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Plant Breeding in Agriculture – A review

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Abstract –

From the beginning of world plant is serving us our daily meal and it will continue till the end of the world. The population of the universe is growing day by day but the cultivable land is decreasing. Scientists concerning the situation are trying to make crop much productive. Concept of plant breeding helping this process; By the act of plant breeding now we are able to upgrade our crops. Different breeding methods giving us a good result by hybrid variety, high yielding variety, disease pest tolerant variety etc. It is now giving a great impact on our crop improvement. Plant breeding is also helping to develop crop, fruits, vegetables variety with high nutritional value. We now can confirm our food and nutrition security by the help of plant breeding.

Keyword -Breeding, improvement, quality, hybrid, mutation.

Introduction

Plant breeding can broadly be defined as the improvement of the genetic patterns of domestic plant populations. Based on the importance of plants for human life, humans have been involved in manipulating and improving plants for their needs for more than 11000 years. Though merely intuitive in the beginning and without a scientific basis for most of the time, scientific knowledge has revolutionized plant breeding over the last decade. These changes, though first effective in the breeding of agricultural crops, have now also reached the field of ornamental plant breeding and in particular rose breeding.

Rose cultivars grown around the world are probably more numerous than any other plant cultivars. As roses have been grown and admired since the origins of civilization, this has surely been true since the beginning of their domestication. There is evidence that they were already cultivated 5000 years ago by the ancient civilizations of China, western Asia and northern Africa. According to the different geographical regions and periods of history, rose cultivars were grown for different main uses;

When the introduced variety is subjected to selection to isolate a superior

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variety and hybridized with a local variety to transfer one or a few characters to them. The botanical garden in different parts of the world also played a significant role in plant introduction. Example : Tea varieties collected from China and North East India initially grown in Botanical Garden of Kolkata from which appropriate clones have selected and introduced to different parts of India.

Plant breeding plays a crucial role in agriculture. It involves selecting and crossbreeding plants to develop new varieties with desirable traits like higher yield, disease resistance, and improved nutritional value. These new varieties help farmers increase their crop productivity and adapt to changing environmental conditions. Plant breeding is essential for ensuring food security and sustainable agriculture. It's fascinating how science can help us enhance the quality and quantity of our crops.

Another criterion is quality parameters of seed. To improve the characteristics of seed quality, seed size, and seed maturity, resistance against biotic and abiotic stress. Lodging characteristic of crop all are deal by plant breeders. Plant breeders must have knowledge of all the agricultural subjects to develop plants that are the best for future plant breeding programme as well as climate change adaptation, to improve and preserve the food security.

Scope of Plant Breeding

- Genetic manipulation of population by increasing the frequency of desirable alleles in cross pollinated crops and introducing male sterile in self pollinated crops like wheat and Rice.
- Intensive breeding of pulses and oil seed crops as it was done in cereals and other crops.
- Proper breeding methods with improved crop management practices.
- Use of heritability methods with improved crop management practices.
- Development of improved high yielding varieties of vegetable and seed crops.
- Quality Improvement in Oil seed and Vegetables.
- Use of transgenic plants as a medicine. e.g. Potato.
- Development of varieties which are desirable for mechanical threshing and Cultivation.

Types of Plant Breeding

There are the following different types of plant breeding:

1. Backcrossing

In this, a plant with desired traits is crossed with a plant that does not have the desired traits but has several other traits.

Inbreeding

In this, self-fertilization occurs. The progeny produced is the same generation after generation. This helps to preserve the original traits.

Hybrid Breeding

In this, two different breeds are crossed to produce the offspring that is more productive than the parents.

Mutation Breeding

The mutations in plant genes result in new varieties. Mutations can also be induced in plants by exposing them to chemicals and radiation.

Genetic Engineering

Genetic engineering helps in producing crops with desirable traits by inserting the gene of interest within the crop DNA. Such crops are known as genetically modified crops. E.g., Bt crops.

Objectives of Plant Breeding

- To increase yield, vigour and fertility of the crop.
- To increase tolerance to environmental condition, salinity, temperature and drought.
- To prevent the premature falling of buds, fruits etc.
- To improve synchronous maturity.
- To develop resistance to pathogens and pests.
- To develop photosensitive and thermos-sensitive varieties.

Conclusion

Plant breeding plays a vital role in agriculture by developing new plant varieties with improved traits. These traits help farmers increase their crop productivity, adapt to changing environmental conditions, and promote sustainable farming practices. By continuously improving our crops through plant breeding, we can ensure food security, enhance nutritional value, and contribute to the overall sustainability of agriculture. It's an exciting field that holds great promise for the future of farming.