

Gardens as Islands of Genetic Diversity

I was standing in the produce section at Albertsons one day when struck by the uniformity of the produce. All of one kind of apples looked exactly alike, same with onions, peppers, potatoes, squash, beans, and even dried beans. I guess I have known this for years, but just now stopped to wonder why. Is this a demonstration of loss of diversity or of a sophisticated state of agriculture, or of the power of “the market”, or something else?

Genetic Diversity in Squash

My inquiry into genetic diversity has grown during the last three years of incorporating native food plants into my kitchen garden. I noticed right off that unlike traditional garden varieties, native food plants tend to produce edibles parts that do not all look alike. The first year my Hopi Pumpkin, (*Cucurbita pepo* - a summer squash) produced fruits that were either roundish and striped, or longish and striped. On closer examination, you could see that no two fruits were “look-a-likes”, as you would expect to see in the zucchini squash, (*C. pepo*) bin at the local supermarket.

That year I saved seed from the roundish form and planted them the next year. The second year I saw no longish fruit, nor has my seed line produced any longish fruit since. This year was the first year that I have seen fruit that is plain pale green without a single dark stripe. This year I saved seed from the plain green fruits and will plant them next year. Is this a case of my selectivity causing a loss of genetic diversity in my own garden? Obviously, the full range of genetic diversity would benefit by saving seeds from as wide a variety of plant characteristics as possible.

Genetic Diversity in Beans

When you buy a bag of Pinto Beans, you expect them to all look the same. When you grow Hopi Black Pinto Beans, you can expect considerable variety. All Pinto Beans are the same species (*P. vulgaris*), share the same ancestry, but have a very different developmental history, so what accounts for the genetic diversity in native beans and the genetic similarity of commercial Pinto beans?

I propose that market and cultural forces have created a general loss of genetic diversity in our produce while greater genetic diversity survives in the agricultural islands of native and local farmers and gardeners. These agricultural islands exist in part because of physical isolation, in part because of cultural isolation and in part because of isolation from the impact of industrial agricultural practices.

It is not just Pinto Beans where you can see these differences in diversity between modern varieties and native varieties. It shows up in Hopi Yellow Limas (*P. lunatis*) as well – in a very distinct dark maroon variant as well as an unmarked yellow variant, with the bulk of seeds falling somewhere in between those two extremes.

Variation in genetic characteristics is not limited to color and size in seeds, but shows up as well in yield characteristics, plant growth and environmental tolerance. Not surprisingly, these genetic variations are even greater in Tepary Beans (*P. acutifolius*). Diversity research with many genotypes of Teparies has shown wide variations for plant growth, number of pods per plant and number of seeds per pod. The published research studies show only moderate variation in seed weight per 100 seeds, but the varieties selected did not include the San Felipe Pueblo White Tepary, which has a huge seed (for Teparies) and produced as prolifically (in my garden) as other varieties.

What is the Value of Genetic Diversity?

At the highest level, that is what keeps us safely fed. Consider the [Irish Potato Famine](#), caused by an airborne fungus (*phytophthora infestans*) and a monoculture of the Irish Cobbler potato. Consider the [Southern corn leaf blight](#) that severely reduced corn production in the United States in 1970, caused by the lack of genetic diversity in corn. Consider the current threat to vast monocultures of Cavendish cultivar bananas caused by [Black Sigatoka](#), also known as black leaf streak. At the same time, we have lost many of the native varieties of bananas that contain genetic resistance to diseases.

It has been demonstrated many times that the loss of genetic diversity through monoculture leads to problems with food crops. So why do we keep valuing, selecting for and producing uniformity? Fortunately, there are still local and native growers who value and select for diversity, as well as several organizations working to preserve localized landraces of food plants.

Till next time,

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There is an illustrated and more thoroughly annotated version of this article at www.darrolshillingburg.com