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## Catching the Amber Wave, 1: *Considerations for growers interested in small grains production*

### *Amber waves washing over the northeast:*

Due to rising market demands, there has been mounting interest in grains sourced from NY and the greater northeast. Extension is getting a lot of inquiries about small grains production, and growers in eastern New York are increasingly reporting that bakers, chefs, brewers, and distillers are knocking on their doors to ask *if* they grow small grains, and *why they don't* (the latter is largely the case). Perishable crops have had most of the spotlight in the local food boom (a boon to fruit and vegetable growers), while "local" and "fresh" dry-commodities have largely been off the radar. Recently though, consumers seem to be looking at their plates of fresh, local salad greens, steamed kale, and roasted rutabaga and thinking that something is missing from their local palate. Even though it's relatively easy to bulk up on whole local vitamins, minerals, and fiber into our diets, we're coming up short on locally-grown calories needed to power through the day. These consumers are asking: My bakery is local, but what about the wheat? What's local about the crust on this pie? The durum for this pasta? The barley for my local craft brew? My morning cereal?? Local meat, dairy, and eggs aside, a substantial amount of plant-based calories can, and often do, come in the form of some sort of grain, and of those, small grains (mostly wheats, oats, barleys, and ryes) often play a central role.



Cornell's Mid-Hudson Valley wheat and barley trials in Dutchess County, NY. Photo: Elizabeth Higgins, CCE-Ulster Co.

The rising demand for locally sourced grains stems from a surge in local food businesses interested in sourcing local products, and can be illustrated in numbers: [Grow NYC/ Greenmarket's Regional Grain Project](#) has archived 36 instances of media coverage documenting rising interest in northeastern grown small grains since 2008; craft brewer members in the [NYS Craft Brewers Association](#) has swelled to well over 100 members (a two fold plus increase in a little over 2 years); ~15 maltings are in development or have opened in NYS in the past year (previously there were none); and at least 70 craft distilleries have opened in NY in recent years (with increasing brewery and distillery numbers attributed to the farm brewery and distillery laws). Eastern NY is also importantly home to two grain milling operations that specialize in processing small batch, locally sourced grain ([Wild Hive Flours](#) in Clinton Corners, NY and [Champlain Valley Milling](#) in Westport, NY). Nearby, and also in accordance with local market demand, the northern New England-based [Northern Grain](#)

[Growers Association](#) formalized in 2004 to support a local grains economy with 75+ current growers and stakeholder members, and hosts a well-attended annual conference. Northeastern growers have also been in recent years pioneering ways to locally market small grains, even on very small scales. Strategies include 1) marketing higher-value ancestral wheats such as emmer, einkhorn, spelt, and heirloom wheats or organically-grown grains, 2) marketing directly to restaurants, artisan bakers, and craft brewers and distillers, and/or 3) marketing grains as novel components of CSAs or farmers market arrays. Eastern NY growers likewise have begun to utilize strategies such as these to seize market opportunities in NYC, Albany, and Burlington, VT metro areas.

Currently there are a few initiatives that are pushing the budding local small grains economy even more; [Grow NYC/Greenmarket](#) requires that vendor products using small grains contain a percentage of grain sourced from within a [250-mile radius of New York City](#), and [New York State's Farm Brewery and Distillery Licenses](#) will require that farm brewers and distillers increasingly source a percentage of their ingredients from New York State (90% by 2024).

### *So why aren't we currently growing small grains for human consumption?*

New York was a major small grains producer in the 1800s (including the Hudson Valley), but a number of practical reasons caused the center of small grain production to migrate west. While western NY still grows a significant but relatively limited acreage of soft wheat (for pastry-grade flours and/or animal feed), eastern NY has particularly been out of the small grains business in any substantial way for nearly 200 years, when pest pressures, soil fertility decline, and the Erie Canal dealt fatal blows to the eastern NY small grains economy. Since then, market quality standards have progressively become much more exacting, and small grain production knowledge, equipment and infrastructure has significantly decreased in eastern NY. Population increases and associated land use pressure has also risen considerably in many parts of NY, generally necessitating more and more growers to produce higher value-per-acre crops to keep agriculture viable. Nonetheless, the climate and soils of eastern NY are capable of producing small grains (especially regarding yield potential), but producing *high quality* small grains for modern human consumption markets in our humid climate can present challenges for NY growers. Northeastern growers in proximity to urban centers will also likely need to sell to markets that will pay premiums for locally sourced grains to be economically viable.

### *So why bother?*

Several aspects of small grains production may be tantalizing to eastern NY farmers:

- 1) *Production economy*: Generally, small grains can be considerably *less* management and input intensive to produce and postharvest handle than vegetable crops. Growers growing field corn as a rotational crop in vegetable production systems are also starting to consider small grains as another option for a rotational field crop. Dairies interested in transitioning more of their operation over to field crops may also find aspects of small grains crop production that can help profitably economize their production systems as well.
- 2) *Net return potential*: Directly marketing a small grain to emerging specialty markets (currently somewhat stabilized by the GrowNYC/Greenmarket and NYS Farm Brewery & Distillery license's regulations) presents opportunities to sell at a premium for more competitive per-acre net returns. Secondary small grains markets are concurrently emerging for alternatives to corn-soy based animal feeds (lower value than human consumption markets, but still with the opportunity to sell at a relative premium price).

- 3) *Rotational Benefits*: Including small grains in rotation with vegetables can importantly help manage weeds and break certain pest, disease pressures that NYS vegetable growers commonly face, especially for growers mainly growing warm season annuals (all small grains are cool season annuals). Including a small grain into field crop rotations may similarly add beneficial diversity to the system.
- 4) *Strategic Marketing*: Including a small grain in your crop array presents opportunities for more market diversity and developing more stable, resilient marketing strategies. Farmers who chiefly produce perishable products may find that including a less perishable, dry commodity (such as small grains) into their marketing scheme can provide more opportunity to sell throughout the entire year as needed, and/or when the price is right.

### *So what's the hitch?*

- 1) *Land base, equipment, and infrastructure*: For most small grains, economy-of-scale is something worth paying close attention to. As a reference: if you currently don't have the capacity and/or land base to produce field corn or a similar field crop, do some serious number crunching and thorough research before you get too excited about small grain production. Having a grain drill, combine, and the right grain drying and storage and infrastructure can really be a game-changer in whether small grains production could pay off for you. Some growers may be able viably produce grains on a smaller, less mechanized scale but will likely need to be growing grains that can fetch premiums at the upper end of the spectrum, and end up needing to creatively engineer ways to make equipment and infrastructure work for their scale.
- 2) *Meeting grain quality standards*: Small grains historically evolved in a semi-arid climate, but have been selected over time to be adaptable to different climates. New York's humid climate still presents challenges for small grains though. Under wet growing conditions, disease can threaten yield somewhat, but more importantly threatens grain quality (principally, via [Fusarium head blight](#)); also, when grains are mature and ready for harvest in wet conditions, kernels can sprout before they are harvested and also negatively affect grain quality. Both of these issues are managed on a fundamental level by choosing appropriate varieties. Additionally, growing wheats with high quality gluten proteins for bread baking can be challenging and variable in New York; wheat has a limited ability to form high concentrations of gluten in a climate with relatively high in-season rainfall (many bread wheats are grown in regions with markedly arid growing seasons). Growing good quality bread wheat in the northeast wheat is highly dependent on variety and a high available nitrogen supply (through topdressing and/or legume-enriched soils with a high N supplying capacity), particularly during grain fill (June).
- 3) *Market Risk*: As with any new market, there are potential risks and growing pains that will likely occur as a new direct market small grains economy develops. In eastern NY, many growers and end-use producers will be in a learning curve for a while, and some will likely not make it through. Currently though, the NYS Farm Brewery and Distillery law and GrowNYC/Greenmarket's regulations are leveraging to incite development of a local small grains economy.

### *What is Cornell doing about it?*

[The Cornell Small Grains Project](#) is a program working on selecting and developing small grain varieties for growers working with NY's environmental conditions and markets. In accordance with small grains production and markets in western NY, the core thrust of Cornell's variety election and breeding efforts has been on soft wheat varieties. Recently though, due to the increasing market demand, Cornell has began researching grains and varieties for emerging specialty markets, including wheat varieties for bread flours, specialty heirloom varieties of wheat, ancestral wheats (emmer, einkhorn, and spelt), malting barleys, hybrid ryes, and selections optimized for organic production. The Cornell Small grains project is currently running two small grains trials in eastern NY, in the Champlain and Mid-Hudson Valleys.

For New York State's environment, two of the most pertinent varietal traits Cornell focuses on for growing quality grains (besides yield) are: *low* [pre-harvest sprouting](#) and *high resistance to* [Fusarium head blight \(aka, "scab"\)](#). Fusarium head blight is a particularly formidable reality of growing grains in the humid northeast, and Cornell's plant pathology department is also actively working on ways for growers to better manage this disease. *Fusarium graminearum* is a widespread soil-residing fungal pathogen ubiquitous in the environment that spreads via the air; this pathogen can infect the kernel at flowering, causing shrunken kernels and development of the fungal toxin, [deoxynivalenol \(DON\), aka, "vomitoxin"](#). The FDA regulates Vomitoxin levels in wheat products, and small grain growers in the northeast commonly struggle with meeting the minimum thresholds set for human consumption, especially in wet years. Fusarium is most commonly controlled by an integrated strategy consisting of 1) genetic resistance in variety, 2) rotations and practices that minimize buildup of Fusarium inoculum in soils, 3) triazole fungicide applications in a 3-5 day window around flowering, and/or 4) effective seed cleaning that culls out the Fusarium-infected, shrunken kernels.

The [University of Vermont Crops and Soils Team](#) and [The University of Maine](#) has also contributed significant research working towards expanding northeastern small grains production options for local direct markets. The University of Vermont importantly also houses the Northeast's only [cereal grain quality testing lab](#). Michigan State University has also begun to [make significant strides in supporting malting barley production](#) for local brewing markets. The Northeast Organic Farming Association of NY ([NOFA-NY](#)) and the Organic Grower's Research and Information-sharing Network ([OGRIN](#)) is also playing a significant role in working with/mentoring organic and smaller-scale growers to support value-added small grains production.

*So I'm still intrigued, how can I minimize risk?*

- 1) *Do your homework.* Review grain production guidelines from Cornell and other northeastern based sources, attend small grains networking and education events, and talk to other northeastern grain growers. Know what goes into producing a small grain and what to expect in managing the crop from seed to market, step by step.
- 2) *Do the math.* Consider the economics from several aspects with regard to the scale of production you are interested in: 1) how much can you gross per unit for a crop, 2) infrastructure and equipment investment, 3) management costs, and 4) how much acreage and yield would you need to net a profit that would justify allotting acreage to a small grain crop. Also consider whether a small grain could help economize production costs through reducing weed, pest, and/or disease pressures in a crop rotation.

- 3) *Know your market:* Establish market connections before seed goes in the ground. Narrow down the market you would like to grow for, and get in touch with potential buyers. Figure out what quality and quantity of product they desire and what they're looking for in a potential direct farm business partnership. Gauge whether they are also someone/a business that you'd like to be in a direct business partnership with as well. It is also important to build a connection with a local animal feed or distillery market outlet in case your crop doesn't meet baking or malting quality standards- the likelihood for this to occur is relatively high, especially when you're in the learning stages and/or in wet years.
- 4) *Get your ducks in a row, start at a manageable scale.* Make sure that you have the equipment and infrastructure you need in order to get your grain seeded, managed, harvested, post-harvest processed, and stored dry. Go easy on yourself while you're in the learning curve; start with a manageable acreage of small grains in accordance with what you can economically move to market, pay close attention, and scale up as you improve.