



# Northern New York Agricultural Development Program FACT SHEET

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## **Organic Field Crop Rotation in NNY: Spring & Winter Wheat**

Principal Investigators: Michael H. Davis, Research Associate, Department of Crop and Soil Sciences, Cornell University; and Farm Manager, Cornell Baker Research Farm, Willsboro, NY; Jerome H. Cherney, E.V. Baker Professor of Agriculture, Department of Crop and Soil Sciences, Cornell University; and Anita Deming, Director, Cornell Cooperative Extension of Essex County

### **Organic Field Crop Rotation**

**Spring and winter wheat are the centerpieces of the first rotation.**

**A local specialty organic flour mill processes more than 100,000 bushels of wheat per year and is interested in purchasing more locally-grown grain.**

**See also  
Small Grains  
Variety Trials 2004  
Fact Sheet online at  
[www.nnyagdev.org](http://www.nnyagdev.org)**

### **Introduction:**

#### **Why Study Organic Wheat Rotation**

In the early 1990s six acres on the Cornell Baker Research Farm in Willsboro, New York, were set aside for the development of organic production systems. Two 5-year rotations were established on the site, which has been certified organic since 1993.

Spring and winter wheat are the centerpieces of the first rotation. Champlain Valley Milling (CVM), a specialty organic flour mill located in Westport, New York, processes more than 100,000 bushels of wheat per year and is interested in purchasing more locally-grown grain. With encouragement from CVM owner Sam Sherman, an organic wheat rotation was developed to provide a model for farmers interested in diversifying their operations and experimenting with organic grain production.

The objectives of the project are:

- to maintain and refine the organic field crop rotation that includes both spring and winter wheat production on certified organic fields at the Cornell Baker Research Farm, and
- to use the wheat rotation at the Farm as an educational tool, encouraging the transfer of the system's strategies to commercial farms interested in producing organic wheat.

**Yields of hard red winter wheat were comparable to the hard red spring wheat yields at about 45 bu/acre.**

**Organically-grown soft white winter wheat yielded 60-65 bu/acre on average.**

## Methods:

### Rotate wheat with alfalfa/timothy hay

The wheat rotation included one year of spring wheat, one year of winter wheat, and three years of alfalfa/timothy hay.

The perennial sod played a critical role in maintaining soil health as the alfalfa fixed nitrogen and the fibrous timothy roots improved soil tilth.

Composted chicken manure from a local egg farm (Giroux Poultry) was applied at a rate of 3 tons/acre prior to seeding the winter wheat. Compost was the only soil amendment used in the system.

Weeds were primarily controlled by late summer fallow periods that preceded both spring and winter wheat seedings (Figure 1).

Additionally, blind cultivation with a Lely spring-tine weeder was used when the wheat was 4" tall to control annual weeds.

**Figure 1. Schematic of the organic wheat rotation at the Cornell Baker Research Farm. The cropping sequence for each of five fields is shown over the course of the five-year rotation.**

Field	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
	sp	su	fa	w	sp	su	fa	w	sp	su	fa	w	sp	su	fa	w	sp	su	fa	w
1	WW	alfalfa + timothy hay							FALLOW	SW	WW									
2	SW	WW	alfalfa + timothy hay							FALLOW										
3	**	FALLOW	SW	WW	alfalfa + timothy hay															
4	alfalfa + timothy hay			FALLOW	SW	WW	alfalfa + timothy hay													
5	alfalfa + timothy hay				FALLOW	SW	WW	alfalfa + timothy hay				**								

plant after 9/15  
plant by 8/10

*Key: SW = spring wheat; WW = winter wheat; \*\* alfalfa + timothy hay*

## Results

Yields of hard red winter wheat were comparable to the hard red spring wheat yields at about 45 bu/acre. Organically-grown soft white winter wheat yielded 60-65 bu/acre on average. The relatively high wheat yields in the organic plots indicate that the plowed down alfalfa/timothy sod and applications of composted chicken manure were able to maintain soil fertility levels over the course of the rotation.

Weed control in both spring and winter wheat fields was excellent (Figure 2). Fallow periods were the key to effective weed control in the system; in some seasons, a blind cultivation with a spring tine weeder may not have been necessary.

The organic wheat cropping system that has been refined at the Cornell Baker Research Farm fits nicely into the production systems of the area's hay farmers. Organic wheat provides hay growers with an opportunity to diversify their crop mix as it can be readily inserted into the field renovation phase of a hay producer's rotation.

Regional farmer interest in organic wheat production is accelerating. In 2002, three Essex County farmers (Mark Wrisley, Bob Perry, and Jamie Phillips) grew a total of 90 acres of certified organic winter wheat as part of a coordinated project involving the Town of Essex Agricultural Initiative, the Adirondack Harvest program in Essex County, and the Cornell Baker Research Farm. The goal of the project was to explore some diversification options that could help revitalize the region's agriculture.

The 2002 wheat yielded well and more wheat was planted for 2003. Mark, Bob, and Jamie are now working with other local farmers that are interested in growing organic wheat, and several of the farmers are purchasing grain bins and investing in combines, indicating that they are excited about the future prospects of organic grain production. In 2004 more than 500 acres of organic wheat were grown in Essex County.



**Figure 2.**  
**Overview of the organic wheat rotation at the Cornell Baker Research Farm. Winter wheat (left) is fully headed (left); spring wheat (right) is just starting to head out. Photo by Michael Davis**

## **Organic Field Crop Rotation in NNY: Spring & Winter Wheat Sponsors**

The organic field crop rotation in NNY: spring and winter wheat research was funded by the Northern New York Agricultural Development Program Program.

### **Principal Investigators**

Michael H. Davis, Research Associate, Department of Crop and Soil Sciences, Cornell University; and Farm Manager, Cornell Baker Research Farm, Willsboro, NY.

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### **For more information on the Organic Field Crop Rotation: Spring & Winter Wheat project,**

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### **The Northern New York Agricultural Development**

**Program** selects and prioritizes research the results of which can be practically applied to farms in the six-county region of northern NY: Jefferson, Lewis, St. Lawrence, Franklin, Clinton and Essex Counties.

**To learn more about the Northern New York Agricultural Development Program,** contact Co-Chairs Jon Greenwood, 315-386-3231, or Joe Giroux, 518-563-7523; or R. David Smith, Cornell University, 607-255-7286; or visit [www.nnyagdev.org](http://www.nnyagdev.org) on the web. ♦



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