

Assessment of Genetic Diversity among 16 Promising Cultivars of Ginger Using Cytological and Molecular Markers

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Z. Naturforsch. **60c**, 485–492 (2005); received September 10/November 16, 2004

Ginger (*Zingiber officinale* Roscoe) is an economically important plant, valued all over the world. The existing variation among 16 promising cultivars as observed through differential rhizome yield (181.9 to 477.3 g) was proved to have a genetic basis using different genetic markers such as karyotype, 4C nuclear DNA content and random amplified polymorphic DNA (RAPD). The karyotypic analysis revealed a differential distribution of A, B, C, D and E type of chromosomes among different cultivars as represented by different karyotype formulas. A significant variation of 4C DNA content was recorded in ginger at an intraspecific level with values ranging from 17.1 to 24.3 pg. RAPD analysis revealed a differential polymorphism of DNA showing a number of polymorphic bands ranging from 26 to 70 among 16 cultivars. The RAPD primers OPC02, OPA02, OPD20 and OPN06 showing strong resolving power were able to distinguish all 16 cultivars. The extent of genetic diversity among these cultivars was computed through parameters of gene diversity, sum of allele numbers per locus and Shannon's information indices. Cluster analysis, Nei's genetic similarity and genetic distances, distribution of cultivars into special distance classes and principal coordinate analysis and the analysis of molecular variance suggested a conspicuous genetic diversity among different cultivars studied. The genetic variation thus detected among promising cultivars of ginger has significance for ginger improvement programs.

Key words: Ginger, Karyotype, RAPD