Development of Seeded Turf–Type Saltgrass

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Objectives:

1. *Establish a new source nursery using seed from progeny of Cycle 2 parental crosses. Select best turf types for polycross.*
2. *Maintain a crossing block of 28 parents selected from Cycle 3 nursery (Cycle 0 = original selections from the wild).*
3. *Form a new crossing block with lines that represent the highest values for turf traits and combining ability. Evaluate progeny performance and uniformity to determine parents for synthetic variety release.*
4. *Collect data for potential vegetative and seeded variety releases.*

Inland saltgrass is a native, western U.S. grass that is well adapted to arid and salty environments and shows high potential value for use in golf course fairways and roughs. Use of this grass would allow golf courses to conserve potable water because of its tolerance to lesser quality water resources. The field selections that form the basis for our current breeding efforts were chosen because they formed uniform, petite, high–density turf with attractive color under high traffic and compacted soil conditions.

The saltgrass development efforts at CSU involves repeated cycles of selection of female and males clones (saltgrass is a dioecious species) that exhibit high turf quality, evaluation of progeny and combining ability when those clones are bred, followed by random inter pollination among clones with high values for the traits we are most interested in. The original saltgrass source nursery was made of accessions collected from the wild in 1999–2001. Lines with the best turf quality under mowing pressure were selected based on ratings of short height, shoot density, rust resistance and seed yield. Progeny of the best lines were formed under random mating in an isolated polycross as well as through specific single crosses.

In 2003 the first generation nursery (Cycle 1) was planted for evaluation of progeny performance, combining ability, and estimated heritability values. Evaluations of the first generation nursery show high narrow sense heritability estimates for turf traits (low canopy height, high shoot density, high seed yield) indicating that phenotypic selection for these traits is effective with saltgrass.

The second generation nursery (Cycle 2) was planted in 2005–2006. The selection and evaluation process of the second generation nursery resulted in a polycross block planted in 2010. This polycross block contains the most promising turf–type saltgrass cultivars developed by us to this point in time (17 females, 11 males). Seed was harvested from this polycross block in September 2012 (this is third generation seed). This seed will be planted in the field in spring 2013 to allow us to conduct

Figure 1. 2010 inland saltgrass polycross nursery of promising parents.

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progeny evaluations. If visual uniformity and mowing quality of the new lines (the parents of progeny trial plants) is deemed acceptable after conducting the progeny evaluations, these parents could be used to develop a synthetic cultivar using the 2010 polycross block. These parents are currently being multiplied vegetatively in the greenhouse as a backup source of elite germplasm and to have material for seed companies interested in potential commercialization of a saltgrass cultivar release. A new source nursery was also planted in 2012 as an additional pool for selection. It is constituted of plants grown from bulk seed collected from the second generation. Initial data has been collected on shoot height and rate of spread of over 560 individual plants.

In 2012, a study was conducted to determine the feasibility of establishing saltgrass using harvested saltgrass rhizomes (i.e. saltgrass establishment via sprigging). Two saltgrass lines (with potential to be released as vegetative varieties) were tested. We evaluated the effects of sprigging date, rhizome planting rate, and rhizome storage time on saltgrass establishment. Saltgrass sprigged in May 2012 established adequate saltgrass ground coverage (≥ 75%) in September 2012 when using rhizome planting rate greater than 266 bushel per acre. For plots sprigged in June, only sprigging rates greater than 400 bushel per acre were successful in established adequate coverage (≥ 75%) by the end of the growing season. Plots sprigged in June using 266 bushel per acre failed to establish adequate coverage in September. One day of rhizome storage did not reduce saltgrass establishment as long as procedures were taken to prevent rhizomes from dehydration.

Summary Points

- High values for narrow sense heritability suggest phenotypic selection for turf traits will be effective for saltgrass.
- Saltgrass seeds were harvested from Cycle 3 poly–cross block in September 2012.
- A saltgrass field was successfully established via rhizome springing.
- Plots sprigged in May established adequate salt–grass ground coverage in September when rhi–zome planting rate was greater than 266 bushel per acre.

Figure 2. Inland saltgrass plots 30 days after sprigs were planted.

Figure 3. Inland saltgrass plots 75 days after sprigs were planted.

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