Incorporating drought tolerance into turfgrass cultivars important to Michigan

Suleiman Bughrara

Drought stress is a major environmental constraint on the turfgrass industry in Michigan. There is a strong commercial, public, and domestic demand for attractive green turf throughout the year, but heavy use of irrigation and fertilizer to keep turfgrass green is environmentally unacceptable because it is wasteful of water and causes pollution by water run-off. This research will use a novel and effective breeding approach that will reduce water usage and bring considerable economic and environmental benefits for Michigan. Turfgrass that survives drought and maintains attractive green cover, will reduce the need for irrigation and turfgrass reestablishment. This will achieve large savings in maintenance costs ranging from reduced requirement for water use to purchase of seed.

The objectives of this research are: a) to develop new turfgrass cultivars with better drought tolerance traits of maintaining green turf cover during periods of sub-optimal water availability and enhance capability for rapid recovery following drought, b) to tag the genes for drought resistance through breeding programs, and c) to develop marker assisted selection (MAS) which will provide breeders with valuable tools to develop newer germplasm with improved drought tolerance. The ultimate goal is to make the turfgrass system more environment friendly and sustainable. Our approach is: 1) to exploit the genetic variability of *Festuca mairei* St. Yves which shows xeriphytic adaptation that allows the plant to survive long summers under drought stress, and 2) to transfer this valuable trait to perennial ryegrass which will be the foundation of new improved cultivars. The outcome of this research will be commercial drought tolerance turfgrass cultivars and molecular markers that assist in the selection of these traits. The close gene homology between species within the grass family (Poaceae) will also facilitate knowledge transfer for the benefit of other turfgrass and major agricultural crop species.