SURVIVAL AND GROWTH OF VEGETATIVELY GROWN PATIPATA (*Schumannianthus dichotoma*) : AN EXPLORATORY STUDY

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ABSTRACT

Pati-pata (*Schumannianthus dichotoma*) grows well in the land which is unsuitable for any other agricultural crop (jute, rice, etc.). Cultivation of pati-pata is less expensive than that of jute or rice, giving a good economic return. An experiment was conducted to determine the growth and survival of a pati-pata plantation during the first year after planting. Both rhizome and branch cutting were used as propagating material for plantation. The results indicate that rhizomes are significantly more suitable than branch cutting for survival, average number of new culms produced and average height growth. No significant difference was found among the localities other than in Sylhet for average number of new culm produced and average height growth in rhizome planting.

সারসংক্ষেপ

যে জমি অন্য কোন অর্থকরী শস্য (ধান, পাট, ইত্যাদি) চাষের উপযোগী নয়, সেখানে পাটিপাতার চাষ সম্ভব। ধান, পাট ইত্যাদির তুলনায় পাটি পাতা চাষের খরচ কম। উপরন্তু এটি অর্থনৈতিক দিক থেকে তাদের চেয়েও লাভজনক। পাটি পাতা চাষাবাদ প্রকল্পে পাটি-পাতা লাগানোর এক বছর পর এর বৃদ্ধি ও বেঁচে থাকার হারের উপর এক গবেষণা চালানো হয়েছে। গবেষণা কাজে মূড়া বা মোথা ও শাখার কাটা অংশ বংশ বিস্তার সামগ্রী হিসেবে ব্যবহার করা হয়। ফলাফল বিশ্লেষণে দেখা যায় মূড়া বা মোথা, শাখার কাটা অংশ থেকে বংশ বিস্তার সামগ্রী হিসেবে উত্তম। বিভিন্ন এলাকা হইতে সংগৃহীত মূড়ার মধ্যে এলাকার ভিত্তিক কোন প্রভাব পরিলক্ষিত হয় নি। তবে সিলেট অঞ্চলের পাটি পাতার মূড়ার বৃদ্ধি কিছু ভাল মনে হয়।

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INTRODUCTION

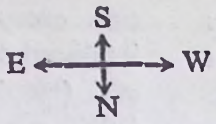
Pati-pata (*Schumannianthus dichotoma* Syn. *Clinogyne dichotoma*) grows well in marshy places. The plant is shrubby with cylindrical blackish stems of 3.7 to 4.6 m (12—15′) height and also dicotomously branched with leaves, broadly rounded at the base. Its flowering period lies between March to May. Flowers are white, yielding two to three lobbed fruits with two to three seeds. This plant is used as a raw material for making shitalpati, mats, etc., from ancient times. Shitalpati and decorative mats are traditional products in Bangladesh. They have potential markets in home and abroad. But this valuable resource is now seriously threatened for its existence. Once the low-lying areas of Sylhet, Barisal, Tangail, Mymensingh, Noakhali, Faridpur and Chittagong districts were rich in pati-pata. No attention was given for scientific management and preservation of the species. As a result, the production of the plant declined at an alarming rate due to over exploitation leaving the cottage industries based on the species in a very dwindling condition.

The deteriorating condition of this resource demands immediate attention for its scientific management. To this end, the Bangladesh Forest Research Institute has undertaken a project on "Survey, nursery, plantation and manaegment techniques of pati-pata." The work presented here is a part of that project. A study was carried out to determine the survival and growth of pati-pata during the first year after planting. This type of work on the species is relatively new. No such work has ever been previously reported in the literature except some general information on its distribution, number of species available, etc., (Hooker 1892). Prain (1903) and Sastri (1950) reported that *S. dichotoma* generally grows upto 3—4 m in height and is popularly known in Bangladesh as pati-pata, murta, maktapati, kedarpati.

MATERIALS AND METHODS

Five main pati-pata growing areas in Bangladesh, viz., Chittagong, Noakhali, Tangail, Sylhet and Barisal were selected for the collection of the propagating materials (both rhizomes and branch cuttings). Fifteen rhizomes and fifteen branch cuttings were collected from each area and planted in completely randomized plots in the nursery of the Bangladesh Forest Research Institute campus in Chittagong. Rhizomes and branch cuttings were planted in two separate plots under homogeneous conditions. The collection and planting of propagating materials were carried out from December, 1983 to June, 1984. Before planting, weeds and grasses were completely removed from the plots through proper spading. The experiment was carried out in statistically laid (CRD) plots under homogeneous field conditions (Fig. 1). The plots were properly cleaned and manured (with cowdung) two times within the year. One year after planting the number of surviving plants along with the number of new culms developed from each stock were counted. The height of the highest new culm of each clump was also measured. The data were analysed statistically using Student's t-test.

Fig. 1. Lay-out for planting of rhizome and branch cutting of pati-pata



25	58	66	29	24	26	59	14	27	49	17	57	54	61	45
44	19	55	73	52	64	16	34	30	33	74	65	10	1	11
28	39	75	4	22	70	13	8	36	12	2	71	21	9	43
31	62	45	50	32	68	3	67	6	42	41	23	5	56	53
63	18	47	40	60	7	15	48	20	35	37	69	51	72	38

Note : *Number randomly placed (both for rhizome and branch cutting)*

No. 1 - 15 *for Chittagong origin, No.* 16 - 30 *for Noakhali origin, No.* 31 - 45 *for Tangail origin, No.* 46 - 60 *for Sylhet origin, No.* 61 - 75 *for Barisal origin*

RESULTS

Table 1 shows that when rhizomes were used as propagating materials, the survival for the origin of Chittagong (Dec.), Noakhali (Dec.), Tangail (Feb.), Sylhet (Apr.) and Barisal (June) were respectively 93, 100, 87, 93 and 93%. In respect of new culms produced, the average numbers were 8, 13, 8, 16 and 11 respectively. The average height of the highest new culm was 76, 77, 72, 124 and 91 cm respectively.

On the other hand, when branch cuttings were used as propagating materials, the survival for the origin of the above localities was respectively 67, 13, 7, 20 and 53%. The average number of new culms produced was 4, 3, 3, 5 and 4 respectively ; and the average height of highest new culm was 45, 43, 39, 44 and 53 cm respectively.

Table 1. Growth and survival of pati-pata after one year of planting

Collection site of planting stock	Date of collection	Date of planting	Type of planting stock	Total no. of planting stock	Survival percentage	Average no. of new culms produced	Average height of highest new culm (cm)
Chittagong	Dec. 10, 1983	Dec. 12, 1983	Rhizome	15	93	8	76
			Branch cutting	15	67	4	45
Noakhali	Dec. 17, 1983	Dec. 29, 1983	Rhizome	15	100	13	77
			Beanch cutting	15	13	3	43
Tangail	Feb 10, 1984	Feb. 12, 1984	Rhizome	15	87	8	72
			Branch cutting	15	7	3	39
Sylhet	Apr. 27, 1984	Apr. 30, 1984	Rhizome	15	93	16	124
			Branch cutting	15	20	5	44
Barisal	June 18, 1984	June 21, 1984	Rhizome	15	93	11	91
			Branch cutting	15	53	4	53

Table 2. Comparison between rhizome and branch cutting for survival percentage, average number of new culms produced and average height of the highest new culms (using t-test)

Location	Survival percentage			Average no. of new culms produced			Average height of highest new culms (cm)		
	R	BC	t-value	R	BC	t-value	R	BC	t-value
Chittagong	93	67		8	4		76	45	
Noakhali	100	13		13	3		77	43	
Tangail	87	7	5.13**	8	3	5.40**	72	39	4.70**
Sylhet	93	20		16	5		124	44	
Barisal	93	53		11	4		91	53	

R Rhizome, BC Branch cutting, t-value calculated at 5% level of significance with 4 df

***highly significant*

Table 3. Comparison on the effect of localities (combined with collection and planting time) on rhizome for average number of new culms produced and average height of the highest new culms (using t-test)

Average no. of new culms produced				Average height of highest new culms			
	Time of				Time of		
Locality	Collection	Planting	Number	Locality	Collection	Planting	Height (cm)
Chittagong	Dec. 10, 1983	Dec. 12, 1983	8	Tangail	Feb. 10, 1984	Feb. 12, 1984	72
Tangail	Feb. 10, 1984	Feb. 12, 1984	8	Chittagong	Dec. 10, 1983	Dec. 12, 1983	76
Barisal	June 18, 1984	June 21, 1984	11	Noakhali	Dec. 27, 1983	Dec. 29, 1983	77
Noakhali	Dec. 27, 1983	Dec. 29, 1983	13	Barisal	June 18, 1984	June 21, 1984	91
Sylhet	April 27, 1984	April 30, 1984	16	Sylhet	April 27, 1984	April 29, 1984	124

Note : *The numbers and the heights joined by the same line(s) indicate no significant difference at 5% level of significance*

DISCUSSION

The statistical analysis (Student's t-test) of the results shows that propagation through rhizomes is significantly more suitable than through branch cuttings for the survival of the plant, new culms produced and height growth (Table 2). This is independent of the localities and the collection and planting time.

When the effect of localities combined with collection and planting time on the new culms and the height growth was analysed using t-test, no significant difference was found among the localities other than in Sylhet in rhizome planting (Table 3).

However, there are certain differences among survival of the plant in different localities with respect to branch cutting (Table 2). It appears that the branch cuttings of Chittagong and Barisal origin planted in December, 1983 and June, 1984 respectively had higher survival than those of other three localities (Table 2). The branch cuttings collected and planted at Chittagong in December, 1983 had a survival as high as 67% after one year. As branch cuttings are expected to be much cheaper than rhizomes, further research on propagation by branch cuttings is warranted Nevertheless, this study showed that rhizomes performed better in the aspects studied in this investigation (which did not include the economics of pati-pata growing).

It was also observed during the investigation that pati-pata grows well, when planted during the rainy season. No intensive attention except weeding and application of some cowdung, two times a year was needed. Cultivation of pati-pata is, therefore, relatively inexpensive.

It is noted that the observations in this paper are only exploratory. It is thus recommended that a comprehensive study be carried out to determine (a) the effect of origin and collection time independantly of each other on the survival, culm appearance and culm height growth, and (b) the economic feasibility of pati-pata growing.

CONCLUSIONS

Cultivation of pati-pata is relatively inexpensive. Rhizomes are significantly more suitable for propagation than branch cuttings. An average of 8–16 new culms developed from a single rhizome during the first year after planting. The average height of the highest culm per rhizome was 91—124 cm after one year of planting.

ACKNOWLEDGEMENT

The authors express their heartfelt gratitude to Dr. M. A. Rahman, Divisional Officer, Bangladesh Forest Institute for his valuable suggestion. They also extend thanks to the supporting staff of the Minor Forest Products Division and pati-pata growers of different localities for their support and valuable information. Thanks also due to Mr. Wazihullah, Senior Research Officer (Statistics), Bangladesh Forest Research Institute, for his valuable assistance in data analysis and interpretation.

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