Observations on Seed Propagation

of 5 Mississippi Wetland Species

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Staff at the USDA Natural Resources Conservation Service Jamie L Whitten Plant Materials Center at Coffeeville, Mississippi, collected 5 species of wetland plants from various locations in Mississippi that showed potential for use in wetland mitigation and restoration plantings or in constructed wetlands for wastewater treatment. Two of these selections were subsequently released for nursery production as source identified germplasm. Although all 5 species can be easily propagated by vegetative means, seedling production may require less production space, result in more uniform planting stock, and could potentially increase genetic diversity of the planting population. Over the years I have made some observations on seed storage environments and germination and seedling growing medium moisture regimes to see if it is feasible to produce these species using conventional nursery seed propagation methods. Although I feel propagation from seeds is viable, my suggestions here are merely a starting point for developing final recommendations. I have noted considerable year to year variation for several species suggesting that further study might be required to determine consistency of response to superior treatments.

I generally collect seeds when fully mature and before any significant shattering occurs and plant them the following spring. Depending on species, seeds can be stored dry in zip-lock-type plastic bags for at least 6 mo. I have also found that post-harvest storage in a moist medium (I used wet paper towels and sphagnum peat moss for experimental purposes, however, other media would probably be acceptable) at 5.5 °C (42 °F) or in cold water (5.5 °C [42 °F]; changed monthly to reduce algal growth), are 2 useful ways of maintaining seed viability. The cool temperatures and moist conditions serve as a stratification process.

For all species, I use a 3:1 (v:v) sphagnum peat moss:sand growing medium amended with commercially recommended quantities of pelletized slow-release fertilizer (for example, 1.8 to 3.6 kg/m^3 [3 to 6 lb/yd^3] Osmocote 13N:13P_2O_5:13K_2O; 8 to 9 mo release rate at 21 °C [70 °F] or 1.8 to 3.6 kg/m^3 [3 to 6 lb/yd^3] Sierra 17N:6P_2O_5:12K_2O; 3 to 4 mo release rate at 21 °C [70 °F]; The Scotts Company, Marysville, Ohio), 4.7 to 5.9 kg/m^3 (8 to 10 lb/yd^3) dolomitic lime, 0.89 kg/m^3 (1.5 lb/yd^3) Micromax micronutrient fertilizer (The Scotts Company, Marysville, Ohio) and a wetting agent (I use 0.59 kg/m^3 [1 lb/yd^3] 2000 G AquaGro [Aquatrols, Cherry Hill, New Jersey], which is no longer marketed). I pasteurize the sand in an electric soil sterilizer for 30 min at 82 °C (180 °F) to reduce weed problems.

For seed germination and subsequent seedling growth, I either maintain a moist medium by regularly watering containers situated on normal greenhouse benches, or I keep it saturated on a commercial ebb and flow greenhouse bench (Midwest Trading, Denmark) with water maintained 0.6 to 1.2 cm (0.25 to 0.5 in) deep. Greenhouse temperatures range from 13 to 38 °C (55 to 100 °F) during the germination period.

ABSTRACT

Viability of seeds under short-term storage and subsequent seedling growth on moist or saturated growing medium varied among 5 Mississippi wetland species. Woolgrass (*Scirpus cyperinus* L. Kunth [Cyperaceae]) and softstem bulrush (*Schoenoplectus tabernaemontani* (K.C. Gmel.) Palla [Cyperaceae]) retained seed viability best under dry or moist storage conditions; seeds germinated best on saturated growing medium but seedlings grew better on nonsaturated medium. Powdery thalia (*Thalia dealbata* Fraser ex Roscoe [Marantaceae]) was similar to these species, but seeds germinated better on nonsaturated medium. Two *Sagittaria* species, longbeak arrowhead (*Sagittaria australis* (J.G. Sm.) Small [Alismataceae]) and bulltongue (*Sagittaria lancifolia* L.), retained seed viability better under moist conditions or immersed in water; seed germination and seedling growth was better on saturated growing medium.

KEY WORDS: germination, seed storage, *Scirpus, Schoenoplectus, Thalia, Sagittaria*, woolgrass, bulrush, arrowhead, bulltongue

NOMENCLATURE: USDA NRCS (1999)

WOOLGRASS

I harvest woolgrass (*Scirpus cyperinus* L. Kunth [Cyperaceae]; Leaf River Source) seeds in mid to late September by pulling or cutting the fruit clusters from the stem. I loosen seeds from the fruit clusters using a brush machine (Westrup a/s Slagelse, Denmark) and then use a 50 X 50 (0.356 X 0.356 mm openings) wire mesh seed cleaning screen to remove inert matter. I have found that woolgrass can be stored dry or moist at cold temperatures without affecting germination;

Photo by BB Billingsley Jr.

*Woolgrass (*Scirpus cyperinus*).*

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I have achieved germination of 40% to 60%. Germination takes about 3 wk and is highest when the medium is saturated. However, after germination seedling growth is best on moist medium. This agrees with my observations that wild plants require fairly wet conditions for germination, but plants become increasingly tolerant of drying substrates as they grow, with mature plants possessing a higher level of drought tolerance than would be anticipated for a wetland plant.

SOFTSTEM BULRUSH

Ripening dates for softstem bulrush (*Schoenoplectus tabernaemontani* (K.C. Gmel.) Palla [Cyperaceae]; synonym = *Scirpus validus* Vahl) seeds vary from early August through mid October and I harvest them by pulling or cutting the fruit clusters from the stem. Without further drying the plant material, I loosen seeds from fruit clusters using a brush machine (Westrup a/s Slagelse, Denmark) and sieve the seeds through a 1/13 (1.953 mm) round hole screen to remove inert matter. I have achieved germination rates around 30% after 4 wk using 2 storage methods: 1) storing seeds under moist, cold conditions for 5 to 7 mo; or 2) dry for 2 to 3 mo followed by 3 to 4 mo cold, moist stratification treatment similar to the post-harvest storage technique described earlier. Seeds germinate best in a saturated growing medium and seedlings grow well under both moisture regimes.

LONGBEAK ARROWHEAD AND BULLTONGUE

I harvest longbeak arrowhead (*Sagittaria australis* (J.G. Sm.) Small [Alismataceae]) and bulltongue (*Sagittaria lancifolia* L.) species during late August through early October by manually shattering fruit clusters on the plants and collecting falling seeds in a container. Seeds require only hand-sieving through screens to remove small amounts of trash (longbeak arrowhead, 3/64 X 5/16 [1.191 X 7.938 mm] oblong hole; bulltongue, 1/16 [1.157 mm] round hole). Both species germinate best on saturated medium (23% to 52% for longbeak arrowhead and 28% to 53% for bulltongue, 10 to 11 wk after planting) after moist and water storage, although I have observed good (49%) germination of bulltongue after 5 mo of dry storage. Continued seedling growth of both *Sagittaria* species seems to be best on saturated medium indicating a preference for anoxic conditions.

POWDERY THALIA

I collect powdery thalia (*Thalia dealbata* Fraser ex Roscoe [Marantaceae]; Indian Bayou Source) seeds by shaking the fruit clusters over a container, and then rub them over a roughened surface (I use an old radiator screen from a tractor) to remove the papery fruit coverings, which are then blown away. Seeds usually ripen in late August through mid September. I found best germination (15% to 35% after 9 to 12 wk) on moist growing medium after either stratifying dry-stored seeds or keeping seeds in moist storage. Further seedling growth, particularly root growth, was also best on moist growing medium.

REFERENCE

USDA NRCS. 1999. The PLANTS database, Version 3.0. URL: http://plants.usda. gov/plants (accessed 29 Sep 2000). Baton Rouge (LA): National Plant Data Center.

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