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Editorial

# Editorial Note on Plant Breeding

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## EDITORIAL

Plant breeding is the science of modifying plant traits to produce desired characteristics. It has been used to improve the nutritional quality of human and animal products.

Plant breeding is the science of modifying plant traits to produce desired characteristics. It has been used to improve the nutritional quality of human and animal products. Plant breeding aims to create crop varieties with unique and superior traits that can be used in a variety of agricultural applications. The most commonly studied traits include biotic and abiotic stress tolerance, grain or biomass yield, end-use quality characteristics such as taste or concentrations of specific biological molecules (proteins, sugars, lipids, vitamins, fibres), and processing ease (harvesting, milling, baking, malting, blending, etc.). Plant breeding can be done in a variety of ways, from simply selecting plants with desirable characteristics for propagation to methods that rely on genetics and chromosome knowledge to more complex molecular techniques (see cultigen and cultivar). The type of qualitative or quantitative traits a plant will have is determined by its genes. Plant breeders strive to create specific plant outcomes and, in some cases, new plant varieties.

Individuals such as gardeners and farmers, as well as professional plant breeders employed by government institutions, universities, crop-specific industry associations, and research centres, practise it all over the world.

International development agencies believe that developing new varieties that are higher yielding, disease resistant, drought tolerant or regionally adapted to different environments and growing conditions is critical for ensuring food security.

### History

Plant breeding is a centuries-old practise that dates back to the dawn of agriculture. Humans began to recognise degrees of excellence among the plants in their fields soon after the first domestications of cereal grains, and saved seed from the best for planting new crops. Early plant-breeding procedures were forerunners to such rudimentary selection methods.

Early plant-breeding procedures yielded noticeable results. Most modern varieties are so different from their wild ancestors that they can't survive in the wild. Indeed, in some cases, the cultivated forms are so dissimilar to their wild relatives that identifying their ancestors is difficult. From an evolutionary standpoint, these remarkable transformations were achieved by early plant breeders in a very short time, and the rate of change was likely greater than for any other evolutionary event.

Gregor Mendel outlined the principles of heredity using pea plants in the mid-1800s, laying the groundwork for scientific plant breeding. In the early twentieth century, as the laws of genetic inheritance were further defined, progress was made toward applying them to plant improvement. One of the most important facts to emerge from the brief history of scientific breeding is that the world's plants contain an enormous amount of genetic variability, with only a small portion of it being exploited.

### The 6 Most Important Plant Breeding Goals

- Productivity Gains:
- Quality has improved
- Disease and Pest Resistance
- Species adapted to specific soils and climates include
- Various kinds Lodging Resistant
- Varieties that are novel or exotic

### Productivity gains

Plants provide the majority of man's food, either directly or indirectly. Even animal foods such as egg, butter, milk, and meat can be traced back to plants, resulting in the popular adage "All flesh is grass."

However, global agricultural output is insufficient to feed the world's growing population.

Even with improved agricultural methods, scientific cropping patterns, fertiliser and pesticide use, and so on, there is always a food shortage in several third-world countries.

Aside from geopolitical causes for such disparities in food distribution, there is also a true scarcity. It's no surprise, then, that scientists are always on the lookout for new plant varieties and

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stocks with higher yields or production. Breeding programmes are being implemented to increase maize, rice, wheat, and other cereal yields per hectare.

If one recalls what the King of Brabdingnong told Gulliver (in Jonathan Swift's Gulliver's Travels) during his fictitious visit to that country.

(The King is said to have said that he would rather have a man who can make two blades of grass grow where one once grew than anyone else); the same can be said of the plant breeder's goal and objective.

Scientists at the Indian Agricultural Research Institute in New Delhi, the Central Potato Research Institute in Shimla, the Regional Rice Research Institute in Cuttack, the Sugarcane Research Institute in Coimbatore, and Agricultural Universities in all Indian states have been engaged in the production of high yielding varieties, just as they have been in many other centres around the world.

## Improved quality

Another characteristic looked for by plant breeders is plant quality in terms of height, size, or form. Many garden plants are admired for their form, density, size, rich colour of the flowers, early or late blossoming, and other characteristics. Similarly, fruit size, nutritional content, and flavour are all known to be increased by breeding. To give just a couple of examples, long staple cotton was created by crossing two Egyptian cotton varieties.

Similarly, sugar beet sugar content has increased from 7% to over 16% as a result of breeding. The Sharbati sonora wheat variety is the result of a wheat induced mutation (Sonora 64). Sonora 64 is known to have higher protein content than this variety.

## Plant breeding selection methods is of two types:

- Selection. Selection is the most ancient and basic procedure in plant breeding.
- Hybridization. The most frequently employed plant breeding technique is hybridization.
- Polyploidy. Most plants are diploid.
- Induced mutation.