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Development and Release of Turf-Type Saltgrass Variety

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Start date: 2016
Project duration: 3 years
Total funding: $90,000

Objectives:

1. To increase the materials (accessions) selected from the source nursery and the first and the second generation nurseries, further develop breeder's fields, and collect data and prepare document for release of elite vegetative saltgrass varieties;
2. Continue to evaluate several seeded lines for potential releases; and collect data and prepare document for potential release seeded saltgrass varieties;
3. To establish field plots made up of progeny from elite parents and from seeds harvested from the third cycle of crossing block for advancement of saltgrass development.

Inland saltgrass is indigenous to western North America where it has adapted to grow in specific niches of wet, alkaline, and saline soils, but is also found on drier and less salty sites. The planting of saltgrass on roughs and possibly even on fairways could help golf courses conserve potable water because of its tolerance to lesser quality (reclaimed water, saline ground and surface waters) water resources while maintaining acceptable turf and providing playing surface. On a broader scale, inland saltgrass has value for use in re-vegetation projects and in areas that commonly have high salinity levels.

Two breeding cycles took place from 2001 to 2010 at Colorado State University. However, due to project down time, some of the plant materials have been lost. Saltgrass germplasms from the breeding cycles remain for further evaluation and selection. After data and material evaluation, we have started plant propagation for selected lines in the greenhouse since summer of 2016. Efforts are in progress in rescuing, increasing and taking inventory of plant materials. So far, we have rescued 13 males and 13 female selected from the second-generation nursery. These saltgrass accessions represent the best turf-type individuals produced. They were clones. After material increase, the lines will be used to establish field plots. Data on spread, establishment, growth, general turf characteristics, and seed production will be collected to provide information for future development.

Two inland saltgrass accessions that have potential for turf and revegetation use on saline sites have been included in a field study to evaluate for sprigging establishment (Picture 1). Results indicated that sprig storage time (up to 2 days) did not affect establishment as long as the sprig materials were kept in shade (temperature under 30 °C) and in a closed bag to prevent desiccation. Saltgrass sprigged in May established adequate coverage (≥ 75%) in September with springing rates at > 270 bush/acre. For plots sprigged in June, only sprigging rates > 400 bushels/acre established adequate coverage (≥ 75%) by September. The accumulated growth degree day (GDD) to achieve adequate coverage was 1531 and 1703 for 800 and 400

bushels/acre sprigging rates, respectively. The accumulated GDD assessment provided in our study suggests that sprigged saltgrass has higher establishment GDD requirements than seeded saltgrass. Among the two line evaluated, the male line had better quality and stronger rhizomes than the female line. After full establishment, the plots have been rated for turf quality and disease incidence and measured for growth. Saltgrass maintained an average turf quality rating between 6 and 8 with 6 as the minimal acceptable rating for the quality and color. Rust was seen in July to September. Two lines differ dramatically in the severity of rust infection with one line almost immune to rust infection. Without mowing, the plants had a 18 cm maximal height.

Saltgrass seeds were harvested from a female saltgrass line with composite saltgrass lines to provide pollen sources. The harvested saltgrass seeds were stratified to establish field plots. Minirhizotron tubes were installed on the seed-established saltgrass plots to monitor root growth over time (Picture 2). Saltgrass had two flushes of root growth. The first occurred earlier in the season than expected, months before shoot growth. This may be a result of wound stimulation from the installation of observation tube. The second and larger flush of root growth coincided with the onset of shoot growth above ground, and began when soil temperature reached 15ºC. When soil temperatures were above 15 ºC, saltgrass roots continued to grow at a slow but steady rate during the summer months.

Summary Points:

- Effort is in progress to increase saltgrass materials for distribution for evaluation by interested partners;
- Saltgrass sprigged in May established adequate coverage (≥ 75%) in September with springing rates at > 270 bush/acre;
- The accumulated GDD assessment provided in our study suggests that sprigged saltgrass has higher establishment GDD requirements than seeded saltgrass;
- Saltgrass root growth coincided with the onset of shoot growth above ground, and began when soil temperature reached 15ºC.

Picture 1: Established saltgrass.

Picture 2a: Install minirhizotron observation tubes

Picture 2b: Mini-rhizotron observation tubes installed on seed-established plots.