Turkish Journal

of

Agriculture and Forestry

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Turkish Journal of Agriculture and Forestry

Chromosome Association in Allotetraploid Interspecific Hybrid Ryegrass and Parental Species

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Abstract: This study was carried out in glasshouse conditions in summer 2000. Metaphase I (MI) chromosome association and numbers of chromosome arms bound were studied in autotetraploid perennial (Lolium perenne L.) and annual ryegrass (Lolium multiflorum Lam.) and their interspecific hybrid plants (Lolium hybridum). In addition, the relationships among different cytological characteristics with respect to meiotic regularity were determined. Chromosome associations at MI were often regular in the parent species and hybrid ryegrass plants however different pairing irregularities were found to be higher in perennial and especially in hybrid ryegrass plants than in the annual ryegrass plant genotypes. Total bivalent pairing at MI were 5.820, 6.324 and 7.009 per cell and total quadrivalent pairings were 4.082, 3.825 and 3..339 in perennial, annual and hybrid ryegrasses, respectively. The difference was significant between annual ryegrass and hybrid ryegrass in terms of the frequency of ring quandrivalents at MI. All other types of chromosome associations showed no difference statistically between the parent species and hybrid ryegrass. In each ryegrass species, there were negative and significant correlations among the frequency of total quadrivalents and those of total and rod bivalents. The number of chromosome arms bound was lower in the allotetraploid hybrid ryegrass than in the parent species. The difference was significant between hybrid ryegrass and the parent species in terms of the same characteristic. On the other hand, there were positive and significant correlations among the number of chromosome arms bound and the frequency of ring quadrivalents, whereas negative and significant correlations were found among the former and those of rod bivalents in each ryegrass species, too. The allotetraploid interspecific hybrids of perennial and annual ryegrass are easily produced and also fertile. Again, sufficient cytological stability in the hybrid plants conserves the integrity of the constituent genomes, resulting in regular chromosome association.

Key Words: Interspecific hybrid, Hybrid ryegrass, Chromosome association

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Turk. J. Agric. For., **26**, (2002), 1-9.
Full text: pdf
Other articles published in the same issue: Turk. J. Agric. For.,vol.26,iss.1.