

WINTER 2010



NEWS

**NORTHERN
GRAIN
GROWERS
ASSOCIATION**

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

Growing Wheat in Vermont

By Ben and Theresa Gleason

Wheat growers in Vermont can trace the history of their vocation back to the development of civilization, between 6,000-8,000 B.C.E. Evidence has been found suggesting that the humans living in the Fertile Crescent of Western Asia, in the area of modern day Iraq, began cultivating wheat at this time. Einkorn wheat was domesticated around 4,000 B.C.E., and soon thereafter the Egyptians established what may have been the first commercial bakery in Giza. The Romans caught up with this technology around 218 B.C.E. when wheat was imported to Italy and commercial bakeries were established. The wealthy ate leavened bread made from very finely ground wheat flour, while the common people and soldiers survived on bread made of coarsely ground flour blended with other grains and broad bean flour. (www.enotes.com/food-encyclopedia/wheat-food)

Fast forward on the timeline to 1778, when The Great Seal of Vermont, designed by Ira Allen, featured several shocks of grain, an indication of the importance wheat once played in Vermont's economy. In the 1850's, 40,000 acres of cropland from the Champlain Valley to Orleans County produced wheat. However, the death knell had already begun to ring for Vermont wheat, as early as 1825, with the completion of the Erie Canal. Cheap transportation and the easier growing conditions in the west made it difficult for Vermont wheat growers to compete in a national market.



Wheat growing is once more on the rise (no pun intended) in Vermont thanks to the pioneers of organic and sustainable agriculture in Vermont, who have been working on increasing the availability of local foods for the past 30-40 years. Vermonters (always forward thinking), with their awareness of global warming and understanding of the true costs of transporting food, have begun to demand more local products.

There are many issues to sort out as Vermont reasserts itself as a legitimate producer of high-quality wheat products. Vermont agriculture is obviously not well-suited to play in the commodities market, so what we re-create here must be sustainable, uniquely our own, suited to our particular place. It is beyond the scope of this article to address those many issues, so let's start from the bottom up. Producing wheat that is suitable and enjoyable for human consumption requires more than sprinkling a few seeds on the ground and praying to the gods. Like the production of any healthy crop, it requires great care and attention to details.

In a short article, we can't attempt to give the complete recipe for successfully growing wheat; however, we can break the process down into several categories and present a few generalizations of what has worked (and failed) for us as we have learned to grow wheat over the past 28 years in the Champlain Valley. We'll try to briefly summarize our understanding of weather, soil conditions and amendments, disease and pests, wheat varieties, planting, harvest, yields, and storage.

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Weather

This is the area of farming where we used to just pray to the gods for the right amount of rain and sun. Now that we humans and farmers have made such a huge impact upon nature the weather is even less predictable. We can only guess what kind of climate change will happen in the next few years, and whether or not we can slow it down. Since we started growing wheat in 1981, weather patterns have changed. We experience more extremes, such as unusually wet or dry growing seasons. The past several summers have been particularly wet. The generally high rainfall of the Northeast has for the most part prevented us from producing wheats with high protein like that grown in the Midwest (we make up for it with better taste in our wheat). Rainy weather during pollination can affect the heads of wheat, making them smaller, and shrunken. *Fusarium* or head blight (more later) is often a problem in damp seasons. The harvest season rarely offers reliable weather; getting a combine into a muddy field presents a challenge. Even if you can get the combine into the muddy field, you still need a series of dry days if you wish to harvest perfectly ripe, dry wheat.

Soil Conditions, Amendments, and Crop Rotations

Wheat prefers well-drained, well-prepared soil. The heavy clay soils of the Champlain Valley can limit early spring planting, so we have chosen to plant mostly winter wheats in order to work with the conditions we have. Winter wheat requires more nitrogen than spring wheat, so we work into our rotation a good stand of legumes such as red clover, sweet clover or alfalfa and then plow it in. Wheat following soybeans usually does well because beans mellow the soil (the problem with this rotation comes in getting the wheat planted early enough after the soybeans). Manure or compost can also be used. We have used composted poultry manure from layer hens at 2-3 tons per acre, however over time it has increased the Ph in some of our fields to as high as 7.6.

Diseases and Pests

Fusarium is perhaps the biggest disease concern we face in Vermont. It can present a problem in damp seasons, when it appears as pink or shrunken "tombstone" kernels. A vomitoxin or Don test can determine the safety of the crop. Some varieties have some resistance to *Fusarium*, but none are completely resistant. It is best to buy new certified seed each year if *Fusarium* is a prob-

lem. Wheat should also be rotated with a non-grass crop to prevent a build-up of *Fusarium* in the soil. As far as pests go, the only concern of note is that of Hessian fly, which can damage a crop if it is planted too early. Quebec has recently been experiencing problems with Hessian fly.



Planting

The best planting dates for winter wheat are September 10 through September 25. Again, planting too early can result in damage from Hessian fly; early planting can also result in too much early growth that will mat down under heavy snow. Planting too late reduces yield and erosion control. Frost seeding spring wheat into a fall-prepared field is being done in Quebec and is worth trying here in Vermont. Spring wheat is best planted by April 15.

Varieties

Currently there are a few varieties of wheat offered by seed dealers in Vermont. You need to look outside the region for more variety. Most of the best varieties for the northeast are from Canada or the northern grain growing areas of the U.S. The NGGA is currently running trials to determine varieties best suited to success in Vermont. That information is available from NGGA. Our best recommendation is to look for varieties that are most resistant to *Fusarium*.

Harvest and Yields

Wheat is usually harvested by direct cutting with a combine when it is dry in the field. You can use a moisture tester or chew the grain to see if it is hard. The heads will turn down as it dries and the stalks will turn completely yellow. Another method is to windrow when the kernels are still a little soft and let it dry on the stubble. Then it can be harvested with a combine with a pick-up attachment or maybe by hand (for back yard growers) if you don't have access to a combine. This method works well if you have several good drying days. It is best to have your combine squeaky clean and ready to go by the second week of July in the Champlain Valley. In a clean, weed-free field, a properly maintained and adjusted combine can glean a remarkably clean harvest. Yields vary considerably depending on soil type, fertility, and weather conditions. Winter wheats for me have varied from one to two tons per acre. Spring wheat seldom does more than one ton per acre, although it might produce higher yields if frost seeded. Apparently, the high-input wheat fields in France yield 4 1/2 tons per acre, so you can see what



ideal weather and soil conditions (*with the addition of a few growth hormones and chemical fertilizers!*) can produce!

Storage

Wheat needs to be stored in metal containers or grain bins to keep rodents away. It should be stored at 13-15% moisture. A drying floor in a grain bin allows you to harvest at higher moisture and use a fan to finish drying. A drum or rotary screen cleaner used when the wheat is going into storage will eliminate smaller weed seeds, unthreshed heads, and most green material.

Although Vermont wheat production will probably never return to its glory days when 40,000 acres were planted in wheat, we probably don't need to. There is, however, a demand, and a need for the delicious wheat being grown here. With the assistance of all the interested agronomists, growers, bakers, and eaters in Vermont, there is no reason we can't continue to improve and refine our agricultural practices, as we make our unique contribution to good eating in Vermont.



SPRING WHEAT VARIETY TRIAL- 2009

*Dr. Heather Darby and Erica Cummings,
UVM Extension*

It is time to start thinking about spring planting of wheat. Wheat should be seeded as early as possible in the spring. In Vermont that means mid to late April. A later planting date not only reduces yield but also often gives weeds the upper hand. Proper variety selection will be one of the most important crop decisions you will make this spring. A variety should be selected on yield potential, quality, and disease resistance. Last season, UVM Extension evaluated yield, protein, and disease of 11 spring wheat varieties. The growing season brought cooler temperatures and higher than normal rainfall patterns across the region. The cooler temperatures were great for wheat growth; however the ample precipitation during flowering encouraged fungal pathogens.

HWS9258J was the highest yielding spring wheat variety at 4098.7 lbs ac⁻¹ while AC Walton was the lowest with 1426.1 lbs ac⁻¹. Unfortunately, high levels of bird damage were seen in the tallest wheat varieties (AC Brio & Walton). The birds caused much of the wheat to lodge and resulted in lower yields for these varieties. Wheat varieties with awns appeared to have less bird damage. The Durum wheat, which was noticeably shorter, suffered less bird damage but had higher weed pressure. The test weights of varieties were significantly different; both Glenn and Steele wheat had the highest at 62.0 bu ac⁻¹ while the lowest was

CLASSIFIEDS

For Sale: Certified Organic – Red Fife heirloom wheat seed \$1.25 / lb; Oat and Barley seed \$.40/lb; Contact: Butterworks Farm (802)744-6855 or (802)999-7722

For Sale: Hesston 1014 mower; 12ft cut, conditioning, rolls removed, for use as a grain swather: \$600.00. John Deere 443 corn head High Tin - \$1,000.00. Adapter plate for a John Deere 5000 series; self-propelled chopper to John Deere combine heads- \$1,500.00. Contact: Ken Van Hazinga (802) 897-2423

Table 1. Yield, test weight, crude protein, and disease analysis of spring wheat varieties.

Variety	Type	Yield @ 13.5% Moisture lbs/acre	Test weight bu/acre	Crude protein %	Ergot g/100g seed	DON ppm
AC Barrie	Hard Red	1654	59.7	18.4	<0.01	0.57
AC Brio	Hard Red	1577	59.9	17.6	0.02	0.80
Glenn	Hard Red	1949	62.0*	17.6	0.10	0.57
HWS9258J	Hard White	4099*	59.2	16.4	0.67*	1.53
Hallmark	Durum	3120	57.6	17.2	0.02	2.70*
Norwell	Hard Red	2317	60.8*	17.0	0.13	0.6
Propel	Hard Red	2148	60.8*	17.8	0.02	0.1
SD7006J	Durum	1898	55.7	17.8	0.03	2.70*
Sable	Hard Red	3754*	60.0	18.8	0.43	1.13
Steele	Hard Red	3076	62.0*	17.7	0.07	0.27
Walton	Hard Red	1426	58.9	16.9	0.37	0.47
LSD (0.01)	12.74	764	1.84	NS	0.13	0.762

* Wheat that did not perform significantly lower than the top performing variety in a particular column are indicated with an asterisk.
NS = None of the varieties were significantly different from one another.



SD7006J, 55.7 bu ac⁻¹. There was no significant difference in the levels of grain protein among varieties. We observed many plant pathogens in the spring wheat this season. The amount of Ergot, *Claviceps purpurea*, was highest in HWS9258J with 0.67g / 100g of seed. *Fusarium* Head Blight (FHB), *Fusarium* head blight can contaminate grain with mycotoxins. A vomitoxin called deoxynivalenol (DON) is considered the primary mycotoxin associated with FHB. The durum wheat varieties, Hallmark and SD7006J, had the highest DON amounts. Overall, most varieties had less than 1 ppm of DON.

MARCH 9, 2010 GOING THE WHOLE GRAIN

the Northern Grain Grower's Association's annual meeting

UVM Davis Center, Burlington, Vermont

9:30 am-4:00 pm, lunch provided

Please join us for the 6th annual grain growing conference. This daylong event will provide you with a diverse array of educational topics. Conference highlights include: keynote speaker **Dr. Paul Hepperly**, formerly from the Rodale Institute, will discuss several topics related to sustainable soil management including the benefits of composting, bio-char, and cover cropping. **Ron Rosmann**, cofounder of the Practical Farmers of Iowa (PFI), whose mission is to “research, develop and promote profitable, ecologically sound, and community-enhancing approaches to agriculture.” Ron is a pioneer organic farmer, who will provide a practical outlook on strategies for successful grain production. He will be giving several presentations throughout the day on topics such as; blending feed rations from homegrown grains and forages, weed control, and growing specialty crops. **Dr. Gary Bergstrom**, Plant Pathologist from Cornell University will discuss strategies for managing disease in a changing climate.



This year's conference has been expanded to include 3 concurrent sessions throughout the day. Session 3 will be comprised of a series of baking and cooking demonstrations, taught by local bakers dedicated to using local grains in their products.

This new format is sure to have something for everyone!

Registration fee: \$40.00

Please RSVP by March 5, 2010.

Contact Erica Cummings, UVM Extension, for more information and to register.

802-524-6501 or eecummin@uvm.edu

Membership in Northern Grain Growers Association


Over the past year there has been a lot of exciting activity around the NGGA. We've formalized our organization, created a website and have established non profit status with NOFA VT as our fiscal sponsor. We've also had the opportunity to link with a number of funders including Organic Valley and the Castanea Foundation who have been supportive of our vision and our work. These connections have allowed us the NGGA to get on its feet and to partner with UVM Extension to purchase necessary equipment for grain growers and bakers as well as promoting important research in the region.

We're now at the point where we would like to invite the broader support of interested farmers, bakers and community members. Suggested membership support on a yearly basis is \$35 per individual or farm. These funds will be used to cover expenses for publishing our quarterly newsletter, to support field days and educational workshops and in partial support of the annual winter conference. It's also our hope to continue to expand the available infrastructure locally that is needed to further grain growing here in our region.

There are benefits to those who choose to give support to this important grass roots effort. These include: inclusion on the mailing list for this newsletter, announcements on upcoming events and discounted fees for workshops and the annual conference. You will also be given the opportunity for advertising in the newsletter and networking through the Association website – www.northerngraingrowers.org.

Thanks to everyone who has walked with us in these early days of getting our association moving. There is great excitement within our state and beyond of the work we are doing. We know that support for this organization has long reaching impacts.

If you would like to be a supportive member, funds can be sent to: Heather Darby, treasurer, Northern Grain Growers Association, 278 South Main St., St. Albans, VT 05478. You can also request a copy of the NGGA membership brochure or the Winter Conference brochure at this address.



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