Investigations into Cultural Techniques for the Commercial Production of the

Coastal Halophyte Seabeach Amaranth (*Amaranthus pumilis* Raf.)

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Abstract

The purpose of this study was to determine if seabeach amaranth responds to different color plastic mulches. Four treatments of plastic color mulch were chosen based upon anticipated variations in soil temperatures associated with solar radiation transmissivity and reflectivity of the membrane. They were red, black, green and white. Preliminary results indicated that the red and black mulches did improve overall plant growth. Additionally, the use of the plastic mulch did drastically improve seed harvest efficiencies when compared to the 1998 study.
Final data will be collected in the summer of 2005 when the treatment randomization design will be improved upon.

Materials and Methods:

Seed of seabeach amaranth was stratified for 45 days at 3 degrees Centigrade in zip lock bags containing a mixture of 50% sand and 50% pro-mix growing media. Stratified materials were then placed in standard solid bottom nursery flats and placed into the greenhouse. Upon emergence materials were transplanted into 5 cm containers using a mixture of peat/sand 9:1 ratio. Greenhouse conditions were simulating a14 hour photo period by using 400 watt high pressure sodium lights. Diurnal temperatures of 27 degrees Centigrade during the days and 10 degrees Centigrade during the night.
Field plots were prepared and red, green, black and white plastic mulch 1.25 cm thickness was installed in the field. T-tape with emitters every 30.5 centimeter was installed under the plastic mulch for irrigation purposes.

On June 20th, the plants were transplanted 30 cm. apart directly into the plastic mulch treatments with one control planted without plastic mulch along the southern edge of the experiment. The treatments were arranged in a randomized complete block design (RCDB) with nine replications (df=36). Each experimental unit consisted of 5 plants (n=180). Shoot height (cm) and length (cm) were measured eight weeks after planting in the field. Shoot length was defined as the distance from the crown to the terminal bud of the longest shoot growing horizontally to the ground. Shoot height was defined as distance from the crown to the terminal bud growing vertically to the ground.

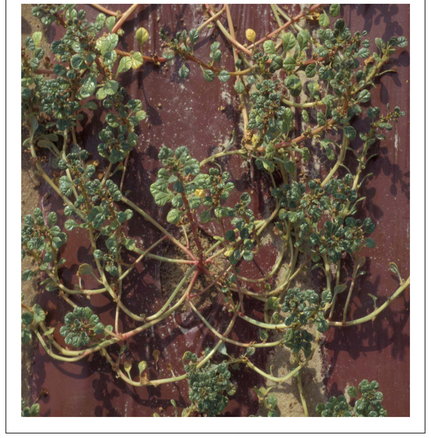

Photo of Seabeach amaranth on red plastic mulch.

Photo of fields showing sorghum windbreaks between rows to decrease loss of shattered seed.

Table 1. Effect of plastic mulch on growth of Amaranthus pumulis (seabeach amaranth) in Cape May Court House, N.J., 2003.

	Shoot Growth (cm)[1]	
Treatment	Length	Height
Red Plastic	27.2a	9.1a
Black Plastic	26.6a (-2.2%)	8.0b (-12.1%)
Green Plastic	20.0b (-26.5%)	6.8c (-25.3%)
White Plastic	12.8c (-52.9%)	5.9c (-35.1%)
Pr > F	<0.0001	<0.0001

[1]Mean separation performed within column.

Results and Discussion:

There was a highly significant effect ($P<0.0001$) of color of plastic mulch on height and length of shoot growth (see Table 1). Plants grown on red plastic and black plastic had significantly longer shoots (27.3 and 26.6 cm respectively) than plants grown on green plastic (19.9 cm) or white plastic (12.8 cm). Plants grown on red plastic (9.1 cm) produced shoots with the greatest height in the study.

Summary:

Cost effective nursery seed production of the coastal halophyte Seabeach amaranth will depend on its response to plastic mulches and the ability to collect seed in a cost effective manner. A field study was established at the Cape May Plant Materials Center in Cape May New Jersey. The study was to determine if plastic mulches would have an effect on plant performance and if the plastic mulch would keep seed separate from soil thus making seed collection and cleaning more cost effective. Greenhouse propagated materials were transplanted into four plastic mulch treatments. They were red, green, black and white. Drip trickle irrigation was installed under the plastic to provide water to the plants.

Results suggest that red plastic and black plastic mulches improved overall plant growth in comparison to the other mulches evaluated. Additionally, the plastic mulch provided an effective membrane for keeping the shattered seed off of the soil surface and made vacuum harvested seed easier to clean

A second year of data collection is planned for 2005.

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