**Polyploidy and Evolution**

Stebbins (1938) reports that from cytogenetic point of view polyploidy or chromosome doubling has far reaching effects on evolution and speciation. This is applicable for majority of plants. We can do this by comparing the morphological and physiological characteristics of a diploid plant with those of a polyploid that has been produced from it artificially, by doubling the somatic chromosome complement. Polyploidy can be induced artificially by Colchicine or Indole Acetic Acid. Genome doubling (polyploidy) has been and continues to be a universal force in plant evolution. Increase in the size and water content of the cells is found to be a significant change.

The primary phylogenetic effect of polyploidy is to stabilize selected hybrid genotypes. It also provides a mechanism by which daughter and parental populations become immediately isolated from each other. Isolation, however, is rarely complete, and introgression commonly takes place across partially sterile hybrids. Polyploidy also buffers genotypes against the shock of absorbing foreign genomes, making hybridization possible between species that are otherwise genetically isolated from each other. Traditional taxonomy can usually not adequately indicate the extent of variability that characterize polyploid complexes.

Modern plant genomes harbor evidence of multiple rounds of past polyploidization events, often followed by massive silencing and elimination of duplicated genes. Recent studies have refined our inferences of the number and timing of polyploidy events and the impact of these events on genome structure. Many polyploids experience extensive and rapid genomic alterations, some arising with the onset of polyploidy. Survivorship of duplicated genes are differential across gene classes, with some duplicate genes more prone to retention than others. Recent theory is now supported by evidence showing that genes that are retained in duplicate typically diversify in function or undergo subfunctionalization. Polyploidy has extensive effects on gene expression, with gene silencing accompanying polyploid formation and continuing over evolutionary time.