

**Somatic Segregation:** The phenomenon of somatic segregation is defined as the formation of two new diploid cell types within the body of an ordinary monozygotic individual.

In these new cell types, either two paternally derived chromosomes or two maternally derived ones constitute a homologous pair. By this mechanism two kinds of cells homozygous for either one or the other allele emerge within the body of an individual heterozygous for a given genetic locus. **Somatic segregation** has been defined by Chittenden (31) as "the production of two genetically dissimilar cells at a somatic cell division."

Amphidiploid species are a form of polyploids that have evolved from interspecific hybridization between two or more diploid species, either through the fusion of unreduced gametes or through interspecific hybridization followed by spontaneous chromosome doubling. Many wild species as well as major field crops like wheat, oat, soybean, cotton, and rapeseed are the result of spontaneous interspecific hybridization, showing the high potential of allopolyploid species. Allotetraploid *B. napus* (AACC,  $2n = 38$ ) has evolved from a natural cross between *B. rapa* (AA,  $2n = 20$ ) and *B. oleracea* (CC,  $2n = 18$ ) along the Mediterranean coast with uncertain evolutionary origin time approximate ranging from 0.12 to 1.37 million years ago [2, 3]. *Brassica napus* was synthesized by hybridization between its diploid progenitor species *B. rapa* and *B. oleracea* followed by chromosome doubling. Cross with *B. rapa* as a female parent was only successful.

**Somatic reduction:** reduction of chromosome number in somatic cells. Haploid cells are the result of the elimination of the complete set of chromosomes due to spindle organizer abnormalities.

#### **Various ways somatic reduction takes place:**

1. Either spontaneously or irradiation of seeds or various chemicals such as chloramphenicol, colchicines, fluorophenylalanine are mutagenic and induce somatic chromosome reduction. Treatment of tetraploid cells of *Sorghum vulgare* with colchicines gave rise to diploid cells, which took over the growing point completely thus giving rise to diploid individuals. Somatic reduction met with failure in other crops except sorghum and flax.
2. Evidence from the available literature shows that spindle abnormalities are primarily responsible for the origin of cells with diverse chromosome numbers in the same tissue. For instance SOMATIC REDUCTION IN AN INTERVARIETAL HYBRID OF CHRYSANTHEMUM, pollen mother cells with two different chromosome numbers in the same anther. Out of 50 pollen mother cells scored for, 14 had only 16 chromosomes each while the rest possessed a normal complement of 18 chromosomes. Sporogenesis (meiosis) was normal in both types of the pollen mother cells; 16 chromosomes forming regularly 8 bivalents instead of 9 observed in normal cells. Presumably, two

homologous chromosomes got lost in some archesporial cells during pre-meiotic mitotic divisions of the sporogenous tissue. Observed somatic reduction in chromosome number is the non-randomness in its occurrence since two homologous chromosomes have been preferentially eliminated. En bloc elimination of certain homologous chromosomes has also been reported to occur in sporocytes of *Bougainvillea* and sugarcane.

3. Cytological chimeras are of interest since they show that survival and co-existence of cells with varying number of chromosomes in the same tissue are possible even in the face of severe intercellular competition in the meristem. From the practical point of view, the occurrence of chromosome mosaics in the gametic cells usually results in high sterility and may give rise to aneuploid progeny, particularly under conditions of self-pollination.
4. In vegetatively propagated plants, somatic reduction in chromosome number may lead to origin of chromosomal races within a species and may even be a factor in speciation.