SELECTION

Selection is basic to any crop improvement. Isolation of desirable plant types from the population is known as selection. It is one of the two fundamental steps of any breeding programme viz., 1. creation of variation and 2. Selection. There are two agencies involved in carrying out selection : one is Nature itself (Natural selection) and the other is man artificial selection. Though both may complement each other in some cases, they are mostly opposite in direction since their aims are different under the two conditions (nature and domestication). The effectiveness of selection primarily depends upon the degree to which phenotype reflects the genotype.

Before domestication, crop species were subjected to natural selection. The basic for natural selection was adaptation to the prevailing environment. After domestication man has knowingly or unknowingly practiced some selection. Thus crop species under domestication were exposed to both natural and artificial selection i.e. selection by man. For a long period, natural selection played an important role than selection by man. But in modern plant breeding methods natural selection is of little importance and artificial selection plays an important role.

Basic Principles of Selection : Notwithstanding the highly complex genetic situation imposed by linkage and espistasis, there are just three basic principles of selection (Walker, 1969) :

1. **Selection operates on existing variability** : The main function of the selection exercise is to discriminate between individuals. This is possible only when sufficient variation is present in the material subjected to selection pressure. Thus, selection acts on the existing variation it cannot create new variation.

2. **Selection acts only through heritable differences** : only the selected individuals are permitted to contribute to the next genetion / progenies. Therefore, should there be greater influence of non-heritable agencies on the individuals selected, the parentprogeny correlation will be greatly vitiated. Hence the variation among individuals to be selected must be genetic in nature, since it is the genetic variation that tends to close the gap between phenotype and genotype. Environmental variability cannot be of any use under selection.

3. **Selection works because some individuals are favoured in reproduction at the expense of others** : As a consequence of its past evolutionary history and breeding struc ture, a population or a crop consists of highly genetically variable individuals with regards to such diverse phenomena as differential viability, differential maturity,

differences in mating tendencies, fecundity, and duration of reproductive capacity. Hence some individuals tend to become superior to others for some or other traits desirable under domestication. These superior individuals are retained for reproduction while others discarded under selection.

Selection has two basic characterics viz.

1. Selection is effective for heritable differences only.
2. Selection does not create any new variation. It only utilizes the variation already present in a population.

The two basic requirements for select on to operate are :

1. Variation must be present in the population.
2. The variation should be heritable.