

What is Plant Breeding?

Plant breeding is an ancient activity that originated as our ancestors shifted from gathering wild plants to growing them in a controlled manner. Modern plant breeders are scientists with advanced degrees in genetics, statistics, and plant mating systems. Everything we eat or wear, that is not derived from man-made or animal products, started in the hands of a plant breeder. What do plant breeders do? They fast forward evolution – using artificial selection (or “cherry-picking” parents) – away from what nature would typically prefer (natural selection). As plants are sessile organisms, breeders strategically choose the parents, cross (mate) them, evaluate their progeny in the field to assess which individual plants have desirable traits, and make new and specific crosses to continue the process. This cycle is repeated over years to create a single variety in the market, field, or garden if you purchase seed packets.

What does this mean in terms of our food? Plant breeders have made it so humans don't have to forage. In nature, plants want to spread their genes as far as possible. For example, primitive crop seed heads of rice and corn “shatter” - sending each of those seeds flying as far as it can go. Plant breeders use artificial and directional (targeting a certain feature) selection, so our domesticated crops have properties needed for efficient growing, harvesting, and eating (e.g. all of the seed kernels stay on the cob). Another classic demonstration of plant breeding power can be observed in the derivation of cabbage, Brussel sprouts, kohlrabi, kale, broccoli, and cauliflower from *Brassica oleracea* (a common wild mustard) through selection of certain attributes (see image below).

Your food is more nutritious, farm yields have increased, and varieties are more naturally tolerant to drought, insect damage, and disease infections than their native counterparts. Plant breeders are the reason produce in the local markets look remarkably consistent in shape, size, and color; all of which make them more appealing to the consumer. Plant breeding genetically modifies crops using artificial and directional selection to create varieties with desired characteristics.

