



Marketing Local Grains in the Northeast

Consumer demand for locally grown grains has created new market opportunities for farmers and grain processors in the Northeast. This document outlines which grains can be grown in the Northeast, what general markets are available for whole grains, and the specific quality requirements farmers need to achieve in order to sell into those markets. Several marketing strategies and sales channels are outlined as well.



GrowNYC and the Organic Growers' Research and Information-Sharing Network (OGRIN) collaborated to create educational, research-based materials that share best practices of regional grain producing and processing with entrepreneurs who seek to join this growing economy. This document is one in a series, and was made possible with funding from the United States Department of Agriculture Rural Development's Rural Microentrepreneur Assistance Program. To read additional materials, visit grownyc.org/grains and ogrin.org.



I. THE NORTHEAST “GRAINSHED”

What grains can we grow?

Wheat

- Winter/Spring: Winter wheat is planted in the fall, over wintered, and harvested in summer. Spring wheat is planted in the spring and harvested in the summer several weeks after fall-planted wheat crops. Spring wheat generally has higher protein content (12-14%) than winter wheat (10-12%).
- Hard/Soft: Hard wheat has relatively high protein content (10-15%) and is generally used for baking bread due to the ability of the high protein content to form strong gluten. Soft wheat can have a range of 7-10% protein and is used for pastries, cakes and crackers.
- Red/White: The color of the wheat relates to the pigments in the bran. Red varieties have small amounts of tannins and can be a bit astringent. White wheat lacks this pigment and is lighter in color and softer in flavor.
- Heritage: Heritage wheat refers to varieties that existed before the breeding of high-yielding (and high-input-requiring) varieties during the Green Revolution in the mid-20th century. Research has shown that heritage varieties of soft white wheat may have higher mineral content than modern varieties and some varieties, e.g., Red Fife, may have distinctive flavor. Heritage wheat varieties can fetch a price premium in comparison to modern wheat, but their usually lower yield must be factored in when assessing the feasibility of their production and marketing.
- Ancient: Emmer, spelt and einkorn. The ancient wheats have hulls that do not fresh free when harvested and require dehulling, an added process.



Top right: A field of spring wheat at Hawthorne Valley Farm in Ghent, NY.

Bottom left: Buckwheat in the hull, hulled and ground into flour.

All three have unique flavor and nutritional attributes and command a price premium in comparison to modern wheat. The ancient wheats can be used as cooked whole grains or milled into flour to make bread, pastries, crackers, or pasta.

Rye

Rye is grown as a winter grain in the Northeast. It is in high demand for spirits, and there is growing demand for use in beer, bread, and baked goods. The Nordic foods movement has had a big impact on the culinary landscape: Chefs and bakers regularly incorporate rye berries into their dishes and flour in their baked goods.

Barley

Winter and spring varieties can be grown in PA and in southern and western NY; spring barley is better adapted for more northern areas of the Northeast. There is high demand for malting varieties and malting-quality barley driven by the craft brewery and craft distillery sector. Researchers are working to identify and develop varieties that will perform well in the Northeast to help fill this demand. There is also a market for food-grade barley for whole-grain cooking. Although most barley is hulled and must be dehulled before use as food (although not for malt), there are some hullless varieties available. Barley makes a good animal feed alternative to corn as well.

Photos: J. Russell/GrowNYC (top right); Elizabeth Dyck, OGRIN (bottom left)



OGRIN

Oats

In the Northeast, oats are planted in the spring. Unlike wheat, barley or rye, oats do not contain gluten. Raw oats can be processed into rolled or steel-cut oats using relatively low-cost equipment. Most varieties of oats are hulled (and must be dehulled before use), but there are several hullless varieties available.

Corn

Both hybrid cultivars and heirloom, open-pollinated varieties can be grown for food-grade corn. Heirloom varieties include three types: flour (soft-starched kernel), which can be ground to a very fine consistency, flint (predominantly hard starch in kernel), which stands up well to preparation methods that involve boiling, and dent (kernel has a hard starchy layer surrounding a floury, soft center), which is multi-purpose. Corn can be used to make polenta, cornmeal, corn flour, roasted corn, tortillas, and snack foods.

Buckwheat

Although not a grass, buckwheat is often included with the other true cereal grains because its food uses are similar: Buckwheat can be ground for flour or its dehulled seed can be used as a whole grain. Buckwheat has no gluten and contains compounds that have been shown to reduce blood pressure and lower blood glucose levels. There is moderate demand for buckwheat flour, which could grow if products beyond pancakes and soba noodles are developed. There is very good potential market for buckwheat groats (dehulled seeds) if buckwheat dehulling capacity can be better developed.

Other grains with potential: Sorghum, millet, and the pseudocereal amaranth can be readily grown in the Northeast, although an extensive market for these grains has yet to be developed. Paddy rice production in the Northeast is in the experimental stage. A significant market exists for quinoa, but varieties adapted to Northeastern conditions have yet to be identified.

II. MARKET OPPORTUNITIES FOR GRAINS

Food-grade Grains and Grain Products

Chefs, bakers, and consumers are increasingly looking to locally grown grains and grain products as new, interesting, and potentially healthful ingredients and foods. For example, according to Spins Trendwatch, sales of spelt grew 363% and those of emmer 39% between 2013 and 2014.* Whole grain baking, baking with heritage and ancient wheat, and gluten-free baking are all trending upward. In addition, the number of artisan bakeries dedicated to working with local grains is on the rise.

Beer and Spirits

In New York the Farm Brewery license requires producers to use a minimum of 20% New York State ingredients in their products. Beginning in 2019 the requirement for NYS ingredients will rise to 60% and ultimately to 90% by 2024. The NYS farm distillery license requires producers to use 75% New York-grown ingredients and comes with the benefit of reduced license fees and the ability to sell product for off-premises consumption directly to consumers.

According to a 2014 NY State Governor's office press release, 57 new farm breweries started up in the state since the Farm Brewery law went into effect in January 2013.** In addition, the same report noted that the number of microbreweries and restaurant breweries (brew pubs) increased by 160% and 230%, respectively, since 2011. Farm distilleries in New York State have increased by 450 percent—from 10



Local farms,
local beer.

Photo: J. Russell/GrowNYC

in 2011 to 55 in 2014. In 2010 there was not a single malting facility in New York State. By 2015 there were seven malt houses in operation and another seven in the construction phase. This exponential growth in malting facilities, breweries and distilleries is driving a demand for corn, barley, rye, and wheat that outstrips the supply at this time.

Animal Feed

There is a growing market for non-GMO feed and for feed that is neither corn- nor soy-based. Spent grains from malting and distilling can be used for animal feed (see animal feed quality requirements below).

*http://wholegrainscouncil.org/files/Grains_Infographic201408SPINS_0.pdf

**<https://www.governor.ny.gov/news/governor-cuomo-announces-significant-growth-new-yorks-wine-beer-spirits-and-cider-industry>

III. QUALITY STANDARDS

To establish and maintain markets for locally grown grain, high quality standards are essential. In general, for grain to be marketable it must:

- be fully mature
- be free of dirt, insects, mold, and excessive chaff and other debris
- have been stored at moisture content of 14% or less (to prevent post harvest mold and other disease issues)

Testing Small Grain Quality

Because of the Northeast's relatively high rainfall and humidity throughout the growing season, small grain quality can be compromised due to inadequate protein development, sprouting in the head, and disease. To determine the market for which a grain lot may be suitable, it should be tested for protein content, falling number, and deoxynivalenol (DON) level. (Other tests may be required by some markets.)

Falling number measures the amount of sprouting that has occurred in the grain (which may have occurred even though the kernel looks intact). Sprouting damage reduces test weight, flour yield, and bread and pasta



A batch of emmer after a first run through a de-huller.

quality. The term 'falling number' refers to the test procedure in which the time (in seconds) required for a stirrer to drop through a slurry made of ground grain and water is measured.

DON or Deoxynivalenol, also referred to as vomitoxin, is a substance that is toxic to humans and animals at certain levels and is regulated by the FDA; the limit for human consumption is 1 part per million. DON can be produced in grain infected with the fungal pathogen *Fusarium graminearum*. Wheat, barley, and rye crops in the Northeast are at high risk for infection by *Fusarium*. See the resources section for more information on DON.

Specific Market Requirements

Growers and processors are urged to check with buyers for specific grain quality requirements. General guidelines are given below.*

Milling Quality

- DON : 1 ppm or less in finished flour (FDA advisory level). Grain with a higher level of DON may be acceptable if the grain is to be blended in the milling process or if high-extraction flour is produced, since the majority of the DON is found in the bran. In milled white flour, e.g., the initial grain DON level is typically reduced by around 50%.
- Protein requirement varies by product:

Flour product	Protein (%)
Whole wheat bread	12-15
All purpose	9-12
Pastry	8-9
Cake	7-8
- Falling number: 300 seconds or higher for wheat; 180 seconds or higher for rye
- No off-flavors (e.g., caused by mold or weed materials)

Malting Quality

- DON: below 0.5 ppm
- 9-11% protein
- Falling number of 300 seconds or higher for wheat and barley; 180 seconds or higher for rye
- 95% or higher germination rate
- Plump, uniform kernels (often defined as those retained on a 6/64 x 3/4 inch screen)

Distilling Quality

- Because the distilling process results in liquor free from DON, distillers can accept higher levels of DON in grain than millers or maltsters.
- Protein: 9% or less
- Low falling number is acceptable.

Animal Feed Quality

Grains that are not suitable for the food or beverage market may be able to be sold as animal feed. The FDA advisory levels for DON as animal feed are

- 5 ppm for swine, not to exceed 20% of diet
- 10 ppm for ruminating beef cattle and poultry, not to exceed 50% of diet

(Note that, if the original grain is infected with *Fusarium*, the brewing or distilling process can concentrate DON levels in spent grain. Before feeding brewers or distillers grain, it should be tested for DON. For more information on DON in spent grain, see the resources section below.)

*Thanks to Andrea Stanley of Valley Malt, Lake Distilling, and Thor Oechsner of Oechsner Farms for providing information on grain quality requirements.

IV. MARKETING STRATEGIES

Communication and Education

An increasing number of consumers are actively searching for locally grown grains and grain products. What specific qualities are consumers looking for? And what are they willing to pay a premium for? The answers will vary among individual consumers but are likely to include one or more of the following:

- **Freshness and flavor:** Many consumers associate locally grown food with freshness. They are looking for raw food, minimally processed food, or for products that are pure, i.e., have not been adulterated with additives to extend shelf life. Along with freshness comes an expectation for enhanced or distinctive flavor.
- **Traceability and transparency:** Consumers increasingly want to know where their food comes from and how it is produced and processed.
- **Sustainability:** Some consumers want to actively build and support regional food security by buying from local farmers and processors and paying them a fair price. They may especially seek out producers who use organic/sustainable agricultural practices and who grow a mixture of crops that promotes biodiversity.
- **Health benefits:** Consumers are often looking for foods with high nutritional value or that contain substances that reduce disease risk or help manage a disease. Some may be very specific in their requirements, e.g., grain that has a low glycemic index value or that is gluten free.

Promotional materials or events that feature and explain all of the above attributes that pertain to a specific product will not only help to attract committed “locavores,” but can grow the market by educating more consumers about the value of locally grown grains. It is critically important to provide accurate product information and, whenever possible, to get feedback from customers to better understand what qualities they prize most highly and whether product quality is meeting their expectations.

Adding Value

As mentioned above, growing or processing certain types of grains (e.g., heritage and heirloom varieties and ancient wheats) that are highly prized by some consumers, can result in price premiums. Additional means of adding value include

- **Third-party certification:** The market for organic food continues to increase, and certified organic grain brings a price premium. Many of the new grain processing facilities in the Northeast require or prefer certified organic product. There is also a market for kosher grains, especially for wheat and spelt. Biodynamic certification provides access to another niche market.
- **Processing:** There are many processing options that can increase grain value, starting with cleaning or dehulling grain. Further value can be added by roasting (as with corn or with green wheat or spelt to produce freekeh), sprouting, or puffing grains. Milling produces not



Photo: J. Russell/GrowNYC

Signs promoting local products at a grocery store.

only flour but allows for further increase in value through baking, pasta production, etc. Malting and distilling also produce high-value products.

Marketing Channels

There are diverse marketing methods for locally grown grains, and innovative approaches continue to develop.

- **Direct to consumers:** Grains can be sold at farmers markets and farm stands, by adding grain to an existing CSA share or starting a grain CSA, through a website, or some combination of these options. The great advantage to selling direct to the consumer is that the entire value of the grains or grain products is captured by the grower. The price that can be charged at the retail level is also considerably higher than when sold in bulk to a processor. In direct sales, the grain grower takes responsibility for promotion, marketing, packaging, and distribution.
- **Restaurants and retail food stores:** Selling to food outlets is often combined with direct sales and relieves the grower of some marketing and distribution costs. The price obtained for product will likely be lower than in direct sales unless selling to very high-end outlets.
- **In bulk to processors, e.g., mills, distilleries, and malting facilities:** Larger-scale grain growers typically sell grain by the ton or in skids to processing facilities. It is critical to maintain good communication with the buyer in terms of quality specifications and responsibility for

grain delivery or shipment. Processors may dock the price for substandard product, e.g., inadequately cleaned grain. Some processors may require that grain is delivered in increments, requiring long-term, high-quality storage at the farm.

- **Partnerships with millers, bakers, distillers, and maltsters:** Informal or formal partnerships with processors can help growers to better guarantee a market for their grains and give processors a dedicated grain supply. Another major advantage is the potential for enhanced communication between partners: Growers get regular feedback on product quality and changing market needs while processors get timely alerts to the effect of growing season conditions on grain supply.
- **Contract growing:** An advantage to contract growing is that a price is stipulated upfront and the market is guaranteed if product (at the quality specified) is delivered. Potential disadvantages are that the grower is locked into growing a specific crop (and often variety) and a price (regardless of the current demand for the product).
- **Cooperatives and food hubs:** By banding together, growers can potentially expand and diversify their grain markets, share the risk of

adverse growing conditions, and share the cost of processing, marketing, and distribution. Currently, there are no grain cooperatives in the Northeast, but in several locations food hubs are developing. In a food hub, growers within a certain area organize to aggregate (and in some cases process) product and jointly distribute and market that product. This creation of shared infrastructure reduces growers' costs and allows especially smaller-scale producers to access markets they could not individually supply.

- **Value chain distribution:** According to the Wallace Center, food value chains are "business arrangements distinguished by their commitment to transparency, collaborative business planning and exchange of market intelligences and business know how among chain partners and their interest in developing business strategies and solutions that yield tangible benefits to each participant in the system."* There are a growing number of innovative distribution models that are dedicated to transparency, fair prices and to building a local sustainable food system.

V. MARKET OUTLOOK

After decades of disinvestment in grain production and processing in the Northeast, we are seeing a resurgence of interest and the development of a new "grain literacy."

More research is being undertaken, and better information is becoming available. Several projects and initiatives are focusing on how grain species and specific varieties perform in food-grade products. As farmers diversify into grains and develop greater expertise, consumers are gaining access to and experimenting with unfamiliar crops and new varieties. An internet search will yield some informative and entertaining blog posts from those who are experimenting in the home kitchen. Meanwhile, professional bakers and chefs are learning to work with "locally grown" flours of varying protein contents and gluten quality, and many now say they prefer these alternatives to "fool-proof" commodity flour blends. Small-scale maltsters and distillers are reporting similar experiences as they develop an understanding of the primary ingredient, the grain itself. Most report an increase in flavor profiles in their end products, saying the result is worth the extra effort and that products made with local grains are fetching a premium from consumers. The market for locally grown grains looks promising.



An Allis Chalmers combine, ready to harvest grains.

* <http://www.wallacecenter.org/resource-library/food-value-chains-creating-shared-value-to-enhance-marketing-success>

RESOURCES

Grain Production and Variety Selection

Malting Barley:

- Cornell University Cooperative Extension, Northwest NY Dairy, Livestock and Field Crops Team: http://nydairyadmin.cce.cornell.edu/uploads/doc_134.pdf

Wheat (Including Heritage and Ancient)

- Organic Growers' Research and Information-Sharing Network: http://ogrin.org/essentials_growing_wheat.html
- eOrganic Webinar: <http://www.extension.org/pages/66869/management-for-high-quality-organic-wheat-and-ancient-grain-production-in-the-northeast#.VfmbABFViko>
- eOrganic Webinar: <http://www.extension.org/pages/72265/heritage-and-ancient-wheat-varietal-performance-and-management-webinar#.VfmabhFViko>
- eOrganic Webinar: <http://www.extension.org/pages/66321/the-ancient-grains-einkorn-emmer-and-speltz-what-we-know-and-what-we-need-to-find-out-webinar#.VfmdhRFViko>
- Kansas State University, Wheat and Flour Testing Methods: <http://www.grains.k-state.edu/igp/wheatflourbook/>

Small Grains University Programs

- Cornell University Small Grains Breeding & Genetics: <http://plbrgen.cals.cornell.edu/research-extension/small-grains>
- Variety Evaluation: <http://plbrgen.cals.cornell.edu/research-extension/small-grains/cultivar-testing>
- Penn State: <http://extension.psu.edu/plants/crops/grains/small>
- University of Vermont Northwest Crops and Soil Sciences: <http://www.uvm.edu/extension/cropsoil/grains>
- University of Maine: <http://umaine.edu/grains-oilseeds/>

Grower Education

- Northeast Organic Farming Association NOFA-NY: <http://www.nofany.org/events/field-days>
- Pennsylvania Association of Sustainable Agriculture (PASA) : <http://www.pasafarming.org/events/farm-based-education>
- Northern Grain Growers Association: <http://northerngraingrowers.org/>
- The Helderberg Brewshed, The Carey Center for Global Good: <http://careyinstitute.org/helderberg-brewshed/>
- eOrganic: <http://eorganic.info/>

Quality Standards and Testing

Deoxynivalenol (DON)

- Guidance for Industry and FDA: <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ChemicalContaminantsMetalsNaturalToxinsPesticides/ucm120184.htm>
- North Dakota State University Fact Sheet: <https://www.ag.ndsu.edu/pubs/plantsci/pests/pp1302.pdf>

Testing Labs

- University of Vermont, Cereal Grain Testing Lab: <http://www.uvm.edu>
- Hartwick College, Center for Craft Food and Beverage, Barley and Malt Quality testing: <http://www.hartwick.edu/craftfoodandbeverage>
- Other labs that test grain quality can be found through an Internet search.

Marketing and Education

- Hartwick College, Center for Craft Food and Beverage: <http://www.hartwick.edu/craftfoodandbeverage>
- Greenmarket Regional Grains Project: <http://www.grownyc.org/grains-main>
- Youtube Channel: <https://www.youtube.com/channel/UCSVboCFtpUKIQDC4x-ROW7A>
- Greenmarket Grains Guide: <http://www.grownyc.org/files/gmkt/grainbooklet.pdf>
- Serious Eats: <http://www.seriouseats.com/2014/03/guide-to-whole-grains-ancient-grains-gluten-free-types-of-grains.html>
- Oldways Whole Grains Council: <http://wholegrainscouncil.org/>

Marketing Approaches

- Direct Marketing: <https://attra.ncat.org/attra-pub/summaries/summary.php?pub=263>
- CSAs: <http://extension.psu.edu/business/ag-alternatives/marketing/community-supported-agriculture-csa>
- Food hubs: <http://www.wallacecenter.org/resource/library/food-hubs-solving-local>





A GrowNYC initiative, the Greenmarket Regional Grains Project fosters a thriving regional grain economy within the local food system, beginning with our network of growers and customers and extending to any farmer, entrepreneur or retailer contributing to its growth throughout the Northeast.

Visit grownyc.org/grains to learn more.



The Organic Growers' Research and Information-Sharing Network (OGRIN) is an organization that generates practical information for organic farmers and gardeners through farmer participatory research, review articles and fact sheets on issues critical to organic farming, and by providing forums for information-exchange between growers.

Visit ogrin.org to learn more.



Committed to the future of rural communities.

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