

Growing Wheat in Vermont

by Ben and Theresa Gleason of Gleason Grains

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: The Great Seal of Vermont, designed by Ira Allen, featured



two 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 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.

Weather 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, & Crop Rotations

Wheat prefers well-drained, well-prepared soil. The heavy clay soils of the Champlain Valley in Vermont 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.

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 for the best yields and fewest weeds.

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 and UVM Extension. Our best recommendation is to look for varieties that are most resistant to *Fusarium*.

Diseases & 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 (Deoxynivalenol) 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 problem. 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.

Harvesting & Storage

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 ½ 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!

Wheat needs to be stored in metal containers or grain bins to keep rodents away. It should be stored at 12-15% 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.