



Hybrids & Heirlooms

As you review seed catalogs and make selections, you may be confronted with the terms hybrid, open pollinated, and heirloom. Knowing what these terms mean will help you know more about the plant and what to expect.

Crossing specific parent plants produces a hybrid seed (plant) by means of controlled pollination. These hybrid seeds are often called "F1" or "F1 hybrids." The terms "hybrid" and "F1" are strictly defined in the seed industry and, when used in seed catalogs, do not apply to plants crossed in the wild.

Some people think of a hybrid as blending two different plants, like mixing a red flowered plant and white flowered plant to get a pink flowered offspring. Unfortunately, the laws of genetics prevent it from being that easy. Most hybridized plants require the cross breeding of carefully chosen parent plants. The resulting seed will produce plants with very specific characteristics. Hybrid plants are very consistent from plant to plant and year to year. Hybrids carry a combination of traits from the parent plants.

Based on desirable traits, breeders select specific male and female parent plants. The plants selected to be the female seed-bearing partner have their pollen bearing anthers removed. They receive pollen only from those plants selected as their partners. By controlling the pollination, the resulting offspring will have identifiable genetic characteristics from both parents.

Producing hybrid seed is more time consuming and expensive because the plants must be hand pollinated. In addition, plant breeders may work for years to find the right combination of desirable traits they are looking for in a plant.

The breeder of the F1 hybrid variety can be the exclusive source of that variety. Only the breeder knows exactly what two parent plants are needed to produce the seed. Other breeders can try to duplicate a hybrid, but only the first breeder knows the exact combination used. Of course, it is through the process of trying to breed new and better varieties that unexpected new ones are found.

Not every F1 hybrid is a winner. The All America Selections program and other trial gardens are ways that new varieties are tested side by side to see what, if any, improvements have taken place in a certain type of flower or vegetable. Before a variety reaches the market, seed companies perform their own trials, and many hybrids end up in the compost pile, never to be seen again.

The extra work needed to produce hybrid varieties usually means higher cost. Are they worth the price? Consider the advantages and disadvantages of hybrids. Hybrids possess wider adaptability to environmental stress and are more uniform from plant to plant than non-hybrids. Other benefits of

hybrids may be earlier flowers, higher yields, improved disease resistance, or other characteristics. Many hybrids are better, more consistent garden performers.

The extra vitality in hybrid plants is called "hybrid vigor." More plants survive the seedling stage, grow larger and stronger than non-hybrids, and have higher yields. Improved disease and insect resistance means fewer pesticides have to be used in the garden.

The primary disadvantage of hybrids is the seeds cannot be saved from year to year. Seeds saved from hybrid plants usually will not produce the same plant the following year because most varieties are not self-sustaining. Offspring of hybrids usually show an unpredictable mixture of characteristics from the grandparent plants instead of being similar to the parent.

Some gardeners feel that the taste of hybrid vegetables does not equal that of heirloom varieties. But taste is so subjective that there does not seem to be a fair test to compare hybrids developed for the home garden to heirlooms. 'Burpee's Big Boy,' 'Celebrity,' and 'Early Girl' tomatoes, 'Sweet Success' cucumber, and 'Premium Crop' broccoli are examples of F1 hybrids that have been popular for years.

Open-pollinated, also known as heirloom or standard, plants are varieties that have stable traits from one generation to the next. Open pollinated plants are fairly similar to each other but not as uniform as hybrids. Because most were originally chosen for only one or two specific characteristics, individual plants of older heirloom varieties may differ greatly in size, shape, or other traits.

Open pollinated varieties are usually grown in fields where they self and cross-pollinate. Wind and insects carry the pollen from one plant to another. Plants that cross-pollinate must be isolated from other plants of different varieties so they will produce seed that is "true to type." Beans, lettuce, peas, and tomatoes are self-pollinating so they are easier to continue year to year without having to isolate them from other varieties of plants.

Genetic "drift" can occur over a period of time. Plants that deviate too far from the accepted standard are removed from commercial nursery fields of open pollinated varieties. Likewise, home gardeners should destroy highly unusual plants if you are trying to preserve an open pollinated variety. Removal of these rogue plants prevents them from pollinating other plants and producing too much variation.

The advantage of open pollinated seeds is that the home gardener from year to year and generation to generation may continue heirloom plants by careful seed saving. Open pollinated plants provide a larger gene pool for future breeding. Well known open pollinated varieties include 'Kentucky Wonder' pole bean, 'Scarlet Nantes' carrot, 'Black Beauty' eggplant, 'Black Seeded Simpson' lettuce, 'California Wonder' pepper, and 'Brandywine' and 'Roma' tomatoes.

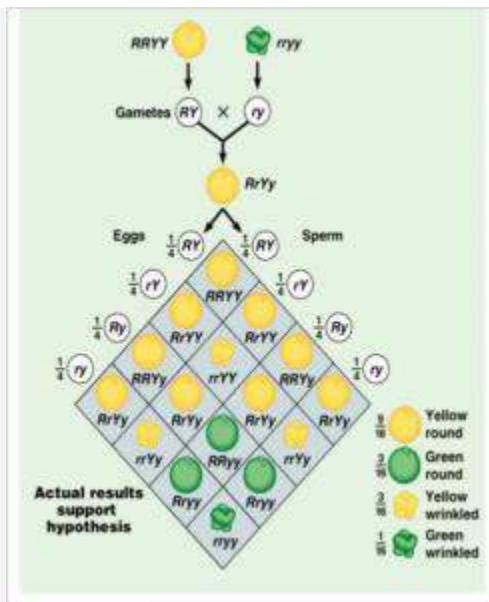
As a gardener you may choose hybrids, heirlooms, or a combination of both types for the garden. Compare the characteristics of each variety with the qualities you want in a plant. Select varieties that are best for your garden.



Seed Saving: Knowing the Difference Between Hybrids, Heirlooms, and Open-Pollinated Plants

Lots of home gardeners and small farmers are interested in saving seeds. Aside from saving money, saving seeds helps to preserve interesting varieties, diversify crop genetics and preserve cultural identity and heritage. The question I hear the most from folks wanting to save seeds is – “What can I save?” The next question is “How do I save them?” In reality, the biggest decisions actually come in selecting seeds and how to plant them, and not in actual saving and storing of the seeds. The first discussion when starting seed saving is:

Hybrid vs Open Pollinated vs Heirloom - What’s the difference?



The offspring from a hybrid can have many different traits.

Hybrid plants are the result of a controlled breeding process, developed through a series of crosses where the parent plants impart the offspring with desirable traits. The breeding process can be long and involved, especially since the process is so controlled. The benefit to newer hybrids is that there has been a focus on disease resistance, where the plants usually have fewer diseases and thus requires fewer pest control inputs. Hybrids also benefit from what is called “hybrid vigor,” where the plants exhibit stronger, more vital growth, higher yields and even higher survival from the seedling stage.

The big drawback with hybrids, especially for those who are interested in saving seeds, is that you really can't do so with most hybrids. Due to the long, involved process in developing the hybrid, the genetics of the hybrid aren't stable enough to allow the seeds to be self-sustaining. This means that instead of traits of the parent plant, you end up with a random mix of traits from the grandparent plants and earlier generations.

Common Misconceptions: Hybrids and GMOs are Not the Same

One misconception that I've seen is that folks think that hybrids are genetically modified organisms. This isn't true—they are developed from many generations of natural breeding that is directed by human hands. The fact of the matter is that there are currently no genetically modified seeds or plants available to the general public. Genetically modified organisms are developed through direct genetic modification in a lab, usually using DNA insertion or deletion. Currently, you will only find these seeds in commodity crops, such as field corn, soy, cotton, etc.



Beans are a commonly saved crop, since their self-pollination results in little crossing with other varieties.
(Photo: Flickr, Jason Anfineson)

Open-pollinated plants are those who have stable genetics, where seeds can be saved with a promise that the offspring will be similar. Due to the variability of the natural pollination process, though, there

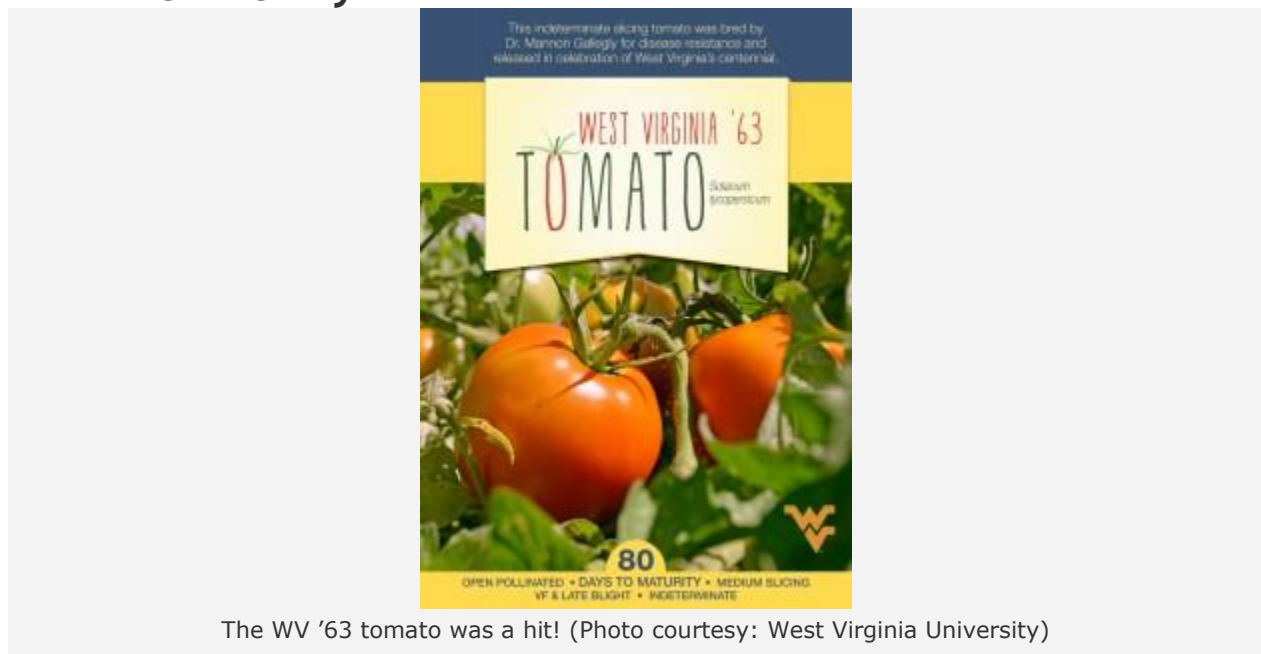
may be variations from individual to individual. In order to save seeds, though, it is often necessary to isolate the plants to ensure that there is no cross pollination from other varieties in the garden, in the neighbors garden and sometimes as far as miles away. (I hope to discuss this topic in a follow-up article.)

Heirlooms are simply open-pollinated varieties that have developed outside of the commercial plant trade and have a historical or cultural significance (a “backstory”). However, not all open-pollinated seeds are heirlooms. There is no hard and fast definition of “heirloom” as some also consider age a determining factor in the “heirloom” designation. The common age is usually 50 years. The seeds have been passed from generation-to-generation and often have a local or even familial significance. Several smaller seed companies have found a niche in the market by exclusively selling heirloom seeds, and even large commercial seed companies are following suit.

More information on heirlooms and hybrids at the following sources:

- [Hybrids & Heirlooms](#) – University of Illinois Extension
- [Heirloom vs Hybrid Seeds](#) – Backyard Gardener

A Local Case Study:



The WV '63 tomato was a hit! (Photo courtesy: West Virginia University)

Consider the WV '63 tomato. It was developed and released from my institution, WVU, 50 years ago in celebration of the state centennial. It was developed through several generations of breeding, but it is an open-pollinated variety. It was a breakthrough, since it was one of the first tomatoes developed with late blight resistance. Since its release, it has mainly been maintained by growing it at the university

farm for seeds and plants sold from the campus greenhouse and by a few small producers in the state and by local seed savers. It is not common in general garden catalogs, though it is available through one that sells heirloom varieties.

This year, to celebrate the state's sesquicentennial and the tomato's 50th birthday, WVU Extension had a massive giveaway program, where an attractive "collector" seed packet was developed and citizens (and others) could request free tomato seeds. Well over 20,000 requests were made and no more are available. But the question that I often get is "is it an heirloom?" What do you think? Is it an heirloom? You can read more about the WV '63 [here](#) and as well as watch a wonderful video from the man who developed it [here](#).

John Porter

Extension Agent, WVU Extension Service

Charleston, WV

@WVUgardenguru