each planting date, no significant differences were observed among varieties for emergence or vigor. While the plots planted at later planting dates showed slower emergence, most plots reached 100% emergence before onset of winter. At Chazy, stunted and brown plants were observed on November 2, 2022, caused by an unknown disease (possibly *Pythium* or other damping off disease). Disease severity was evaluated on November 15 using a scale of 0 to 10 (0 = no disease, 10 = complete plant death in plot):

planting date 1:	average disease score of 2.4,
planting date 2:	average disease score of 1.4
planting date 3:	no sign of disease present, and
planting date 4:	no sign of disease present.



Photo 2: Plots with disease symptoms, Chazy, NY, NNYADP Cereal Rye Cover Crops for Northern New York: Variety Selection and Research Needs project, 2022. Photo by Mike Davis.

There was a strong spatial trend in disease severity, but no significant differences among varieties. Root tissue samples will be submitted for diagnosis when the ground thaws.

On-farm cereal rye variety trial emergence

Plots at all three on-farm locations showed excellent emergence, with no significant differences observed among varieties for emergence or vigor.

Outreach:

In March 2022, as part of each virtual focus group, Dr. Moore gave a brief overview to participants regarding cover crop breeding efforts at Cornell and the planned variety trial and planting date trials. In fall 2022, an overview of the project was presented at the New York Soil Health Summit and the Cornell Seed Conference. Trial results will be shared more widely upon completion of the first year of data collection in spring 2023, with an update added to this report for posting at www.nnyagdev.org.

Next Steps:

A survey on cover crop adoption, management, species and variety selection, and challenges will be developed in February 2023.

In spring 2023, data will be collected at the research station and on-farm locations, including spring stand, maturity at termination, biomass at termination, and optional seed harvest.

In fall 2023, a second year of trials will be planted at the research station and on-farm locations. We will seek to identify additional on-farm locations and more commercially available varieties with potential for northern adaptation, and, if sufficient seed is available, one or more breeding populations will be included.

In fall 2023, results of Year 1 of data collection will be presented at the CCE In-service Meeting and at regional meetings such as the late 2023-early 2024 North Country Crop Congresses.

Following Year 2 data collection (ending spring 2024), trial results will be analyzed and published both as an extension report and a peer-reviewed publication. The results will be widely communicated to NNY farmers through newspaper articles, newsletters, and online resources.

For More Information:

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