

Difference Between Mass Selection and Pure Line Selection

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Key Difference – Mass Selection vs Pure Line Selection

Plant breeding procedures deal with the alteration of genetic composition and the [genotype](#), which results in a beneficial improved crop plant. This is achieved by developing different procedures. Mass selection and Pure line selection are two important aspects in plant breeding. **In pure line selection, development of the variety is highly uniform with the involvement of a single plant. In mass selection, several pure lines are mixed to develop a [heterozygous](#) variety with [genetic variations](#).** This is the key difference between Mass selection and Pure Line selection

What is Mass Selection?

In the context of crop development and improvement, mass selection is one of the oldest methods practiced. In this method, plants which contain similar phenotypic characters are selected in large quantities, and the seed of the plants are harvested and mixed in order to create a new variety. Mass selection can be practiced in both [self-pollinating and cross-pollinating](#) plants. Even though the originally selected plant population is homozygous, the product variety is heterozygous with genetic variations. A progeny test is not carried out when conducting mass selection procedure. This process can be done in two methods; Hallets Method and Rimpas Method.

In Hallet's method, ideal environmental conditions are provided for a crop with ample water and fertilizers; then, the mass selection procedure is carried out. In Rimpas method, mass selection is carried out once a crop is provided with unfavorable environmental conditions, with a less amount of water and fertilizers. Mass selection can be applied for improvement of local varieties and for purification of existing pure line varieties. Improvement of local varieties is important in order to eliminate inferior plants with low-yielding capacities. This will increase the stability and the adaptability. Due to various factors like [mutations](#), natural hybridization, etc., pure line plants have a tendency to vary over time. Mass selection is an important aspect during purification of existing pure line variations.



The mass selection method is advantageous due to certain aspects. Due to the selection of a large number of crops, the resulted variety by mass selection consists of high adaptability than pure line selection method. The mass selection method is quick since no progeny test is carried out and there is no controlled [pollination](#). The genetic variation developed through mass selection can be further improved through another mass selection process carried out a few years later. Since a progeny test is not carried out, we cannot determine whether the plant possesses homozygous characteristics or whether the variety developed within a short time. These aspects are the disadvantages of the mass selection process.

What is Pure Line Selection?

The theory of Pure Line selection was put forward by Johansson, a Danish botanist. He conducted experiments on the plant *Phaseolus vulgaris* which is a species that self-pollinates. During the pure line selection process, a large quantity of self-pollinating crop plants are selected and harvested individually. Progenies of each harvested crop plants are evaluated in order to select the most beneficial plant crop and selected as a pure line. Since this procedure involves a single crop variety, it is also referred to as **individual plant selection**. The plants in pure line selection consist of the same genotype as the parent plant used for the creation of the pure line. Phenotypic differences present within the plants of pure line are environmental and will not transfer to the next generation. Due to certain mutations and mechanical mixture, pure line plants become genetically variable with time. Pure line plants can be utilized in order to develop new varieties by [hybridization](#). Pure line could also be utilized in the study of mutations and in the context of biological investigations. The

procedure of pure line selection is of 03 steps; selection of plants (source of mixed population), evaluation of the progeny and yield trials. Advantages of pure line selection include the development of a plant crop with the highest variety when compared with the original plant variety.

What is the Similarity Between Mass Selection and Pure Line Selection?

- Both processes are involved in the formation of new varieties of crop plants

What is the Difference Between Mass Selection and Pure Line Selection?

Mass Selection vs Pure Line Selection	
Mass selection is a type of plant breeding in which a heterozygous variety with genetic variations is developed by mixing several pure lines.	Pure line selection is a type of plant breeding in which development of a variety which is highly uniform is done with the involvement of a single plant.
Variety	
Several pure lines mix to develop the heterozygous variety with genetic variations.	Development of the variety is of pure line and highly uniform in pure line selection.
Progeny Test	
No progeny test is conducted in mass selection.	A progeny test is carried out on selected plants in pure line selection.
Crops	
Mass selection is practiced in both self-pollinated and cross-pollinated crops.	Pure line selection is practiced in self-pollinated crops.
Pollination	
Pollination is not controlled in mass selection.	Pollination is controlled in pure line selection.
Characteristics of the Varieties	
Varieties developed by mass selection possess high adaptability and stability.	The adaptability and the stability in performance are less in the varieties developed by pure line selection when compared with a mixture of pure lines.

Period of Development

Period of development is 5-7 years in mass selection.

A variety is developed within 9-10 years in pure line selection.

Summary – Mass Selection vs Pure Line Selection

Mass selection and pure line selection are two important plant breeding techniques. It involves the alteration of genotypes in order to develop a more beneficial plant crop. In pure line selection, development of the variety is highly uniform with the involvement of a single plant. In mass selection, several pure lines are mixed to develop a heterozygous variety, with genetic variations. Pure line selection is time-consuming with respect to the development of the variety when compared with the mass selection. This is the differences between mass selection and pure line selection.

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1. “1117270” (Public Domain) via [Pixabay](#)

Reference:

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How to Cite this Article?

APA: Difference Between Mass Selection and Pure Line Selection. (2017, September 28). Retrieved (date), from <http://differencebetween.com/difference-between-mass-selection-and-vs-pure-line-selection/>

MLA: "Difference Between Mass Selection and Pure Line Selection" *Difference Between.Com*. 28 September 2017. Web.

Chicago: “Difference Between Mass Selection and Pure Line Selection.” *Difference Between.Com*. <http://differencebetween.com/difference-between-mass-selection-and-vs-pure-line-selection/> accessed (accessed [date]).



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