

***Coffea arabica* L - A Compilospecies: Implications for Breeding**

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SUMMARY

There are two schools of thought regarding the origin and evolution of *Coffea arabica* L. the world's most important non-alcoholic stimulant beverage. The first or conventional school of thought based their inference on the evidence raised from observations on morphological, cytological, biochemical and reproductive biological features. The school proposes that *C. arabica* evolved by spontaneous hybridization of *C. eugenioides* with *C. canephora*, *C. congensis* or *C. liberica* and doubling of the chromosomes in the natural hybrid. An interesting offshoot of this thought is the belief that *C. arabica* is a segmental allotetraploid. The second or technological school of thought hypothesizes that natural hybridization of *C. eugenioides* or a sub-species by an unreduced gamete of *C. canephora* and spontaneous stabilization of chromosome number in the progeny of triploid hybrid resulted in the evolution of *C. arabica* on the basis of evidence from molecular marker studies. Evidence from some of the marker studies also suggests that *C. arabica* may be sharing considerable genomic homologies with *C. racemosa* and *C. congensis*. Molecular cytogenetic evidence also supports that *C. eugenioides* and *C. congensis* are the probable evolutionary parents of *C. arabica*. The distribution of *C. arabica* outside the area of distribution of all diploid species was attributed to the events of Pleistocene. Both schools agree that *C. eugenioides* or a sub-species of it is the most probable female progenitor of *C. arabica*. While they differ in the matter of male progenitor, in that, a species of the canephoroid group or liberio-excelsoides group is considered to be the likely male progenitor of *C. arabica*. Considering the genetical evidence from plant breeding studies, the disease resistance genes of *C. liberica* and *C. canephora* are inherited by *C. arabica*. All these available evidence points to the possible compilospecies nature of *C. arabica*. This has strong implications for the breeding practices, as inheritance patterns in compilospecies are considerably different from those observed in diploids and allopolyploids. These aspects are discussed and a possible breeding model with integration of vegetative selection to maintain traits of interest in the commercially exploited arabicoid derived materials is suggested. Utilization of unique tetraploid hybrids of interspecific origin like Ligenioides, Racemusta and Robarbica are proposed for use in breeding for resistance to coffee berry disease, insects and nematodes on the basis of their cytoplasmic genetic endowments.