

Genetic diversity in colonial bentgrass (*Agrostis capillaris* L.) revealed by *EcoRI/MseI* and *PstI/MseI* AFLP markers

H. Zhao and S. Bughrara

Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824, USA

Email: bughrara@msu.edu

Keywords: colonial bentgrass, diversity, AFLP

Introduction Colonial bentgrass species (*Agrostis capillaris* L.) is a potential genetic resource for the improvement of other bentgrass species (*Agrostis* spp.) with regard to resistance to environmental stresses and diseases. Transferring resistance from colonial to other bentgrass species is a promising goal in turfgrass breeding programs (Belanger, 2003). Assessment of genetic diversity among accessions of colonial bentgrass species will contribute to eliminate undesirable duplications in the germplasm collection and increase the efficiency of research efforts. It will allow researcher to select diverse resistance genes from different sources to incorporate and pyramid these resistance genes into creeping or other bentgrass species cultivars. The objectives of this study were to investigate the genetic diversity of colonial bentgrass species consisting of 22 PI accessions from USDA collected from 11 countries, 14 accessions from north Spain and three commercial cultivars by using AFLP markers (*EcoRI/MseI* and *PstI/MseI* enzyme combinations), and to compare the correlation between estimates of genetic diversity derived from these two enzyme combinations.

Materials and methods Thirty-six accessions were used in the study. The polymorphic bands produced from AFLP analysis (*EcoRI/MseI* and *PstI/MseI* enzyme combinations) were scored. Genetic diversity analyses were conducted using Numerical Taxonomy and the Multivariate Analysis system (Exter Software Co., New York).

Results A total of 182 unequivocally recognizable polymorphic bands were obtained from *EcoRI/MseI* AFLP analysis. The genetic similarity (Jaccard) coefficients (GS_j) ranged from 0.34 to 0.70 with a mean of 0.55. A dendrogram among 39 colonial accessions based on their cluster analysis of GS_j coefficients showed that no major 'ball cluster' was found (Figure 1). 120 polymorphic bands were scored from *PstI/MseI* AFLP analysis. Values of GS_j ranged from 0.99 to 0.45. With CPCA subroutine programs of NTSYS, a rotated PCA with the AFLP markers as observations was used to determine the number of groups based on Eigen values. Three groups were formed with an average $GS_j=0.63$ (Figure 2).

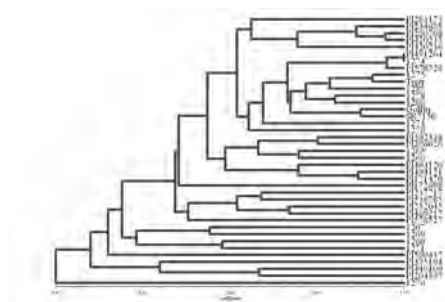


Figure 1 UPGMA dendrogram of 39 accessions revealed by *EcoRI/MseI* AFLP markers

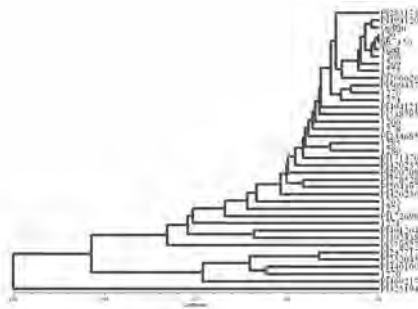


Figure 2 UPGMA dendrogram of 39 accessions revealed by *PstI/MseI* AFLP markers

Conclusions A high level of diversity in colonial bentgrass species was demonstrated with averages of 0.51 (*EcoRI/MseI*) and 0.58 (*PstI/MseI*)(GS_j). Greater genetic diversity was detected by *EcoRI/MseI* AFLP primer combinations because of genome region difference (hypermethylated vs. hypomethylated regions). A positive correlation ($r=0.44$, $p=0.0099$) between the two Jaccard similarity matrices was obtained by a Mantel test.

References

Belanger FC, Meagher TR, Day PR, Plumley K, Meyer WA (2003) Interspecific hybridization between *Agrostis stolonifera* and related *Agrostis* species under field conditions. *Crop Sci.* 43:240–246