Molecular, Physiological, and Ecological Evaluation of Latvian Genetic Resources of Valuable Wild Legume Species Trifolium fragiferum in the Context of Sustainable Agriculture

Garbarino , Magnolia (School: Pawling High School)

Trifolium fragiferum (strawberry clover) is a wild legume species found rarely in Northern European seaside areas and is genetically close to domesticated clover species. Seven micro-populations of T. fragiferum have been identified in Latvia, along the coasts of the Baltic Sea and Bay of Riga. The goal of this study is to evaluate the tolerance of identified Latvian T. fragiferum accessions to abiotic stress, as well as to determine their genetic diversity. Two Northern European genotypes (TF1 from Latvia and TF9 from Denmark) of T. fragiferum were grown in controlled settings with varying soil sodium levels (0-5 g/L) in order to quantify the physiological and morphological effect of salinity on the samples. Further, the soil conditions of wild Latvian T. fragiferum accessions' environments were evaluated for all eight identified genotypes (one of the seven micro-populations was split into two genotypes). In controlled conditions, most photosynthetic and morphological parameters of TF1 experienced a smaller relative effect as a result of elevated sodium when compared with TF9. Sodium was found to have a significant positive correlation with photosynthetic parameters, and a significant negative correlation with biomass for both TF1 and TF9. The results of the field study show genetic and morphological diversity between the identified accessions. These findings allow for a comprehensive understanding of the physiology, stress tolerance, and genetic diversity of Latvian accessions of strawberry clover, which will help determine its viability as a genetic resource for other clover species and for use in a variety of sustainable agricultural settings.

Awards Won: