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|  |  | **BREEDING METHODS IN SELF-POLLINATED CROPS** |  |  |
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|  | Homozygosity is the rule for breeding self-pollinated crops. A new cultivar of a self-pollinated crop normally originates from an increase of: |  |
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|  | * A mixture of plants, or a single plant, selected from introduced germplasm, | | | | |  |
|  | * A mixture of plants, or a single plant, selected from a local population, or | | |  |  |
|  | * A single plant selected from a hybrid population. |  |  |
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|  | In the breeding of self-pollinated crops, thousands of strains are normally grown in adjacent plots in the breeding nursery without pollination control. Some natural cross-pollination generally occurs, but the amount is usually so small that it is ignored except when extreme purity is essential, as in genetic studies, or when a strain is being increased for final distribution as a new cultivar. If the amount of natural cross-pollination is sufficient to visibly affect uniformity, reselection is practiced to re-purify the strain. |  |
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|  | **ASSEMBLY OF GERMPLASM** |  |
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|  | The initial step in a breeding program is to *assemble a wide assortment of germplasm* (genetic strains of diverse origin) of the desired species, this collection of germplasm will help to collect all potentially useful genes from all possible sources like   * ***Commercial cultivars:*** are a desirable source of useful germplasm, except where their use is restricted by legal protection. * ***Advanced breeding lines:*** with proven adaptation and productivity are another useful source of germplasm. These lines may be assembled from state, national, or international breeding programs or from gene banks |  |
|  | * ***Landraces:*** are verities which were previously cultivated in the native area but now are replaced by modern cultivars. Landraces still serve as a source of useful genes.   Germplasm accessions should be grown initially in the local environment to identify sources of genes for maturity, yield potential, disease resistance, and other desired traits, and to observe inherent weaknesses. | | |  |
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|  | **SELECTION** |  |
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|  | ***Selection, as a breeding procedure, involves identification and propagation of individual genotypes or groups of genotypes from mixed populations, or from segregating populations following hybridization.***  Selection may not be effective in isolating the desired genotypes unless genetic variation can be identified and distinguished from environmentally caused variability within the mixed population, Selection procedures practiced in mixed populations of self-pollinated crops are *mass selection and pure-line selection*. The populations created are referred to as *mass selections* or *pure lines*, respectively. |  |
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|  | **MASS SELECTION**. ***In the mass-selection procedure, plants are chosen and harvested on the basis of phenotype and the seeds composited without progeny testing.*** Cultivars developed by mass selection are normally uniform for qualitative characters but quantitative traits may still have variation. It is because in quantitative traits are controlled by many genes so phenotypic differences are too small to be recognized, or cannot be accurately distinguished from environmentally caused variations. |  |
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|  | The objectives in mass selection are to: |  |
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|  | * Purify a mixed cultivar or plant population by selecting and propagating visibly similar plants, or | | |  |
|  | * Develop a new cultivar by improving the average performance of the population. |  |  |