TECHNICAL NOTES

COFFEEVILLE PLANT MATERIALS CENTER

No. 6 Coffeeville, Mississippi 1990

Advanced Evaluations of Giant Reed: IV. Comparison of a Coffeeville PMC Selection with Five Accessions from Brooksville (1987-1989)

Abstract

Six accessions of giant reed (Arundo donax L.) were evaluated at the Coffeeville Plant Materials Center (PMC) to determine if differences were great enough to justify release of a superior cultivar for conservation purposes in the PMC service area.

The accessions that were compared were PI-432432, a Coffeeville PMC selection, and five others that had performed better in Florida at the Brooksville PMC. The accessions were compared for survival, spread, and rhizome and stem production for three years. All accessions performed well, but differences were not great enough to warrant separate releases by the two PMC's unless demand becomes greater than anticipated.

Introduction

In advanced evaluations of giant reed completed at the Coffeeville PMC in 1986, PI-432432 was selected as the best of several accessions that had been evaluated there (Coffeeville PMC, 1987a; 1987b; 1987c). During the same period, the Brooksville PMC conducted evaluations on another assembly of giant reed and determined that five accessions performed better there than the Coffeeville selection (Brooksville PMC, 1986).

Since the anticipated use of giant reed in the southeastern United States did not appear great enough to support commercial production of two releases, this study was made to determine if PI-432432 would be sufficiently superior to justify releasing it for the Coffeeville PMC service area.

Materials and Methods

Six accessions of giant reed were assembled at the Coffeeville PMC and compared for winter injury, rate of spread, stem production, and rhizome production. Accessions were:

Accession	Origin
432425	Start County, Texas
432427	Sumter County, Georgia
432432	Randolph County, Georgia
9035155	Ware County, Georgia
9035156	Walton County, Florida
9035262	Leon County, Florida

Rhizomes of the six accessions were planted in Field 1-E in Oaklimeter sil at the Coffeeville PMC on March 23, 1987. The planting was a randomized complete block design with four replications. Each block contained a one-row plot of each accession. Rows were 50 feet long and 12 feet apart. Each row plot contained 10 separate hills where individual rhizomes were planted 5 feet apart. Fertilizer (13-13-13) was applied the first year at a rate of 300#/acre.

Data were taken for each plot at the beginning and end of the growing season (1987-1989). Evaluations recorded included survival (percent of hills alive), number of stems per hill, average stem height (inches), and average spread (length X width in square inches) of each hill.

At the end of the three-year evaluation period, three hills were randomly selected from each row and the entire biomass of each hill was collected and divided into aboveground (stem) and underground (rhizome) separates. The separates were air dried, weighed, and the data analyzed.

Results and Discussions

Average values for all hills of each accession for the evaluation period (1987-1989) are given in Tables I and II. The average number of stems is given in Table I, and Table II gives the average spread and height for the hills. As the data in these tables indicate (*), accessions PI-432427 and PI-432432 consistently have the highest average.

Table I. Average Number of Stems per Hill at Coffeeville, MS (1987-1989)

Accession Number	Spring 1987	Fall 1987	Spring 1988	Fall 1988	Spring 1989	Fall 1989
432425	2.0	14.8	24.3	37	61	63
432427	1.8	15.3	31.0	47	61	64
432432	2.2	16.3*	34.3*	57*	73*	80*
9035155	2.3*	13.3	27.0	40	59	61
9035156	2.0	14.3	24.8	46	59	61
9035262	2.1	14.5	26.3	45	60	61

Table II. Average Spread (sq. in.) and Height (in.) Per Hill in the Fall For Giant Reed Accessions at Coffeeville, MS (1987-89)

Accession Number	Spread (sq. in.)			Height (in.)		
	1987	1988	1989	1987	1988	1989
432425	121	917	1920	86.3	179*	173
432427	128*	1044*	2229*	104.5*	178	183*
432432	128*	851	2205	98.0	159	168
9035155	117	829	2061	98.0	169	173
9035156	117	919	1960	86.8	167	179
9035262	128*	876	1882	98.8	169	172

The data for Table II above were taken at the end of each growing season. Each hill was measured and average values for spread and height for each accession were computed. Average spread was recorded in square inches (length X width), and the average height for stems was the average height of the larger stems based on the judgment of the recorder. Although these measurements may be semi-quantitative, they are useful to compare growth of the six accessions.

At the end of the third growing season, three plants of each row of each accessions were harvested. Average weights for aboveground (stems) and underground (rhizome) production per hill are given in Table III.

Table III. Average Weight (lbs.) of Six Giant Reed Accessions Produced from one Rhizome after Growing for Three Years

Accession	Rhizomes	Stems
432425	32.5	21.9*
432427	37.2	18.6
432432	37.3	18.8
9035155	41.8*	18.6
9035156	41.8*	19.7
9035262	30.3	17.8

All the data were statistically analyzed. Of the data, an analysis of variance showed significant differences in only two characteristics. They were percent survival three months after planting and the average number of stems per hill in the spring of the second growing season (1988). Averages of these were separated using the Duncan's multiple range test (DMRT). Results of these analyses are given in Table IV.

Table IV. Average Survival (%) and Stem Count for Giant Reed with Means Separated by DMRT (p=0.05)

Accession	Survival	Stems
432425	77.5 BC	25 C
432427	90.0 ABC	31 AB
432432	72.5 C	34 A
9035155	97.5 A	27 BC
9035156	92.5 AB	25 C
9035262	92.5 AB	26 C

The data for PI-432432 in this study are comparable to those obtained in earlier studies (Coffeeville PMC, 1987a; 1987c). When similar data are compared in the previous reports, some values are higher and some lower in this study. For rhizomes were planted in March in the earlier study (Coffeeville PMC, 1979a), survival was 80 percent compared to 72.5 in this study.

Conclusion

Except in two cases, an analysis of variance did not show any significant differences between accessions. Of the six selections tested at Coffeeville, any accession would adequately serve the purposes for this service area based on the criteria observed.

Years of testing at the Coffeeville PMC have shown giant reed to be climatically adapted, is easy to grow, and appears to be adapted to a number of soil types and conditions. Potentially, giant reed could be used to stabilize banks, in vegetative flumes (Coffeeville PMC, 1988), in constructed wetlands, and other situations using conservation plants or ornamentals. Any further work with this giant grass should be directed toward application rather than toward releasing a cultivar where so few differences between accessions can be shown.

References

Brooksville PMC 1986. Annual Technical Report pp. 12-27.

Coffeeville PMC. 1987a. Technical Notes No. 3. Advanced Evaluations of Giant Reed: I. Results of the Monthly Planting Study.

_____. 1987b. Technical Notes No. 4. Advanced Evaluations of Giant Reed: II. Planting Position study.

_____. 1987c. Technical Notes No. 5. Advanced Evaluations of Giant Reed: III. Survival and Spread Study (1983-1986).

_____. 1988. Technical Notes No. 2. Investigations into the establishment of vegetative flumes at the Coffeeville Plant Materials Center (1983-1987).