Plant Genomics 2019 : Complex analysis of genetic differentiation in Lolium westerwoldicum European collections revealed by biochemical and molecular markers

Abstract:

Lolium westerwoldicum Break a very important forage grass was initiated in Westerwolde (Netherlands) and this is why its name was created by the place where the species has been selected. This annual grass can exist as diploid or tetraploid form. Thirty tetraploid cultivars originated from different European countries were examined according to phosphoglucose isomerise (PGI, EC5.3.1.9). PGI as one of the most important enzyme systems, catalysis the reversible isomerization of glucose-6-phosphate and fructose-6-phosphate and have an influence on starch production in chloroplasts. Individual plants were genotyped from one-month old seedlings cultivated in the uniform greenhouse conditions. Electrophoresis was performed on horizontal, 11% starch gels (Sigma) in Ashton buffer system pH 8.1 and staining procedure from Vallejos with some minor modifications. Electrophoretically detected PGI band patterns show four alleles in one locus. Because of its dimeric structure, PGI is very polymorphic in all Lolium species. Investigated cultivars were described by such genetic parameters as observed and expected heterozygosity, fixation indices and polymorphic indices of genotypes. Similarities between populations, based on allele frequencies were illustrated by dendrogram constructed using the unweighted pair of group method UPGMA. All investigated populations (=cultivars) show oscillation in polymorphism level from Pg=0.1267 for almost monomorphic cultivar Gonzales to the most polymorphic cultivar Kaja (Pg=-.9025). Molecular biology offers a wide range of markers that can be utilized in crop breeding. Besides these mentioned above investigations, ten other populations composed of individuals belonging to the two species: L. westerwoldicum and L. multiflorum were simultaneously compared according to PGI and AFLP markers and show spectacular separation of these species in question.

Biography:

Maria Krzakowa works as Professor Senior at Adam Mickiewicz University in Poznaǀ, Poland. Some years ago, she spent one- year training as Post Doc at the University of California Davis. She learned there allozymes detection by horizontal electrophoresis. First of all, her scientific activity was concerned about genetic variation of natural populations of Bryophytes (different species of Hepatics and Mosses) and later on forest trees: Scots pine (Pinus sylvestris), beech (Fagus sylvatica) and ash-tree (Fraxinus excelsior). In the meantime she developed investigations on grasses, for example Apera spica-venti and Alopecurus myosuroides. Her main achievement was the first description of dimeric peroxidise in reed (Phragmites australis). It was some kind of discovery, as dimeric peroxidise was known earlier only from the rice (Oryza sativa).Now, she is working on European collection of Italian and Westerwolds ryegrasses (Lolium spp.) considering biochemical and molecular polymorphism of these important forage grasses.x

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