Botanical Resources and Chromosome

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Cytogenetics -the F_1 of cytology and genetics- was born in 1920s and the 1930s were the golden period of cytogenetics. The present and the preceding decade are the renaissance of cytogenetics. Chromosomes have three functions: to conserve, transmit and express genetic information that they carry. In some plant species, it is not easy to distinguish individual chromosomes by the conventional staining method. To identify the individual chromosomes fluorochromes and Giemsa staining can be applied. One of the fascinations of cytogenetics lies in discovering the immense variety of numerical and structural chromosome mutations.

Chromosome data are indispensible to those engaged in a variety of botanical studies, ranging from systematics and evolution to plant breeding, forestry, horticulture, and plant biotechnology. Plant chromosome D/B can be used as the useful tool: 1) for the systematists it is intended to show how chromosome numbers can be used as a basis of the classification of species, genera, and families, 2) for the plant breeders it is intended to show, in general, the genetic structure of groups of plants and in particular what species may be crossed and with what results, 3) for the cytologists it is intended to show what work has been done and where it has been published, 4) for the geneticists and evolutionist it is intended to show the rules or laws of chromosome variation and 5) for the biotechnologists it is intended to show the exact localization of genes on the chromosomes.

The present subject deals with chromosome counts of some plant species from Korea and karyotyping is also discussed. Recently rapid development of micro

electronics has made it possible to analyze the plant chromosomes digitally by an image analysis method. The technique of molecular cytogenetics using total genomic DNA as a probe, GISH (genomic *in situ* hybridization), are useful for the discrimination of chromosomes in hybrids and polyploids, and for the detection of chromosomal rearrangement. The wide array of currently available FISH (fluorescence *in situ* hybridization) technique extends the resolution of visual mapping from some megabases to only a few kilobases probes. Flow cytogenetics and chromosome micromanipulation can be used for the genome analysis. Chromosome engineering allows plant breeders to produce chromosome or chromosome fragments addition, substitution or translocation lines.

The project to establish the chromosome D/B of native plants Korea is just launched. The web sites, **chromosomeworld.com** in English and **chromosomekorea.com** in Korean, are is available from next year.