

Organic Seed Crop Production: A New Niche for New England Farmers

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Restoring Our Seed: The Context

In the last two generations the seedscape has changed dramatically. Farmers, who for thousands of years saved seeds and improved crops, abdicated those functions to professionals. Public university breeding programs, which introduced most of the best cultivars until late in the twentieth century, have mostly disappeared, replaced largely by proprietary corporate research. A series of consolidations has rocked the wholesale seed industry, reducing the players to a small handful. One company, Seminis, controls 60% of the North American vegetable seed market, yet, is itself, on shaky financial footing.

These changes are producing the following results:

- 1) Varieties are bred for wide adaptability to broad geographic regions. Varieties specifically adapted to New England's cool, short-season climate are neglected.
- 2) Seeds are bred with dependence on high input agro-chemicals. The needs of organic growers and home gardeners who eschew pesticides and herbicides are largely ignored.
- 3) Varieties are bred for long-distance shipability with little regard to the needs of growers with local markets where taste and freshness are highly valued.

Today's seed system is over-centralized, vulnerable and too vanilla. The new organic rule, requiring the use of certified organic seed where commercially available is a response to a need for a more diverse system. Although many small seed companies have arisen in counterpoint to industry consolidation, their expertise and production capabilities are limited. The organic rule is ahead of the industry. Small regional seed companies need technical support to meet this challenge.

Restoring Our Seed: The Program

Restoring Our Seed is a Northeast-SARE funded program. Our goal is to develop the knowledge and skill for organic seed production and crop improvement, and to build a network of farmers, cooperative extension, seed companies and markets to produce more and higher quality organic seed for our region. We come together in workshops, on-farm field days, and collaborative breeding projects. Our work is posted on our website: growseed.org.

Why Grow Seed on Your Farm?

All farmers have in common that we are always short of cash, short of time, burdened with a never-finished list of tasks and details of daily life already too complicated. Why on earth would we consider growing seeds and adding another layer of complexity to our lives?

Economic Reasons:

- 1) To save money. Seed prices are rising rapidly.
- 2) To acquire desired varieties regardless of their commercial availability. If you are your own source, you don't have to worry about others' crop failures, or unexpected out-of-stocks.
- 3) To meet or exceed standards of the new organic rule. You'll have certified organic seed even when others can't find it.
- 4) To adapt and improve varieties to your conditions and climate. According to Bert Grosghal of Even' Star Organic Farm in Maryland, it is not difficult to build in outstanding degrees of local adaptability, disease tolerance and weather-hardiness into favored varieties without sacrificing flavor.

“If you are already running a market-driven farm, you have the background to manage your own crop genetics. And if you're a surviving farmer in this competitive and corporate era, you've got more than enough brain cells to manage your crop genetics very well...Seed saving and genetic management can be readily integrated into the seasonal operations of most market farms.”

Grosghal has attained tolerance to *fusarium* and *verticillium* wilts in 25 lines of tomatoes and 10 of peppers, to *rhizoctonia* in ten lines of brassica, drought-hardiness in 5 brassicas, cold-hardiness in 10 brassica lines including his special strain of cold-hardy arugula and resistance to splitting in cherry and teardrop tomatoes following heavy rains.

- 5) To develop a new source of on-farm income. High Mowing, Turtle Tree and Fedco are among seed companies in our region looking for growers. Seeds of Change also buys extensively from farmers. Growers have had success marketing seeds at farmers market or starting their own mail order business.
- 6) To get two harvests from the same crop, a vegetable or fruit harvest plus a seed harvest. Many crops, such as lettuce, melons and pumpkins, can be double-dipped. Others, such as peas or beans where the seed is the edible part, cannot.

Ecological Benefits:

Plowing, tilling and cultivating creates ecological disturbance. A freshly-plowed garden is a pioneer ecosystem. Pioneer systems are typically unstable. They are colonized by pioneer species including most of our vegetable crops which are good at occupying a freshly-disturbed system but poor at competing. In a typical monoculture of lettuce, you

have only lettuce plus the enemies of lettuce. With no checks on the enemies, the farmer is forced to intervene extensively to keep them at bay. A more complex agro-ecosystem will reduce the necessity of farmer intervention. Seed crops increase farm biodiversity by:

- 1) Allowing plants to go through their full flowering cycle. This creates habitats for beneficial insects, pollinators and predators of insect-pests. Seed crops provide shelter, food and stability for beneficials within the habitat upheavals of the pioneer vegetable farm ecosystem.
- 2) Creating more ecological niches resulting in increased species diversity.
- 3) Increasing complex species interaction for enhanced biological control of insect pests.
- 4) Changing the nature of the organic matter being returned to the soil. The mature tissues of seed-bearing crops contain more lignin and fix more carbon for soil food than nitrogen-rich vegetative crops or green manures alone.
- 5) Increasing the pollination rate and yields of vegetable crops.

Techniques to Increase Benefits:

- 1) Doublecropping: Two uses for the same crop. Example: beets are thinned for beet greens and bunching beets. Remaining plants (selected for maximum fitness) are grown for seed the second year.
- 2) Intercropping: Two crops in the same space grid. Example: cilantro as an understory of sweet corn.
- 3) Hedgerows: Planting an insectary hedgerow such as a fennel seed crop adjacent or as a border to other crops.
- 4) Seed Guilds: Mixing different plant families with compatible growth habits that won't cross in the same patch to be grown for seed.

How Growing Seed Differs from Growing Vegetables

- 1) Some seed crops require a longer growing season. Examples: peas, beans, lettuce, cucumbers.
- 2) Many seed crops have different spacing and cultural requirements than when grown for produce. Examples: radish and mustard require much more space because they grow huge when allowed to go to seed. Lettuce must be started indoors because it is so much longer to mature as a seed crop. Beets and carrots which are annual food crops are biennial seed crops.

- 3) Seed crops have different harvesting, cleaning and conditioning requirements and require additional equipment such as fans, tarps, fanning mills or cleaning machines. They require threshing, drying and storage areas.
- 4) Seed crops of cross-pollinated crops require isolation from other crops of the same species. Examples: zucchini and pie pumpkins must be isolated from each other because each is *Cucurbita pepo* and will cross. Beets and Swiss chard are both *Beta vulgaris* and will cross.
- 5) Controlling disease is even more important in seed crops. Some diseases are seed-borne.
- 6) Seeds have a longer harvest window. For example: tomato seed can be harvested over an extended period of weeks.
- 7) Marketing is different. A contract with a seed company enables you to market the entire crop at once and avoid the typical vegetable marketing hustle. On the other hand, there are far fewer potential markets and gluts are quite possible. One of Fedco's seed growers greatly prefers seed production to vegetable production because she home schools her four daughters and seed production allows her to stay on the farm. Even though she refuses to estimate her hourly return for seeds (it is so low) she can't beat the working conditions.
- 8) Seed crops can fail unexpectedly at the end. They may fail germination test for reasons not readily apparent. They can mold in improper storage conditions or be molested by rodents.

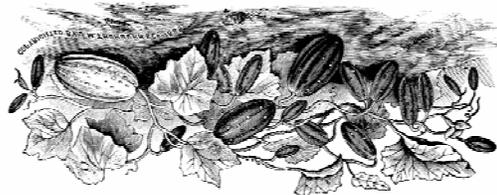
Restoring Our Seed: Participatory Breeding

In addition to our organic seed production program, we are teaching how to breed varieties that will flourish on organic farms.. Season by season we are selecting for exactly what New England farmers want - superior flavor, early maturity, resistance to local pests and disease, and reliability in our cool climate.

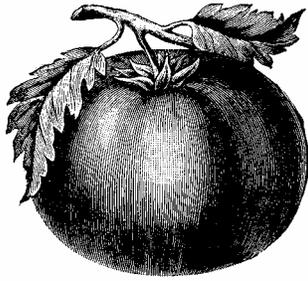
To date our breeding projects include:

A Delicious, Disease Resistant Pickle

With the support of Dr. Mark Hutton, Maine Cooperative Extension, ROS growers are developing a delicious, disease-resistant pickling cucumber. Last year we crossed a delicious pickle, Conquest, that is no longer commercially available with Clinton, a disease-resistant pickle. Rob Johnston provided the Conquest seed and Mark Henning of Cornell University supplied the Clinton seed, and conducted the first generation cross at Cornell. Seeds from the second generation are available to interested growers

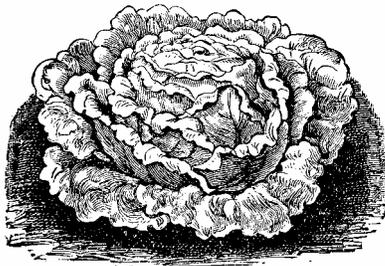


Tomato



We are continuing our improvement of Purden's Purple, an heirloom tomato, for resistance to *alternaria* (early blight). In the coming years we hope to increase the durable horizontal resistance of this variety to early blight.

Cold-Hardy Lettuce



ROS will supply several lettuce varieties, such as Winter Density and Red Sails, known for cold-hardiness, to interested growers. Growers will select for cold-soil tolerance by starting seedlings in a low-heated greenhouse and transplanting early. Lettuce will be selected to increase robustness and for resistance to bottom rot. Seed will be saved from the best survivors.

Later in the season growers will plant these seeds in an unheated hoop or greenhouse, rogue again and save seed from the varieties most tolerant to cold. Lead Growers: Jeremy Barker-Plotkin, (Jay Leshinsky, Middlebury College Organic Garden -pending approval)

Dancing Salad Green

ROS and Frank Morton will mentor a project to cross three *Brassica rapas* to develop a niche-market, tasty, colorful salad green. ROS will supply seed for:

- 4) Mizuna (serrated, cold-hardy) x
- 5) Tatsoi (spoon-shaped leaves) x
- 6) Scarlet Turnip (red leaves).

Frank and Karen Morton, www.wildgardenseeds.com, will develop an ecological breeding module with photos and selection guidelines. Our goal is to help growers see the plant as a breeder might.

Lead Growers: Jeremy Barker-Plotkin, Eli Rogosa, (Jay Leshinsky, Middlebury College Organic Garden -pending approval)

Super Spud

Dr. Raoul Robinson and Jim Gerritsen, woodprairie.com, are working with ROS to cross about ten of the best modern potatoes and select for early maturity, high yield, disease and pest resistance. Download Dr. Robinson Amateur Potato Breeding manual on: www.sharebooks.ca.



Other Breeding Interests:

Kim Stoner, Conn. Extension and entomologist, expressed interested in selecting arugula or mustards for flea beetle resistance. There was a ripple of yes! at our recent conference at this suggestion. This would be a long-term project.

Dr. John Sokoloski from Yale suggested breeding for nutrition; ie: higher anti-oxidants - lycopene. He suggested crossing a black tomato (Black Krim or Cherokee Purple) with a thicker-skinned tomato, perhaps a paste tomato.

What have you dreamed of breeding?

To be involved in the breeding program contact Eli Kaufman at humus1@netvision.net.il

Levels of Scale

Each succeeding level requires a greater amount of responsibility and commitment while offering a higher potential benefit.

- 1) Save seed for own use. Failure affects only you. Some amount of crossing may be tolerable.
- 2) Select seed for crop improvement. Requires greater time commitment and more attention to detail than #1. May greatly increase on-farm economic benefits over #1.
- 3) Contracted seed production. Seed quality affects many other stakeholders including the seed company and its customers. Crossing and off-types are not tolerated. Commits more land than #1 or #2. Possibility of total loss if seed not up to germination standard. Increases diversified on-farm income. Seed company takes responsibility for germ tests, packaging, labeling, and retailing.
- 4) Retail. Become your own seed company. Responsible for all facets of seed quality including adherence to state and federal laws, germ testing, packaging, labeling, marketing (through farmers markets, catalog, retail store or whatever). Huge value-added potential. For example, a cucumber variety that might wholesale for \$30 per lb. could bring \$307.20 when divided into 256 1.75g packets at \$1.20 each. However, operating own seed company involves high overhead. For example, Fedco paid more than \$30,000 to print and mail 40,000 catalogs last year not counting labor costs for the production time.
- 5) Intermediate between 3) and 4) could be a seed growers' cooperative. It has been talked about but not yet tried.

Finding the Appropriate Scale

- 1) Do you want to commit to growing seed? Why?
- 2) What is the level of commitment appropriate to your purpose?

- 3) If you are growing to sell, imagine a triangle with three legs: A scale, B variety, C market. Each is an interdependent variable so we have a complex system.
- 4) How much land do you wish to commit? How much time? What equipment will you need? Will isolations required for cross-pollinating crops interfere with your vegetable operation?
- 5) What is the market for the variety you wish to grow? A niche variety such as Candy Roaster squash or Boothby Blonde cucumber will have a limited market requiring only a few pounds of seed. On the other hand, competition from other growers for these specialty items may be nil. These varieties are appropriate for small scale. Specialty heirloom tomatoes and melons may require so little land that they can be grown by backyard gardeners. On the other hand, mainstream varieties such as Marketmore 76 cucumber could be suitable for large scale production in the hundreds of pounds and there is much more demand for famous heirloom tomato Brandywine than for the obscure Schmeig's Striped Hollow. Another grower could flood the market for any of these varieties and change your future plans.

Real-life Results

Lettuce breeder Frank Morton is often says that making money is the hardest part of seed growing. Yet it can be done. High Mowing Farm's Tom Stearns reports making better than \$37 per hour after expenses on a 2,000 square foot crop of mizuna seed (67# total) valued at \$20 per lb. Of course Tom is in the business. He has all the equipment, expertise and desire to make it work. One of his growers, growing a similar mustard crop the same year reported making a dismal \$2.07 per hour. This grower, relatively inexperienced and with lower fertility achieved less than one-seventh of the yield per plant of Stearns. Several Fedco growers have achieved good results, one making 9.74 per hour after overhead on tomatoes (a fairly typical result), one making 9.28 an hour on three pepper varieties, one realizing \$12.63 per hour on a 38# crop of Long Pie Pumpkin. Two years later the same pumpkin grower averaged 8.82 per hour for a market basket of six crops. But for a time-consuming failure with a difficult onion crop, she would have achieved \$14.16. Many of these crops check in with high gross per acre: Stearn's mizuna at \$26,800 and several tomato varieties exceeding \$30,000. Trouble is, where you gonna sell an acre of tomato seed production? And therein lies one of the rubs.

The Intangibles

Money is important but the truth is most of our seed growers aren't in it only for the money. Growing seed brings other satisfactions, including allowing plants to complete their life cycles, reconnecting to a more self-sufficient farm heritage, finding the security that comes with controlling the source of our food. Growing seed is an opportunity to give people a way to grow food instead of just giving them food. As well-known plant breeder Carol Deppe puts it,

"Why save seeds? Saving seeds is fun... Gaze at the seed, run your fingers through it, play with it and you can feel the connections...Unquenchable joy arises... It is the joy

that comes from being who you are supposed to be and doing what you are meant to do."

Bio

CR Lawn founded Fedco Seeds in 1978 and has worked with the cooperative for the past 25 years. He is a speaker, catalog writer and heirloom vegetable variety specialist.

Eli Rogosa Kaufman is an organic farmer, idrc.ca Research Fellow in Regenerative Farming and works with Mideast farmers to improve native landraces. She founded www.jerusalemcityfarmers.org.