Abstract

A novel technique, mixing surface spreading and air-drying (splash) to study plant chromosomes is used to determine the possibility of a response in the genotype-environment for three legumes. These species are typical of Mexican arid and semi-arid areas, from populations occurring in localities with different climatic conditions. The species studied are Prosopis laevigata and Acacia schaffneri, from Municipio Santiago de Anaya, State of Hidalgo (20° 16´ N) and P. laevigata and Acacia farnesiana from Municipio Bermejillo, State of Durango (25° 49´ N). Four features are evaluated: total chromosome length, karyotype, polysomatic frequency, and seed weight. This study corroborates in Prosopis laevigata a diploid number of 2n=28 and determines statistically significant interpopulation differences (a= 0.01) in chromosome total length; the karyotype formula shows no change (2m+10sm+2st); and the polysomatic frequency does not exceed 10%. In the studied species of Acacia, diploid chromosome numbers of 2n=26 are recorded, and no statistically significant interspecific differences (a= 0.01) in total chromosome length are found. However, with the use of this mixed technique of spreading and air-drying, different karyotypic formulas, here reported for the first time, are obtained: 9m+2sm+2st for A. farnesiana, and 9m+4sm for A. schaffneri. Both species of Acacia show a similar polysomatic frequency, not surpassing 30%. No significant differences (a= 0.01) are found in seed weight between Prosopis strains and between species of Acacia. The results indicate a kind of adaptation in close relationship with environmental requirements that modify chromosomal characters via natural selection. These environmental requirements do not necessarily affect other nucleotype-dependent characters, such as seed weight.

Keywords

Prosopis, Acacia, Cytogenetics, Spreading and air-drying, Karyotype, Total chromosome length, Polysomatic frequency, Genotype-environment interaction, Genecology