

EVALUATION OF PLANTS FOR STABILIZING UNSHAPED GULLIES

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ABSTRACT

In 1985, a project was initiated to evaluate plant materials in Escambia County, Alabama, for stabilizing unshaped gullies. Thirty seven plant accessions were planted in 1985, 1986, and 1987. The accessions selected for the project had the characteristics of being strongly rhizomatous and the ability to tolerate sediment buildup. Sediment buildup and sanding over is a serious problem for plants to survive in the main gully floor when high intensity rains occur.

Giant reed (*Arundo donax*), PI 432427, was used initially to provide some control of the flow of water and to prevent the main flow area from moving from one area to another because of sediment buildup. *Arundo donax* was planted to serve as a diversion. It has strong rhizomes and can resist the sediment buildup and the high velocities that can cause a plant to be washed away. 'Alamo' switchgrass was planted along the entire gully floor and other open areas. This plant can also resist sediment buildup by extending its rhizomes up through the sediment. The massive root system serves as a barrier to prevent soil movement.

Two accessions of Flageo marshhay cordgrass (*Spartina patens*), PI-421238 and PI-415141, was planted vegetatively near the edge of the gully to provide erosion control as water moved into the gully from adjacent areas of the watershed. Marshhay cordgrass is also strongly rhizomatous and can grow in areas where sediment and sanding over is a serious problem.

INTRODUCTION

Stabilization of large, active caving gullies using engineering methods is so expensive that less costly alternatives are needed. The floors of some gullies often remain sources of large amounts of sediment even after the caving is stopped by engineering methods. The deep sand and the unstable conditions of these gullies make natural plant succession difficult. These gullies cover about 80,000 acres in Alabama and Georgia.

Needs:

Plants that:

- establish quickly and easily without site preparation
- spread by rhizomes or runners
- form a dense, deep, tight root system that resists the caving actions of gullies
- grow well on deep sands
- tolerate low fertility
- tolerate varied moisture conditions

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Study Area:
(Escambia County Alabama)

The Escambia County Gully located on Sturdy Oak Farm (The Eichold Company), Section 20, Township 1 North, Range 5 East was the site selected for the study. The Escambia County Gully most likely originated in 1927 or 1929. The drainage area is 360 acres which is approximately 20 percent cropland and the remaining 80 percent is in woodland. The gully is approximately one mile in length.

In 1973 a sediment basin was constructed at the lower end of the gully. Eight fence structures were installed across the gully in June of 1983. The gully bottom width at the fence structures are as follows:

- structure no. 1 - 140 ft. lower end
- structure no. 2 - 120 ft.
- structure no. 3 - 80 ft.
- structure no. 4 - 20 ft.
- structure no. 5 - 20 ft.
- structure no. 6 - 25 ft.
- structure no. 7 - 22 ft.
- structure no. 8 - 18 ft.

Thirty-seven plant accessions were planted in the Escambia County gully project in 1985, 1986 and 1987 to be evaluated for gully erosion control. The 37 accessions selected have exhibited potential for gully stabilization in previous field planting trials. Most accessions selected for this planting are strongly rhizomatous and have the ability to tolerate sanding over, which is a serious problem in the main gully floor when high intensity rainfall occurs.

RESULTS AND DISCUSSION

The most promising accessions after the first growing season were:

- Giant reed (*Arundo donax*) - PI-432427
- 'Alamo' switchgrass (*Panicum virgatum*) - PI-422006
- Marshhay cordgrass (*Spartina patens*) - PI-421238 and 415141
- Bitter Panicum (*Panicum amarum*) - PI-421909 and 9003324

In 1986, additional plantings were established in other locations of the gully (Refer to Planting Layout for Escambia County Gully for details.) A list of the accessions that were planted in 1986 is provided below.

- 3 accessions of Marshhay cordgrass (*Spartina patens*)
- 1 accession of Honeysuckle (*Lonicera mackii*)
- 11 accessions of Giant reed (*Arundo donax*)
- 1 accession of willow (*Salix caprea*)
- 1 accession of willow (*Salix humilis*)
- 1 accession of 'Bankers' willow (*Salix cottetti*)
- 1 accession of Shoreline common reed (*Phragmites australis*)

The most promising accessions after the fourth year continued to be Giant reed (*Arundo donax*), Alamo switchgrass (*Panicum virgatum*), Marshhay cordgrass PI-421238 and PI-415141 (*Spartina patens*), Bitter Panicum PI-421909 and 9003324 (*Panicum amarum*).

Bankers dwarf willow (*Salix cottetti*) was a failure for the second time.

CONCLUSION

The Escambia Gully was evaluated for seven years to determine the best single plant and any combination of plants to recommend for stabilizing gullies in Alabama and Georgia. The dominant plants after seven years are as follows:

Giant reed (*Arundo donax*) - PI-432427
Alamo switchgrass (*Panicum virgatum*) - PI-422006
'Flageo' Marshhay cordgrass (*Spartina patens*)- PI-421238
Marshhay cordgrass (*Spartina patens*)- PI-415141

The Soil Conservation Service Plant Materials Centers at the following locations provided most of the plant materials.

- Americus Georgia PMC
- Brooksville Florida PMC
- Jamie L. Whitten Mississippi PMC
- Quicksand Kentucky PMC
- Knox City Texas PMC