

Organic Breeding Roundtable Summaries

This past fall (2004) as part of the USDA-SARE funded grant “Collaborative Breeding for and in Organic Systems,” we held three organic breeding roundtables in Maine, New York, and Pennsylvania. We also had a shorter organic breeding brainstorming discussion at the 2004 Restoring Our Seed conference in Brattleboro, Vermont. Roundtables were organized in conjunction with the Maine Organic Farmers and Growers Association (MOFGA), the Northeast Organic Farming Association of New York (NOFA-NY), and the Pennsylvania Association for Sustainable Agriculture (PASA). A total of 56 farmers, 5 breeders, and 7 seed company representatives participated in these successful brainstorming sessions. Companies represented included: Turtle Tree Seeds, High Mowing Seeds, Seeds of Change, Harris Seeds, Johnny’s Selected Seeds, Fedco Seeds, and Pine Tree Seed. The roundtables involved farmers, breeders, and seed companies coming together to discuss what new and improved vegetable varieties organic farmers need. This involved growers sharing how they make variety choices for their farms including what traits are important, what vegetables groups need the most improvement and what their main challenges are for each important vegetable group. The growers then came up with three different lists of varieties that would help them. This included: varieties that are no longer available but growers still want to use, varieties that are very good but need some improvement, and new varieties with unique characteristics that need developing.

Growers had a lot to say when it came to the issues of varieties for organic farming as well as concerns with organic seed. Most of the growers participating in the discussions were farmers growing fewer than 25 acres of vegetables and marketing either direct to consumers or direct to wholesale accounts like restaurants and supermarkets. Generally growers were most concerned about traits such as taste, disease and insect resistance, and the ability to obtain good marketable yields in the challenging farming conditions of the Northeast. Of equal concern was the quality of the organic seed currently available especially since certified organic growers are required to use it according to current USDA Organic regulations. Many growers shared stories of frustrations and problems they have had with organic seed including varieties not being true to type, poor germination, and poor vigor. This reiterated the importance of working with seed companies and seed growers to increase the consistency and quality of all organic seed.

We have summarized what all the growers had to say. We will work to begin breeding varieties that match grower’s needs. We will try to work with the companies that have discontinued varieties to either have them bring them back or have them licensed to another company. Growers lamented the passing of such varieties as Burgundy Delight sweet corn, Indian Summer spinach, and King Richard leek. Farmers throughout the roundtables were fairly consistent in some of their wishes. Many asked for a better open-pollinated broccoli- especially one for fall production, a pepper that colors up earlier in the summer, a sweet onion that stores a little longer, and good tasting tomatoes that have increased disease resistance.

Crop Groups of importance:

Growers were asked to come up with crop groups that needed improved varieties in for organic farmers. Inevitably they came up with all the major vegetable crop groups. They were then each assigned 3 dot stickers and were able to put them next to the names of the 3 crop groups that they thought were most important in relation to producing improved varieties. Below is how the crop groups were prioritized across all the roundtables. The top eight seemed to have the most interest across all the states. The number in parentheses is the number of dots each got.

- 1- Tomatoes (19)
- 2- Greens/lettuce (14)
- 3- Onions (12)
- 4- Winter Squash (11)
- 5- Pepper (9)
- 6- Sweet Corn (8)
- 7- Potato (8)
- 8- Spinach (7)
- 9- Fresh Beans (snap) 5
- 10- Carrots (4)
- 11- Summer Squash (4)

Traits of Importance:

Growers were then asked to come of with a list of crop traits (across all crop groups) that are important to them as organic farmers. They then ranked them as before but each grower had 5 dots. Below is how the traits were prioritized. Many other traits were listed but were not consistently ranked as important.

- 1- Flavor (30)
- 2- Disease Resistance (24)
- 3- Marketable yield (21)
- 4- Insect Resistance (16)
- 5- Nutritional Quality (15)
- 6- Regional Adaptation/ Flexibility of the variety over many different conditions and growing seasons (15)
- 7- Seedling vigor and cold soil tolerance and hardiness (15)
- 8- Overall Appearance (13)
- 9- Variety is Open Pollinated (10)
- 10- Long harvest window (6)
- 11- Ease of Harvest (5)

Important Traits Crop by Crop:

Growers were then asked to go through each crop and list the traits that were important to them for each one. We did not rank them. Not all the crops were discussed in each roundtable.

Field tomatoes:

- Problems: early blight, blossom end rot, cracking esp. in cherries, late blight
- Improvement needed: earliness, cold tolerance, uniform ripening, earliness, cold tolerance, uniform ripening, shelf-life

Hoop house tomatoes:

- Problems: leaf mold, botrytis, sclerotinia, sunburn, early blight, septoria leafspot, poor flavor, late blight, anthracnose, blossom end rot
- Improvement needed: earliness, short vine length (semi-determinate), extended harvest at consistent harvest intervals, heavy set, ease of picking, cold soil tolerance, big late fruit set, flavor

Peppers

- Problems: corn borer, CMV,
- Improvement needed: fruit set in cold climate and hot weather, adaptation to plastic culture

Onion/alliums:

- Problems: Botrytis leaf blight and neck rot, thrips, pink rot, purple blotch, Mildew (powdery, downy), thrips, inability to compete with weeds
- Improvement needed: cold soil tolerance, weed competition, adaptation to higher density planting, drought tolerance, storage esp. for Spanish types

Lettuce:

- Problems: Bolting, sclerotinia (bottom rot), aster yellows in lettuce from leafhoppers, slugs, tarnish plant bug
- Improvement needed: evenness of maturity and cold hardiness and heat tolerance in mixes, shelf life in poor conditions, flavor, not turning bitter in heat/heat resistance, brittleness in red lettuce, yields/A., holding ability in field, loft in leaf lettuce, germination in summer heat

Spinach:

- Problems: poor germination (under warm conditions), CMV
- Improvement needed: Season adaptability

Sweet corn:

- Problems: European corn borer, worms, poor cold soil emergence
- Improvement needed: More ears/stalk, yield/A., cold soil germination and ability to get phosphorus in cold conditions, ear worms

Brassicas/broccoli:

- Problems: Flea beetles, black rot- especially for cauliflower, clubrot, alternaria, , hollow stem, poor consistency in early broccoli, aphids, alternaria, leaf spot, head rot

- Improvement needed: nutritional content, ability to ship without ice, tolerant to cold temperatures (while in field), low boron tolerance

Potato:

- Problems: Late blight, scab, leafhoppers, low yield, rhizoctonia (black scurf), early blight, Colorado potato beetle (but not in PA)
- Improvement needed: fingerling types, flavor

Cucurbits:

- Problems: Gummy stem blight, fusarium basal rot, downy mildew, powdery mildew, cucumber beetles, squash bugs, alternaria on cucumbers and winter squash, blight, zucchini mosaic virus, anthracnose,
- Improvement needed: temperature tolerance, fruit set, ease of harvest for zucchini, spinelessness in zukes, fewer and smaller seeds in cucumber, ability of zukes and cukes to hold

Improving current varieties, new variety ideas, and discontinued varieties:

Growers came up with three different lists of varieties that are summarized within each crop group below. One are varieties they like and currently use but need improvement. A second category is new varieties that they would like to see developed. And the final category are varieties that are no longer available but they would like to see made available again. The state where the idea came from is in parentheses.

Summer squash/zucchini:

- Golden zucchini that top sets (ME)
- Zucchini that will hold up for a few days or longer on vine or shelf (ME)
- Costata Romanesca that is higher yielding with good taste (ME)
- Raven F1 Green Zuke with mildew resistance

Winter squash:

- Butternut that is full-size and earlier maturing with good storage qualities (ME)
- Ponca with more size and quality (ME)
- Delicata that is consistent- size and quality are currently unpredictable (ME)
- Delicata that is true to type and like the old Delicata (NY)
- Bush Delicata that has fruit that looks like the old Delicata (NY)
- Buttercup with better yield (ME)
- Blue Hubbard that is high quality and half the size (ME)
-

Melons:

- Armenian cucumber that has high quality and insect resistance (cucumber beetle) (ME)
- Honey dew that is earlier with good flavor and high sugars (ME)
- Ice-box watermelon that is oval shaped (ME)
- Watermelon that has a built in ripeness indicator (ME)

- Abrosia like melon that is early (ME)
- Moon & Stars with flavor and texture (ME)
- Crenshaw that is earlier (ME)
- Orange watermelon that is earlier (ME)
- Seedless small oval red watermelon (ME)
- Improve Golden Gopher (NY)
- Small melon for 1-2 people, high brix, OP, high yield, greater yield than 4 melons per plant, sweet (NY)
- Bring back: Sugar Bowl, Early Chaca, Honeyshaw (ME), Flyer Melon-JSS (NY)

Cucumbers:

- Telegraph with increased yield and disease resistance (PA)
- Diva F1 cucumber with increased disease resistance (PA)
- Slicer with continued productivity over a long period- Now growing: Marketmore 76, Diva, General Lee, Straight 8, Olympia, Suvo, Gervine, Holland, Telegraph, National, Boothby, Cross Country, Cool Breeze (ME)
- Bring back: Express (ME)

Pepper:

- Ace pepper with thicker walls, more blocky and heavier fruit (ME)
- Gold pepper with a higher yield than 3-4 enormous fruits, such as Gourmet (ME)
- Sweet pepper that colors up early, tastes good, high yield (NY)
- Hot early pepper (NY)
- A good early yellow pepper (NY)

Field tomatoes:

- 3-5 oz red, early with flavor like Moskvich but firm and bigger-OP (ME)
- Medium size yellow 6-8 oz-OP (ME)
- Taxi with more flavor and early blight and septoria resistance-OP (ME)
- Glacier without the wateriness and larger (4-6 oz)-OP (ME)
- Grape that stays on the plant till ripe-OP (ME)
- Paste type like Bellstar, bigger with taste-OP (ME)
- Crack-resistant Sungold cherry-OP (ME)
- Sun sugar cherry with flavor more like Sungold-OP (ME)
- Early blight resistance in tomatoes in general with good quality(VT, NY)
- An early disease resistance, good flavored slicer (NY)
- Early, indeterminate OP with long productivity, small, good taste, med skin (NY)
- Garden Peach with a larger size (PA)
- Striped Cherry Tomato- improve Isis Candy (PA)
- Bring back Kellogg's Breakfast- not available in market grower quantities (NY)

Hoop house tomatoes:

- Principe Borghese for drying that is higher yielding (ME)
- Big Beef that is disease resistant (leaf mold) (ME)
- Striped German that is earlier (ME)
- Heirlooms that ripen more uniformly and are easier to pick (ME)
- More vibrant red or dark color or mahogany (ME)
- Streaked bright cherry with good production (ME)
- Bring back Buffalo (F1) (ME)
-

Sweet corn:

- All varieties with Germination and vigor, cold tolerance, better yield per foot (ME)
- Quickie with flavor and taller or with higher ear set (ME)
- Improve on Fleet's cold soil germination (ME)
- Better selection of vars. esp. early and second-early that aren't treated, corny-tasting, not like candy (ME)
- Corn that does not require isolation (ME)
- corn for fresh market (ME)
- Husk protection for fewer ear worms (ME)
- Red corn that tastes good (ME)
- Bring back: Burgundy Delight, Platinum Lady and Kandy Plus, an untreated Seneca Arrowhead (ME)
- Stowell Evergreen Sweet Corn (OP) needs improving (restoring); last source mark Tenensvoldt (VT)
-

Head lettuce:

- Butterheads and Boston types with more heat tolerance (ME)
- Blushed Butter Cos with more bolt resistance (ME)
- Larger plant to pack as full plant with Merlot color (ME)
- A bigger Pablo (ME)
- New Red Fire without bottom rot or aster yellows, with a head that holds together better (ME)
- Buttercrunch without tip burn on outer leaves and with better cold tolerance (ME)
- Good red iceberg (ME)
- A lettuce with LMV resistance (VT)
- Lolla Rossa as a full sized head (NY)
- Two Star lettuce that bolts latter in the summer (NY)
- Pirat (Red Bronze) need restoring- head has gotten smaller, lacks tightness, lacks butter taste (PA)
- bring back Plato II (ME), Large Boston lettuce Carmona- JSS (NY)

Leaf lettuce:

- Dano that tolerates downy mildew (ME)
- Aruba with downy mildew resistance (ME)
- Deep red leaf for fall and winter production that doesn't get white mold (ME)
- Mixes with even germination and growth rate (ME)
- Lolla Rossa that is 7 days earlier for salad mix

Greens:

- Endive that is less bitter with loft (ME)
- OP spinach that is smooth and easy to harvest (including at baby stage)- currently use Catalina F1 and Wolter F1 (VT, NY)
- A spinach for each season/planting- especially on that germinates in summer
- Bring back Wolter F1 spinach (VT), Indian Summer Spinach-JSS, Fedco (NY)

Brassicas:

- Arcadia that is bluer (ME)
- Blue broccoli with side shoots (ME)
- Vigorous uniform head size open-pollinated broccoli (ME)
- OP Broccoli with good taste, can hold some in field, staggered harvest; Currently use Thompson, Green Goliath, Waltham, Umpqua, and Premium F1 (VT)
- Fall Broccoli with large head, head rot resistant, ability to handle cold (NY)
- Fall Cauliflower with a good head (NY)
- Earlier mid-season broccoli
- Tighter Packman that holds better and is more dome-shaped (ME)
- Violet Queen with a bigger head (ME)
- Consistent Savoy cabbage, liked Kilosa, consistency in size and time of harvest for open-pollinated varieties (ME)
- Small early cabbage like Dynamo (ME)
- Snow Crown cauliflower that doesn't pink under stress with better consistency and quality (ME)
- Cauliflower good in heat (ME)
- More consistency in head size and days to maturity for cauliflower and broccoli (ME)
- Open-pollinated Brussel sprout that produces (ME)
- Michjilli Chinese Cabbage is losing quality and needs restoring (VT)
- PMR and BWR in all squash (VT)
- Brussel Sprouts 14" high packed on a stalk (NY)
- Fall Broccoli Raab (PA)
- Bring back Emperor, Signal and Bravo broccoli and Columbia cabbage (ME), Andes Cauliflower untreated (VT), Jade F1 Brussel Sprouts, Green Valiant Broccoli F1- JSS, Multikeeper Cabbage- only available treated from Stokes (NY), Green comet Broccoli, Columbia Cabbage F1- Fedco (PA)

Onions:

- Red onion that will produce a consistent seed crop (ME)
- Early maturing Redwing (ME)
- OP storage Red onion (VT)
- Sweet onion that stores longer (ME, NY)
- Really hard storage onion (ME)
- A sweet onion adapted to S. PA area (PA)
- Faster scallion (NY)
- Bring back: King Richard leek (ME, NY), Laura Leek- JSS (NY)

Potatoes:

- Yukon Gold with early blight and scab resistance (ME)
- More uniform Rose Finn Apple fingerling (ME)
- French fingerling more like a fingerling (ME)
- Breeding for fresh market culinary traits such as flavor, texture, specific gravity (ME)
- Bulky early potato, a round white potato that boils without a hole inside (ME)
- A scab resistant in high PH soils (NY)
- Good tasting Russet Potato for baking (NY)
- Disease resistant potato (like Prince Hairy) that tastes good (NY)
- Potatoes that set lower on the hill (NY)
- Bring back Sheppody Russet Potato (VT)

Miscellaneous:

- More uniform Plum Purple and French Breakfast radish (ME)
- French Breakfast that is as cold tolerant as most radishes (PA)
- Consistent seed size for planters so no adjustments necessary (ME)
- Cutting sunflowers with more than a single bloom (ME)
- Quick-growing baby carrot for market production (ME)
- Color in everlastings (ME)
- Nantes Fancy carrot has lost much of its quality and needs restoring (VT)
- Top Weight carrot- is too rough, should be smoother and still fast growing (VT)
- A good spring and summer carrot (VT/NY)
- Golden Chard with vigorous better germination (NY)
- Bolt resistant Cilantro- better than Jantar (NY)
- Winter killed Vetch (NY)
- Cover crop-Sept planted legume, cold adapted producing a lot of biomass (NY)
- Golden Beets with better germination and increased vigor (NY)
- Jade green beans that are easier to pick (come off vine easier (NY)
- Purple Sting Beans with increase yield, stay purple when you cook them, like Royal Burgundy (PA)
- Mon Petite Cheri Filet Bean- Park Seeds (PA)
- Rutabaga adapted to the mid-Atlantic (PA)
- Annual Globe Artichokes that taste good (PA)

- Radicchio- more varieties for all seasons on the east coast (PA)
- Regionally adapted garlic varieties for PA (PA)
- Bring back White Korean Radish- available treated Twiley (NY), White Doll Turnip- Ornamental edibles (PA)