SUMMARY

The demand for local organic food is steadily increasing throughout Vermont and New England. Consumers are asking for bread baked with locally grown wheat; however bakers have been slow to incorporate local wheat flour because of the challenges associated with obtaining grains that consistently meet bread-baking standards. Addressing the quality issue is essential for expanding the bread flour market in the northeast.

One of the major quality factors facing Vermont grain producers is protein content. Much of the wheat currently produced in Vermont has protein levels below what most commercial mills would consider suitable for flour production. Assuring adequate available nitrogen (N) for grain yield and protein are the primary challenges of organic winter wheat production in New England. Topdressing N to increase protein quantity and quality is recommended for conventionally grown wheat, but the effectiveness of topdressing organic N sources needs evaluation.

In 2010, we were awarded a partnership grant titled “The Effects of Topdressing Organic Nitrogen on Wheat Protein”, to explore the relationship between topdressing organic nitrogen amendments (composted poultry manure, Chilean nitrate, and an available bagged fertilizer), the application times (tillering and flag leaf), and how these two factors influence the quality and quantity of grain protein, on farm. First year results demonstrated that topdressing can have a positive impact on both yield and quality. However, one year of data is not adequate to confidently recommend that farmers begin changing fertility practices. Our group is hoping to repeat the study in 2011 to further solidify the results. In addition, a cost benefit analysis will be conducted to determine cost effectiveness of this practice.

OBJECTIVES

In March 2010 the University of Vermont Extension was awarded a SARE Partnership grant to establish a trial at Gleason Grains in Bridport, VT. The purpose of this project was to determine whether topdressing organic nitrogen (N) amendments, during key times of wheat development, would increase grain protein and yields. The amount of protein in wheat depends largely on soil nitrogen availability during plant growth. Higher protein levels generally result in improved baking characteristics. Assuring adequate available nitrogen (N) for grain yield and protein are the primary challenges of organic winter wheat production.

ACCOMPLISHMENTS

A field trial was conducted on Ben Gleason’s farm in Bridport, Vermont. In September of 2009 Ben prepared the seedbed using standard best organic methods and seeded with Redeemer, a hard red winter wheat. In early April of 2010 we laid out the trial plots (10’ X 20’). The experimental design was a randomized complete block with a split plot design. The treatments were replicated four times. The topdress treatments were Chilean nitrate, composted poultry manure, and ProBooster (North Country Organics); and an unamended control. The timing of amendment application was at tillering and the flag leaf stage or a split application at both stages. Soil nitrates were sampled throughout the growing season to monitor plant available nitrogen. Wheat yield and moisture were determined at the time of harvest. Wheat quality was measured at the UVM Extension Grain Quality Testing Laboratory.

The first year of data suggests that organic nitrogen (N) sources applied at flag leaf and as split applications at tillering and flag leaf stages had significantly higher protein levels than N just applied at tillering or the control plots. Interestingly, the product ProBooster (North Country Organics Inc.) applied at the flag leaf stag resulted in protein levels that were 3 percentage points higher than the other fertility treatments applied at this stage. Wheat that received topdress amendments always resulted in higher protein levels than the unamended control plots. Across all treatments ProBooster had the highest protein level of 13.4%. From these results it indicates that ProBooster may be a viable N fertility source for increasing winter wheat protein concentrations.

In addition to the research experiment farmers and other interested stakeholders were invited to the Gleason Farm to learn about the trial and other aspects of wheat production. *Producing High Quality Organic Bread Wheat*, an on-farm workshop was held June 8, 2010 at Gleason Grains in Bridport, VT. The workshop highlighted the NE SARE funded organic fertility experiment. In addition, Ben Gleason discussed crop rotation and weed control in wheat grown for human consumption. We viewed Ben’s wheat processing facility including his seed cleaning and meadows mill operation. This event had 53 attendees consisting of farmers, Extension, and other agricultural professionals. Many of the farmers were anxious to view project results. The results from the project will be presented at the Northern Grain Growers Association Winter Conference in March. An article will also be published in the group’s newsletter and posted on both the ngga.org and uvm.edu/extension/cropsoil/ websites.

IMPACTS

These first year results demonstrated that topdressing can have a significant impact on both yield and quality. However, one year of data is not adequate to confidently recommend that farmers begin changing fertility practices. Pending funding, we plan to repeat the trial in 2011 to verify the results. Farmers are excited to implement some new practices to improve wheat quality on their farms. This was obvious based on the turnout at the on-farm field day held in June. Cost evaluations are currently being conducted to determine the cost benefit of topdressing the wheat. Further impacts will be quantified at the end of the project period.