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|  |  | **WHAT IS A CULTIVAR?** |  |  |
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|  | *The cultivar (agricultural variety) is a group of genetically similar plants, which by structural features and performance may be identified from other groups of genetically similar plants within a species*. In binomial nomenclature The plant kingdom is divided into Phylum, which is subdivided into class, which is further subdivided into order, Orders are divided in families, *families* of plants are divided into *genera*, which are subdivided into *species*. Within the species, the agronomist and horticulturalist recognize numerous *agricultural varieties*, more commonly referred to as *varieties* or *cultivars*. |  |
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|  | This relationship can be clarified by examining the taxonomic classification of a common crop plant, the Wheat, a species in the family, Poaceae: |  |
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|  | Family: Poaceae (subfamily Pooideae) Genus: *Triticum*Species: *aestivum* |  |
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|  | The scientific name of the cultivated Wheat is *Triticum aestivum*; the first word designates the genus, the second word the species. The species, *T. aestivum*, contains many forms that are genetically different and distinguished from each other by heritable traits such as maturity, seed color, presence or absence of awns, plant type, disease resistance, gluten content of seed etc. |  |
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|  | A population of Wheat may be composed of a single genotype or a mixture of genotypes and may be variously referred to as an ***Experimental Strain*, A *Strain*, or A *Line***. Thousands of |  |
| Experimental strains are generated in the plant breeder's nursery each year. Once a superior strain is identified, it may be named, the seed increased, and distributed as an 'agricultural variety' or 'cultivar'. Earlier, the term 'variety' was commonly used by farmers and seed producers; later the term 'cultivar' was coined to serve as the international equivalent of a cultivated variety. Variety and cultivar may be used interchangeably, but cultivar is now preferred in scientific literature and is used in this text. ***The distinction of being Named and Distributed Commercially serves to set apart the cultivar from the experimental strain or breeding line*.** In the Pakistan, the name, description, and developer of new field crop cultivars are registered by a board e.g. Punjab Seed Council, KPK Seed Council etc. |  |
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|  | Two essential characteristics of a cultivar are **(1) *Identity* And (2) *Reproducibility***. Identity is necessary so that the cultivar may be recognized and distinguished from other cultivars within the species. Typically, the distinguishing features may be morphological structures, color markings, physiological response, disease reaction, or performance. Reproducibility is needed so that the characteristics by which the cultivar is identified will be reproduced in the progeny. In self-fertilized crops, a cultivar increased from a single, homozygous genotype will be uniform in appearance, whereas a cultivar increased from a mixture of genotypes will exhibit a range of genetic variability according to that present in the mixture. |  |
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|  | **GENETIC SIGNIFICANCE OF POLLINATION METHOD** |  |
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|  | Self-pollinated crops differ in genetic make-up from plants in crop species that are normally cross-pollinated. In a crop that is self-pollinated, it is the rule that plants will be homozygous. This assumption may be made because: |  |
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|  | * Loci with identical genes (*AA* or *aa*) will remain homozygous following self-pollination,
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|  | * Loci with contrasting genes (*Aa*) will segregate, producing homozygous and heterozygous progeny in equal proportions.
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|  | Heterozygosity is reduced by 50% with each successive self-fertilization (Fig.1). After several successive generations of self-pollination, the proportion of heterozygous loci remaining in a population is very small. Although complete homozygosity is theoretically unattainable, plants selected from a mixed population after five to eight generations of selfing will normally have reached a practical state of homozygosity such that their progeny will be uniform in appearance and performance. |  |
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|  | Breeding procedures in self-pollinated species are based on the genetic structure of self-pollinated populations. A mixed population of a self-pollinated crop is composed of plants with different homozygous genotypes. If single plants differing in genotype are harvested and the seed increased, each will produce a pure population, although the populations will differ from each other. Heterozygous plants may arise in a population of a self-pollinated crop through **(1) *Cross-pollination* among plants with different genotypes, or** **(2) *Mutation*.** The progenies of the heterozygous plants will quickly segregate in succeeding generations giving rise to homozygous subpopulations. |  |
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| Fig.1.Proportions of homozygous and heterozygous genotypes in a population after successive generations of self-pollination, assuming equal fitness for survivalamong genotypes. S0, original selfed plant; S1, first selfed generation; S2, second selfed generation; and so on. |