



Equipment settings for cleaning seeds of

SMOOTH CORDGRASS

Spartina alterniflora Loisel.

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ABSTRACT

USDA NRCS Cape May Plant Materials Center has successfully utilized an agricultural combine for cleaning seeds of smooth cordgrass (*Spartina alterniflora* Loisel. [Poaceae]). Large-scale conservation and restoration efforts will benefit when this technique can be cost effectively implemented.

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KEY WORDS

seed cleaning, shoreline erosion control, tidal marsh restoration

NOMENCLATURE

USDA NRCS (2006)

Smooth cordgrass (*Spartina alterniflora* Loisel. [Poaceae]) Photos by Cape May Plant Materials Center

Smooth cordgrass (*Spartina alterniflora* Loisel. [Poaceae]), also known as smooth cordgrass and saltwater cordgrass, is a dominant warm-season species occupying the intertidal zone of estuarine plant communities. It is native on the US Atlantic and Gulf coasts but is considered to be a highly invasive species on the US Pacific coast. Although primarily used for erosion control on shorelines and canal banks, it is also used to reduce wetland losses and for restoring tidal marshes within its native range. It forms an extensive rhizomatous root system that is roughly 5X larger than its aboveground biomass. The rhizomes are a favorite food of snow geese (*Chen caerulescens* L. ssp. *atlantica* [Anatidae]).

In the past, large-scale harvesting, processing, and cleaning of smooth cordgrass seeds has been limited to hand processes to ensure high levels of viable seeds. The USDA NRCS Cape May Plant Materials Center used an agricultural combine as a form of large-scale seed-cleaning equipment. This resulted in hundreds of pounds of viable seeds. These results serve to advance the cost effectiveness of large-scale estuary conservation and restoration efforts.



Figure 2. A combine efficiently separated seeds from chaff.



Figure 1. Harvested cordgrass must be turned daily to promote proper drying.



Figure 3. Cleaned cordgrass seeds.

HARVEST AND POSTHARVEST

Seeds are harvested by hand during September and early October with a variety of handheld tools. During postharvest handling, seeds are allowed to after-ripen in a wind- and weather-protected building for at least 14 d. Combined material is spread over an area no deeper than approximately 30 to 38 cm (12 to 15 in). Materials are turned every day by hand with a pitchfork, to ensure even temperatures and ripening, and are lightly watered with a garden hose to ensure that seeds do not desiccate (Figure 1).

Traditionally, nurseries would then run materials through small-scale seed-cleaning equipment or clean it by hand; instead, the Cape May PMC used a Massey Ferguson 8XP plot combine (Massey Ferguson, Coventry, Great Britain; owned by AGCO Corporation). Staff used pitchforks to slowly but steadily feed materials into the head. The head was raised about 30 cm (1 ft) off the ground; the reel was raised upward away from the head and set on the slowest rotating speed (Figure 2).

Many combine settings were tested, and the following settings yielded the cleanest and least-damaged seeds.

Fan speed: 9
Cylinder speed: 7
Concave: 12
Air inlet: Full-Open
Adjustable sieves: 15 mm

PROCESSING AND CLEANING SEEDS

Following combining, materials were transported to the seed-cleaning plant. Two primary pieces of equipment were used. Materials were first scalped using a Model 36-A seed scalper manufactured by the Hance Corporation (Westerville, Ohio). One 18/64th top screen was used with no bottom screen. Air was closed to avoid seed loss. Materials were then screened in a Model 62-D Clipper Seed Separator (Clipper Separation Technologies, AT Ferrell Company, Bluffton, Indiana). The 62-D three-screen separator performed best at the following settings.

Hopper roller opening: 2/3rd open
Air deflector board: 1/4 in open
Fan speed: 900 RPM
Top screen: #24
Middle screen: Slotted 6/64th by 3/4 in
Bottom screen: 1/25th covered with paper
Adjustable speed: 1/2-turn open
Seed discharge door: Closed
Top and bottom fan balancer:
Air flow ribbon balanced

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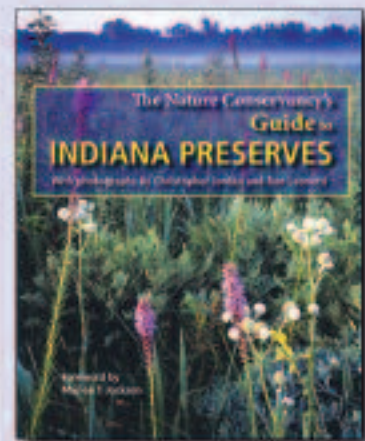
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Once cleaned (Figure 3), cordgrass averages 385 000 seeds/kg (175 000 seeds/lb) (USDA NRCS 2006).

Cost-effective seed cleaning of the coastal halophyte smooth cordgrass can be accomplished. Because of the purchase costs associated with the machinery mentioned, a propagator will need to carefully examine available labor rates, quantity of seeds that will be processed, and the cost of equipping their operation with similar machinery.

REFERENCE

[USDA NRCS] USDA Natural Resources Conservation Service. 2006. The PLANTS database, version 3.5. URL: <http://www.plants.usda.gov> (accessed 17 Oct 2006). Baton Rouge (LA): National Plant Data Center.

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