

## **SOUTH DAKOTA– Survival & Forage Production of Red Clover in Poorly Drained Permanent Sod on Saline Soil in Eastern South Dakota**

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**U**nproductive pastures and haylands dominated by introduced cool-season grasses that are sodbound or otherwise negatively affected by unfavorable soil conditions may be improved with the addition of an adapted legume. Red clover is particularly attractive for this purpose because of its adaptation in a wide range of soil conditions, such as impeded drainage, and its ability to establish through broadcasting without major renovation. The objective of this study was to determine survival and productivity of four red clover entries (three cultivars and one local population) in a permanent sod of Kentucky bluegrass on a Hamberly-Badger complex soil, with typical poor drainage, moderate salinity, and general unsuitability for conventional crop production.

Seedlings of ‘Robust’, ‘Wildcat’, ‘Redlangraze’, and a local population, started from seed in cone-tainers in the greenhouse in February, were planted into Kentucky bluegrass sod on the South Dakota State University Plant Pathology Farm in Brookings on May 16, 2005. Experimental design was four replications of each entry in 36-plant plots with 3' interplant spacing in a randomized complete block. This is a plant density of 4,840 equidistant plants/ac. The grass sod was rotary-mowed to a 4" stubble height twice during spring 2005 prior to transplanting. Interplant spaces were similarly rotary-mowed three times during each of the growing seasons of 2005 and 2006. Individual plants were harvested at full bloom for determination of dry matter forage yield on August 10, 2005, and June 21, 2006. Percent plant survival was determined in August 2006 and July 2007.

Significant differences were found between years, among entries, and among plants within entries for forage yield. Mean annual red clover forage yields were 206 lbs/ac in 2005 and 686 lbs/ac in 2006. Averaged across years, Redlangraze produced 15% more forage (484 lbs/ac) than Wildcat or the local population. The large variation among plants within entries for forage yield suggested genetic variation existed within each for forage-producing ability in a highly competitive sod on a marginal agricultural soil.

No differences were found among entries for mean survival in 2006 (94%) or 2007 (44%). The large mortality between the middles of the second and third growing seasons (i.e., July 2006 and July 2007) was typical for red clover in eastern SD. In addition, surviving plants in 2007 were much less vigorous than they were in 2006, also expected. However, this study allowed us to identify individual plants within four populations of red clover that displayed relatively high levels of tolerance to a set of environmental conditions that included severe competition from permanent grass sod and highly unfavorable soil conditions. This is a common scenario in low pastures and haylands dominated by introduced grazing tolerant perennial cool-season grasses in the northern Great Plains.