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Winter Wheat Trials in Maine with Response to Compost

In the growing season of 2000, five winter wheat varieties and common Spelt were broadcast sown the last week of September on one acre of fairly uniform but mediocre soil. The site is a late Northwest slope, newly cleared six years ago. The field was divided into six roughly equal strips. Soil samples were taken and one was sent to Soil Foodweb Inc., a biological testing lab in Corvallis ,OR. .The second soil sample was later sent to Woods End Research Lab in Mt. Vernon, ME. For a chemistry work up.

A source for compost was also tested by SFI and a sample was set aside for Woods End Lab for the chemistry as well. The two sets of tests gave an accurate picture of what was missing in both soil and compost samples that could be amended locally.

As indicated, most of the primary nutrients ,minor and trace elements needed lifting.

Phosphorus was particularly low ,so colloidal phosphate, aragonite(Ca.),greensand and a little humate were added to the compost just before spreading in May of 2001.

The timing of the compost application was intended for an established young wheat stand when it is just starting to develop a crown and has a good sod to drive over without damage. Only six cubic yards of compost and 550 lbs. total of amendments were applied to one half of the trial ground. This seemingly low application rate is a realistic investment for a first year with a low per/acre valued crop. There is plenty of room for improving the soil chemistry here, just as there is on any real world farm where economic constraints limit the fine tuning of the soil system.* Copies of the soil and compost tests are included here for reference.

The six plots were sown to the following wheats;

Common spelt, an unchanged ancient type of wheat, recently repopularized.

Cayuga,a soft white pastry type.

Seward,a medium hard red .

Rose, a hard red, high gluten type.

Golden 50, a medium hard red, multi- purpose wheat.

New Brunswick, a generic hard red obtained from the province.

Of these six, the spelt seed was not viable and although the thin stand was as hardy as the best of the wheats ,it was not worth representing in this trial. (I have grown excellent spelt before and feel it warrants a place in Maine agriculture.)

Cayuga and **Seward** were spread with amended compost but were not tested for crude protein, nor were they measured by weight after harvest. Both varieties however were clearly more robust with about 40-50% larger heads, especially the **Cayuga** which appears to be a potentially heavy yielder. **Cayuga** did not have much flavor which is typical of most pastry wheats. It would also be a good candidate for a feed grain . The plant is more leafy than the hard wheats ,and lastly it threshed very cleanly.

Seward is a relatively tall plant which appeared to yield as well as the following **Rose** but the inferior flavor doesn't lend itself to baking .There was not enough gluten to get a good rise on the dough ,yet the flour would not perform well with pastry work either. This wheat does have good feed possibilities and could fill that role easily

The following wheats were tested for crude protein in the control group as well as the compost treated side of the plots. **Rose** was further tested for complete nutritional comparison between control and treatment. All three compost/ protein sets :(**Rose Golden 50,** and **New Brunswick**),were carefully weighed after threshing and cleaning to determine the yield in pounds /acre. (See yield column).

Rose In our opinion, this is the best in this particular trial for overall growing habit, yield, flavor, and bread baking qualities. In the field; **Rose** stood at 32"-34"without lodging. It was observed that the straw from the compost treated side was thicker and not hollow. There was a cottony or thin pithy structure in most of the stems. This was not observed in any of the other plots. As indicated, the greatest gain from the compost application is in the protein group with some small improvement in the minor elements. *See the Dairy One comparisons. The yield comparison for **Rose** in pounds /acre calculations were; control.....1502.82 lbs./a.

w./ compost....1894.86 lbs./a.

New Brunswick This selection also shows great promise for Maine growers. Straw height averaged 30+" in the compost plot. The baking qualities were almost as good as **Rose,** perhaps a little stickier dough, and a slightly darker end product with a good earthy taste. The control side of the **New Brunswick** plot had somewhat spindly straw and would have lodged if there had been a wet spell near harvest time. There was nearly a full percentage point gain of crude protein, but the real good news on this one is it's considerable yield possibilities calculated here;

control..... 1708.20 lbs/a.

w/ compost.....2220.66 lbs/a.

At a 50 lb. bushel that would be over 44 bushels to the acre, Quite respectable for the short comings of the soil, considering that further soil building and fine tuning has a ways to go here! * See also the Dairy One comparisons.

Golden 50 . This wheat is very different from the above two ,being much shorter and lower yielding. While being almost pathetic for plant structure on the control soil plot , it was remarkably improved with the compost treatment in all aspects and surprisingly managed to reach 14% crude protein . Even without the compost treatment**, Golden 50** is an especially tasty wheat that does well as a pastry , quick bread , or risen yeast loaf which was possible with the grain from the compost plot. The most redeeming value of this selection is its light nutty flavor. We know from past year's experience with this one that it can exceed the qualities and yield found in this trial.* See the Dairy One pages.

Golden 50 cont.

Once again we see a fairly dramatic increase in yield due to the application of compost as seen here; control.....571.73 lbs./a.

w./ compost...952.86 lbs./ a.

Observations, Comments and Conclusions

All of the grains trialed here proved to be hardy enough to over winter without damage. All but **Cayuga** we have grown before, so their strengths and weaknesses are familiar to us. The only time winter kill was seen is when there is bare ground, sub zero freeze and thaw fluctuations. **Rose** and **New Brunswick** have both survived –20f ,bare ground conditions in the past.

Fall sowing avoids the problems associated with mud season, which for spring wheat is The ideal time to plant by taking advantage of the cool damp season's growth opportunities . Another disadvantage for coastal growers is that the harvest window often extends into wet weather, increasing the likelihood of lodging and difficulty with combining, and curing the crop. Dry down phase is more certain with winter wheats finishing typically in August instead of late September. Sowing in the early fall minimizes the compaction problem. It is practical to use a winter wheat sowing directly after a frost killed crop such as cucurbits, sweet corn, potatoes, and other row crops which have already been fed well. The soil gets a living green mulch to protect it, and reduce erosion, followed by a lower labor cash crop. If the previous crop is of low profile then there is the no till option as well.

We found that the straw became available at the time it was needed most for dry weather mulching.

The timing of winter wheat also allows the farmer to over-sow a forage or hay crop such as red clover to develop in time for a late season cutting following the removal of the wheat crop. The benefits of this overlapping rotation should be clear to any biologically minded farmer but should be accurately profiled in a separate control and method comparison.

Between August 2nd and 10th, 2001 , all the trial plots had been scythe harvested and threshed in an old 1930s model threshing machine which did an acceptable job .

We found that the cost of inputs for this trial would not be cost effective to the grower unless they were purchased in bulk bag or trailer load quantities. It is also clear that compost can be too costly to purchase off the farm for a slim profit margin crop like wheat. On farm generated compost would help this situation, and a little of the correct soil amendments go a long way if combined with it to maximize the effect of the compost. .

NOTE; The economics of increased scale would make the cost inputs more affordable, especially when labor inputs of the whole project are more mechanized than our farm here.

If a grain crop is rejected for the lack of protein alone, then compost is worth using in any case. Looking at the yield figures below it is evident that compost also accounts for wide increases in all three chosen wheats. **Rose** and **New Brunswick** in particular have yield capabilities showing economic viability.

A word on wheat values as related to this trial.

Checking current organic wheat berry prices in 50 lb. Units was around 35 cents/lb. Wholesale by the bin load, as would be delivered to a mill, ranged widely from around 26 cents to the 36 cent level. This probably depends somewhat on a favorable protein analysis.

variety	**Compost treated yields**	whl.sale x .35 lb	blk. bin .26 lb	retail .79 lb.	
Rose (yields)	1894.86 lbs	$663.20	$492.66	$1496.94	per acre.
New Brunswick	2220.66 lbs.	$777.23	$577.37	$1754.32	per acre.
Golden 50	952.86 lbs	$ 333.50	$247.74	$752.76	per acre.

There are offers made to growers as low as .10 lb. Which is absurdly low and rather inappropriate for the average Maine farm even if the gross income per 100 acres was $25,000 ,(50bu/acre). The cost of raising that scale of crop to milling standards necessitates a higher wholesale value.