

Developing regionally-adapted, resilient alfalfa germplasm pools

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Alfalfa improvement depends on the presence of necessary genetic variation for traits of interest. If commercial breeding populations don't contain sufficient useable variation, germplasm held in gene banks, such as the USDA National Plant Germplasm System, can be evaluated as sources of needed traits. However, for complex traits like forage and seed yield, forage quality, adaptation, persistence, salinity, and water stress, screening germplasm accession by accession is time consuming and often unsuccessful. Therefore, we propose to develop a series of germplasm pools targeted to Northern and Southern regions of the USA. Pools will consist of germplasm from diverse ecogeographic regions and will be recurrently selected to improve various traits of importance. Use of these pools should provide opportunity for breeders to access unique genetic variation that can accelerate genetic gain for important traits into the future. We will conduct a genetic diversity analysis in order to determine if the new germplasm differs from existing elite cultivars. This project will provide the genetic resources for variety development that would benefit farmers and seed companies through higher yields or more resilient varieties. The project includes participants from California, Wisconsin, and New York, representing three major alfalfa producing regions. Currently, we are evaluating non-dormant germplasm in two locations in southern California to develop initial southern-focused germplasms. Four northern germplasms were developed prior to the beginning of the project, and these are being evaluated for further selection in northern California, Wisconsin, and New York. Additional germplasm accessions will also be screened at those locations to supplement the previously developed northern germplasm pools.