

Evaluating the Effectiveness of Seed Banks for the Recovery of Sawgrass in A.R.M Loxahatchee National Wildlife Refuge

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BACKGROUND

Sawgrass (*Cladium jamaicense*) is an important species in the Everglades, contributing to the formation of peat ridges and providing vital habitat for plants and animals. As a result, the conservation of sawgrass is imperative in order to maintain the integrity of the Everglades marsh ecosystem. Recovery of sawgrass following natural disturbances like wildfires is by regrowth from belowground rhizomes. However, herbicides used for invasive species management destroy rhizomes, thereby limiting recovery. Sawgrass can also produce seeds, which can recolonize or spread sawgrass communities. In this study we examine the soil sawgrass seed bank at the A.R.M Loxahatchee National Wildlife Refuge (Figure 1). This study will provide insight into the recruitment potential of sawgrass from soil seed banks, and help evaluate the potential rate of habitat recovery following invasive species removal in the Everglades.



Figure 1: Study sites were located at the A.R.M. Loxahatchee National Wildlife Refuge in Boynton Beach, FL (left). Samples were collected from sawgrass-dominated communities (right).

OBJECTIVES

The study is comprised of two components:

1. A seed bank assay to quantify the density of sawgrass seeds in the extant soil seed bank.
2. A germination assay to quantify seedling emergence under optimal greenhouse conditions.

METHODS

- Soil samples were collected from sawgrass-dominated communities at ARM Loxahatchee National Wildlife Refuge.
- 15 samples (10 cm dia, 3cm deep) collected for seed bank density.
- 15 samples (20 cm x 30 cm, 5 cm deep) collected for germination assay.

1. SEED BANK DENSITY

- Obtain replicate soil samples of known volume.
- Count all sawgrass seeds from each soil sample (Figure 2).



Figure 2: Sawgrass seed, typically ~3 mm in length.

2. SEED GERMINATION

- Sawgrass soil samples (n=15) collected in aluminum and returned to Davie Greenhouse (Figure 3).
- Saturated soil conditions maintained and samples monitored weekly for seedling emergence (Figure 3).



Figure 3. Layout of seed germination samples in the Davie Greenhouse (left) and example of sawgrass seedling emergence from the soil seed bank (right).

RESULTS

- Sawgrass seed density is approx. 5350 seeds m².
- Sawgrass germination is low, with a maximum of 14 sawgrass seedlings observed in a single sample.
 - ~23 seedlings m²

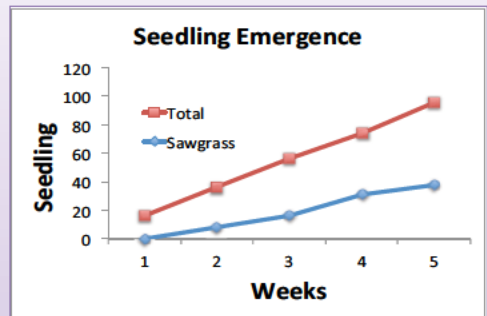


Figure 4: Sawgrass seedlings germinated in contrast to total seedlings germinated in entire seed bank study. After five weeks 38 sawgrass seedlings and 96 total seedlings were observed.

IMPLICATIONS

- This study will provide us with a better understanding of both the spatial distribution and recruitment potential of sawgrass seeds.
- As a result, we will be able to better estimate the reestablishment ability of sawgrass following a disturbance.

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