



Adding Value: Ancient and Heritage Grains

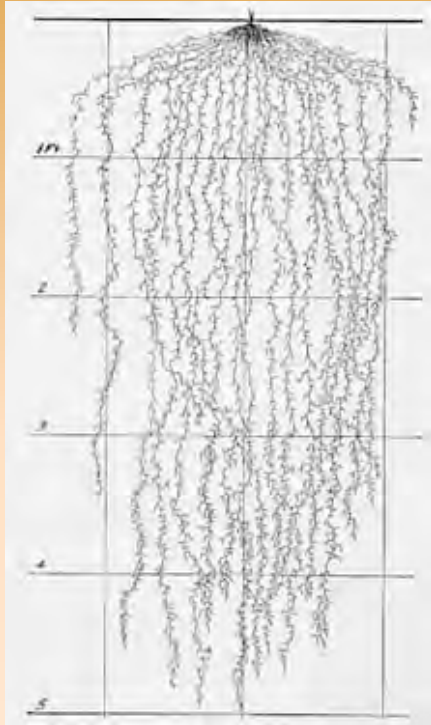
Elizabeth Dyck, OGRIN
June Russell, GrowNYC

NOFA-CT 2014

Value-Added Grains for Local and Regional Food Systems Project

- Funded by Organic Research and Education Initiative (OREI)
- Goal: To increase food-grade small grain production through
 - a focus on potentially high-value crops
 - adding value through processing

Why the focus on small grains?



Rye roots
Weaver, *Root
Development
Of Field Crops,*
1926



How do you add value to grains?

- Selling as locally or regionally produced grain
- Growing organically
- Growing specialty crops that have high market potential—e.g., heritage varieties, ancient grains
- Package or process grains on or off farm: e.g., mill, bake, make pasta, crackers, breakfast cereal, beer, distilled liquor

Value-Added Grains for Local and Regional Food Systems Project Team

- Universities
 - Cornell
 - North Dakota
 - Penn State
 - Oregon State
- Farmer organizations
 - **NOFA-NY.** Northeast Organic Farming Association
 - **PASA.** Pennsylvania Association of Sustainable Agriculture
 - **NPSAS.** Northern Plains Sustainable Agriculture Society
- **GrowNYC-Greenmarket**
- **OGRIN.** Organic Growers' Research and Information-Sharing Network

Value-Added Grains for Local and Regional Food Systems Project Team

- Special thanks for help with this presentation to
 - Steve Zwinger, NDSU, Carrington Center
 - Frank Kutka, NPSAS
 - Julie Dawson, University of Wisconsin
 - Greg Roth, Penn State
 - Mike Davis, David Benscher, Lisa Kucek, Cornell University
 - Joel Steigman, Small Valley Milling
 - Robert Perry, NOFA-NY
 - Rachel Lodder (photographs)

Ancient Grains: What are they?

All hulled, all have both spring and winter types

- Einkorn:
 - *Triticum monococcum*
 - Domesticated ~10,000 years ago
- Emmer:
 - *Triticum turgidum ssp. Dicocon* (same species as durum wheat)
 - Domesticated ~10,000 years ago
- Spelt:
 - *Triticum aestivum ssp. Spelta* (same species as common wheat)
 - Domesticated ? (in dispute)

Agronomic reasons to grow ancient grains

- Sources of genetic diversity—e.g., emmer a source for wheat disease resistance traits
- Low input requirements
- More tolerant to environmental stress, e.g., cold, wet soils, drought



Accession 168805 (winter)
from Germplasm Resources
Information Network (GRIN),
reportedly collected in
Kansas in 1948





Accession 168674 Black Velvet
Emmer from Germplasm Resources
Information Network (GRIN),
collected from Germany





Black emmer –15 pounds planted
to an acre. Henry Beiler Farm, PA





North Dakota Common spring emmer,
grown at Oechsner Farms, Newfield NY



Lucille emmer (spring), selection by G.F. Stallknecht,
grown by Joel Steigman, Small Valley Milling, PA



Oberkulmer
spelt
(winter),
grown at
Henry
Beiler farm,
PA

What are heritage wheat varieties?

- Breeders
 - Varieties that existed or were developed before the use of dwarfing genes by breeders, roughly pre-1950s.
- Consumers
 - Pre WWII varieties (as in heirloom vegetable varieties); the older the variety, often the more “cachet.”



Kit Kelley, White Frost Farm, PA, with bundles of fall-planted Red Fife



ROUGE DE BORD
BALTASSAT



ROUGE DE BORD
BALTASSAT



Warthog

ROUGE DE BORD
BALTASSAT

**Rouge de Bordeaux, French
Heritage wheat, one of a collection
donated by French organic growers to
US organic growers**

Einkorn nutritional characteristics (summary by Frank Kutka)

- Higher lipid content than bread wheat (4.2 vs. 2.8 g/100g)
- Usually high in minerals although low in cadmium
- Lower in total phenols
- Usually higher in protein, Vitamin E, and lutein
 - Lutein: a carotenoid associated with reduced incidence of degenerative chronic diseases
- Contains gluten: not safe for those with celiac disease

Emmer nutritional characteristics (summary by Frank Kutka)

- Usually has higher minerals, higher fiber, and lower glycemic index than common wheat. (Recommended for diabetics in India.)
- Often has higher antioxidants (total phenolics and flavonoids) and protein.
- Not high in carotenoids.
- Often has higher phytic acid concentration.
- Contains gluten: not safe for those with celiac disease

Spelt nutritional characteristics

- Higher lipid and unsaturated fatty acid content
- Some minerals tend to be higher in spelt: Cu, Fe, Zn, Mg, P, especially in the bran.
- Spelt has less phytic acid
- Spelt cultivars highly variable in terms of protein content and gluten quality
- Spelt gluten more extensible and less elastic
- Contains gluten: not safe for those with celiac disease

Nutritional characteristics of heritage wheat

- Heritage soft white wheats: higher in Cu, Mg, Mn, P, Se, Zn than modern counterparts
 - K. Murphy et al., 2008
- Grain of salt needed: Better digestibility reported by some consumers may not be a function of age of variety—e.g., could be baking method

Celiac disease is *not* a food allergy or intolerance: it is an auto-immune disease that is triggered by the omega 5 gliadin proteins found in cereals including wheat (spelt is a type of wheat), barley and rye. Some celiac sufferers also cannot eat oats. In common with other auto-immune diseases (including rheumatoid arthritis) this causes the body to attack itself. In the case of celiac disease, the immune system produces antibodies that attack the lining of the digestive system, sometimes resulting in perforation of the stomach or intestines. The Celiac Society estimates that the disease affects around 1 in 100 people in Britain.

An allergy is a condition that causes the body mistakenly to recognize a substance –such as gluten - as toxic and produce histamine in defense. The body then reacts to the histamine in any number of ways, including rashes and breathing difficulty. At an extreme level, a person's histamine response is so great it causes the body to go into anaphylactic shock, which in a minority of cases may even result in death.

A food intolerance is a sensitivity that can't be diagnosed by a standard allergy test. The causes are various, including the body not producing an enzyme that is necessary for breaking down a certain foodstuff or part of one; a toxic compound in the food; a pharmacologically active compound (e.g. caffeine) to which some people are sensitive; or interaction with compounds in the food and drugs that a person is on. Symptoms of an intolerance could include uncomfortable indigestion and/or excessive gas production, leading to a bloated feeling.

Einkorn

- Einkorn, the “mother wheat.”
- There is a lot of interest in einkorn, as many people who have sensitivity to gluten are reporting that they are able to digest einkorn although no conclusive studies have been performed.



Einkorn

- Rich in Lutein
- High in Thiamin
- High in essential dietary minerals
- Good source of B vitamins
- **It has excellent flavor!**



Einkorn bread, Zurich, Switzerland



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Propose a Presidium

Slow Food Presidia

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Haute-Provence Einkorn

France

For thousands of years, the history of einkorn (*Triticum monococcum*) has been closely linked to that of the Mediterranean. Until Roman times, this cereal was widely eaten, but later it was almost totally replaced by wheat, tender and durum, which ousted the various minor cereals, due to its higher yield and the fact it needed no processing. As einkorn has a hull, it must always be decorticated (with a similar technique to that used for rice). For a dozen or so years now, einkorn has enjoyed renewed interest, thanks to its rustic sturdy plant that adapts to rather dry climates and poor soil, to its nutritional and organoleptic qualities (it is rich in protein and magnesium). Haute Provence Einkorn (in French *petit épeautre*) from is a local plant, which can be traced back to

Presidium

Producers

Info & contacts

Consumed as a grain or used to make flour, pasta and even beer, the presidium will seek to create appreciation for this eclectic cereal outside of France. The taste qualities and sensorial features that make einkorn so highly prized and distinctive will also be defined in order to allow producers to compare and exchange with other small-scale minor cereal productions throughout the world. Unrivaled by recent industrial varieties, the presidium will work to rediscover and reintroduce the Haute Provence Einkorn's history and quality to the consumer.



Our Search For The Purest Form Of Wheat Brought Us Back 12,000 Years.



Einkorn

Einkorn is very different from all other varieties of wheat. It was the first species of wheat grown by man more than 12,000 years ago. Now considered a relic crop, it has practically been forgotten because its yield is low in the fields and its type of gluten makes bread-baking a challenge.

We were determined to find the purest form of wheat to use in Jovial™ products. Our journey for purity led us farther and farther back in time, all the way to the origins of agriculture. We overcame numerous difficulties of locating, replenishing and harvesting Einkorn to once again bring this gift of nature back to life. We feel confident about the exceptional quality of Einkorn- pure, nutritious and surprisingly delicious.

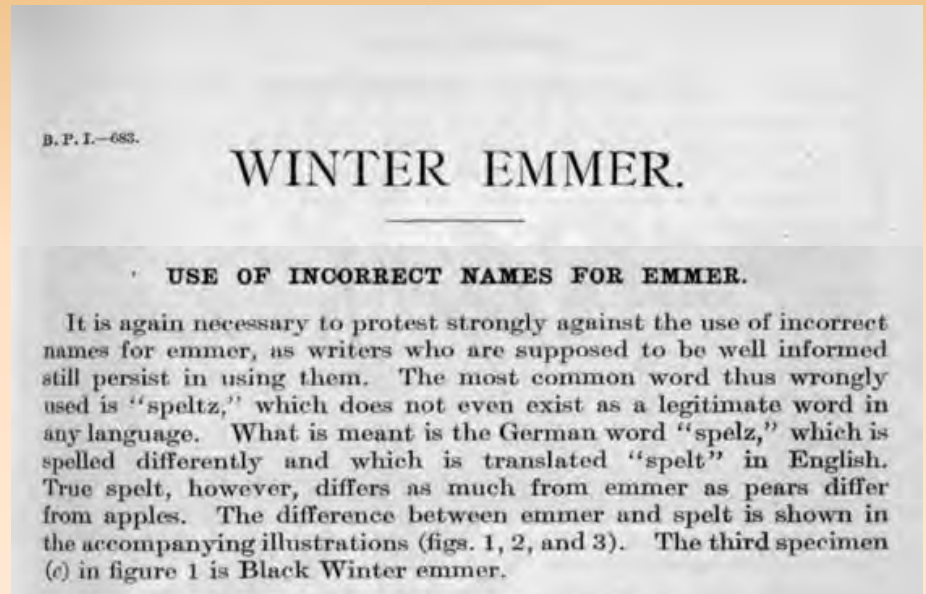
We encourage you to read on and discover how amazing Einkorn really is.

Powerful free radical scavenger
Genetically purest wheat
High in Thiamin
High in Trace Minerals
Delicious
Never hybridized
Rich in Lutein
High in Essential Dietary Minerals
Good source of Fiber
Good source of Protein
Good source of B Vitamins

Jovial Foods, a grains retailer, provides information, recipes and news about Einkorn and Einkorn products

Emmer

- Emmer is often (mis)labeled as farro, Italian farro or spelt.
- Among others who caution against the impostors is Faith Willinger, an American who lives in Italy and researched farro while writing her book, "Red, White and Greens," (HarperCollins, 1996). She discovered that the proper English definition of true farro is not spelt, but **emmer**, a word that is rarely used but is nonetheless correct. "Even Italians are confused," Ms. Willinger said in a recent telephone conversation from Florence. *From: New York Times 1997 Farro, Italy's Rustic Staple: The Little Grain That Could*



USDA Brochure, 1911

Farro confusion

“Farro” is not necessarily emmer

- Emmer may be called farro, but “farro” is not always emmer.
- “Farro” is a grain with a hull that is not free threshing. All of the “ancient” wheats are “farro” and could be spelt, einkorn or emmer. I.e. Einkorn is called “Farro Piccolo.”
- We are trying to make a concerted effort to market emmer as “emmer,” or at the least as “emmer (farro).”
- Emmer is a precursor to durum wheat and has been described as “Hearty and Robust,” with a flavor once described as “more elegant than earnest.”
- Emmer is great as a whole grain and when ground into flour, can be made into pasta and bread.
- There is a big potential market for emmer pasta.



Emmer Pasta



Sprouted Emmer

Emmer bread is delicious, it tends to be more dense, as it has a lower gluten content than wheat.



1 McEvoy Ranch's peppery Dico Nuovo is a regional favorite of California chefs. \$42. mcevoynyc.com

2 Anckley's Brude michi font of sea salt *travese-michè* (USDA) No. 347-087-1061

3 Made in from Mexico, *Acosta Balsamico di Montebello* is a passaparola for 12 years. \$150. spanishkitchen.com

4 Wineforest dried wild porcini mushrooms are the perfect addition to any chef's arsenal. wineforest.com

5 With a blend of a rich flavor, *Pollen Ranch Tomatoes* will be in 25 hours of 2011. \$9 for 25 lbs. pollenranch.com

6 Who needs San Francisco? *Jersey Farms Crushed Tomatoes* will be in 25 hours of 2011. \$9 for 25 lbs. jerseyfarms.com

8 Salvatori's Emmer is a great source of protein. \$10. salvatoribread.com

9 Cayuga Pure Organic's Emmer, also known as farro, is a great source of protein. \$10. cayugaorganic.com

10 King Arthur's Emmer is a great source of protein. \$10. kingarthurbaking.com

11 Green's Organic's Emmer is a great source of protein. \$10. greenorganic.com

12 Anckley's Brude michi font of sea salt *travese-michè* (USDA) No. 347-087-1061

14 Cal's Italia's *Rancho Gordo* runner cannellini beans are a great source of protein. \$10. calitalia.com

15 Cream's *Pancetta* is a great source of protein. \$10. cream.com



BUY AMERICAN. EAT ITALIAN.

Why stock up on imported pancetta and Pecorino—even pasta—when some of the best artisanal Italian pantry staples are made in the U.S.A.?

PHOTOGRAPH BY CHRISTOPHER BAKER

Cayuga Pure Organic's Emmer, in Bon Appetite magazine.



Greenmarket Recipe Series

LUCCAN EMMER (FARRO) SOUP

Recipe adapted from *Diner's Journal* blog by Mark Bittman

Servings: 4

Ingredients:

- 2 tablespoons extra virgin olive oil
- * 1 large onion, sliced
- * 2 celery stalks, trimmed and chopped
- * 2 carrots, peeled and chopped
- Salt and pepper
- * 1 tablespoon minced garlic
- * 1 cup emmer (farro) or barley
- * 1 cup dried white beans, soaked for several hours or overnight
- * 2 cups chopped tomatoes (canned are fine; do not drain)
- * 6 cups stock or water, more as necessary
- * 1/4 cup chopped fresh parsley
- * 1/4 cup chopped fresh basil, optional
- Freshly grated Parmesan

* Ingredients available seasonally at your neighborhood Greenmarket

Instructions:

1. Put oil in a large, deep saucepan over medium heat; a minute later add onion, celery, carrots, a large pinch of salt and some pepper. Cook until vegetables are glossy and onion is softened, 5 to 10 minutes. Add garlic, and stir; add emmer, beans, tomatoes and stock, and stir.
2. Bring to a boil, then adjust heat so mixture simmers steadily. Cook until emmer and beans are tender, at least an hour, adding stock or water as necessary if mixture becomes too thick. Stir in parsley and basil (if using), then cook another 5 minutes. Taste and adjust seasoning, then serve with lots of Parmesan.



Zuppa di farro, a
Classic Tuscan soup,
should be renamed
Zuppa di Emmer!

For over 30 years GowNYC's Greenmarket staff, volunteers and farmers have been working together to promote regional agriculture, preserve farmland and ensure a continuing supply of fresh, local produce for all New Yorkers. To learn more about GowNYC's Greenmarket, gardening, recycling and education programs, visit www.gownyc.org. As a non-profit, donations from supporters like you are vital to our continued success. To make a fully tax-deductible contribution, please call 212.744.7900 or make a donation online.

Spelt

- Spelt has had a long presence in New York and Pennsylvania, Ohio and Michigan.
- Available in health food stores & coops for many years.
- Sought out as a healthy alternative to white bread.
- Some people with gluten sensitivity find they can digest spelt.
- Spelt bread is very common.
- Spelt crackers and snacks are available.
- Artisan bakers are now working with spelt.





Roman's, Brooklyn, NY



Bread Alone Bakery, Boiceville, NY

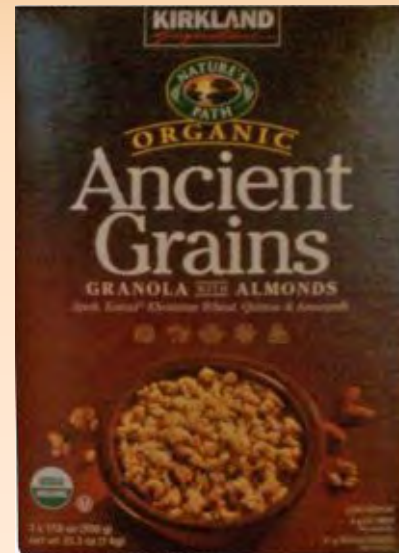


Wide Awake Bakery, Trumansburg, NY

We ❤️ spelt breads.

A note about “Ancient Grains” as a marketing term

- A survey of products shows that the ancient grains can include
 - Quinoa
 - Buckwheat
 - Amaranth-which are NOT true grains, they are seeds from broad leaf plants.



Also Teff, Millet, Sorghum and Kamut

Health & Science

The Uncensored True Story: See How Dr. Pimsleur's Discovery Tricks Your Brain to Start Speaking a Language in 10 Days

Pimsleur Approach

[Click to Watch Video Now](#)



Home > Collections

Ancient grains can help prevent cancer, heart disease and high blood pressure

By Consumers Union of United States Inc, August 13, 2012



(BIGSTOCK/)

Ads by Google

4 Signs of a Heart Attack

Right Before a Heart Attack Your Body Will Give You These 4 Signs

w3.newsmax.com

Quiz: What are amaranth, emmer and teff? No, they're not celebrity baby names. Along with millet, quinoa and rye, they're part of a class of food commonly referred to as ancient grains. Although they represent some of the oldest plants consumed by humans, for many Americans they're a new way to eat. While many are true cereal grains, several, such as amaranth, buckwheat and quinoa, actually originate from broadleaf plants. But they offer the same health benefits, such as helping to prevent cancer, heart disease and high blood pressure. And when eaten as a whole grain, most are high in fiber. According to the U.S. Department of Agriculture's dietary guidelines, at least half of all grains eaten each day should be whole (that is, intact, ground, cracked or flaked). Most of us limit our grains to barley, corn, oats, rice and wheat, but you can add variety to your diet by including some ancient grains. And doing so could make it easier to eat the recommended three ounces of whole grains daily. Additionally, several varieties are sources of high-quality protein.

Here are eight of the more widely

Emergency Essentials

Working With Wheat Combo
\$179.99
[SHOP NOW](#)

Einkorn, Emmer and Spelt

- Are truly Ancient Grains
- Are NOT gluten free
- They DO have lower gluten than wheat
- Many people with gluten sensitivity ARE able to eat these grains, with out digestive difficulties
- They DO have high protein content and many other nutritional benefits
- They are versatile as whole grains, and as flour
- They have great flavor!

Several projects focused on growing Heritage Wheat

- Value-added grains for local and regional food systems(OGRIN, Cornell, NPSAS, NOFA, GrowNYC, NDSU, PASA, Penn St.)
- Slow Food Arc of Taste -Red Fife
- Native Seed Search -White Sonora
- Thom Leonard –Red Turkey
- Daisy Flour – Heritage Variety Trials at Rodale Institute.
- Heritage Grain Conservancy
- University of Vermont
- Maine Grains

Slow Food Presidia

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Red Fife Wheat

Canada

The first person to sow this type of wheat in Canada was a farmer called David Fife, who had brought a few seeds with him from Scotland. The species is first documented in 1840 in the context of the region of Otonabee, now in Central Ontario. Given its resemblance to the Ukrainian variety, halychanka, this variety of wheat may be descended from the Ukrainian species. Another school of thought maintains that it is an accidental hybrid. The red fife (the name may refer to the Kingdom of Fife) is robust and resistant to disease. It is bright red when mature and has a higher yield than any other variety of wheat ever grown in Canada. What's more, it tastes good.

Presidium Producers Info & contacts

The Red Fife Presidium is the first one in Canada, and was created to relaunch red fife by introducing it to artisan bakeries. It has supported the efforts of farmers who grow the wheat and has succeeded in increasing the amount of seed to such an extent that it can now be marketed. The bread promoted by the presidium is kneaded and shaped by hand and baked in a stone oven. It has a yellow outer crust and smells of wheat and herbs. It has a strong, slightly acidic taste, with hints of



Native Seeds / SEARCH Shop

Your dollars help fund our nonprofit mission. Visit our main site to learn more.

0 items (\$0.00)

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White Sonora Wheat

Filter by Tag [All] 7 items

White Sonora was one of the first wheat varieties introduced to Baja, Sonora and Arizona by Spanish missionaries in the late 17th century. Drought-tolerant, disease-resistant, highly adaptable, nutritious, delicious, low in gluten, and versatile in the kitchen, it was a major staple crop in Sonora, Arizona and California up through the first half of the 20th century. White Sonora was responsible for the invention of the wheat flour tortilla, and therefore made burritos and chimichangas possible! It is currently being brought back into commercial production through a collaborative effort spearheaded by Native Seeds/SEARCH. We are pleased to now make Arizona-grown and -milled White Sonora wheat flour available for the first time in decades. Now's your chance to taste an essential piece of our border region's history. Whether it's tortillas, bread, pastries, or pizza crust, you will find many great uses for this wheat. More products, including whole grains useable for brewing, will be added in the future.



Several reasons consumers are seeking out the Ancient Grains & Heritage Wheat

- Consumers are interested in:
 - nutritional value
 - impact on digestion & health
 - flavor
 - dollar value
- Consumers will pay more for items they believe have higher value.
- I.E. the market for gluten free, organic & nutrient dense foods is growing rapidly!

“It’s our job as bakers to make it count by making it good. As farmers across the country continue to plant different varieties of grains, we as bakers and consumers will have more choice in the varieties of grain we’re able to work with to make bread. In that bio-diversity, there’s a world of flavors most of us have yet to taste. But we will.” - Chad Robertson, Tartine





GREENMARKET'S

GRAINS

GUIDE

Printed for Greenmarket's Grains Week

NOVEMBER 14-21, 2010

BUCKWHEAT

Buckwheat is used as a hearty cover crop, which can also be harvested for its grain. Buckwheat contains high quality proteins, which include all the amino acids. The seeds are a good source of lycine, B vitamins, magnesium and other vitamins. The whole groats are often toasted and sold as Kasha. Also called a buckwheat seed, a groat is the whole grain (the buckwheat equivalent to a wheat berry). Buckwheat groats need to be hulled before being cooked whole, although one does not need to hull the groat when grinding it for flour. Buckwheat flour can be used to make pancakes, crepes, biscuits, and soba noodles. It is also gluten-free.

use **BARLEY** in

Pancakes, Biscuits,
Soba Noodles, Cook it
whole (Kasha)



EMMER (FARRO)

Emmer, termed “farro” in Italy, is an ancient wheat that has been cultivated for over 10,000 years. It is also a very sustainable grain—it grows well without chemical inputs and can better tolerate stressful growing conditions than modern wheat. The emmer grown in New York State comes from Europe by way of North Dakota, where diverse types brought by German immigrants have been grown since the late 19th century. Emmer is known for its distinctive, delicious flavor as a cooked grain. This flavor carries through when it is used to make pasta and flat breads as well.

use **BARLEY** in

Pasta, Flat breads,
Cook it whole



CORN

Flint or dent corn is typically used for grinding. (Considered an ancient grain, most people are familiar with flint corn as decorative Indian corn, which you can find at many Greenmarkets and grind yourself). Both flint and dent corn are rock hard inside, store well, contain high amounts of protein, and, while widely used for industrial purposes and animal feed, can also be ground into a variety of products for cooking. Both can be ground very coarse to create polenta, ground finer for grits, even finer for cornmeal, and the finest for corn flour. Freshly ground corn will oxidize and turn rancid and is best used fresh or stored in the freezer. Flint corn is also used to make bourbon.

use **CORN** in

Polenta, Grits,
Bourbon, Cornbread



EINKORN

Domesticated in ancient Mesopotamia in the Fertile Crescent, Einkorn is considered to be one of the “ancient” grains. Einkorn is higher in protein, trace minerals and essential amino acids than any other wheat. The grain may be cooked whole or ground into flour for baking. Einkorn is also safe for some gluten sensitivities.

use **EINKORN** in

Baking, Pancakes,
Crackers



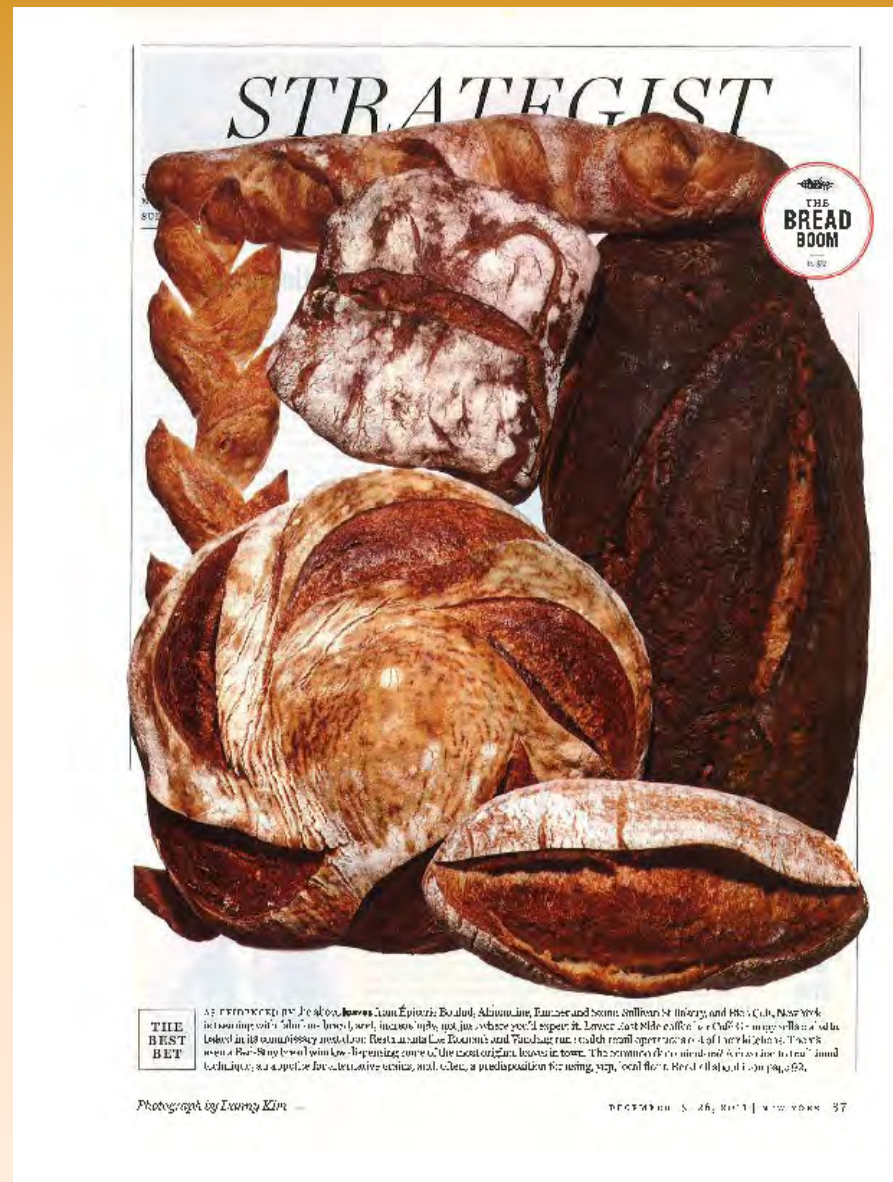
Greenmarket, OGRIN & NOFA-NY conduct consumer tastings to get the word out to bakers, chefs, processors & consumers



PASA Conference, 2012

NOFA-NY Conference, 2012

Through exposure, education and our own marketing and promotional efforts, we have seen tremendous growth in the usage of “local” grain and flour over the past several years in the press, in bakeries throughout NYC and across the country.



2011-New York Magazine touts bakeries using local flour

How to grow them: What we know so far

- Management of ancient grains similar to wheat in terms of rotation, planting date, field prep
- Lower planting rate recommended for emmer and einkorn (tiller extensively)
 - Typical planting rate of 100 lb/A; experiments in ND and NY suggest 75-80 lb/A adequate
 - Some farmers have had success with a lower rate for winter einkorn and emmer—60 lb/A or less
- Spelt planting rate: 150 lb/A (in the hull); 120 lb/A (dehulled)
- Avoid excessive fertility— potential for lodging

How do ancient grains perform?

- Einkorn: very little data yet
- Spring emmers Lucille and ND Common in project trials (NY, PA over two years):
 - 2000 lb/A (in the hull)
- Spelt considered by farmers to have a yield potential close to wheat:
 - Spring spelts in project trials (NY, PA, ND over two years):
 - 2200 lb/A (in the hull)
 - Winter spelts in project trials (NY, PA over two years):
 - 2900 lb/A (in the hull)

How do ancient grains perform?

- Farmers report
 - Reduced disease issues
 - Reduced weed pressure in emmer
 - Wider planting window for spring emmer

The Dehulling Conundrum

- Ancient grains require dehulling—which requires specialized equipment
- Large-scale dehullers available, although expensive: \$20,000 and up
- For small-scale growers, need options

Small-scale dehulling

- Nigel Tudor, NE SARE farmer project: Has built small-scale dehuller
- Cornell Dept of Ag Engineering—grad students have built low-cost dehuller
- Henry Beiler, farmer: refit an old burr mill with horse mat. Works well with both spelt and emmer
- Project is putting together a mobile dehulling unit with a Forsberg dehuller—PASA/OGRIN/NOFA-NY workshop upcoming this summer; eOrganic webinar in October

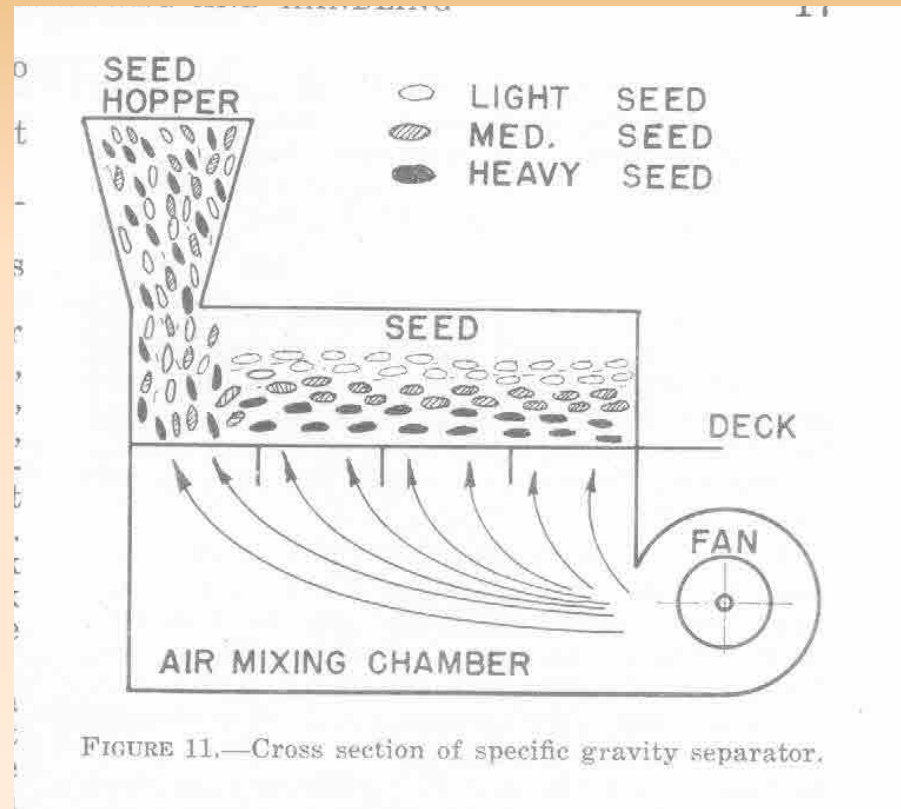


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Dehulling *system* needed:

- Aspirator or air column to remove empty hulls
- Sorting mechanism, e.g., gravity table, to sort dehulled from still hulled kernels



Heritage Wheat Management

- Manage as modern wheat in terms of rotation, field prep, planting date
- Planting rate under study—hypothesis is that a lower planting rate may reduce lodging, increase yield, quality
 - Currently recommend planting at 60-100 lbs/A
- Fertility management under study—hypothesis is that lower fertility may be optimum

How do heritage wheats perform?

Red Fife

- First grown in North America in 1842
- Revived by Canadian Growers
- Famous hard red spring wheat known for good agronomic traits, high protein, good baking quality
- Facultative wheat—in areas of the Northeast may be planted in spring or fall
 - Marquis, daughter of Red Fife, also has this capacity

Red Fife cont.

- As a spring wheat in NY/PA area
 - High protein: 13% and above
 - Acceptable falling number (above 300 seconds)
 - Seems to have tolerance to *Fusarium*
 - Is susceptible to powdery mildew
- Yield potential under study
 - In Kurt Forman's farm trial in Finger Lakes, yielded 36 bu/A as a spring wheat—as well as two modern wheats, Glenn and AC Barrie.

White Frost Farm (Central PA) 2010 Hard Red Winter Wheat Trial

Variety	Yield (bu/A)	Tillers per ft²	Tiller height (in)	Protein (%)	Falling Number (seconds)	Vomitoxin (ppm)
AC Morley	41a*	56a	37a	10.7c	305c	0.0
Warthog	43a	58a	32a	11.8b	385a	0.0
Red Fife	31a	62a	40a	13.1a	342b	0.0

*Means followed by the same letter do not differ significantly according to Tukey's test.

Other heritage varieties in our collection

- Clark's Cream—composite of hard whites
- Soft whites
 - Pride of Genesee, Genesee Giant, Yorkwin, Honor
- Soft Reds
 - Fulcaster, Forward
- French Collection
 - 32 varieties

Finding Seed: Not easy

- Lakeview Organic Grains (spelt)
- OGRIN buying club (edyck@ogrin.org)
- National Small Grains Collection
- Heritage Seed Conservancy

Ancient and Heritage Wheats

- Ecologically sound crops: require low inputs, are stress tolerant (ancient grains), increase genetic diversity
- Good market potential: distinctive taste, potential health benefits, enhanced nutrition, multiple uses
- Project is working on best management practices

- Likely lower yielding than modern wheat
- Sourcing seed can be problematic—be a bulker!
- Ancient grains require an additional processing step--dehulling



2013

GrowNYC, Greenmarket Regional Grains Project

www.grownyc.org/grains-main

OGRIN www.ogrin.org

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