Conservation, Distribution, and Utilization of Pasture and Rangeland Plant Genetic Resources

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Introduction The Plant Genetic Resources Conservation Unit (PGRCU) , Griffin , Georgia , USA , preserves and distributes seed of over 86 ,000 accessions of crop and wild species to users throughout the world (USDA , ARS , 2007) . The species maintained are those adapted to the climate of the southern USA . Over 7 ,600 of these accessions are commonly utilized for pasture , hay , and rangeland research . The objective of this paper is to identify the conservation , distribution , and research utilization of pasture and rangeland genetic resources from the PGRCU germplasm collection .

Materials and methods The main forages conserved at this location include annual clovers , legumes , and warm-season grasses . A large number of sorghum accessions at this location (over 34 ,000 accessions) are also utilized for forage as well as grain research , but will not be included in this paper . A total of 2 ,154 annual clover accessions are maintained including *Trifolium alexandrinum* , *T . incarnatum* , *T . nigrescens* , *T . resupinatum* , *T . subterraneum* , and *T . vesiculosum* . A total of 1 ,234 forage legume accessions are maintained including *Aeschynomene americana* , *Macroptilium atropurpureum* , *Neonotonia wightii* , *Desmodium* spp . , *Lablab purpureus* , *Desmanthus illinoensis* , *Kummerowia striata* , *Lespedeza cuneata* , and others . A total of 4 ,258 grasses are maintained including *Andropogon gerardii* , *Bothriochloa* spp . , *Cenchrus ciliaris* , *Cynodon* spp . , *Digitaria* spp . , *Panicum* spp . , and *Paspalum* spp . The bulk of all seed is maintained in sealed bags at 18℃ , while samples for distribution are maintained at 4 C and 25% relative humidity . Almost 85% of all forage and range accessions are available for distribution and over 96% of the accessions have a safety backup sample maintained at Ft . Collins , Colorado , USA .

Results and discussion Since 1988 , over 10 ,000 annual clover , over 3 ,600 forage and range legume , and over 10 ,900 forage and range grass accession samples have been distributed to researchers throughout the world . These accessions have been utilized for research on forage production , range improvement , grazing potential , erosion control , salt tolerance , cover crops , environmental adaptation , productivity under irrigation , disease and insect resistance , disease host range , genomics , DNA sequencing , tissue culture , phylogenetic relationships , chemical composition (i .e . phytoestrogen , tannin , medicinal , natural products , starch , proteins , fiber , nutraceutical) , genetic diversity , biomass and biofuel , identification of archaeological specimens , and educational uses . Additionally , annual clovers have been utilized for research on ozone tolerance , seed establishment , polyploidy , microsatellite analysis , organic farming , and green manure . Forage and range legumes have been utilized for research on xylem anatomy , molecular systematics , phenotypic plasticity , ecology , weeds and invasive species , mitochondrial genes , mycorrhizae , nodulation , forage for wildlife and goats , alternative crops , and allelopathy . Forage and range grasses have been utilized for research on phytoremediation , cryopreservation , ribosomal DNA , inflorescence and leaf morphology , ornamental potential , somatic hybridization , photosynthesis , stomatal response , cytology , protoplast , photorespiration , gene expression , genetic transformation , shade tolerance , soil fertility response , water use efficiency , rhizome growth , evolutionary genetics , and ecosystem processes . Forage and rangeland genetic resources are utilized for more than just traditional plant breeding and cultivar development , as demonstrated by this extensive range of research studies .

Conclusions Forage and range genetic resources are utilized in a wide range of research studies including both basic and applied research . These resources provide genetic material for current as well as future improvement of pastures and rangeland . The conservation of forage and rangeland genetic resources provides researchers with the range of genetic diversity required to continue to understand and improve the world's pastures and rangelands .

Reference

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