

WINTER 2011



NEWS

NORTHERN
GRAIN
GROWERS
ASSOCIATION

**To Encourage and
Support the Production,
Processing, and
Marketing of Grains
in Vermont and the
surrounding areas.**

A Brief History of Grain Production in Vermont

PART ONE

By Jack Lazor

The story of grains in Vermont must begin with the “three sisters” crops of corn, beans, and squash. Archeological evidence from the Skitchewaugh site on the Connecticut River near Springfield, Vermont reveals that these crops were first cultivated around 1100 A.D. The Woodland Abenaki began to supplement their hunter gatherer diet with cultivated crops around this time. Corn and bean culture came several centuries later to the Champlain Basin because game was more plentiful and easier to procure in a broader and less challenging landscape. The Donahue site at the mouth of the Winooski River on Lake Champlain saw its first agriculture beginning in 1440. Flint corn, squash, and kidney beans were grown together in mounds by the women of the tribe. Just about all Native American agriculture was practiced on alluvial soils at the deltas of Vermont’s major rivers. When the fertility declined, cultivation was moved to new spot.

Vermont’s first white settlers came from opposite ends of the territory. The French worked their way southward from the Richelieu River down into Lake Champlain building forts at Isle La Motte and Crown Point, settling the land in seigneuries, long narrow strips with frontage on the lakeshore. The English constructed Fort Dummer, southeast of Brattleboro in 1724. The British land tenure style concentrated on large rectangular fields with several crops in rotation. War between the French and English in Europe and North America as well as hostile raids from displaced Native peoples held back the advancement of settlement until the Treaty of Paris was signed in 1763 and British took control of northeastern North America. Until this point, subsistence farming had been the order of the day. Corn, beans, wheat, rye, barley, oats, and flax were all grown for home use.



*Jack Lazor in one of his fields of wheat,
Westfield, VT.*

had done quite poorly in southern New England and had been replaced by rye as the chief cereal crop. The highly fertile clay loams of the Champlain basin, coupled with a perfect climate produced prolific crops of very high quality wheat. By 1800, Vermont had become a major exporter of wheat. Stories abound about twenty to thirty bushel to the acre yields and people paying for their farms in one year with wheat. Within twenty years, yields

Vermont’s first wave of settlement began in the 1760’s as newcomers made their way up the Connecticut river valley and followed the Crown Point military road to the Champlain lowlands. A second, larger group of Revolutionary War veterans arrived after 1790 in search of new land grants. It soon became apparent that wheat grew quite well on these newly cleared acres. Wheat

Continued on next page

History of Vermont Grain Growing, *continued*
began to decline as soils became exhausted from the continuous cropping of wheat. Wheat crops were totally devastated by the wheat midge two years in a row in the 1830's. Vermont soon lost its breadbasket status after the Erie Canal was completed in 1825 and the center of wheat production moved to the Genesee Valley of western New York. As worn out soils grew back to grass and pasture, sheep farming soon became the order of the day. Favorable tariff legislation in 1828 gave American produced wool a distinct advantage over British imports, making sheep farming much more attractive.

Wheat production peaked in Vermont in 1840 at 644,000 bushels. By 1850, total harvest was 535,955

bushels. Thirty years later, the Census of Agriculture tallied wheat production in Vermont at 337,257 bushels. Wheat continued to be cultivated for family and local consumption on small hill farms all over the state. Census records indicate that two acres of wheat were cultivated on my farm in 1880. The yield was fifteen bushels to the acre. By the turn of the century, total statewide production had fallen to 34,650 bushels. A very brief nationwide boom in the cultivation of wheat occurred just after World War One when crops failed in the Russian Crimea. Vermont production climbed back to 176,003 bushels in 1919. Wheat has never really died out as a crop here in Vermont. As late as 1950, over 900 acres were reported to the census.

The Vermont grain story will continue in our next issue.



Impact Of Topdressing Organic Nitrogen On Wheat Protein

Dr. Heather Darby and Erica Cummings, University of Vermont Extension

Funded by a NESARE Partnership Grant

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.

In early April of 2010 the experiment was imposed within a winter wheat (var. 'Redeemer') field on the Gleason Farm. The experimental design was a randomized complete block in a split plot design.



Harvesting plots

Treatments were replicated four times. The main plots were amended with one of 3 organic N amendments applied at a rate of 20 lbs of available N per acre. The amendments used were; 'Cheep Cheep' (4% N), Pro-Booster (10% N), and Natural Nitrate of Soda (16% N). The product 'Cheep Cheep' is an OMRI approved and widely available

dehydrated poultry litter product. It has a guaranteed analysis of 4-3-3. The OMRI approved 'ProBooster' is a fertilizer manufactured for North Country Organics in Bradford, VT. The blended fertilizer is composed of vegetable and animal meals and natural nitrate of soda. It has a guaranteed analysis of 10-0-0. The OMRI approved Natural Nitrate of Soda is more commonly known as 'Chilean Nitrate'. It is mined from Northern Chile. It has a guaranteed analysis of 16-0-0. The use of Natural Nitrate of Soda is allowed, however, it is limited to supplying no more than 20% of the crops total N requirements. The split plots were the timing of the N fertilizer application. The plots were fertilized by hand at the tillering stage, the flag leaf stage, or a split application with ½ the rate at both growth stages.

Due to an inundation of sweet clover, the plots had to be mowed on July 30, 2010 and dried down before harvesting with an Almaco SP50 plot combine on August 2, 2010. Quality measurements included test weight, crude protein (CP), falling number, and Deoxynivalenol (DON) mycotoxin analysis.

RESULTS

A fertility source x application time interaction was observed for yield (Figure 1). This suggests



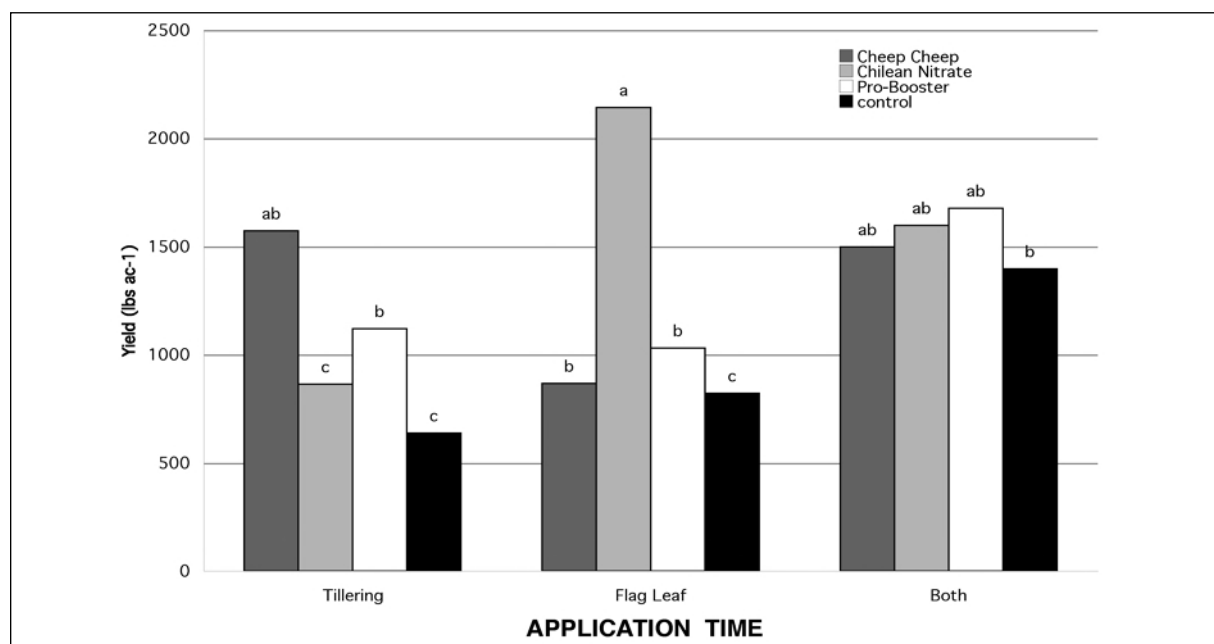


Figure 1. The interaction of organic N application timing and amendment type on wheat yield

*Varieties with the same letter did not differ significantly in yield.

that the impact of the organic N fertility source on yield will vary across the range of application times. For example, 'Cheep Cheep' and 'Pro-Booster' applied at tillering had a significant increase in yields over the 'Chilean Nitrate' or the Control. This presumably has to do with the slow release nature of this amendment potentially supplying N to the plant over a longer period of time. This would be compared to the 'Chilean Nitrate' being more rapidly available. Interestingly when 'Chilean Nitrate' was applied at the flag leaf stage it resulted in significantly higher yields than the other fertility treatments applied at this stage. When the applications were split there were no significant differences between treatments.

A fertility source x application time interaction was observed for CP concentration (Figure 2). This suggests that the impact of organic N fertility sources on CP will vary across the range of application times.

Application of N sources at tillering did not result in protein increases as compared to the control. However, applications of N fertility sources at the flag leaf stages did result in a significant increase in CP as compared to the control. The 'ProBooster' application

resulted in the highest CP concentrations. Increases in crude protein concentrations were only significantly higher than the control in the 'ProBooster' treatments. Overall, the application of organic N sources at the flag leaf stage resulted in the best chance to improve wheat protein levels. The first year of data suggests that organic 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, Pro-Booster applied at the flag leaf stage resulted in protein levels that were three 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 controls.

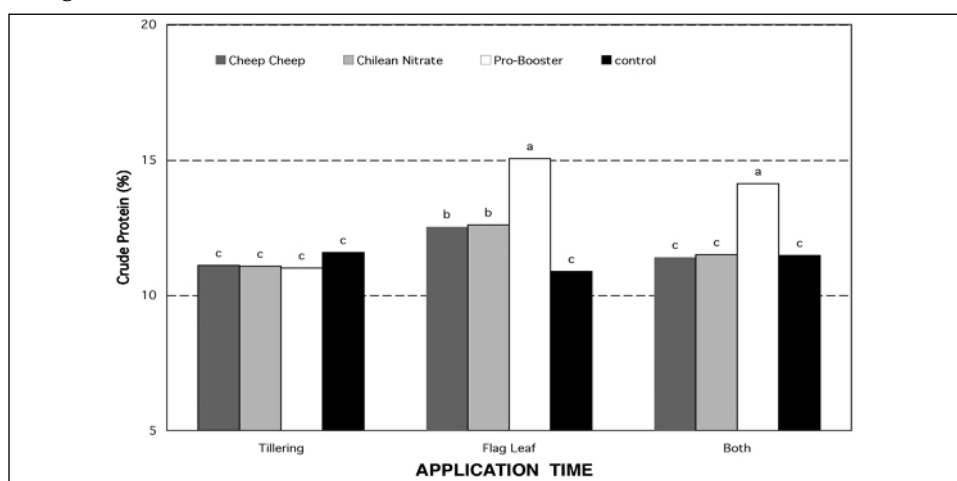


Figure 2. The interaction of organic N application timing and amendment type on wheat protein levels

*Varieties with the same letter did not differ significantly in protein levels.

University of Maine and University of Vermont Extension Trip to Denmark

Organic Bread Wheat: Farms, Mills, & Bakeries

By Theresa Gleason, Gleason Grains, Bridport Vermont

On Sunday, October 24, an intrepid crew of University of Maine and UVM researchers, Maine and Vermont organic farmers, and a high energy, 23 year old professional videographer met up at a utilitarian Danish hotel in Copenhagen. Our mission: To storm through Denmark in four and a half days, visiting organic grain farms, mills, bakeries, research stations and experimental farms.

The trip was part of a collaborative grant awarded to Dr. Ellen Mallory, University of Maine and Dr. Heather Darby, University of Vermont. On this trip we hoped to see how the Danes, with their progressive environmental/agricultural policies were growing, marketing, and baking with organic grains. We left Denmark having met many farmers, bakers, and researchers possessing high integrity, passion, and a deep sense of ecology. Whatever role the individuals we met played in this system of producing high quality bread wheat, they seemed to be highly engaged in their lives, excited to talk with us, and proud of the work they are doing.

We heard several themes repeated throughout the trip. Niels Halberg, at the Foulum Research Station encapsulated what we saw of the research work in

Denmark when he outlined the goal of International Center for Research in Organic Food Systems (ICROFS): “To make the principles of organic agriculture become a global reference for sustainability in agriculture and food systems due to evidence based on research and adaptive management” (i.e. farmers and researchers working together).

If we didn’t already know it before going on the trip, we knew after the trip the importance of value-added product. At Viskingegard, Kragegarden, Aurion, Skaertoft, Bregentvedgard, and Mordrupgard, we met the folks who do it all; grow it, mill it, bake it, sell it. Each location was as unique as the individuals who own and operate the farm. Some of the farms used high tech, others used technology that’s been around since the 11th century. Some focused on heritage varieties of grain, others focused on high-yield, modern varieties. Farms varied in size, from dozen employees to just a couple.

Uniqueness aside, the other themes and commonalities that emerged in talking with the farmers seemed to be about:

(1) The product’s special qualities; high nutrition, the importance of stone milling, freshness, the gastronomy of grain, grading systems, flavor, protein content, knowledge of good growing and harvesting practices.

(2) It was also common to talk about the transparency and integrity of the farms, and their high organic standards.

(3) We noticed that most of the operations were farms that had been in the family for more than one generation, and most of the farmers had been engaged in farming for many years. The abundance of on-farm grain storage seemed to be part



Marie-Louise Risgaard of Skaertofte, showcases some of their products, Denmark.

of the inheritance of large buildings, due to Denmark's rainy climate.

- (4) Farm machinery. Danish research funds apparently include money that is not tied to corporations, so the universities can develop technology that is more relevant and readily accessible to smaller organic farms.
- (5) We observed that most of the farms had a large and beautiful space in which they could greet people, provide product samples, and sell products.
- (6) It became clear to us that we could use a lot of pointers about marketing. These farmers were producing high quality diverse products, they were proud of it, and they appeared to get their message out clearly.
- (7) Did I talk about taste? Even though this goes along with special qualities, it stands on its own as a repeated theme. How does one get the best flavor from the wheat? Is it the variety? Is it the method of growing? Is it in the baking; the combination of ingredients, the baker's skill and artistry in coaxing out all the unique flavors in the grains? And how about that rye? The Scandinavians are of course, renowned for their rye breads, but how little we knew! The slowly baked pumpernickel bread at Aurion was like taking a sip of fine French wine. It had a complexity and depth of flavor that I do not think I have ever tasted in bread. The French may have the world's best red wine, but as far as I am concerned, the Danes knowledge of, and taste in bread, puts the French to shame.
- (8) Land management/fertility issues seem different than ours. The areas we visited primarily had rich soil (although there are regions with sandy soil, which does not hold the nutrients). With this nice soil, they appeared able to focus more on the grains they can grow, with a four or five year rotation of grains. In that one year, they grow a mixture of red clover and white clover, usually with a mixture of perennial rye grass. This does not appear applicable to grain growing in the Northeast. They also do not appear to have a

Fusarium issue, although they have problems with another mycotoxin, Ochratoxin, which appears in storage.

The Danish government is very concerned about water quality and nitrogen pollution, due to the large number of corporate pig farms in one region of Denmark. Overall, it appeared that what drives governmental agricultural policy is their concern for the environment. Although the organic grain farmers in Denmark are rightfully concerned about conventional farm practices, it seems to me that organic agriculture will continue to gain ground since the policy appears to be based upon safe-guarding and bettering the environment. Currently, 10% of all Denmark's farms are organic, the government policy is to increase that to 20% by 2020.

Our last visit of the trip illustrated some of what is right in Denmark. We traveled to ATP-Huset, the largest pension company in Denmark, with 3500 employees. At ATP-Huset, about 700 employees eat in the company cantine each day, for which they pay \$70 month. We were set up to visit the baker, Helge Heilskov Kristensen, to tour the bakery and then have lunch in their cantina. We arrived at the clean and bright kitchen, the aroma of baking bread greeting us. On the counter were several types of Danish bread, among which was a traditional old-fashioned loaf with so many good ingredients that one piece could be a complete meal! Helge proceeded to show us his set up; the gleaming kitchen, steam oven, and a storeroom filled with bags of Danish organic flours.



Jorn Ussing Larsen checking his pumpernickel bread at Aurion's bakery, Denmark.

He demonstrated shaping dough into loaves; which he then put in the very hot and steamy oven, so that he could magically pull out the finished loaves about 15 minutes later. He answered questions, gave us bread-baking advice and encouraged us to sample! Next, we were shown to the buffet table in the well-designed dining room, where employees were eating. The buffet table, with many different kinds of salads and vegetables, several main course dishes, and the ever-present Danish selection of breads, cheeses and cold meats, were all labeled with signs noting which

choices were most healthy. And, really, everything was light and fresh and tasty. Oh, yeah, and there was a sign that said 80-90% of the ingredients were ORGANIC!

After returning home we feel affirmed in our own work. We feel inspired by the example set by the Danish people. We feel challenged to make changes both personally and politically. And I am going to learn to make a great loaf of Danish rye with that starter from Helge!

Calendar of Events

February 12-14, 2011

University of Vermont
Burlington, VT

29th Annual NOFA Vermont Winter Conference at the University of Vermont (UVM) campus in Burlington VT. February 12-14, 2011. This conference is the pre-eminent gathering of Vermont's local food community, and the highlight of the season for those who are interested in all things organic, local and sustainable! This year's conference will also officially kick off the celebration of NOFA Vermont's 40th anniversary!

To find out more about this year's conference or to register, please visit the NOFA website, www.nofavt.org or call (802)434-4122.

February 12-20, 2011

City Market
Burlington, VT

We ♥ Local Food - Desert Recipe Competition. Sponsored by City Market in Burlington, VT, February 12-20, 2011. Attention bakers! With new local flour available in our bulk department, local dairy, and sweet honey and maple syrup, we're challenging you to profess your love for local food by making an all-local desert. Enter your localvore recipe into the contest and you could win a year's supply of local maple syrup! For more information please go the City Market website, www.citymarket.coop

February 18, 2011

Trapp Family Lodge
Stowe, VT
10:00 am - 3:30 pm

2nd Annual Winter Hops Conference at the Trapp Family Lodge in Stowe, VT. February 18, 2011 from 10 am to 3:30 pm. Dr. John Henning will discuss strategies for achieving high quality hop production as well as the challenges and opportunities presented by a low-trellis system. Further topics include hopyard trellis construction, the history of hops in Vermont, and a Local Brewers Panel. Lunch included. For more information, please contact Heather Darby or Rosalie Madden at UVM Extension, (802) 524-6501. Cost of registration: \$30 for members of the Northeast Hop Alliance, \$40 for non-members. Lunch included.

March 9, 2011

Davis Center,
University of Vermont
Burlington, VT
9:30 am - 4:00 pm

7th Annual Northern Grain Growers Conference at UVM's Davis Center in Burlington, VT. March 9, 2011 from 9:30 am-4:00 pm. Keynote speaker Marie-Louise Risgaard from Skaertofte mill and bakery, all the way from Denmark, will discuss innovative grain product development and marketing. Other topics include; weed control, cover cropping, grain cleaning and storage, small scale grain production, baker sessions, and much, much more! Lunch included. For more information, please contact Heather Darby or Erica Cummings at UVM Extension, (802) 524-6501. Cost of registration: \$30 for members of the Northern Grain Growers Association, \$40 for non-members.



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