The Difference Between Heirlooms, Hybrids, and GMOs

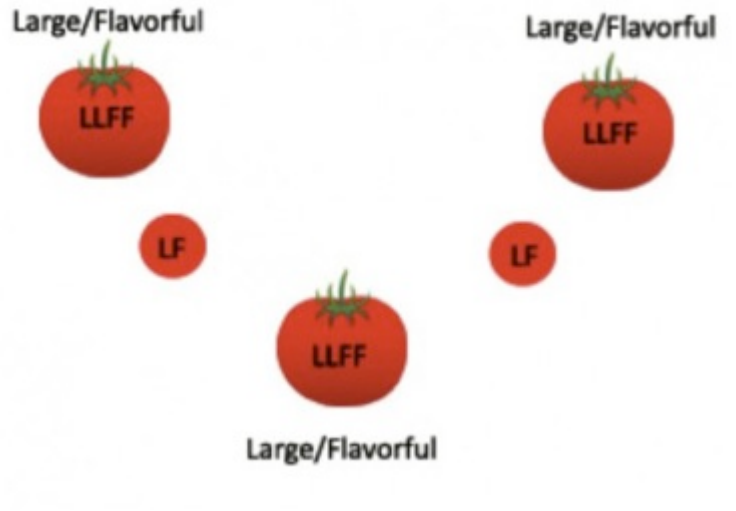
Know Your Produce – Perfect Produce Is Unnatural

There is nothing quite like the taste of a fresh fruit or vegetable straight from the garden. To the eye of the gardener, this vegetable picked ripe off of the vine is perfect. They nurtured it, carefully tended to it, and then finally, get to enjoy the fruit of their labors. However, compare this vegetable to one at the grocery store and it is suddenly asymmetrical, small, not candy apple red, and even has, gasp!, a brown spot.

To gardeners, this poses the question, "What is it about those grocery store vegetables that make them all so perfectly colored, perfectly big, and perfectly symmetrical? And, how did they become the standard of how a vegetable should look?" The truth of the matter is that they look perfect because they are unnatural.

In order to understand the differences between fresh produce from a garden and what you see on the average grocery store shelf, you've got to look far beyond what is apparent on the surface. In fact, it all comes down to the minutest material of the plant, it's DNA. As we have gained an understanding of genetics, we've also learned how to manipulate the genetic material of the food we grow, for good, and for bad. Let's take a look.

Heirlooms



We'll start with what's natural, the way fruits and vegetables have been grown and propagated for thousands of years. It's a very simple concept: you save the seeds of a fruit or vegetable with favorable characteristics, (typically color, shape, size, and flavor), and plant them year after year. Other than selecting which fruit or vegetable seeds to save, the seeds are in no way manipulated. The plants are allowed to open pollinate and ripen in their own time. Today, we refer to these plants as heirlooms. Since seeds from heirloom plants can be harvested and planted year after year, a farmer or gardener never has to purchase those particular seeds again. In a sense, it's the ultimate sustainable agriculture practice.

Figure 1. If an heirloom plant is allowed to open pollinate with other plants of the same variety, the seeds will produce a fruit identical to the parent plant. Source: Kerry Soltis

Hybrids

Heirlooms, however, like all things good and natural, are not perfect. They have a relatively small gene pool and typically lack disease resistance. As we began to learn more about the genetics of these heirlooms, certain varieties were cross-pollinated in order to create new varieties with disease resistance and traits that would enable them to grow in a wide variety of climates. In other words, rather than allowing the plants to open pollinate, two different varieties were purposely crossed to create a plant with specific traits, a hybrid.

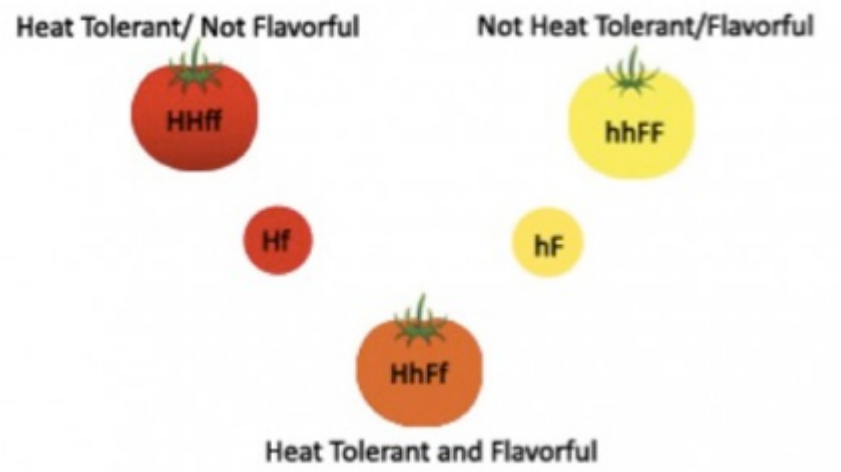


Figure 2. If you cross-pollinate two plants, each with a dominant favorable trait, the resulting fruit will bear both of those traits. Source: Kerry Soltis

These sorts of hybrids are a great blessing to farmers and gardeners who live in hot, humid, or very dry environments. They enable more people to grow their own food, decrease their pesticide usage, and live more sustainable lifestyles.
The one major downfall of these hybrids is that their seeds do not necessarily result in plants that are identical to the parent plant, so seeds cannot be saved.

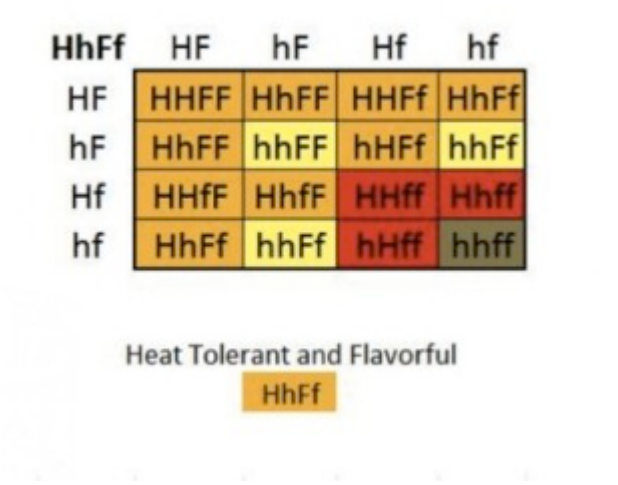


Figure 3. This punnet square illustrates a cross between two hybrid plants. If you were to cross two heat tolerant, flavorful varieties, only half of the resulting plants would be identical to the parent plant. Source: Kerry Soltis

For a gardener or small farmer, growing certain hybrid varieties is not a bad thing, by any means. However, in the mid 1900s, the agriculture industry began taking hybridization to the next level by selecting for traits that would benefit their industry, and thus, their profits. Size, shelf life, high yields, and aesthetics quickly became the top priority for food production. Why not right? Who wouldn't want large quantities of produce on grocery store shelves? It all sounds great until you realize what traits are compromised to get these varieties—mainly nutrition and taste. Researchers often refer to the decrease in nutrient content when high yielding plant varieties are developed as the Genetic Dilution Effect.

Studies have found that nutrient content in many of the nation's main food crops have dramatically decreased over the last century. For example, the protein in wheat, barley, and corn has decreased by approximately 40% since the 1940s. The calcium in broccoli has decreased by more than 50%. Furthermore, since these hybrid plants produce high yields of larger fruits and vegetables, more nutrient rich fertilizers must be applied to support their growth, resulting in more nutritional losses. Raspberries, for example, when fertilized with large amounts of phosphates, will produce double the yield, yet their mineral content decreases by 20-30%. So essentially, our grocery stores are packed with an abundance of big, beautiful fruits and vegetables, but their nutritional value has never been lower. And don't forget taste. Taste isn't typically on the high priority list when it comes to creating hybrid varieties for mass production.

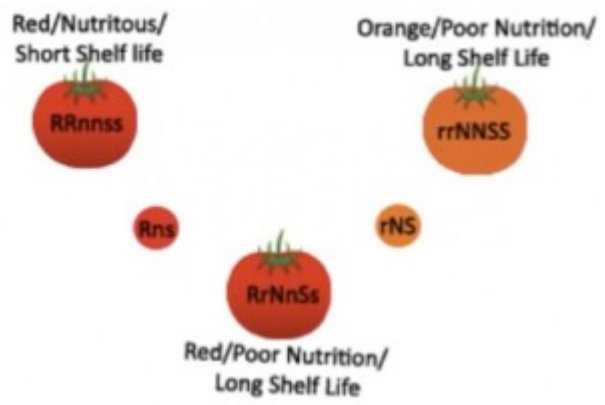


Figure 4. When plants are hybridized for mass production, aesthetics, yield, and shelf life are often selected for over nutrition and taste. Source: Kerry Soltis

Hopefully it's starting to become apparent that when it comes to perfection, it's all in the eye of the beholder. That home-grown tomato with a little brown spot is probably starting to become much more appealing than those "perfect" grocery store varieties that lack nutrition and flavor.

GMOs

The scary truth is that produce manipulation does not end with these tasteless hybrids. Here in the United States more genetically modified (GMOs) crops are being planted each year. These plants are created using biotechnology. Techniques such as, splicing, microinjection, viral carriers, and bacterial carriers create plant varieties that could never occur naturally. These methodologies give food scientists the ability to introduce favorable genes of completely unrelated species into food producing plants. Unfavorable genes can now also be silenced. Many of these food crops, particularly corn and soy, are ending up in common food products. These food products are not required to be labeled as containing GMOs, so there is no way to avoid them other than buying foods with an organic label.

Not only is this process unnatural, it also has the potential

to be extremely dangerous to our health and the environment. A frequently used method for creating pest resistant plant varieties involves artificially inserting a toxin carrying gene from a soil bacterium, *Bacillus thuringiensis*, into plant DNA. The resulting plants then produce that toxin, which in turn will kill the larvae of their pests. It is currently unclear how this toxin affects humans. In a similar process, soy beans are genetically engineered so that they can tolerate high levels of pesticide application. As a result more toxic pesticides are being applied to these crops.

We shouldn't be messing with Mother Nature though; she'll always find a way around our ingenious ideas. Since the onset of this mass pesticide use, superweeds and superbugs have emerged that have adapted to the pesticides, so that they are in no way effected by them. Unfortunately these superweeds and superbugs have the potential to spread into our natural ecosystems and severely disrupt ecological balances.

Figure 5. DNA from a completely non-related organism is inserted into plant DNA so that it produces toxins, making the plant pest resistant. Source: Kerry Soltis

It's all pretty scary stuff, especially when you consider that Monsanto, the major U.S. company behind all of this genetic engineering, has gone so far as to patent their genomic creations. Farmers who elect to plant GMO crops must sign an agreement that they will not save seeds. Even worse, as wind, insects, and birds spread the seeds and pollen of GMO crops, heirloom crops become contaminated with the GMO DNA. Heirloom farmers have no way of knowing that their crops have been contaminated until they plant the compromised seeds. Monsanto has such a stronghold on the industry that when this occurs the heirloom farmers are sued for infringement on patent laws rather than Monsanto being penalized for contaminating the crops of these farmers.

Consumers, gardeners, and local farmers hold the power when it

comes to fighting back against food modification. If we change our perception of the perfect produce and begin selecting fruits and vegetables that are locally grown, nutritious, and flavorful, agriculture will have no choice but to respond accordingly. It’s Darwinism at the grocery store level. We get to decide what is fit to stock the shelves and what isn’t!

Further Reading:

- *Understanding and Detoxifying Genetically Modified Foods*
- *How To Detoxify and Heal From Vaccinations – For Adults and Children*
- *Scientists Against GMOs – Hear From Those Who Have Done the Research*
- *Doctors Against GMOs – Hear From Those Who Have Done the Research*
- *Celebrities Against GMOs*
- *How to Avoid GMOs*