Organic Seeds and Public Domain Plant Breeding

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Biopiracy is big business. So is owning and controlling the foodsystem. Tied to the land, water, and resources, our prevalent agriculture is suffering from monocultures, petrochemical inputs, the tyranny of machines, insufficiency of human labor and the hegemony of the wall street banking system.

So control of the seeds, particularly the control of availability, variety and diversity of crop plant seeds which in turn reflects the directions of collecting, breeding and selection by governments, corporations, universities, plant breeders, seed companies and backyard gardeners determine what is available to us as consumers, cooks, gardeners, farmers, eaters, ecologists; people all.

It is with some of these things in mind that in the 1970's and 1980's we began collecting seeds and breeding new varieties for the organic movement and the public domain.

Mendel began breeding peas more than a century and a half ago. His legacy endures. We found a copy of his paper on peas in which he shows how to unfold the flower, distinguishing pollen from stigma, and learned how to transfer pollen from one flower to another.

In the 1980's, we made a public domain vine snap pea (Sugaree) because all the available ones were plant variety patent protected (PVPed). The company controlling these peas wasn't interested in organics. Yet organically grown snap peas were important plants in our diets and our cuisine. So we used classical plant breeding to liberate some garden peas. This work continues. We developed a yellow podded vine snap pea with unusually sweet leaves (Opal Creek) and in collaboration with Carl Jones a vine snow pea with delicious 8-9" pods (Green Beauty). Recently we used the parsley bush pea which has leafy fronds rather than tendrils to develop hypertendril peas, ones with large, many fingered tendrils that have snow, snap and shell characters in different lines. This year, in collaboration with Phil Gouy, we identified several traits likely to increase the productivity of bush and vine peas by 2-3 fold and began crossing them into our favorite cultivars.

From this we reckoned that organically grown, organically adapted and organically selected cultivars held by the public would be vital for the organic movement and for humanity in general. In addition, these cultivated varieties would have to reflect as many aspects of the local gardening food system as possible; namely, temperate zone crops adapted to the coast, the valleys and the mountains. We needed to explore and develop new, superior and original varieties to promote, enhance and distinguish organic, biological agriculture. Recognizing that F1 hybrids and GMOs (Genetically Modified Organisms) were further aspects of the privatization of the genome pool, our organic varieties would be open pollinated, free from imposed transgenes and selected under organic conditions.

To us, the organic evolution has moved from 60 Centuries of Chinese Agriculture, from the Indore System of Composting, from Steinerian Biodynamics to the era of the Molecular Biology of Organisms. In particular, microbes that make up an essential part of organic soil cooperate to form biosomes, groups of interacting creatures that promote, enhance and sustain plant growth and health. Bacteria and archaea integrally connect to mycorhizal fungi and viruses in the soil network that biologists call the rhizosphere, the root zone of plants.

A recent microbiological discovery: For decades farmers have been using reduced nitrogen fertilizers like urea and ammonium sulfate to enhance the growth of the plants they grow. Yet plants don't utilize reduced ammonia very well, they prefer and concentrate nitrate,

oxidized nitrogen in their cell vacuoles. The conversion of reduced nitrogen provided by a variety of microbes, like blue-green bacteria, to nitrate has recently been discovered to take place thanks to a previously unrecognized group of archaea called 'crens'. They are present in most soils, in most ecosystems on planet earth. Bacteria don't convert much ammonia to nitrate, crens do. This opens up vistas for further developments in microbially enhanced fertility regimes to increase the output of organic food.

Since part of our work with seeds was to provide for the kinds of foods we love to eat and flowers that improve our moods and gardens, we began with our favorite garden crops: sweet corn, broccoli, onions, winter squash, peas, beans, tomatoes, peppers, eggplants, marigolds, sunflowers and zinnias.

At the same time, we were fortunate to collaborate with Dr. Sarangamat Gurusiddiah, head of the Bioanalytical Laboratory at Washington State University at Pullman, WA (since retired), in making hundreds of amino acid analyses of organically grown crops looking of nutritional selection criteria for many of our crops. Nutribud broccoli, one of our brassica cultivars was found to have significant amounts of glutamine, one of the energy sources for our brains, hence the name.

Since we originally began growing food with heirloom cultivars, it soon became apparent that some heirlooms did better than others in terms of vigor, productivity, seed production and food quality. We chose and continue to look for fine heirlooms as parents in making new kinds.

After growing more than 200 varieties of tomatoes during our decades of organic gardening, we had established preferences and picked our favorites for parents. It takes just a few minutes to make a cross. It takes many months and years to follow the cross to new and improved varieties.

While our first crosses were with heirlooms, now many new kinds come from the intercrossing of varieties that have taken us years to develop. Familiarity and experience is necessary to sustaining and developing worthwhile new cultivars.

A key aspect of laying out a garden for developing new varieties is to know the how's, what's and when's for each and every kind of plant. Are the plants insect, bird, bat, ant, wind or water pollinated? Are there complete flowers, ones with both pollen and stigmas, or plants with male and female flowers on the same plant or are there both male plants and female plants? And then there are the critical issues of inbreeding and outcrossing. Some plants like sunflowers, brassicas and cucurbits prefer to outbreed. Others like tomatoes, legumes and marigolds are usually self-fertile.

Then there is timing. So many aspects of fertility have to do with timing. When the flowers open, when the pollen is mature, when the stigmas are receptive, whether the sun is shining or rain is a'fallin, the emergence of insects thru their metamorphosis from larva to pupa to adult, the direction and timing of the wind, the daily and diurnal temperature and the many kinds of intervention that a gardener or plant breeder can interpose to aid or limit pollination are all important in the conjunctions that lead to seed production.

Taking your hand to seed collecting and plant breeding opens possibilities for uniquenesses in your garden, new vistas that unfold with each crop and each garden with the unknown as a friend and ally involving yourself in sustainable ecology and the paradigm shifts coming with new discoveries about life.