USDA
United States Department of Agriculture

Fall Issue
Sept, Oct, Nov

Cape May, New Jersey
USDA-NRCS

Cape May Coastlines

INSIDE THIS ISSUE:

Figure 1. Field erosion before grassed waterway seeding (Oct., 2013).

Figure 2. Grassed waterway one year after installation (Sept., 2014)

Production of Saltmarsh Mallow

The PMC continues to work on a Virginia saltmarsh mallow (*Kosteletzkya virginica*) project in conjunction with the University of Delaware Halophyte Biotechnology Center in Lewes, DE. The PMC started partnering in the effort to look for potential crops suitable for sustainable saline agriculture and wetlands restoration in the wake of current and inevitable future sea level rise. These coastal farms and wetlands are an important part of the economy in the Mid-Atlantic region. The goal is to identify, develop, and improve salt-tolerant crops for use in high-saline agroecosystems.

While this research is locally and regionally relevant, knowledge gained can also be used in other parts of the world that are challenged with highly salinized soils or in regions with access only to saline water for irrigation. Project partners in China include Nanjing University, which is also conducting *Spartina patens* research for saline agroecosystems. Additionally, this crop has also been successfully used for 2nd generation biofuel production.

This year, the PMC planted saltmarsh mallow at the PMC into a periodically flooded pit and an upland dry plot for comparison. The PMC will also begin cleaning and storing seed of various collections of this plant for the University of Delaware researchers, Jack Gallagher and Denise Seliskar.

This work was recently featured in an NPR radio program entitled “The Pulse” in a segment called “Sea level rise spells salty future for coastal farms”. The show mentioned a recent 2014 survey conducted by the New Jersey Climate Adaptation Alliance which found “71 percent of respondents named increased flooding as a ‘great concern’ for their farms, and 41 percent said the same for saltwater intrusion.”

Field Office Assistance in Woodstown

In October 2013, the PMC staff assisted the Woodstown, NJ field office by providing a mix of cool and warm season native grass seed and seeding recommendations for a grassed waterway installation in sandy soils. The plants included in the seeding were: ‘Carthage’ switchgrass 5 lb/ac; ‘Atlantic’ coastal panicgrass 5 lb/ac; Canada wildrye 10 lb/ac; creeping red fescue 30 lb/ac; and 10 lb/ac perennial ryegrass. The farmer used a Brillion seeder set at the lowest setting, and the site was covered with an erosion control blanket that was 30% coconut fiber. By mid-November cool-season companion grasses were well-established. After one year of growth the seeding is doing well, and there is no evidence of significant gullying. According to the NRCS civil engineering technician, this seeding mix performed well and will be recommended for similar situations in the future.

Plant Development: Amberique-bean

PMC staff is continuing efforts to develop amberique-bean (*Strophostyles helvola*) for dune revegetation purposes. The purpose of the trial was: 1) to determine if there were any trends between this year's planting and last year's; 2) to established the date of optimal harvest yield; and 3) to determine ideal seeding rates.

In May, 10 accessions from the 2013 seed increase were planted at a "high" and "low" rate both at the Cape May PMC and on a newly constructed dune in Avalon NJ. They were planted on 5 foot rows, with 12 ft between rows, and replicated twice. The Avalon trial area had been planted with American beachgrass (*Ammophila breviligulata*) prior to seeding.

Seedling counts were performed weekly for 11 weeks to track seedling emergence and survival. Early indications show a higher seedling survival rate at the PMC trial compared to the dune trial.

Figure 3. Amberique-bean planted into constructed dune.

Staff collected data on flowering, seed set, and mature seed production dates, vegetative spread, and root measurements. Seed from each plot was collected separately and stored until cleaning.

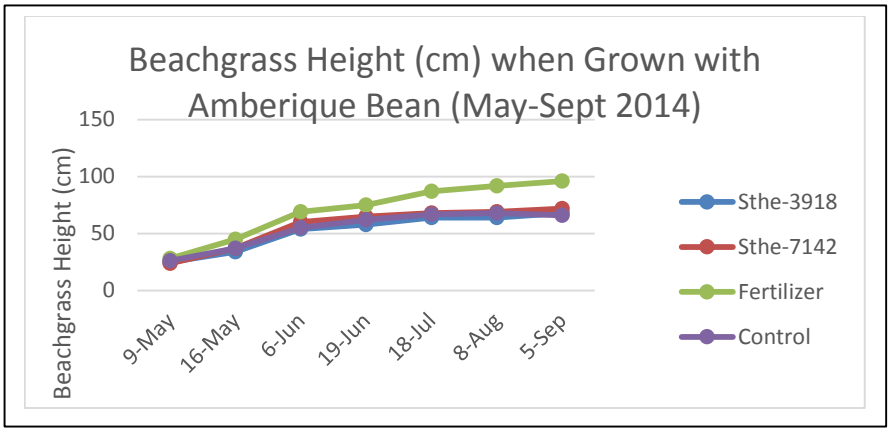
Additionally, an experiment was installed in the NJPMC hoop house to determine if there is any mutualistic beneficial effect of growing American beachgrass and amberique-bean together. The hypothesis was that growing amberique-bean in combination with beachgrass should increase stem number, shoot height, root length, and seed formation due to the N-fixing mechanisms in the legume's roots. The treatments consisted of the two "best-performers" from the 2013 amberique-bean seed increase, a fertilizer, and a control. The treatments were replicated four times for a total sample number of 160 pots (10 for each treatment).

So far, results indicate that the only significant effect was the increase in the number of beachgrass seedheads produced when grown in combination with both amberique-bean accessions, as compared to control. At this point, the mechanism responsible for this effect is unknown.

Stem height and stem number were significantly greater in the fertilizer treatment (as predicted), but not different between amberique-bean and control (not expected).

Figure 4. Root length of beachgrass (left) and Amberique bean (right).

The two amberique-bean accessions were different in leaf count and root length. Other attributes such as leaf length, leaf width, seed length, seed width, seedpod count, nodule count, size, and activity were not significantly different. Data on root and shoot biomass have yet to be analyzed, but so far, there does not appear to be a significant benefit to root or shoot growth, or stem number to beachgrass when grown with amberique bean in a controlled setting.



Cover Crop Observation Study: Single; Mix; and Cocktail

Due to recent national and state interest in cover crops, use of cocktail mixes, and soil quality, PMC staff teamed up with the State Office resource staff to establish a demonstration planting of a variety of late-seeded cover crop species (seeded Oct. 3). Species were: cereal rye; winter triticale; oats; hairy vetch; annual ryegrass; tillage radish; crimson clover, and phacelia. Three plots included a mix of 1) tillage radish + annual ryegrass + crimson clover; 2) tillage radish + oats; and 3) tillage radish + triticale + crimson clover.

Additionally, a separate observation study of cover crop cocktails was seeded on Sept. 16. The first cool-season mix (10 species) consisted of spring oats, rye, purple vetch, white clover, red clover, Austrian field pea, rape, forage chicory, forage radish, and purple top radish. The second mix (7 species) consisted of rye, barley, Austrian field pea, forage radish, purple top radish, rape, and purple vetch. The two mixes were planted at a "high" 69.5 lb/ac and "low" 52.5 lb/ac seeding rate. These cover crops followed a warm-season planting of sorghum and cowpea mixture.

Figure 1. Single species cover crop plots 20 days after planting.

Figure 2. Cover crop cocktail mix (7 species) 30 days after planting.

Cape May
Plant Materials Center
1536 Route 9 North
Cape May Court House
NJ, 08226

Phone: (609) 465-5901
Fax: (609) 465-9284

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