



Breeding Method in Cauliflower and Cabbage

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Cabbage (*Brassica oleracea* var. *capitata*) and cauliflower (*Brassica oleracea* var. *botrytis*) are two cruciferous vegetables with distinct characteristics and culinary uses. Successful breeding programs are essential to develop varieties with improved traits, adapting to evolving agricultural demands and environmental challenges. This abstract provides a concise overview of the breeding methods employed for these cruciferous crops.

Keyword:- Introduction, Breeding method in Cauliflower and Cabbage, Reference

Introduction

Cauliflower (*Brassica oleracea* var. *botrytis*) is a versatile and nutritious vegetable belonging to the Brassicaceae family, which also includes cabbage, broccoli, and Brussels sprouts. Known for its distinctive white curd, or compact inflorescence, cauliflower is a cool-season crop that is cultivated and consumed worldwide. Cabbage (*Brassica oleracea* var. *capitata*) is a widely cultivated and versatile leafy vegetable belonging to the Brassicaceae family. This family also includes other cruciferous vegetables such as broccoli, cauliflower, Brussels sprouts, and kale. Cabbage is known for its distinctive round or oval shape, with tightly packed leaves forming a dense head. The breeding method for cauliflower is similar to that of cabbage, as both belong to the same plant species (*Brassica oleracea*) and share common breeding techniques. Here's an overview of the breeding process for cauliflower:

Selection of Parental Lines: Breeders choose cauliflower plants with desirable traits such as uniformity, disease resistance, head quality, and adaptation to specific growing conditions. These plants serve as the parental lines for the breeding program.

Crossing (Hybridization): Controlled pollination is conducted by transferring pollen from the male parent to the female parent. This can be done manually or with the assistance of natural pollinators like bees.

Generation of F1 Hybrids: Seeds from the cross are collected and planted to produce the first generation of hybrids known as F1 hybrids. These hybrids often display a combination of desirable traits inherited from the two parental lines.

Evaluation of F1 Hybrids: The F1 hybrids undergo thorough evaluation for characteristics such as head size, shape, color, taste, and disease resistance. This evaluation helps identify the most promising hybrids.

Selection of Superior Lines: Based on the performance in F1 hybrids, superior individuals are selected for further breeding. These selected plants become the new parental lines for subsequent generations.

Continued Crossbreeding and Selection: The breeding process is repeated through multiple generations, with ongoing selection for the best-performing plants. This iterative process helps stabilize the desired traits and eliminate undesirable ones.

Field Trials: Selected lines are subjected to field trials to assess their performance under different environmental conditions. This ensures that the developed varieties are adaptable and consistently express the desired traits.

Molecular Breeding (Optional): Similar to cabbage breeding, molecular techniques, including DNA markers, may be employed for identifying and selecting plants with specific genes associated with desired traits, providing precision and efficiency.

Release of New Varieties: Once a cauliflower variety with stable and desirable traits has been developed and tested, it is released for commercial cultivation.

Breeding cauliflower is an ongoing process to develop varieties that meet market demands, consumer preferences, and changing agricultural conditions. The specific traits targeted in breeding programs may vary based on regional needs and market requirements.

The breeding method of cabbage typically involves a combination of traditional plant breeding techniques and, more recently, molecular breeding methods. Here's an overview of the process:

Selection of Parental Lines: Breeders select cabbage plants with desirable traits such as disease resistance, high yield, good taste, and suitable growth habits. These plants become the parental lines for the breeding program.

Crossing (Hybridization): Controlled pollination is carried out by transferring pollen from the male parent (pollinator) to the female parent (seed bearer). This can be done manually or with the help of insects.

Generation of F1 Hybrids: The resulting seeds from the cross are collected and planted to produce the first generation of hybrids known as F1 hybrids. F1 hybrids often exhibit desirable traits that result from the combination of genetic material from the two parental lines.

Evaluation of F1 Hybrids: The F1 hybrids are then evaluated for various characteristics such as vigor, disease resistance, quality, and uniformity. This helps breeders identify the most promising hybrids.

Selection of Superior Lines: From the F1 generation, superior individuals are selected based on the desired traits. These selected plants become the new parental lines for the next generation of breeding.

Continued Crossbreeding and Selection: The process is repeated through multiple generations, with the continuous selection of the best-performing plants. This helps in stabilizing the desired traits and eliminating undesirable ones.

Field Trials: Selected lines are tested in different environments through field trials to ensure that the desired traits are consistently expressed under various conditions.

Molecular Breeding (Optional): In more recent times, molecular techniques such as DNA markers are used to identify and select plants with specific genes associated with desired traits. This can speed up the breeding process and provide more precision.

Release of New Varieties: Once a cabbage variety with stable and desirable traits has been developed, it is released to farmers for commercial production.

It's worth noting that cabbage breeding is a continuous process, and new varieties are developed to meet the evolving needs of farmers, consumers, and changing environmental conditions.

References

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