

Seabeach Amaranth Seed Sowing Protocol



Sea Girt National Guard Training Facility
2019



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Introduction

Seabeach Amaranth (*Amaranthus pumilus*) is a federally threatened plant species native to New Jersey. It grows in open sandy beachfronts along the Atlantic coast. Habitat destruction and alteration, such as grooming beachfronts for recreational use, are the primary threats to this species. Seabeach amaranth is also intolerant to overcrowding by other native and non-native plant species, and can be easily displaced by fast growing competitors such as the invasive Asiatic Sand Sedge (*Carex kobomugi*).

The Department of Military and Veterans Affairs, with cooperation from the Stockton University Environmental Internship Program (SUEIP) and the United States Fish and Wildlife Service (USFWS) will conduct an experimental growing season at the Sea Girt National guard Training Facility. The Northern and Southern Protection Areas (NPA and SPA) of the beachfront will serve as experimental plots for determining the effectiveness of three different seed sowing methods:

1. Casting – seeds deposited on the surface, not covered
2. Cast and Cover – seeds deposited on the surface, then covered with sand
3. Seed Planting – seeds placed in depressions 1cm deep, then covered with sand

Methods for each sowing method are included below. Results from this experiment will be used to determine which of the three sowing methods, if any, are most effective and practical for planting in the future. Seeds will be provided by Wendy Walsh from the USFWS.

Important parameters:

1. Experimental plots must not be established near previously documented amaranth locations to avoid any pre-existing seedbanks that could skew trial results.
2. Experimental plots must not be established near previously documented Asiatic Sand Sedge locations, as uprooting of regenerating sand sedge could disrupt the conditions of the plot.
3. Experimental Plots must not be established in the vegetation thinning area.
4. Wind at this beachfront typically blows in a S, SW, or SE direction. Experimental plots should be arranged in an East – West direction to avoid potential seed distribution between experimental plots.
5. E-W plots should not be located more than 5m from each other.
6. N-S plot rows should not be located more than 15m from each other.
7. Each plot will receive the same number of seeds, regardless of the sowing method.
8. Plot arrangement should be staggered, as shown in Figure SG1 to avoid any bias in regards to location or conditions.

9. The persistent winds at the Sea Girt facility, as well as the low density of the amaranth seeds could pose experimental challenges due to seeds dispersing out of the experimental plots. Weather conditions, including wind speed and direction should be documented at the time of planting. If wind conditions prove to be an issue, perhaps a cold stratification/post-germination planting method should be implemented in future years.

Methods

1. Back-navigate to documented sand sedge and amaranth locations using historical location data. Flag these locations so they can be avoided when establishing the experimental plots.
2. Starting at the north end of the NPA, establish the first E-W plot line, as shown in Figure SG2, spacing each plot at least 5m apart.

Establishing a Plot

- A. Using Orange flags, mark the boundaries of a 2m x 2m square.
 - B. Write the plot number on the flag with a permanent marker.
 - C. Record the number, coordinates, planting method, and other notes on “Datasheet A: Seabeach Amaranth Experimental Plot - Sowing” (see attached).
3. After the first E-W plot line has been established, fill a sample bag with surface sand for grain size and moisture content analysis. Label the bag with the Plot number.
 4. Sow the seeds with the assigned planting method according to Table 1: Assigned Sowing Method.

Casting – Gently cast 30 seeds into the plot area, with an attempt to distribute them evenly throughout the plot area. Do not cover.

Cast and Cover - Gently cast 30 seeds into the plot area, with an attempt to distribute them evenly throughout the plot area. Using a gentle kicking motion, kick sand from outside of the plot area to evenly cover (approximately 1cm deep) the sown seeds inside of the plot area, being careful not to move the seeds out of the plot area in the process.

Planting – Make 15 depressions in the sand, evenly spaced (at least 10 inches apart) in the established plot area. Place a white flag 2 inches East

(toward the ocean) of each depression to mark its location. Place 2 seeds in each depression, then gently fill the depression with sand.

Table 1: Assigned Sowing Method

Protection Area	Plot Line	Plot #	Sowing Method
NPA	1	1	Cast
NPA	1	2	Cast & Cover
NPA	1	3	Plant
NPA	2	4	Plant
NPA	2	5	Cast
NPA	2	6	Cast & Cover
NPA	3	7	Cast & Cover
NPA	3	8	Plant
NPA	3	9	Cast
NPA	4	10	Cast
NPA	4	11	Cast & Cover
NPA	4	12	Plant
NPA	5	13	Plant
NPA	5	14	Cast
NPA	5	15	Cast & Cover
NPA	6	16	Cast & Cover
NPA	6	17	Plant
NPA	6	18	Cast

Protection Area	Plot Line	Plot #	Sowing Method
SPA	7	19	Cast
SPA	7	20	Cast & Cover
SPA	7	21	Plant
SPA	8	22	Plant
SPA	8	23	Cast
SPA	8	24	Cast & Cover
SPA	9	25	Cast & Cover
SPA	9	26	Plant
SPA	9	27	Cast

5. Continue to establish the remaining plot lines in the NPA and SPA, working North to South, spacing each plot line at least 15m apart.

6. Analyze the collected sand samples for grain size using dry sieving and roto-tapping lab methods.

7. Analyze the collected sand samples for moisture content
 - a) weigh the non-dried sample
 - b) dry the sample in a drying oven
 - c) weigh the dried sample
 - d) non-dried sample mass – dried sample mass = amount of moisture lost during drying.

8. Monitor each plot bi-weekly throughout the growing season, collecting and analyzing additional sand samples. Document plot observations on the “Datasheet B: Seabeach Amaranth Experimental Plot – Bi-Weekly Monitoring” (see attached).

Materials Needed

For Sowing:

Seeds

Datasheet A

Table 1

Sample bags for sand collection

Measuring Tape – at least 15m

GPS

Historical amaranth and sand sedge location data – loaded on GPS

Camera

Clip Board, Pens, Pencils

For Bi-Weekly Monitoring:

Shovels and garbage bags – for uprooting sand sedge

Datasheet B

Sample bags for sand collection

Measuring Tape – at least 15m

GPS

Historical amaranth and sand sedge location data – loaded on GPS








Camera

Clip Board, Pens, Pencils

**Figure SG1
Sea Girt Beachfront
NPA and SPA**



Legend

-  Veg Thin Area
-  Installation_Area
-  NPA Boundary
-  SPA Boundary
-  Plot - Cast
-  Plot - Cast & Cover
-  Plot - Plant

0 50 100 200 300 400 500 Feet

1 inch = 203 feet



Notes:
SPA boundary approximate



Scale: 1 inch = 203 feet

File: Figure SG1

Date: 3/8/2019




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Figure SG2
Sea Girt Beachfront
NPA



Legend

-  Veg Thin Area
-  Installation_Area
-  NPA Boundary

-  Plot - Cast
-  Plot - Cast & Cover
-  Plot - Plant



1 inch = 101 feet



Scale: 1 inch = 101 feet

File: Figure SG2

Date: 3/8/2019






Created By: Your Name

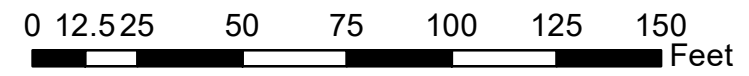


**Figure SG3
Sea Girt Beachfront
SPA**



Legend

-  Installation_Area
-  SPA Boundary
-  Plot - Cast
-  Plot - Cast & Cover
-  Plot - Plant



1 inch = 46 feet



Notes:
SPA boundary approximate



Scale: 1 inch = 46 feet
File: Figure SG3
Date: 3/8/2019
Created By: John Hallagan

