

**9th International Conference on
Agricultural Biotechnology: Ten Years After**

organized by the:

**International Consortium on Agricultural Biotechnology
Research (ICABR)**

and the:

**Catholic University of Leuven
CEIS - University of Rome "Tor Vergata"
Centre of Sustainable Resource Development, University of California at Berkeley
Economic Growth Centre, Yale University**

Ravello (Italy), July 6-10, 2005

**Cytogenetic and karyotypes studies of *Rosa damascena mill*
(Rosaceae) from Some Area of Iran**

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ABSTRACT

Rose is a shrub belonging to the family Rosaceae (Rose family) and the genus *Rosa*, species *damascena* variety common names damask.. This is the first report on chromosome number and karyotype for 15 *Rosa damascena mill* genotypes. Fifteen *Rosa damascena mill* populations were sampled for this study. To observe metaphase plates, root-tip meristems were immersed in 0.01 M α -Bromo naphthalene at 4°C for 2-3 h and then fixed in ethanol: acetic acid (3:1, v/v) at 60°C for 8 min, and finally stored in %70 ethanol at 4°C. To observe metaphase chromosomal, meristematic tissue was stained with %0.02 (w/v) Aceto-orcein. For staining, root-tip were put on Aceto-urcein at room temperature for 35-40 min. The roots were then gently squashed in a drop of %45 acetic acid. For the cytological investigation, images were captured with a BX50 Olympus camera. For numerical karyotype analysis, chromosomes from five metaphase were measured for *Rosa damascena mill* were identified and ordered according to their long length, short length, total length (TL), Form percentage ($F\% = \frac{\text{short length}}{\sum \text{total length of all chromosomes}} * 100$), the ratio (r) between the long and short arms, the ratio (R) between the longest and the shortest chromosome pair and chromosome volume. Ideograms were drawn from mean values, and chromosome types were determined according to Levan et al. (1964)

and for study symmetric according to Stebbins (ST) and Romero-Zarco method Karyological features were evaluated as number of satellite pair, length chromatin of karyotype, total form percentage where $\%TF = (\sum \text{short length} / \sum \text{total length of all chromosomes} * 100)$, the relative length (RL) of each chromosome ($100 * \text{total length of each chromosome} / \sum TL$), the global asymmetric index (ASI) where $SI\% = (\sum \text{long arms} / \sum \text{total length of all chromosomes} * 100)$, Difference of range of relative length (DRL; $= \%RL_{Max} - \%RL_{Min}$) and Dispersion Index. Genotypes tested were tetraploid that genotype No. 6 was diploid ($2n=2x=18$), tetraploid ($2n=4x=28$) and hexaploid ($2n=6x=54$). Satellite numbers were differed, ranging from 0 to 2 pairs and were differed in satellite length. The most chromatin length were detected in G2 (21.51 μm) while G4 demonstrated the least (11.29 μm). The type of chromosomes were determined as m in all genotypes, using Levan's chromosome nomenclature. Karyotypes were classified in 1A of Stebbin's classification. In addition to this, to test the karyotypic symmetry in more detail, other parameters, e.g. Romero-Zarco, total form percentage of karyotype (%TF), symmetry index (%S), coefficient of variation (%CV), dispersion index (DI) were also considered. For instance, in Romero-Zarco method, the A1 and A2 coefficients were 0.269 (G1) and 0.102 (G11), respectively. The first 3 principal component analysis PCA justified %99 of the total variations Corrolation determined for cytogenetical parameters. Cluster analysis was carried out for either chromosomal parameters classifying in 2 classes(Figure 1).

Figure 1. Phylogenetic two obtained by cluster analysis using specimen 16 with $2n=28$

Keywords: *Rosa damascena mill* , Cytogenetic variation, Karyotype, Chromosome