

GERMINATION TEST OF "BIRI-LEAF" SEEDS UNDER DIFFERENT TREATMENTS

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Introduction

The economic importance of plantation of Tendu (*Diospyros — melanoxylon*), commonly called "Biri-Leaf" Tree species, in Sind province, arises out of the necessity, which can be measured and is underlined with the following figures of foreign exchange being spent on the import of Biri-Leaves and distribution thereof among the four provinces. (T.C.P.)

FOREIGN EXCHANGE

Year	Contracted Quantity M/Tons.	Value Rs. (Mill:)	Remarks
1973-74	600	3.500	
1974-75	872	5.000	
1975-76	572	3.940	
1976-77	810	5.500	
1977-78	500	2.530	
1978-79	858	4.571	
1979-80	962	6.000	
1980-81	No foreign exchange was released.		
1981-82	749	14.000	
1982-83	—	—	
1983-84	1250	20.000	During first shipping period.

DISTRIBUTION OF 'BIRI-LEAVES'

S. No.	Provinces	Percentage (%)
1.	Sind	67.5
2.	Punjab	20.0
3.	N.W.F.P	7.5
4.	Baluchistan	5.0

Past Research work —

No substantial research work has been carried out on the species, which is not endemic to the Province of Sind. It was introduced in 1962. However, the successful results of the progeny garden, established on an area of 1.5 acres with planting stock raised from the seed imported from India, has become the source of encouragement and provides basis for perception, that the species can, successfully, be planted in the climatic and other environmental

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conditions obtainable in Sind Province. The seeding, which this progeny garden, has started, now solves the problem and makes it independent of the source of seed supply, which was, India.

The imperative need of testing germination capability of "Biri-Leaf" seed, standardization of nursery technique, finding requirements of irrigation water and determining method of sowing/planting, in fact, remain to be investigated by laying out different relevant studies. This study was, thus, laid out in Miani to, just, begin the course of the research work desired to be conducted in future.

Objectives

Study and compare the extraneous effect of different treatments on the germination capability of "Biri-leaf" seed.

4. Plan of work

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|---|---------------------------------|
| 1. Location | Miani. |
| 2. Area | 0.25 Acres. |
| 3. Period | June 1984. |
| 4. Species | (Diospyrose melanoxylon) (seed) |
| 5. Treatments | 6—A-Hot Water Treatment |
| | B-Cold Water |
| | C-Seed Scratching |
| | D-Tera-sorb |
| | E-Cow-Dung |
| | F-Control |
| 6. Method of sowing | Sowing on ridges. |
| 7. Method of irrigation | Flow irrigation. |
| 8. Spacing | One foot apart. |
| 9. Depth of water delivered | 3" inches — 6 times per month. |
| 10. Total delta delivered | 216" — 18 feet. |
| 11. Number of seeds in each replication of each treatment | 50 Nos. |
| 12. Number of replications | 6 Nos. |
| 13. Total number of seeds sown | 50 x 6 x 6 = 1800 |
| 14. Design | Randomised block. |

Data tabulation

Data of the seeds germinated and height growth of seedlings was recorded after full one year of growth. It may also be pointed out here, that the seedlings after germination, which were observed to have died for any reason, were also noted and have been included in this table.

Table — I: Seed Germination (Percentage)

Repli- cations	A	B	C	D	E	F	Total Blocks
1	14	32	26	34	36	64	206
2	10	46	16	34	54	38	198
3	16	48	22	46	42	62	236
4	10	44	20	48	56	42	220
5	16	48	26	56	66	60	272
6	12	38	18	50	32	58	208
Total Treatment	78	256	128	268	286	324	1340
Mean — \bar{X}	13	42.7	21.3	44.7	47.7	54.0	

6. Results

Above data of seed germination has been put to statistical analysis. The "ANOVA" table has accordingly been constructed. Computation details of sum of squares are given in appendix — I.

Table — II: "ANOVA"

Source	D/F	SS	MS (Variance)	'F' Ratio
Treatments	5	7888.889	1577.7778	24.94
Blocks	5	619.556	123.9112	1.96
Error	25	1518.778	63.27112	
Total:	35			

Computed 'F' ratio of 24.94 is greater than the tabulated ratio of 2.6 at 5% level and 3.86 at 1% level with 5/25 Degrees of freedom, in respect of treatments. This is indicative of the fact, that difference in extraneous effect on seed germination due to various treatments, is highly significant.

However, tabulated "F" ratios of 2.6 and 3.86 respectively at 5% and 1% level, are a little larger than the computed "F" value and, thus, the difference due to environments and other factors like soil and irrigation etc. does not appear, particularly, at 5% level of significance.

In fact, the analysis of variances indicates only the existence of difference, but does not differentiate effect due to one treatment than the other. This has been done by comparison of treatment Means with the L.S.D. test.

Standard Error of the Mean:—

$$S\bar{X} = \sqrt{\frac{2 \times 63.27112}{6}} = \sqrt{21.0904} = 4.59$$

T = 2.06 at 5% level of significance.

Significant Difference = D = 2.06 X 4.59 = 9.46

Difference between means by more than 9.46 signifies the difference between treatments.

Table — II: Comparison of Means

	A	B	C	D	E	F
F	54.0 — 13.0 = 41.0	54.0 — 42.7 = 11.3	54.0 — 21.3 = 32.7	54.0 — 44.7 = 9.3	54.0 — 47.7 = 6.3	—
E	47.7 — 13.0 = 34.7	47.7 — 42.7 = 5.0	47.7 — 21.3 = 26.4	47.7 — 44.7 = 3.0	—	—
D	44.7 — 13.0 = 31.7	44.7 — 42.7 = 2.0	44.7 — 21.3 = 23.4	—	—	—
C	21.3 — 13.0 = 8.3	—	—	—	—	—
B	42.7 — 13.0 = 29.7	—	42.7 — 21.3 = 21.4	—	—	—
A	—	—	—	—	—	—

The figures, signifying the difference between treatments have been underlined.

Treatments significantly differing from one another, therefore, are:—

F — A F — B F — C
E — A E — C
D — A D — C
B — A B — C

Treatment means arranged in ascending order, are:—

A	C	B	D	E	F
13.0	21.3	42.7	44.7	47.7	54.0

See Chart — Appendix — II.

7. Conclusion:

1. Difference due to treatments, in germination of seed is highly significant. "F", control gives the best results followed by the treatment "E" of cow-dung, "D" of Tera sorb and "B" of cold water.
2. Effect of environments and other factors on seed germination is insignificant. This indicates that the species can be propagated in environmental conditions obtaining in Sind Province.

Fresh full size seeds of "Biri-Leaf" tree species give the highest germination percentage. Seeds collected from healthy mother trees should be sown, latest, during mon-soon season.

Appendix — I

COMPUTATION STATEMENT OF SUM OF SQUARES

1.	Correction Factor :	$\frac{(1340)^2}{36}$	=	$\frac{1795600}{36}$	=	<u>49877.777</u>
2.	Total SS :	59968	—	49877.777	=	10090.223
3.	Treatment SS :	$\frac{346600}{6}$	=	57766.666	—	<u>49877.777</u> 7888.889
4.	Blocks SS :	$\frac{302984}{6}$	=	50497.333	—	<u>49877.777</u> 619.556
5.	Error SS :	10090.223 = 10090.233	—	(7888.889 8508.445	+	619.556) 1581.778
D/F	Total SS	: 36 — 1 = 35				
D/F	Treatment SS	: 6 — 1 = 5				
D/F	Blocks SS	: 6 — 1 = 5				
D/F	Error SS	: 35 — (5 + 5) = 25.				

Appendix — II

CHART
SHOWING TREATMENT MEANS
GERMINATION %

