Reserving Genetic Diversity in Dominant Great Plains Grasses: Investigating the Geographic Distribution of Buffalograss Cytotypes

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Buchloë dactyloides (Nutt.) Engelm. (buffalograss) is a major component of mixed- and shortgrass prairies of Kansas and the Great Plains, and is of economic importance both as a forage grass and as a native turf grass alternative for lawns and golf courses. Like many critical Great Plains grasses, buffalograss includes a series of cytotypes (genotypes differing in the number of sets of chromosomes per cell), including diploids (2 sets), tetraploids (4 sets), pentaploids (5 sets), and hexaploids (6 sets). This is important, as cytotypes often vary with regards to economically important ecological traits, and since the diploid cytotype is sought after for plant breeding and crop improvement. Preliminary studies suggest that buffalograss diploids are rare, and the overall picture of cytotype distribution within buffalograss is essentially unknown. This is important since rapid range shifts due to climate change could potentially eliminate certain cytotypes if they are non-randomly distributed geographically. The aim of this study is to use genetic tools to establish the geographic distribution of buffalograss cytotypes, and we have observed the number of alleles (versions of a gene) at 14 genetic loci in 437 individuals. Using this approach we infer that diploids are indeed rare, with only three individuals identified. Tetraploids and hexaploids are both quite common, and each of these polyploids is clearly non-randomly distributed geographically. Clarifying the distribution of buffalograss cytotypes will therefore identify important seed stock locations for turf grass and conservation breeding programs.