

Screening Alfalfa Accessions for Southern Great Plains

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Alfalfa (*Medicago sativa*) is one of the most important forage legumes cultivated over a wide range of climates and geographies for its high yield and forage quality. It produces more protein per hectare than many other crops, and therefore is a desirable forage for dairy and livestock production systems. Alfalfa can be grown as a pure stand for hay, silage, haylage, or as a mixture with other grasses and legumes in pastures and rangelands. Due to its perenniality, deep root system, and tolerance to cold, heat and drought, alfalfa plays an important role in sustainable agricultural production systems. However, its persistence and productivity in southern Great Plains of USA is limited due to multiple biotic and abiotic stress factors. To identify the non-dormant germplasm that is persistent and tolerant to biotic and abiotic stresses of the region, we are screening alfalfa accessions from various countries within USDA-GRIN collection. Accessions that are persistent and tolerant to biotic and abiotic stresses of the region will be identified, evaluated for various agronomic traits and incorporated into the breeding program.

A total of 650 (635 plant introductions, 11 dormancy checks and four commercial checks) populations were studied in this research. Fifty seeds from each population are germinated in greenhouse and 10 plants/ plot/accession were transplanted at Dupuy, Ardmore, OK in October 2015. The experiment was laid out in an alpha lattice with two replications. Data on winter survival, spring growth, growth habit, plant biomass, stand persistence and disease score are collected using proximal sensors and visual scores in 2016, 2017 and 2018. Significant differences were observed for all the traits measured. Alfalfa accessions that are persistent and tolerant to biotic and abiotic stresses of the region are identified and the results will be discussed.