

## I<sup>4</sup>- A Breeder Driven Molecular Program

### Background

Publicly available genetic resources generated by the Texas A&M University System are vast and varied. Among the monocots alone, the germplasm collections are represented in cool-season, warm-season and annual and perennial plants, and include corn, sorghum, sugar cane and several species of small grains, forages and turfgrasses. Many traits, including both biotic and abiotic plant responses, are present and/or important across the entire grass family. One of the most valuable resources available to the improvement of plants is the genetic material which controls the expression and transmission of important biological traits. Within the turfgrass germplasm resources alone, resistance to biotic stresses including disease, insect and mite resistance (armyworms, sod webworms, mole crickets, eriophyid mites etc.), and abiotic stress responses such as low light tolerance (shade), salinity and drought tolerance are known and continually being documented. As an example, moving genes among the turfgrass species will accelerate the development process which benefits our urban clientele with plants requiring less water, nutrients and pesticides to maximize the urban landscape and conserve natural resources, while adding to the knowledge base and genetic resources of the Texas A&M University System's plant improvement programs.

### Objectives and Approach

- Develop the genetic maps for targeted turfgrass species of Zoysiagrass, St. Augustinegrass and Texas Bluegrass.
- Establish a molecular position relative to resistance to the Fall Armyworm in two distinct turfgrass species: Zoysia matrella, a warm-season grass, and Texas Bluegrass, a cool-season grass.
- To develop a proof-of-concept, in the use of marker assisted selection procedures to be more efficient and productive in throughput and output. Targeted areas of genetic diversity include:
  - Zoysiagrass germplasm base (Salinity tolerance, Armyworm resistance, Floral production)
  - Texas Bluegrass Populations (Armyworm Resistance, Powdery Mildew resistance)
  - St. Augustinegrass Disease Resistance (Grey Leaf Spot resistance)

### Program Benefits

Mining germplasm resources is not novel to the Texas A&M system, nor is the use of marker assisted selection in the advancement of cultivar development. What is unique however is targeting what is generally considered minor or specialty crops where little if any attention has been directed in exploiting the genetic diversity of perennial cropping systems. As advances are made in one or more of these targeted areas, identification and isolation of genes of interest will enable the transfer of genetically controlled traits to other cropping systems. Transferring a plants ability to accumulate salt in its leaf tissue may enhance bioremediation of saline soil sites with high productivity plant systems, or to control the introduction of pollen into the atmosphere which is aggravating to allergies etc. Considerable interest has been generated in this area of research and it has provided for a tremendous opportunity to develop strong.

### Researcher

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