



PROPAGATION AND ESTABLISHMENT OF A NATIVE WETLAND PLANT SPECIES: *BECKMANNIA* *SYZIGACHNE*

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Introduction

Beckmannia syzigachne, or American sloughgrass, is a native annual or short-lived perennial bunchgrass found on flooded or seasonally saturated soils in the cooler parts of North America. This cool-season species is described as leafy, shallow-rooted, and having a closed panicle. It is considered a valuable wetland forage species and is often hayed or grazed, and the seeds provide food for waterfowl, seed-eating birds, and small mammals. 'Egan' American sloughgrass was developed by the Alaska Plant Materials Center solely for use in wetland restoration. Currently, the Corvallis (Oregon) Plant Materials Center is evaluating local ecotypes of American sloughgrass for use in wetland or riparian restoration projects in western Oregon, primarily. Results of studies evaluating seed germination, flood inundation tolerance, competitive ability with reed canarygrass (*Phalaris arundinacea*), and stand establishment of select ecotypes are described below.

Seed Germination

American sloughgrass lacks complex seed dormancy characteristics and rapidly colonizes exposed moist soil. Reported seed germination percentages vary, but they may be improved with processing and providing alternating temperature regimes. Thus, effect of seed processing (manually rubbing seed and machine-dehulling) on germination of wild collections of three local ecotypes under laboratory conditions (alternating temperatures) was compared to a control in 1996 and 1998. Treatment effect on germination varied with year and with ecotype ($p < 0.05$). In 1996, rubbing decreased mean germination of one ecotype by 12 percent, but increased mean germination by 8 and 25 percent for the remaining two ecotypes. In 1998, rubbing increased mean germination percentages by 36, 50, and 29 percent. Dehulling increased mean germination percentages by 4, 15, and 21 percent in 1996 and by 17, 36, and 20

percent in 1998. Overall treatments, germination percentages ranged from 48 to 99.

Flood Inundation

Tolerance American sloughgrass is well-adapted to low, irrigated, and somewhat acidic to alkaline soils; it performs best on clay soils covered with a shallow layer of organic matter. Inundation tolerance for specific ecotypes is unknown in most cases. Thus, effect of inundation depth (saturated to 18 inches) and spring duration (45 days, 30 days) on shoot growth and flowering of transplants (three ecotypes) in constructed wetland cells was examined in 1996 and on survival, regrowth, and flowering in 1997 and 1998. Effect of treatment varied with year ($p < 0.01$). In 1996, plants grown under 45 days spring inundation (followed by dry summer conditions) produced longer shoots than those grown under 30 days spring inundation. Two ecotypes exhibited decreased shoot growth at the 15 inch depth. For both local ecotypes, flowering was greater at shallower depths and following 45 days inundation; 'Egan' did not flower. With 45 days spring inundation, 100% of plants (local ecotypes) survived to 15 inches, and with 30 days spring inundation, 25% of plants survived to 15 inches, by September 1996.

In 1997, no surviving transplants of 'Egan' were found. For local ecotypes, shoot height decreased with increasing depth. Moderate to poor flowering occurred at all depths on surviving plants, following 45 days spring inundation; flowering occurred to 12 inches on

surviving plants, following 30 days spring inundation. In 1998, shoot height and flowering was not significantly affected by treatment, although trends were similar to those seen in 1997. For both duration treatments and local ecotypes, survival declined from 100% at saturation to 64% at 6 inches, 17% at 12 inches, and 0% at 15 inches, in 1998. One survivor was noted at 14 inches.

Competitive Ability

As reed canarygrass is a common invasive wetland plant in the Pacific Northwest, the competitive ability of American sloughgrass with this invader must be evaluated. Thus, the survival, growth, and reproductive capacity of two local ecotypes of American sloughgrass with reed canarygrass was examined in pots at select plant densities and inundation regimes, under greenhouse conditions. Though results varied with year ($p < 0.05$), data indicated that transplants of local ecotypes may withstand competition from reed canarygrass seedlings only at minimum densities of 4:1 (American sloughgrass:reed canarygrass) under saturated to freely draining conditions, in terms of survival, shoot biomass, and seed production.

Stand Establishment

To maximize seed yields, research has shown that weed competition in production fields should be minimized, and irrigation should be applied as necessary to prevent drought stress

and disease in established stands. Seed yields of 390 to 550 lb/ac have been reported. Generally, stands decline after four to five years. Evaluation of select seeding rates and row spacings to maximize upland stand establishment and seed yield for local ecotypes will be conducted in fall 1998 and spring 1999 at the Corvallis Plant Materials Center. Overall, American sloughgrass can be effectively seed-propagated and planted in saturated or temporarily flooded soils.