FISH Mapping of 18S Ribosomal DNA on Several Rose Cultivars

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Rose is one of the major ornamental crops worldwide. It is a woody perennial flowering plant of the genus Rosa. Chromosome numbers in the genus Rosa range from 2n = 2x = 14 (diploid) to 2n = 8x = 56 (octoploid) with a basic chromosome number of 7. Since rose has very small mitotic metaphase chromosomes, it makes difficult to discriminate their homologous chromosome by using ordinary karyotype methods. Fluorescence in situ hybridization (FISH) technique using ribosomal DNA probe could be an ideal method to discriminate its homologous chromosomes. Six rose cultivars, ‘Rose Marine’, ‘Vital’, ‘Golden gate’, ‘Blue bird’, ‘Naphtha’, and ‘Peace’ were investigated for its chromosome analysis in this study. Chromosome analysis was done by using FISH techniques with 18S ribosomal DNA. Results revealed that all cultivars are tetraploid (2n = 4x = 28) except ‘Marine’, which is triploid (2n = 3x = 21). Three loci of 18S rDNA signals were detected in triploid (‘Marine’) cultivar and four loci in all the tetraploid cultivars. All the 18S rDNA signals were found in the terminal region of the short arm of chromosomes. According to the FISH signals, chromosome length and morphology, karyotype were constructed. This FISH chromosome analysis results in these five rose cultivars could be useful in more phylodendron molecular cytogenetics study and genomic analysis. FISH karyotype would contribute to the understanding of karyotype evolution in plants and approximate positions of genes and molecular markers. (This work was carried out with the support of “Cooperative Research Program for Agriculture Science and Technology Development (Project No. PJ012804) Rural Development Administration, Republic of Korea.”)

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