

## Strawberries and Hybridization

### Are Strawberries GMOs?

It is important to note there are currently no genetically modified strawberries on the market. If you see a “non-GMO” label on a package of strawberries, remember all strawberries are non-GMO, even if the label doesn’t say so.

### What is a GMO?

Genetically modified organism (GMO) or in this case genetic modification, is a breeding tool that utilizes modern molecular genetic engineering (GE) techniques to produce crops with desirable or beneficial traits. GMO technology has allowed farmers to create non-browning apples, herbicide-resistant soybeans, and corn that can protect itself from worms. With an ever growing population and such a high demand for “perfect” food, the potential for future GMO crops is endless. There are currently only 10 genetically engineered crops available for commercial production and sale. These include soybeans, corn (field and sweet), Arctic Apples, White Russet potatoes, canola, cotton, papaya, alfalfa, sugar beets, and summer squash. Scientific consensus agrees that these crops are just as safe as their non-GMO counterparts.<sup>1</sup> The National Academies of Sciences, Engineering and Medicine found “no substantiated evidence of a difference in risks to human health between current commercially available genetically engineered (GE) crops and conventionally bred crops, nor did it find conclusive cause-and-effect evidence of environmental problems from the GE crop.”<sup>2</sup>

### What is hybridization?

As you have already learned, strawberries are not GMO crops. Plant breeders use a different technique to create a strawberry variety with desired traits. This technique is called hybridization. Hybridization is the process of crossing two genetically different individuals to result in a third with a different, often preferred, set of traits.

In hybridization the plant breeder takes pollen from the flower of one strawberry variety and transfers it into the flower of another variety of strawberry. The seedlings from these crosses are then evaluated for the characteristics breeders are looking for. It can take thousands of hybrid seedlings before finding one that contains characteristics and traits desirable for the marketplace. The most common type of hybridization involves crossing two organisms of different breeds (in cultivated plants, these are called varieties or cultivars) within the same species. This is also called crossbreeding. In agriculture, it is used to create more sustainable crops, varieties that combine good features of the two parents or new flavors.



By now, you are probably wondering what

other fruits are produced by hybridization. One example of cross-species hybridization is the tangelo, a cross between a tangerine and a pomelo.

With a growing population and a high demand for delicious and diverse foods farmers have to maintain genetic diversity while still producing a healthy and sustainable crop. Hybridized crops have many benefits including resistance to disease and insect pressure.

### **Hybrid Strawberry Plant**

Not many people think where did this strawberry originate from, but in a historical standpoint it is interesting to learn just where and how our food came to be. An example of an accidental hybridized strawberry is the cultivated strawberry . This was an accidental hybridization between *F. chiloensis*, which grows along the western seaboard of North and South America as far south as Chile, and *F. virginiana* which is a woodland species mostly found in eastern North America. Both were eaten by indigenous people before they were brought to Europe in the mid-16th century, where they were cultivated separately.



Photo credit: <https://www.mygardenlife.com/plant-library/3186/fragaria/x-ananassa/roman>

Their fruits were larger than native European species, which made them desirable, but the key event in modern strawberry history was a chance cross-pollination between these two species when they were grown together in France. The offspring was the even larger fruited *F. x ananassa*.<sup>3</sup>

### **So how are strawberries grown?**

Strawberries are almost never grown from seed. Like most fruit crops, they are vegetatively propagated from a plant part. One reason is this ensures that the offspring will be “true-to-type”, almost clones of the parent plant. Strawberries make this easy because they naturally propagate prolifically through their runners and daughter plants.

Farmers and gardeners have been raising strawberries from the runners since the plant was domesticated. Strawberry nurseries grow the plants specifically for the daughter plants rather than for the fruit. They may sell the tips, daughter plants before they set roots, to other nurseries or farmers who grow them into plug plants. Or nurseries may let the daughter plants root, then dig them up, remove the soil from the roots and sell them as “bare root plants.”

By using vegetative cuttings, it is easier for farmers to set up the number of desired plants, space them exactly where they want them and have assurance that they will survive, giving the farmers a good stand.

Strawberry plant breeders do raise plants from seeds because they are actively seeking

new and unexpected crosses—the genetics of a seed are unpredictable combinations of the genetics of the parents. Plant breeders manage these crosses, picking specific parent plants to cross, because they are looking to get characteristics of each parent into the offspring—for example, one parent may be very productive, but not have very good tasting fruit while the other may have good fruit but not be very productive. They hope the offspring will have the good characteristics of both: very productive and with good fruit. Of course, they could also get offspring that are unproductive and have poor fruit.

#### Foot Notes

1. <https://www.agdaily.com/insights/farmers-daughter-strawberries-just-tip-gmo-labeling-debate/>
2. National Academies of Sciences, Engineering and Medicine  
<http://dels.nas.edu/Report/Genetically-Engineered-Crops-Experiences-Prospects/2339>
3. <http://digitalbotanicgarden.blogspot.com/2009/12/cultivated-strawberry-fragaria-x.html>