

Project Title

**Validation/standardization of various parameters
in the Tall Seedling Protocol.**



**PROJECT REPORT SUBMITTED BY
THE RESEARCH WING, FOREST DIRECTORATE,
GOVT OF WEST BENGAL.**

TO

**THE WEST BENGAL FOREST AND BIODIVERSITY CONSERVATION
SOCIETY**



PREFACE

Good Nursery is the key of Good Plantation. The main object of Forest Department is to create good forest. The Research Wing of the Forest Directorate, Govt of West Bengal has taken a very important initiative to produce good quality tall seedlings in nursery for better plantation by setting different parameters in nursery.

Traditionally, current year seedlings are planted in the field plantations. The smaller seedlings are damaged in fire and due to grazing by cattle. Real solutions are hard to come by, since it has socioeconomic connotations. Tall seedlings are used mainly for road side plantations. Tall seedlings above grazing height are best for plantations and are useful for slow growing or medium growing tree species also.

A Tall seedlings protocol has been developed by the Research wing by setting different parameters to raise good quality tall seedlings. Experiments regarding tall seedlings in West Bengal are being done mostly in a sporadic manner. But now through this Project, Research Wing, WB is trying to develop tall seedling nursery scientifically to create better plantations in future.

This project report is an attempt for narrating the nursery establishment guidelines and protocol for tall seedlings. We think this project report will be valuable field guide for tall seedling nursery practitioners in the field for Plantation Management.


Principal Chief Conservator of Forests
Research, Monitoring and Development
West Bengal

ACKNOWLEDGEMENT

A tall seedlings protocol was developed by the Research wing based on present practices in different forest divisions and practices followed in private nurseries growing tall seedlings.

This tall seedling nursery protocol project was started on 2018 funded by JICA (WBFBCP) by setting up six different parameters on Arjun, Mahul and Haldu species. For this innovative research work firstly we thanks to The Principal Chief Conservator of Forests (Research, Monitoring & Development) Dr Jose T. Mathew, IFS who first gave the proposal for doing such type of research work. Thanks to the Chief Project Director of WBFBCP Sri Debal Roy, IFS who approved the project. Thanks to The Principal Chief Conservator of Forests, RMD, Shri V.K. Yadav, IFS for his kind support to complete the project work and publishing the report. Thanks to the Additional Principal Chief Conservator of Forests Smt Pratibha Raj, IFS and Chief Conservator of Forests, R&D, Shri D. Mallick, IFS for guidance and all support to publish the report successfully. Thanks to Shri B. Sarkar, IFS, Conservator of Forest, Research Circle, WB for guidance in the field and submission of the project report.

Smt Nabanita Sanyal, WBFS, ADFO of this Division involved herself for editing this report. Thanks to the Forest Range Officer, Arabari Research Range Shri Niladri Sakha,FR who provide the growth data and good quality photography . All the staff of Silviculture (South) Division specially Shri Sumit Chakraborty who worked hard for this project from the beginning to till end.


Divisional Forest Officer
Silviculture South Division

Project Profile

1. Title of the Project:-Validation/standardization of various parameters in the tall seedling protocol.

2. Implementing Team

Principal Investigator	Sri M. L Sarkar, IFS Divisional Forest Officer Smt Nabanita Sanyal, WBFS Assistant DFO	Silviculture South Division
Co-Principal Investigator	Niladri Shankha, FR Range Officer	Arabari Range
Support Staff	Jaydev Choulia	Arabari Range
	Kalinga Mahata	Arabari Range
	Sumit Chakraborty	Division Office

3. Project Location

Division	Range	Location
Silviculture South Division	Arabari Range	Research Nursery at Arabari.

4. Project Commencement Date – 01.07.2019

5. Project Completion Date – November, 2021.

6. Project Cost – 24,00,000.00

7. Funding Agency – West Bengal Forest and Biodiversity Conservation Project

Introduction

Traditionally, current year seedlings are planted in the plantations as well as along the road sides. Casualty often occurs on the plantations especially near to the human habitation due to the biotic disturbances, mainly grazing. Real solutions are hard to come by since it has socioeconomic connotations.

Here comes the advantage of Tall seedlings above grazing height. Tall saplings have an initial growth advantage over its competitors i.e. weeds. Besides the high survival rate, number of saplings per ha would be lesser viz. a viz. current year seedlings.

A tall seedlings protocol was developed by the Research wing based on present practices in different forest divisions and practices followed in private nurseries growing tall seedlings. Forest Directorate has notionally accepted the proposal from the Research Wing and was circulated to all the Divisions vide PCCF(HOFF)'s No 9748/CS/2M-282/15(p+v) dt. 15.12.17. The protocol was developed based on certain assumptions which are to be validated or standardized to come out with a foolproof recommendations to be implemented. Moreover, proper experimentation would help to minimize the cost of these specifications. This project is made essentially to validate these assumptions through scientific experimentation through statistical designs.

Objective of the Study

- a. To validate/standardize different parameters in the tall seedlings protocol viz.

1. Pot size
2. Potting mixture
3. Shifting
4. Watering
5. Shade
6. Spacing between saplings in the nursery

- b. To elucidate the most economic specification so as to reduce the cost of production per tall sapling.

Materials:-

Different potting mixture i. e. Soil: Cow dung :Sand =2:1:1) finds better for both the species & different size of pot.

Treatment:

Experiment	Species	No of Treatment	No. of Replication	Result
Pot size experiment	Arjun & Mohul	4	3	Going on
Potting Mixture	Mahul & Haldu	6	3	T6 (i.e. S:C:Sand =2:1:1) finds better for both the species
Shifting experiment	Arjun & Mohul	4	3	Going on
Watering experiment	Arjun & Mohul	3	3	Going on
Shade experiment	Arjun & Mohul	3	3	Going on
Gap experiment	Arjun & Mohul			Going on

Previous works done

Different states have done pioneering works and tried to venture into this aspect of plantation forestry primarily due to the problem of grazing in forest plantations. States like Karnataka have been practicing this techniques in urban forestry sector where large saplings are maintained in plastic gunny bags. Jute gunny bags though environmental friendly, is not useful for longer term due to biodegradation. Of late, Tripura forest dept. was found to be raising tall seedlings to the height of several meters for immediate greening of certain construction sites. Some experimental works were being done in Madhya Pradesh as well as other states. Tall saplings are useful for slow growing or medium growing tree species.

Experiments regarding tall seedlings in West Bengal is being done mostly in a sporadic manner often by certain enthusiastic DFOs or FROs on their own initiative by shifting the extra seedlings left in the Nursery on larger polypots and were used for in fillings or being distributed to public or being planted along the road sides. Due to lack of a centralized programme, DFOs have to re-adjust the expenditure by saving from related works. Certain private nurseries in Amtala area (24-Parganas-South) are found to be maintaining tall tree saplings in bituminous tins and renting out the same for setting up `locations` for film shooting or for marriage receptions. Mortality has never been reported; often trees adjust to the appearance of a small trees due to the long years of confining in the containers.

Methodology

Each of the parameters shall be tested with a block of 15 to 20 seedlings with three replications. Tall seedlings protocol has been made for the slow and medium growing species only since the fast growing species do not necessitate such treatments.

i. Nursery Protocol of tall seedlings has been developed based on various practices adopted in private and Forest Directorate's nursery. Various parameters have been prescribed such as:

(a) Poly pot size:

Year:1: 5"x10" with 1 hole at bottom (from 1st Feb to 14th Aug),

Year: 2: 12"x14" with 5 holes at bottom (till 14th Aug of next year),

Year:3: 18"x18" in year 3 (till 30th June of next year in North Bengal and 31st July of next year in South Bengal)with 5 holes at bottom as explained in circular above

(b)Potting mixture prescribed is (Top Soil : Burnt rice husk : Compost) :: (1:1:1),

(c) Shifting prescribed in Rainy season is every 1 month and in Dry season every 2 months,

(d) Watering in Dry season prescribed is Twice daily, in Rainy season on no rainy days once daily and in Winteronce daily,

(e) Shade prescribed in Year 1 is 75% close, inYear 2 50% close& in Year 3No shade,

(f) Spacing or Gap between seedlings was prescribed during period 16th Aug(Y1) to 31st Mar(Y2) 5" to 8" apart depending upon crown & 16th Jun (Y2) to 31st Mar (Y3) 1' to 1.5' apart depending upon crown.

Now trials for one higher and one or two lower specifications need to be done to standardize the specifications.

ii. Species selected for trial are –

1. One Medium growing species
2. One Slow growing species

Parameters to be standardized:

1. Pot size

For trials, two species are chosen with 4 sizes of polypot (Treatments) in each year with 3 replications with 20 seedlings in each trial. In the year:1, four polypot sizes are chosen as

mentioned below. Depend upon the results of the first year, in the year:2 either of the two options shown below shall be tried. In the year 3, either of the three options listed below shall be taken up based on the results obtained in the previous year. Economical size of the Polypot shall be the criterion for selecting the polypot in the second year.(ref: Annexure I)

Year:1	Poly pot Size						Currently prescribed		
	Year 1	3x7	4x8	5x10	6x12				
Year:2									
if Year 1	3x7	4x8		OR	if Year 1	5x10	6x12		
Year 2	6x12	8x12	10x12	12x14	Year 2	8x12	10x12	12x14	14x16
Year:3									
if Year 2	6x12	8x12		OR	if Year 2	10x12	12x14		
Year 3	10x12	12x14	14x16	16x18	Year 3	14x16	16x18	18x18	20x20
						OR			
					if Year 2	14x16			
					Year 3	16x18	18x18	20x20	22x24

Following measurements shall be taken to assess the pot size results: Height & Collar Girth


Time of Measurements

1. Year 1, before transplanting in next bigger polypot
2. Year 2 before transplanting in next bigger polypot
3. Year 3 when seedling is ready

2. Potting mixture

For the trials, two species are selected with 6 types of potting mixture in the year 1 and 3 types of potting mixture in year 2 and year 3 respectively, with 3 replications with 15 seedlings in each trial. The potting mixture of first year that give better results shall be tried in the second year and those selected ones of the second year shall be tried in third year as mentioned.(Annexure II)

Potting mixture						
	(Soil:Compost:Burnt rice husk)			(Soil:Compost:sand)		
Year 1	1:1:1	1:2:1	2:1:1	1:1:1	1:2:1	2:1:1
Year 2	1:1:1	1:1:0	2:1:0			
Year 3	1:1:1	1:1:0	2:1:0			

 Currently prescribed

Measurements to be taken

1. Height
2. Collar girth of seedlings


Time of Measurements

1. Year 1, before transplanting in next bigger polypot
2. Year 2 before transplanting in next bigger polypot
3. Year 3 when seedling is reading

3. Shifting

For trials, two species are selected with 4 types of shifting during dry and rainy season in each year with 3 replications with 20 seedlings in each trial. Growth of the root will be measured coming out of polypot and extra roots will be cut while shifting as mentioned above in tall seedlings protocol circulated.(Annexure III)

Shifting	Rainy season				Dry season			
	Year 1	20 days	1 month	45 days	60 days	1.5 months	2 month	2.5 months
Year 2	20 days	1 month	45 days	60 days	1.5 months	2 month	2.5 months	3 months
Year 3	20 days	1 month	45 days	60 days	1.5 months	2 month	2.5 months	3 months

 Currently prescribed

Measurements to be taken


1. Length of root
2. Thickness of root

Time of Measurements

1. At the time of every shifting

4. Watering

Watering(in a day)	Dry			Rainy			Winter		
	Year 1	twice	daily	alternate	twice	once	alternate	twice	once
Year 2	twice	daily	alternate	twice	once	alternate	twice	once	alternate
Year 3	twice	daily	alternate	twice	once	alternate	twice	once	alternate

 Currently prescribed

For trials, 2 types of species are selected for 3 types of watering schedule each year in dry, rainy and winter season with 3 replications with 20 seedlings in each trial. Best results of first year will be tried in second year and best resultsof second year will be tried in third year. Annexure IV)

Measurements to be taken

1. Height
2. Collar girth of seedlings

Time of Measurements

1. Every month

5. Shade

For trials, 2 types of species are selected with 3 types of shades as shown below in each year with 3 replications with 20 seedlings in each trial. Best results of first year will be tried in second year and best results of second year will be tried in third year. (Annexure V)

Shade	1st April to 30th June				
Year 1	25%	50%	75%		
Year 2		25%	50%	75%	
Year 3			no shade	25%	75%



Currently prescribed

Measurements to be taken

1. Height
2. Collar girth of seedlings

Time of Measurements

1. At the time of putting seedlings in shed
2. At the time of removal of shed

6. Spacing in the Nursery

For trials, 2 types of species are selected with types of gap as below with 3 replications with 20 seedlings in each trial. Best results of first year will be tried in second year and best results of second year will be tried in third year. (Annexure VI)

Gap	(16th Aug to 31st March)			(16th June to 31st March)			
Year 1	3"	5"	8"				
Year 2				4 inch	7 inch	1ft	1.5 ft



Currently prescribed

Measurements to be taken

1. Crown diameter
2. Height & Collar girth of seedlings

Time of Measurements

1. At the time of putting seedlings in shed
2. At the time of removal of shed

Project outlay and Estimate:

Estimate for Project on standardization of various parameters in raising tall seedlings at one location at Arabari			
	Physical	Rate	Financial
Raising of Saplings	Number of Seedlings		
Year 1	28980	8	2,31,000
Year 2	9810	30	2,94,000
Year 3	3510	50	1,75,000
Infrastructure			12,00,000
Overhead (experience sharing Tours, meetings, tour of experts etc.)			4,00,000
Contingency (Inflationary adjustments)			1,00,000
TOTAL			24,00,000

Outcome:

The results obtained from the experiments on these parameters shall be incorporated to bring forth a revised "Protocol for tall seedlings" after revising the estimate also.

Details of experiment design - Annexure I													
ECONOMICAL POT SIZE EXPERIMENT													
3 year trial model for 3 species x 3 replication x 20 seedlings per treatment x 4 pot size (treatment)													
					Poly pot Size								Currently prescribed
		Pot size		Year 1	3x7	4x8	5x10	6x12					
	if Year 1	3x7	4x8				if Year 1	5x10	6x12				
	Year 2	6x12	8x12	10x12	12x14		Year 2	8x12	10x12	12x14	14x16		
	if Year 2	6x12	8x12				if Year 2	10x12	12x14				

			2	2				2							
		Year 3	10x 12	12x 14	14x 16	16x 18		Year 3	14x16	16x18	18x18	20x20			
								if Year 2	14x16						
								Year 3	16x18	18x18	20x20	22x24			
year 2 & year 3 polypots are closed at one end and 5 holes at bottom															

Number of seedlings raised for each trial											
	Replicati on	Species 1				Species 2				no of seedlings to be raised	
		T1	T2	T3	T4	T1	T2	T3	T4		
Year 1	1	320	320	320	320	320	320	320	320		
	2	320	320	320	320	320	320	320	320		
	3	320	320	320	320	320	320	320	320		7680
		T.x.1	T.x.2	T.x.3	T.x.4	T.x.1	T.x.2	T.x.3	T.x.4		
Year 2	1	80	80	80	80	80	80	80	80		
	2	80	80	80	80	80	80	80	80		
	3	80	80	80	80	80	80	80	80		1920
		T.x.x. 1	T.x.x. 2	T.x.x. 3	T.x.x. 4	T.x.x. 1	T.x.x.2	T.x.x. 3	T.x.x.4		
Year 3	1	20	20	20	20	20	20	20	20		
	2	20	20	20	20	20	20	20	20		
	3	20	20	20	20	20	20	20	20		480

Details of experiment design - Annexure II															
FAST GROWING POTTING MIXTURE EXPERIMENT															
3 year trial model for 6 potting mixture (treatment) x 2 species x 3 replication x 15 seedlings per treatment															
		Polypot size :		Size	in cc										
			Year 1	5x10	850										
			Year 2	12x14	5250										
			Year 3	18x18	15200										
year 2 & year 3 polypots are closed at one end and 5 holes at bottom															
		Potting mixture													
			(Soil:Compost:Burnt rice husk)			(Soil:Compost:Burnt rice husk)									
		Year 1	1:1:1	1:2:1	2:1:1	1:1:1	1:2:1	2:1:1							
		Year 2	1:1:1	1:1:0	2:1:0										Currently prescribed
		Year 3	1:1:1	1:1:0	2:1:0										

		Number of seedlings raised for each trial													
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	Replication	Species 1						Species 2						no of seedlings to be raised
		T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6	
Year 1	1	135	135	135	135	135	135	135	135	135	135	135	135	
	2	135	135	135	135	135	135	135	135	135	135	135	135	
	3	135	135	135	135	135	135	135	135	135	135	135	135	4860
		T.x.1	T.x.2	T.x.3				T.x.1	T.x.2	T.x.3				
Year 2	1	45	45	45				45	45	45				
	2	45	45	45				45	45	45				
	3	45	45	45				45	45	45				810
		T.x.x.1	T.x.x.2	T.x.x.3				T.x.x.1	T.x.x.2	T.x.x.3				
Year 3	1	15	15	15				15	15	15				
	2	15	15	15				15	15	15				
	3	15	15	15				15	15	15				270
x is the number selected from previous trial														

Details of experiment design - Annexure III														
ECONOMICAL SHIFTING EXPERIMENT														
3 year trial model for 3 species x 3 replication x 20 seedlings per treatment x 4 shifting duration(treatment)														
Poly pot size :			Size	in cc										
		Year 1	5x10	850										
		Year 2	12x14	5250										
		Year 3	18x18	15200										
year 2 & year 3 polypots are closed at one end and 5 holes at bottom												Currently prescribed		
Shifting				Rains			Dry season							
		Year 1	20 days	1 month	45 days	60 days	1.5 months	2 month	2.5 months	3 months				
		Year 2	20 days	1 month	45 days	60 days	1.5 months	2 month	2.5 months	3 months				
		Year 3	20 days	1 month	45 days	60 days	1.5 months	2 month	2.5 months	3 months				

Number of seedlings raised for each trial														
	Replication	Species 1				Species 2				no of seedlings to be raised				
		T1	T2	T3	T4	T1	T2	T3	T4					

Year 1	1	20	20	20	20	20	20	20	20	
	2	20	20	20	20	20	20	20	20	
	3	20	20	20	20	20	20	20	20	480
		T1	T2	T3	T4	T1	T2	T3	T4	
Year 2	1	20	20	20	20	20	20	20	20	
	2	20	20	20	20	20	20	20	20	
	3	20	20	20	20	20	20	20	20	480
		T1	T2	T3	T4	T1	T2	T3	T4	
Year 3	1	20	20	20	20	20	20	20	20	
	2	20	20	20	20	20	20	20	20	
	3	20	20	20	20	20	20	20	20	480
x is the number selected from previous trial										

Details of experiment design - Annexure IV												
ECONOMICAL WATERING EXPERIMENT												
3 year trial model for 3 species x 3 replication x 20 seedlings per treatment x 3 watering schedule (treatment)												
	Polypot size		Size	in cc								
		Year 1	5x10	850								
		Year 2	12x14	5250								
		Year 3	18x18	15200								
		year 2 & year 3 polypots are closed at one end and 5 holes at bottom										Currently prescribed
		Watering(in a day)	Dry			Rainy			Winter			
		Year 1	twice	daily	alternate	twice	once	alternate	twice	once	alternate	
		Year 2	twice	daily	alternate	twice	once	alternate	twice	once	alternate	
		Year 3	twice	daily	alternate	twice	once	alternate	twice	once	alternate	

Number of seedlings raised for each trial									
		Species 1			Species 2				
		T1	T2	T3	T1	T2	T3	no of seedlings to be raised	
Year 1	1	180	180	180	180	180	180		
	2	180	180	180	180	180	180		
	3	180	180	180	180	180	180	3240	
		T.x.1	T.x.2	T.x.3	T.x.1	T.x.2	T.x.3		

Year 2	1	60	60	60	60	60	60	60	
	2	60	60	60	60	60	60	60	
	3	60	60	60	60	60	60	60	1080
		T.x.x.1	T.x.x.2	T.x.x.3	T.x.x.1	T.x.x.2	T.x.x.3		
Year 3	1	20	20	20	20	20	20	20	
	2	20	20	20	20	20	20	20	
	3	20	20	20	20	20	20	20	360
x is the number selected from previous trial									

Details of experiment design - Annexure V												
SHADE EXPERIMENT												
3 year trial model for 3 species x 3 replication x 20 seedlings per treatment x 3 types of shade (treatment)												
Polypot size :		Size	in cc									
	Year 1	5x10	850									
	Year 2	12x14	5250									
	Year 3	18x18	15200									
year 2 & year 3 polypots are closed at one end and 5 holes at bottom												
	Shade	1st April to 30th June										
	Year 1	25%	50%	75%								
	Year 2		25%	50%	75%						Currently prescribed	
	Year 3			no shade	25%	75%						
Number of seedlings raised for each trial												

	Replication	Species 1			Species 2			no of seedlings raised
		T1	T2	T3	T1	T2	T3	
Year 1	1	180	180	180	180	180	180	
	2	180	180	180	180	180	180	
	3	180	180	180	180	180	180	3240
		T.x.1	T.x.2	T.x.3	T.x.1	T.x.2	T.x.3	
Year 2	1	60	60	60	60	60	60	
	2	60	60	60	60	60	60	
	3	60	60	60	60	60	60	1080
		T.x.x.1	T.x.x.2	T.x.x.3	T.x.x.1	T.x.x.2	T.x.x.3	

Year 3	1	20	20	20	20	20	20	20		
	2	20	20	20	20	20	20	20		
	3	20	20	20	20	20	20	20	360	
		x is the number selected from previous trial								


Details of experiment design - Annexure VI												
GAP EXPERIMENT												
2 year trial model for 3 species x 3 replication x 20 seedlings per treatment x types of gap as below (treatment)												
	Poly pot size :		Size	in cc								
		Year 2	12x14	5250								
		Year 3	18x18	15200								Currently prescribed
year 2 & year 3 polypots are closed at one end and 5 holes at bottom												
	Gap	(16th Aug to 31st March)			(16th June to 31st March)							
	Year 2	3"	5"	8"								
	Year 3				4 inch	7 inch	1ft	1.5 ft				

Number of seedlings raised for each trial										
	Replication	Species 1				Species 2				no of seedlings raised
		T1	T2	T3		T1	T2	T3		
Year 1 + Year 2	1	80	80	80		80	80	80		
	2	80	80	80		80	80	80		
	3	80	80	80		80	80	80		1440
		T.x.1	T.x.2	T.x.3	T.x.4	T.x.1	T.x.2	T.x.3	T.x.4	
Year 3	1	20	20	20	20	20	20	20	20	
	2	20	20	20	20	20	20	20	20	
	3	20	20	20	20	20	20	20	20	480
x is the number selected from previous trial										

Results and Discussion

1. Pot size Experiment:-

For trials, three species are chosen with 4 sizes of poly pot (Treatments) in each year with 3 replications with 20 seedlings in each trial. In the year:1, four poly pot sizes are chosen as mentioned below. Depend upon the results of the first year, in the year:2 either of the two options shown below shall be tried. In the year 3, either of the three options listed below shall be taken up based on the results obtained in the previous year. Economical size of the Poly pot shall be the criterion for selecting the poly pot in the second year.(ref: Annexure I)

Year:1	Poly pot Size					 Currently prescribed
	Year 1	3x7	4x8	5x10	6x12	

Year:2

if Year 1	3 X 7	4x8		
Year 2	6 X12	8x12	10x12	12x14

OR

if Year 1	5x10	6x12		
Year 2	8x12	10x12	12x14	14x16

Year:3

if Year 2	6x12	8x12		
Year 3	10x12	12x14	14x16	16x18

OR

if Year 2	10x12	12x14		
Year 3	14x16	16x18	18x18	20x20

OR

if Year 2	14x16			
Year 3	16x18	18x18	20x20	22x24

Following measurements shall be taken to assess the pot size results: Height & Collar Girth

Time of Measurements

Year 1,before transplanting in next bigger poly pot

Year 2 before transplanting in next bigger poly pot

Year 3 when seedling is ready

POT SIZE EXPERIMENT & DATA ANALYSIS REPORT OF ARJUN DURING - JUNE-21

One way

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	240	157.65	23.120	1.492	154.71	160.59	103	218
	2	240	175.97	18.573	1.199	173.61	178.33	140	267

	3	240	184.42	26.419	1.705	181.06	187.78	140	459
	4	240	210.94	27.218	1.757	207.48	214.40	135	277
	Total	960	182.24	30.762	.993	180.30	184.19	103	459

D_JUN_21	1	240	11.55	1.285	.083	11.39	11.72	9	18
	2	240	14.25	2.170	.140	13.97	14.53	11	21
	3	240	14.24	2.164	.140	13.97	14.52	11	22
	4	240	16.47	3.105	.200	16.07	16.86	12	25
	Total	960	14.13	2.862	.092	13.95	14.31	9	25

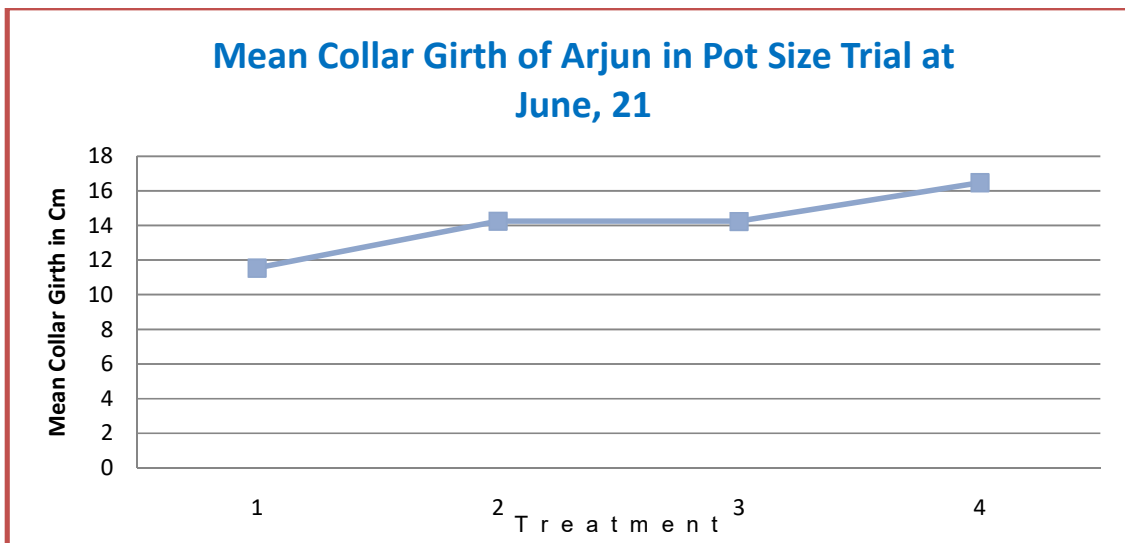
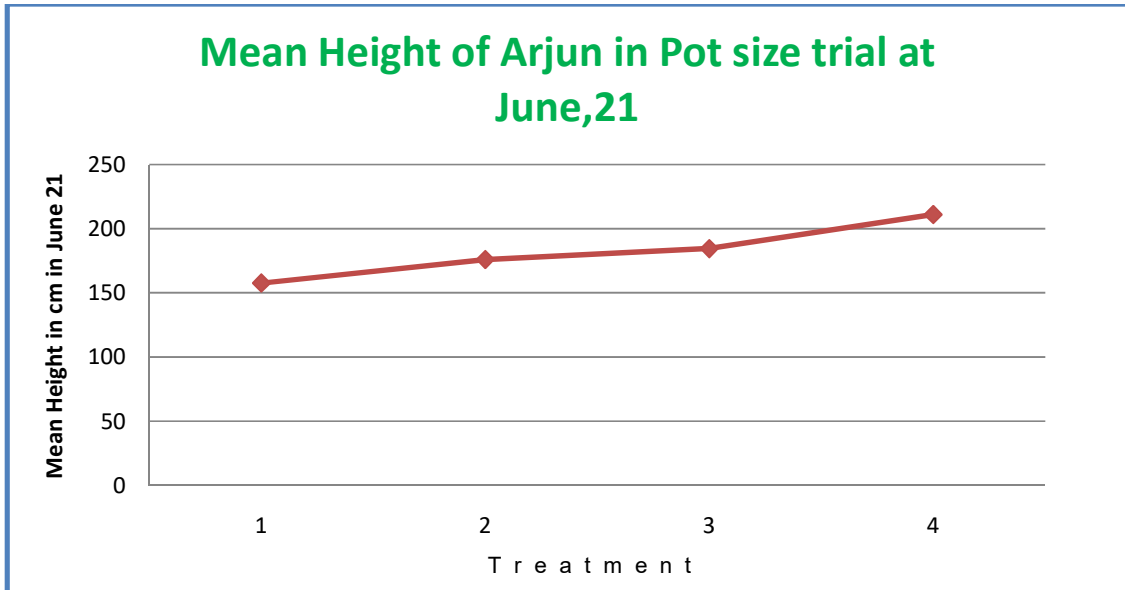
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	353447.754	3	117815.918	203.284	.000
	Within Groups	554063.208	956	579.564		
	Total	907510.962	959			
D_JUN_21	Between Groups	2912.335	3	970.778	187.739	.000
	Within Groups	4943.363	956	5.171		
	Total	7855.697	959			

Post Hoc Tests - Homogeneous Subsets

HT_JUN_21					
Duncan					
Treat	N	Subset for alpha = 0.05			
		1	2	3	4
1	240	157.65			
2	240		175.97		
3	240			184.42	
4	240				210.94
Sig.		1.000	1.000	1.000	1.000

CD_JUN_21				
Duncan				
Treat	N	Subset for alpha = 0.05		
		1	2	3
1	240	11.55		
3	240		14.24	
2	240		14.25	
4	240			16.47
Sig.		1.000	.981	1.000

Means Plot



Inference:-

- Treatment (T1) is 8" X 12" Poly pot
- Treatment (T2) is 10" X 12" Poly pot
- Treatment (T3) is 12" X 14" Poly pot
- Treatment (T4) is 14" X 16" Poly pot

The 2nd year growth performance of Pot size experiment of Arjun in terms of Height and Collar diameter during June-21, the bigger pot size is better growth. The growth performance wise pot size in descending order i.e. Treatment - 4 (14" X 16"), T3 (12" X 14"), T2 (10" X 12"), T1 (8" X 12") poly pot.

POT SIZE EXPERIMENT & DATA ANALYSIS REPORT OF MOHUL DURING - JUNE-21

Oneway

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	240	43.83	8.394	.542	42.76	44.90	20	68
	2	240	53.10	8.363	.540	52.04	54.17	37	75
	3	240	56.18	11.270	.727	54.74	57.61	34	94
	4	240	59.65	10.645	.687	58.30	61.01	43	105
	Total	960	53.19	11.380	.367	52.47	53.91	20	105
D_JUN_21	1	240	6.67	1.385	.089	6.49	6.85	4	13
	2	240	7.35	1.655	.107	7.14	7.57	5	12
	3	240	8.31	1.773	.114	8.09	8.54	5	13
	4	240	9.09	2.020	.130	8.83	9.35	5	15
	Total	960	7.86	1.951	.063	7.73	7.98	4	15

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	33198.778	3	11066.259	116.265	.000
	Within Groups	90993.338	956	95.181		
	Total	124192.116	959			
D_JUN_21	Between Groups	812.947	3	270.982	91.246	.000
	Within Groups	2839.139	956	2.970		
	Total	3652.087	959			

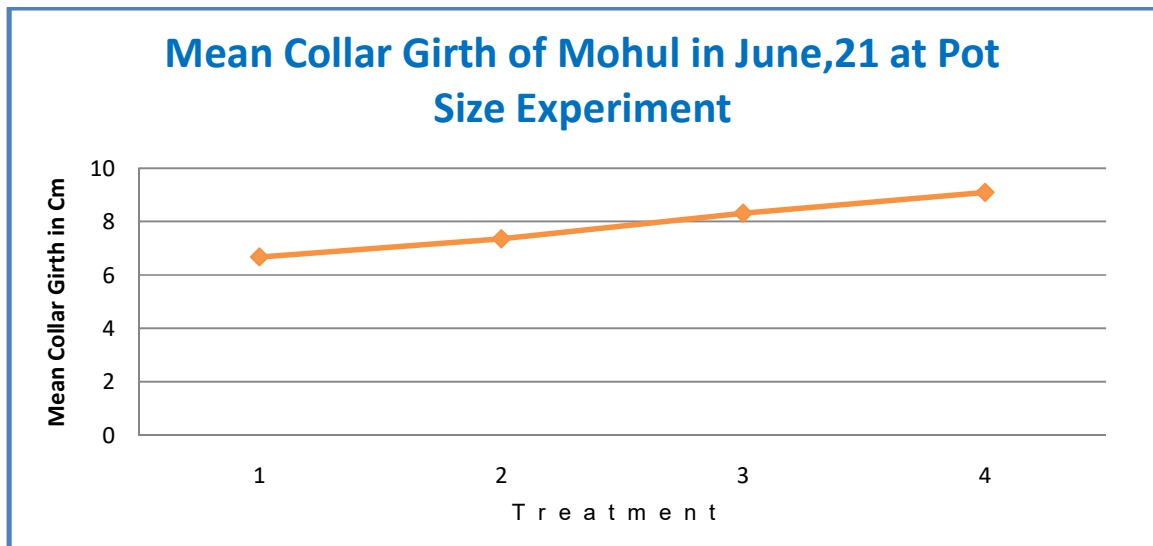
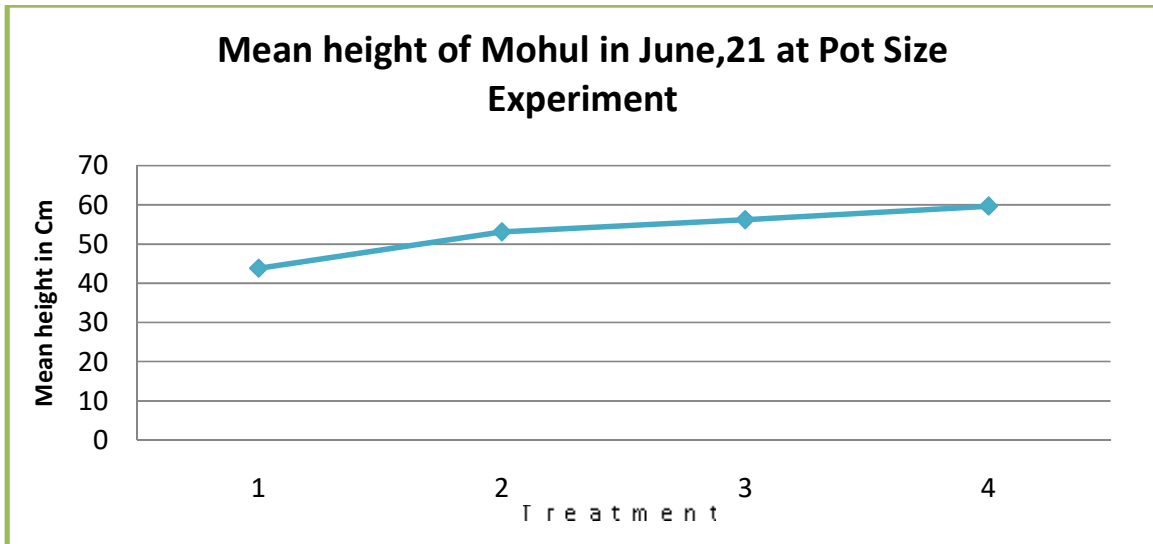
Post Hoc Tests Homogeneous Subsets

HT_JUN_21					
Duncan					
Treat	N	Subset for alpha = 0.05			
		1	2	3	4
1	240	43.83			
2	240		53.10		
3	240			56.18	
4	240				59.65
Sig.		1.000	1.000	1.000	1.000

CD_JUN_21					
Duncan					
Treat	N	Subset for alpha = 0.05			
		1	2	3	4
1	240	6.67			
2	240		7.35		
3	240			8.31	
4	240				9.09

Sig.		1.000	1.000	1.000	1.000
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Means Plots



Inference:-

- Treatment (T1) is 8" X 12" Poly pot
- Treatment (T2) is 10" X 12" Poly pot
- Treatment (T3) is 12" X 14" Poly pot
- Treatment (T4) is 14" X 16" Poly pot

The 2nd year growth performance of Pot size experiment of Mohul in terms of Height and Collar diameter during June-21, the bigger pot size is better growth. The growth performance wise pot size in descending order i.e. Treatment -4 (14" X 16"), T3 (12" X 14"), T2 (10" X 12"), T1 (8" X 12") Poly pot.

2.Potting Mixture Experiment

For the trials, two species are selected with 6 types of potting mixture in the year 1 and 3 types of potting mixture in year 2 and year 3 respectively, with 3 replications with 15 seedlings in each trial. The potting mixture of first year that give better results shall be tried in the second year and those selected ones of the second year shall be tried in third year as mentioned.(Annexure II)

Potting mixture						
	(Soil:Compost:Burnt rice husk)			(Soil:Compost:sand)		
Year 1	1:1:1	1:2:1	2:1:1	1:1:1	1:2:1	2:1:1
Year 2	1:1:1	1:1:0	2:1:0			
Year 3	1:1:1	1:1:0	2:1:0			

Currently prescribed

Measurements to be taken

3. Height
4. Collar girth of seedlings

Time of Measurements

4. Year 1, before transplanting in next bigger poly pot
5. Year 2 before transplanting in next bigger poly pot
6. Year 3 when seedling is reading

Data Analysis of Potting Mixture Experiment & Report of Mohul during – June-21

One way

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUL_21	1	45	92.22	25.837	3.852	84.46	99.98	58	148
	2	45	96.47	21.925	3.268	89.88	103.05	60	141
	3	45	100.60	25.387	3.785	92.97	108.23	51	152
	Total	135	96.43	24.504	2.109	92.26	100.60	51	152
D_JUL_21	1	45	17.98	4.050	.604	16.76	19.19	11	31
	2	45	18.84	3.722	.555	17.72	19.95	13	32
	3	45	20.40	5.031	.750	18.89	21.91	11	31
	Total	135	19.07	4.389	.378	18.32	19.82	11	32

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUL_21	Between Groups	1579.304	2	789.652	1.321	.270
	Within Groups	78881.778	132	597.589		
	Total	80461.081	134			
D_JUL_21	Between Groups	136.152	2	68.076	3.675	.028

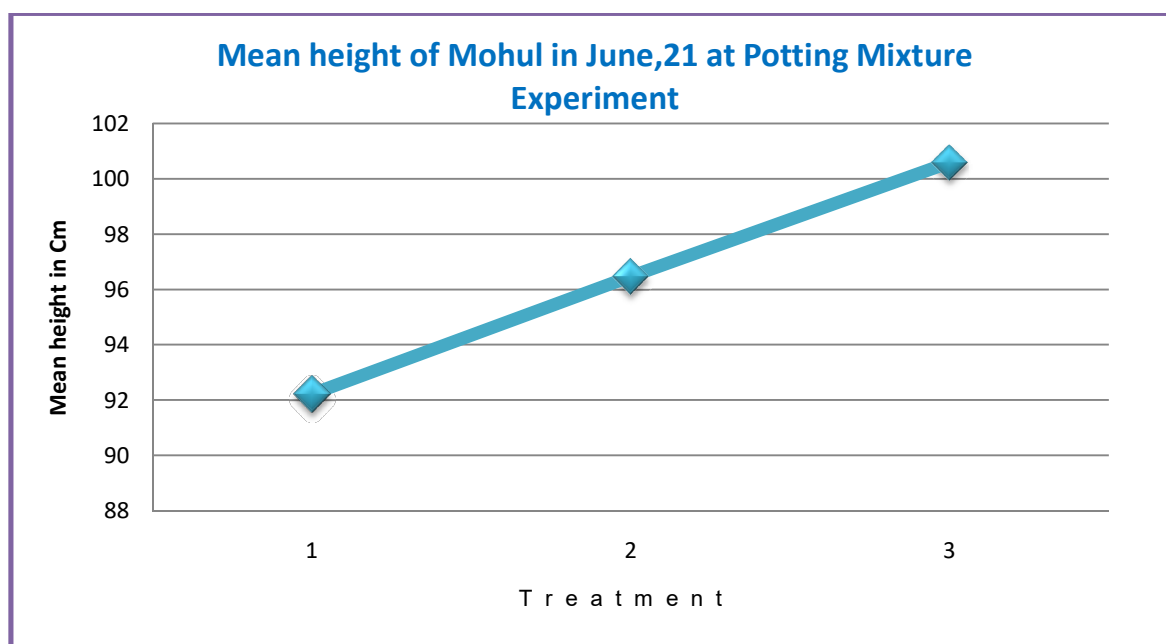
	Within Groups	2445.119	132	18.524		
	Total	2581.271	134			

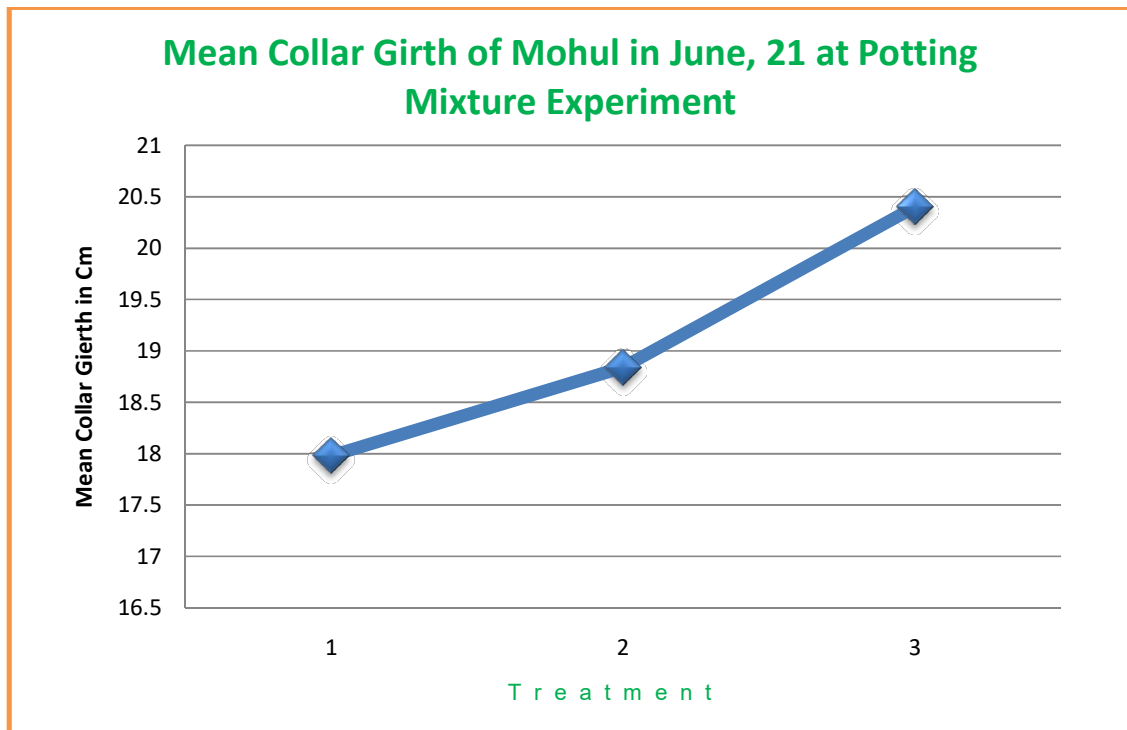
**Post Hoc Tests
Homogeneous Subsets**

HT_JUL_2021			
Duncan			
TREAT	N	Subset for alpha = 0.05	
		1	
1	45	92.22	
2	45	96.47	
3	45	100.60	
Sig.		.127	

CD_JUL_21			
Duncan			
TREAT	N	Subset for alpha = 0.05	
		1	2
1	45	17.98	
2	45	18.84	18.84
3	45		20.40
Sig.		.345	.087

Means Plot





Inference:- Pot Size in 2nd year - 12" X 14"

Treatment (T1) is (Soil : Compost : Burnt Rice Husk = 1:1:1)

Treatment (T2) is (Soil : Compost : Burnt Rice Husk = 1:1:0)

Treatment (T3) is (Soil : Compost : Burnt Rice Husk = 2:1:0)

The 2nd year growth performance of Potting mixture experiment of Mohul in terms of Height and Collar diameter during June-21, Treatment –3 (Soil : Compost : Burnt Rice Husk = 2:1:0) is better than T2 (Soil : Compost : Burnt Rice Husk = 1:1:0), Treatment (T1) (Soil : Compost : Burnt Rice Husk = 1:1:1)

Potting mixture experiment & Data Analysis Report of Haldu During – June-21

Oneway

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUL_21	1	45	156.36	13.999	2.087	152.15	160.56	134	189
	2	45	176.82	10.236	1.526	173.75	179.90	157	209
	3	45	161.84	17.267	2.574	156.66	167.03	135	210
	Total	135	165.01	16.493	1.419	162.20	167.81	134	210
D_JUL_21	1	45	23.41	4.850	.723	21.95	24.86	11	33
	2	45	24.89	4.097	.611	23.66	26.12	18	34
	3	45	25.23	3.914	.583	24.05	26.40	19	33
	Total	135	24.51	4.347	.374	23.77	25.25	11	34

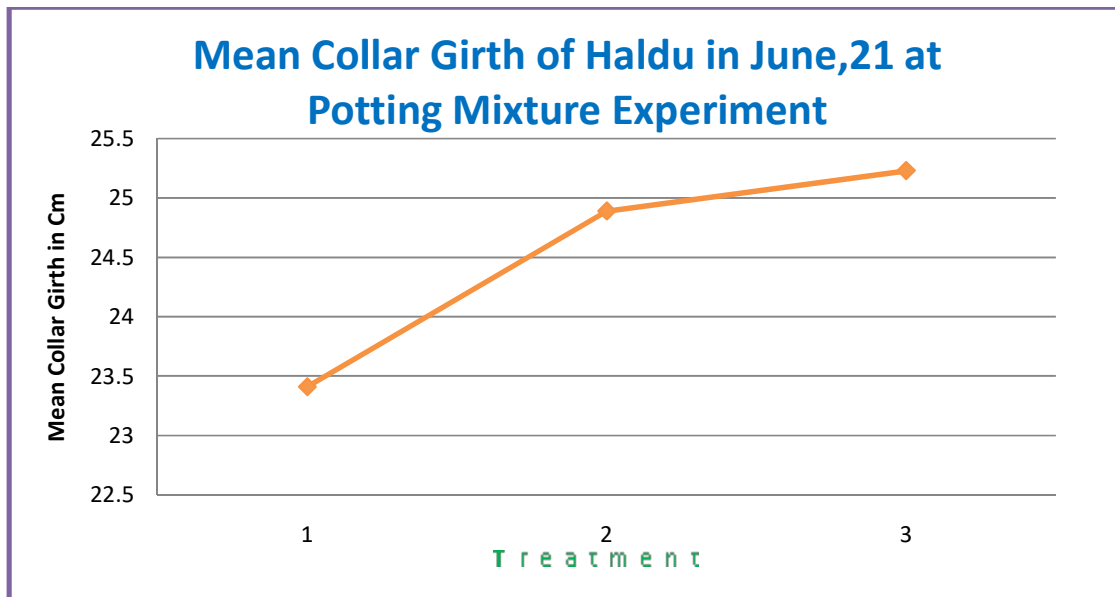
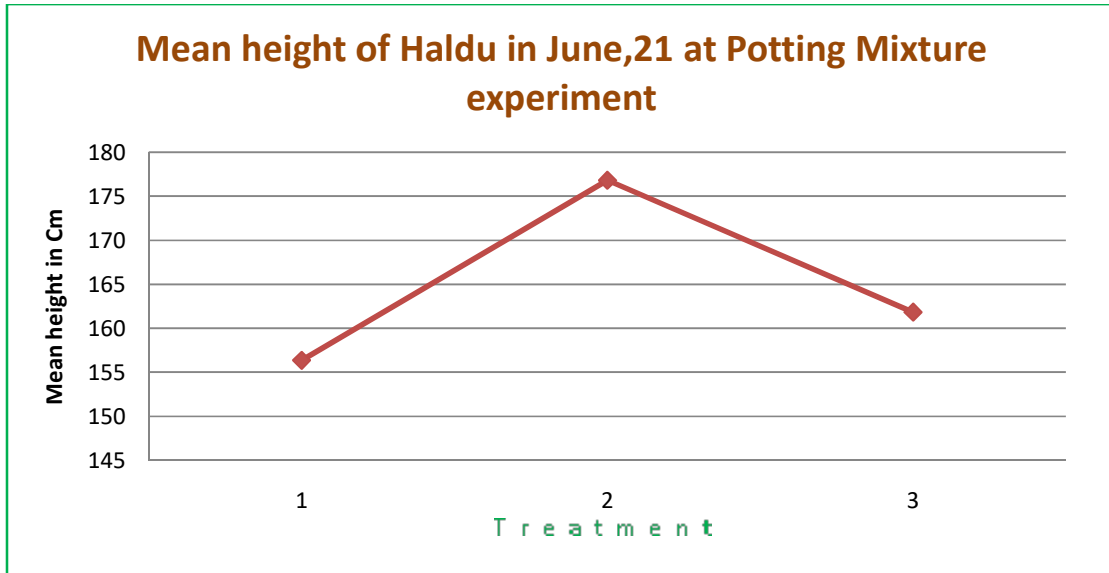
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUL_21	Between Groups	10100.193	2	5050.096	25.298	.000
	Within Groups	26350.800	132	199.627		
	Total	36450.993	134			
D_JUL_21	Between Groups	84.746	2	42.373	2.285	.106
	Within Groups	2447.752	132	18.544		
	Total	2532.498	134			

Post Hoc Tests - Homogeneous Subsets

HT_JUL_21			
Duncan			
		Subset for alpha = 0.05	
TREAT	N	1	2
1	45	156.36	
3	45	161.84	
2	45		176.82
Sig.		.068	1.000

CD_JUL_21		
Duncan		
		Subset for alpha = 0.05
TREAT	N	1
1	45	23.41
2	45	24.89
3	45	25.23
Sig.		.059

Means Plots



Inference:- Pot Size in 2nd year - 12" X 14"

Treatment (T1) is (Soil : Compost : Burnt Rice Husk = 1:1:1)

Treatment (T2) is (Soil : Compost : Burnt Rice Husk = 1:1:0)

Treatment (T3) is (Soil : Compost : Burnt Rice Husk = 2:1:0)

The 2nd year growth performance of Potting mixture experiment of Haldu in terms of Height and Collar diameter during June-21, Treatment –3 (Soil : Compost : Burnt Rice Husk = 2:1:0) & T2 (Soil : Compost : Burnt Rice Husk = 1:1:0), is better than Treatment (T1) (Soil : Compost : Burnt Rice Husk = 1:1:1)

3. GAP/Spacing Experiment in the Nursery

For trials, 3 types of species are selected with types of gap as below with 3 replications with 20 seedlings in each trial. Best results of first year will be tried in second year and best results of second year will be tried in third year.(Annexure VI)

Gap	(16th Aug to 31st March)			(16th June to 31st March)			
Year 1	3"	5"	8"				
Year 2				4 inch	7 inch	1ft	1.5 ft

 Currently prescribed

Measurements to be taken

3. Crown diameter
4. Height & Collar girth of seedlings

Time of Measurements

3. At the time of putting seedlings in shed
4. At the time of removal of shed

Gap Experiment of Arjun Data Analysis report of June-2021

One way

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	240	167.35	28.902	1.866	163.67	171.02	86	246
	2	240	167.14	29.768	1.922	163.36	170.93	86	236
	3	240	172.78	26.425	1.706	169.42	176.14	88	247
	Total	720	169.09	28.481	1.061	167.01	171.17	86	247
D_JUN_21	1	240	13.78	2.845	.184	13.42	14.14	7	23
	2	240	13.81	2.517	.162	13.49	14.13	7	23
	3	240	14.66	2.892	.187	14.29	15.02	8	23
	Total	720	14.08	2.782	.104	13.88	14.29	7	23

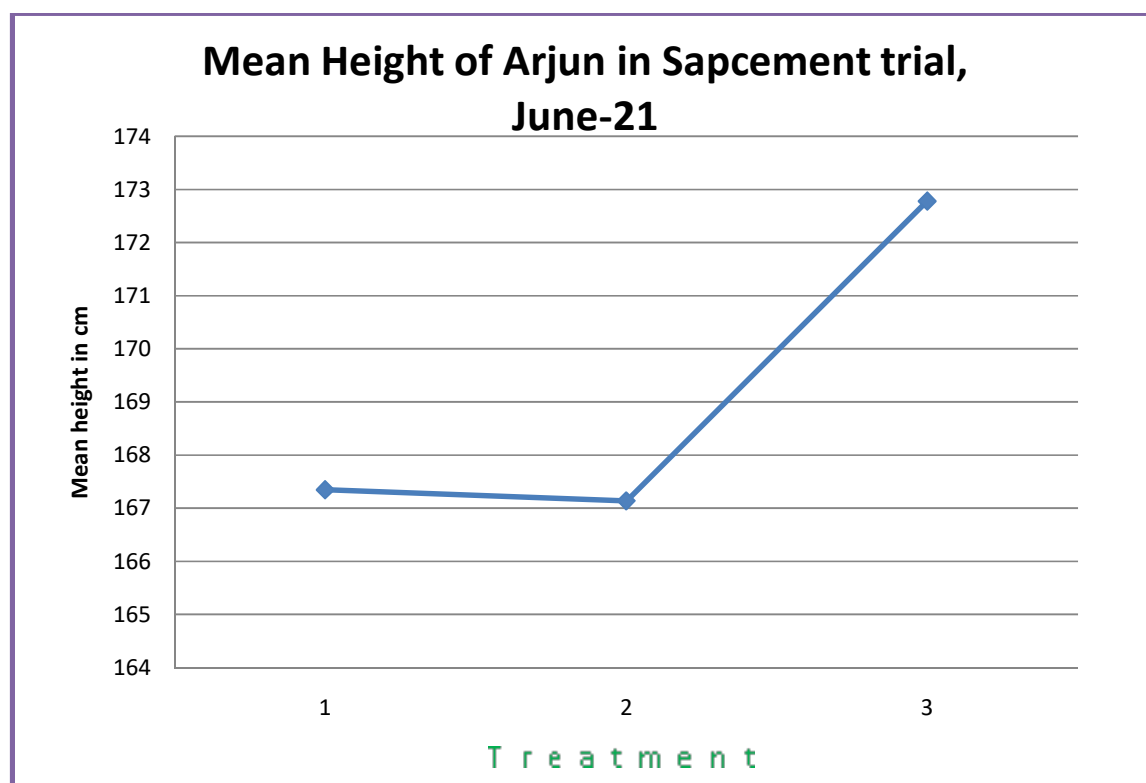
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	4907.536	2	2453.768	3.042	.048
	Within Groups	578306.775	717	806.565		
	Total	583214.311	719			
D_JUN_21	Between Groups	118.453	2	59.226	7.797	.000
	Within Groups	5446.015	717	7.596		
	Total	5564.467	719			

**Post Hoc Tests
Homogeneous Subsets**

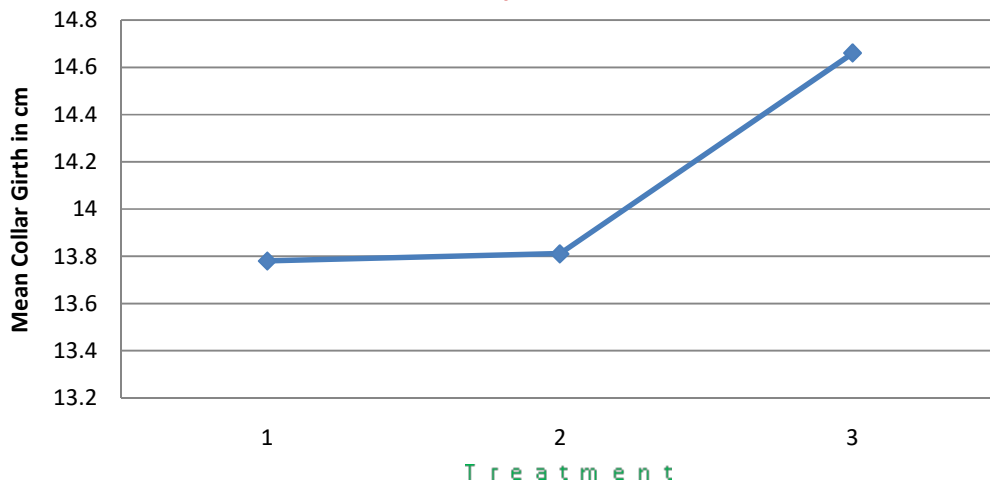
Ht_JUN_21			
Duncan			
TREAT	N	Subset for alpha = 0.05	
		1	2
2	240	167.14	
1	240	167.35	
3	240		172.78
Sig.		.937	1.000

CD_JUN_21			
Duncan			
TREAT	N	Subset for alpha = 0.05	
		1	2
1	240	13.78	
2	240	13.81	
3	240		14.66
Sig.		.909	1.000

Means Plots



Mean Collar Girth of Arjun in Spacement Trial, June-21



Inference:-

Pot Size in 2nd year is 12" X 14"

Treatment (T1) is 3" GAP each poly pot

Treatment (T2) is 5" GAP each poly pot

Treatment (T3) is 8" GAP each poly pot

The 2nd year growth performance of GAP experiment of Arjun in terms of Height and Collar diameter during June-21, Treatment -3 (8" GAP) is better than Treatment -2 (5" GAP) & Treatment-1 (3" GAP)

Gap Experiment of Mohul Data Analysis report of June-2021

One way

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	240	51.57	10.729	.693	50.20	52.93	25	87
	2	240	52.11	8.652	.558	51.01	53.21	31	88
	3	240	47.96	10.396	.671	46.64	49.28	29	78
	Total	720	50.55	10.123	.377	49.81	51.29	25	88
D_JUN_21	1	240	10.52	3.022	.195	10.13	10.90	6	25
	2	240	10.62	2.451	.158	10.30	10.93	6	20
	3	240	9.27	2.142	.138	9.00	9.54	5	23
	Total	720	10.13	2.633	.098	9.94	10.33	5	25

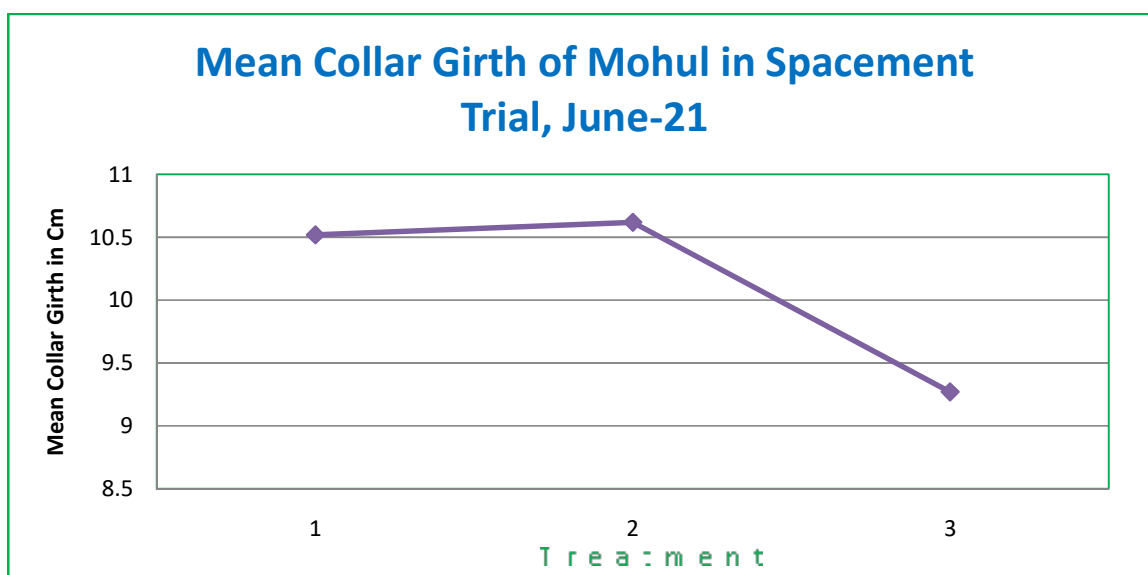
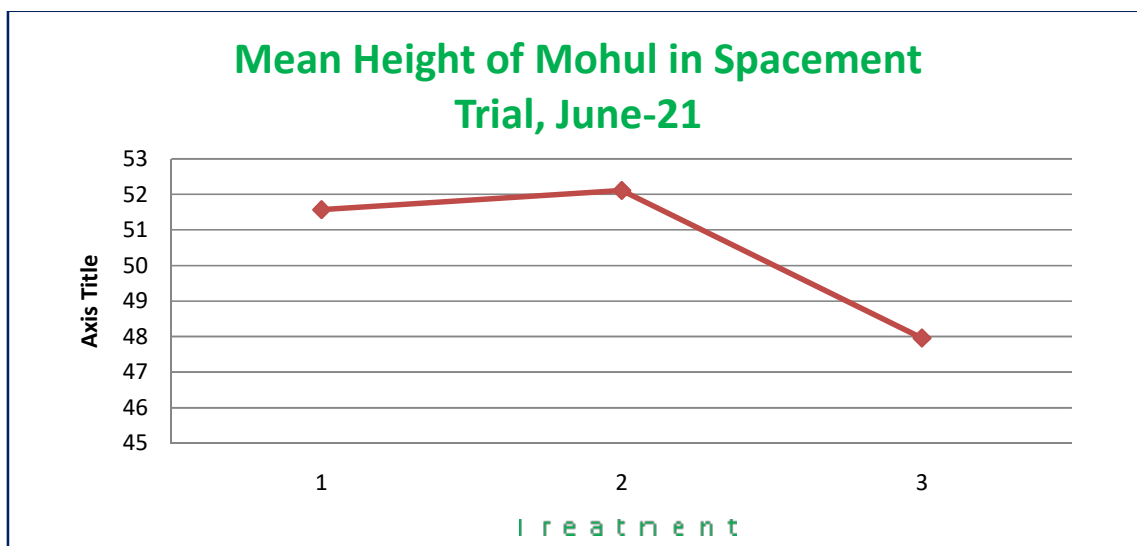
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	2437.708	2	1218.854	12.268	.000
	Within Groups	71234.779	717	99.351		
	Total	73672.488	719			
D_JUN_21	Between Groups	270.632	2	135.316	20.575	.000
	Within Groups	4715.536	717	6.577		
	Total	4986.168	719			

Post Hoc Tests Homogeneous Subsets

Ht. JUN_21			
Duncan			
TREAT	N	Subset for alpha = 0.05	
		1	2
3	240	47.96	
1	240		51.57
2	240		52.11
Sig.		1.000	.552

CD JUN_21			
Duncan			
TREAT	N	Subset for alpha = 0.05	
		1	2
3	240	9.27	
1	240		10.52
2	240		10.62
Sig.		1.000	.670

Means Plots



Inference:-

Pot Size in 2nd year is 12" X 14"

Treatment (T1) is 3" GAP each poly pot

Treatment (T2) is 5" GAP each poly pot

Treatment (T3) is 8" GAP each poly pot

The 2nd year growth performance of GAP experiment of Mohul in terms of Height and Collar diameter during June-21, Treatment -2 (5" GAP) & Treatment-1 (3" GAP) is better than Treatment -3 (8" GAP).

SHADE EXPERIMENT

For trials, 3 types of species are selected with 3 types of shades as shown below in each year with 3 replications with 20 seedlings in each trial. Best results of first year will be tried in second year and best results of second year will be tried in third year. (Annexure V)

Shade	1st April to 30th June				
Year 1	25%	50%	75%		
Year 2		25%	50%	75%	
Year 3			no shade	25%	75%

Currently prescribed

Measurements to be taken

1. Height
2. Collar girth of seedlings

Time of Measurements

1. At the time of putting seedlings in shed
2. At the time of removal of shed

Shade Experiment & Data Analysis Report Of Arjun- Durign June-21

One way

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	180	180.47	25.422	1.895	176.73	184.21	127	234
	2	180	181.71	29.376	2.190	177.38	186.03	122	267
	3	180	176.83	16.580	1.236	174.39	179.27	129	242
	Total	540	179.67	24.429	1.051	177.60	181.73	122	267
D_JUN_21	1	180	16.05	3.099	.231	15.59	16.50	11	23
	2	180	15.75	2.937	.219	15.32	16.18	10	23
	3	180	14.69	2.078	.155	14.39	15.00	10	22
	Total	540	15.50	2.797	.120	15.26	15.73	10	23

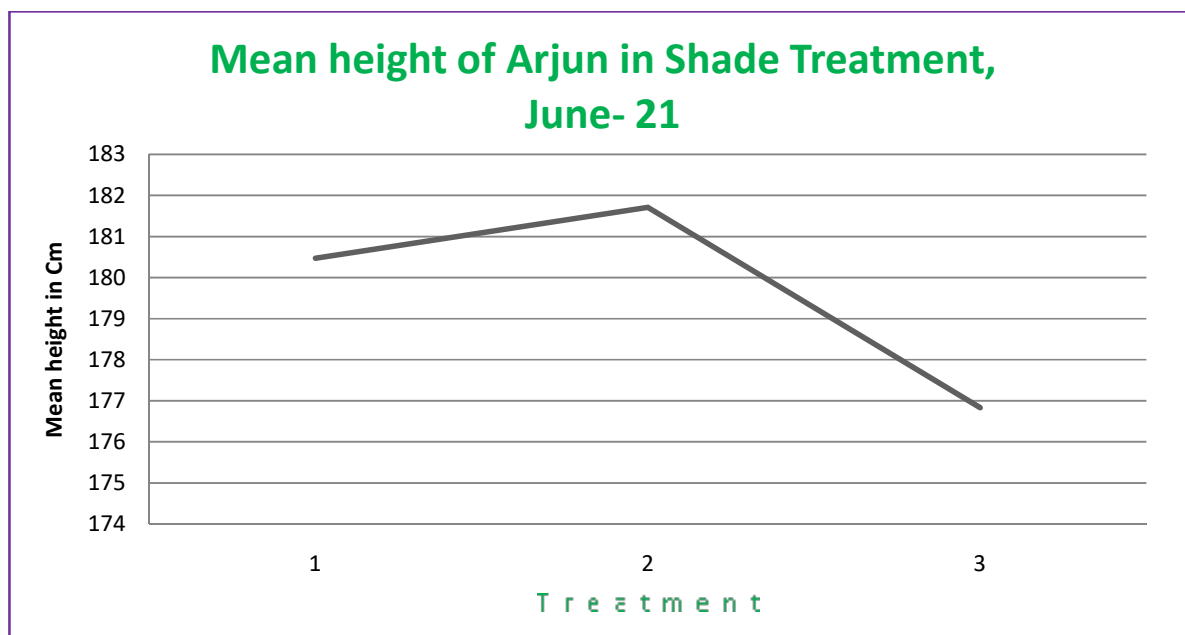
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	2314.144	2	1157.072	1.946	.144
	Within Groups	319349.856	537	594.692		
	Total	321664.000	539			
D_JUN_21	Between Groups	182.524	2	91.262	12.144	.000
	Within Groups	4035.550	537	7.515		
	Total	4218.074	539			

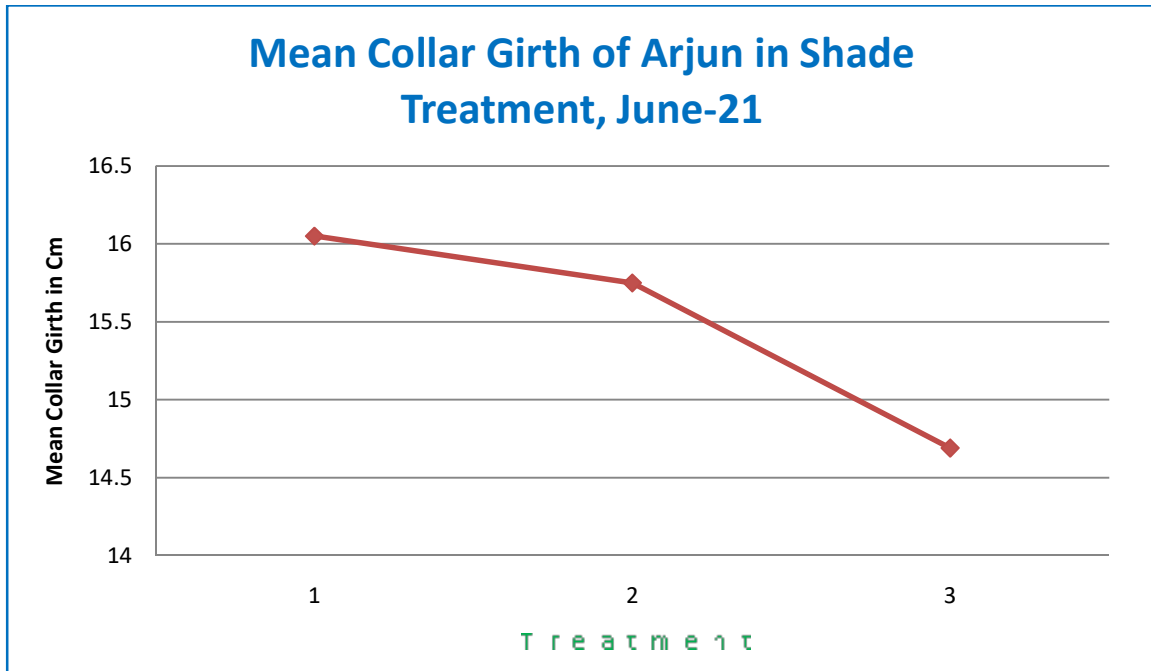
**Post Hoc Tests
Homogeneous Subsets**

Ht_JUN_21		
Duncan		
TREAT	N	Subset for alpha = 0.05
		1
3	180	176.83
1	180	180.47
2	180	181.71
Sig.		.073

CD_JUN_21			
Duncan			
TREAT	N	Subset for alpha = 0.05	
		1	2
3	180	14.69	
2	180		15.75
1	180		16.05
Sig.		1.000	.310

Means Plots





Inference:-

Pot Size in 2nd year - 12" X 14"

Treatment (T1) is 25% Agro-net Shed

Treatment (T2) is 50% Agro-net Shed

Treatment (T3) is 75% Agro-net Shed

The 2nd year growth performance of Shed experiment of Arjun in terms of Height and Collar diameter during June-21, the shed type of T1 (25%shed) & T2 (50% shed) is better than T3 (75% shed).

Shade Experiment & Data Analysis Report Of Mohul- During June-21

One way

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	180	47.27	13.234	.986	45.32	49.21	23	79
	2	180	42.57	11.460	.854	40.88	44.25	24	77
	3	180	46.39	10.922	.814	44.78	48.00	26	79
	Total	540	45.41	12.065	.519	44.39	46.43	23	79
D_JUN_21	1	180	9.28	3.009	.224	8.83	9.72	5	19
	2	180	8.52	2.403	.179	8.17	8.88	4	15
	3	180	9.08	2.813	.210	8.67	9.50	4	18
	Total	540	8.96	2.767	.119	8.73	9.19	4	19

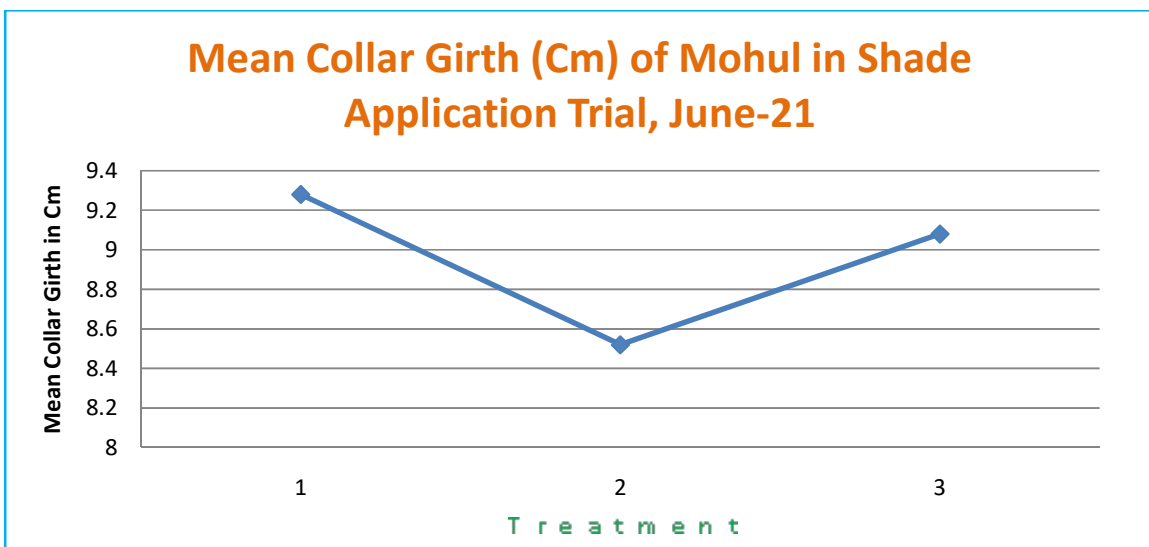
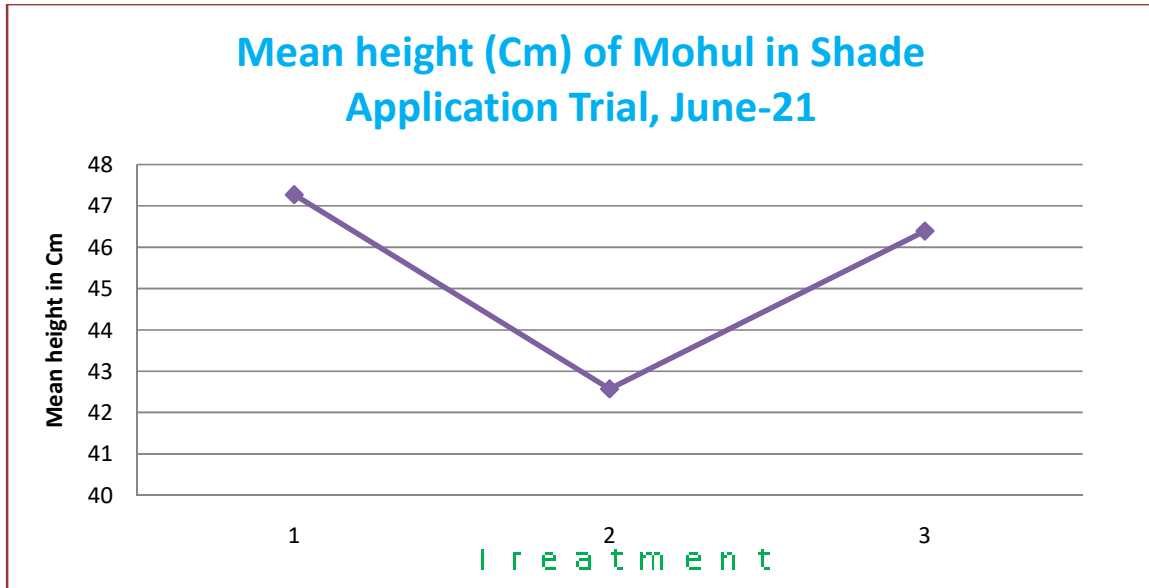
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	2248.193	2	1124.096	7.921	.000
	Within Groups	76212.178	537	141.922		
	Total	78460.370	539			
D_JUN_21	Between Groups	55.208	2	27.604	3.641	.027
	Within Groups	4070.906	537	7.581		
	Total	4126.114	539			

Post Hoc Tests - Homogeneous Subsets

HT_JUN_21				
Duncan				
TREAT	N	Subset for alpha = 0.05		
		1	2	
2	180	42.57		
3	180			46.39
1	180			47.27
Sig.			1.000	.485

CD_JUN_21				
Duncan				
TREAT	N	Subset for alpha = 0.05		
		1	2	
2	180	8.52		
3	180	9.08		9.08
1	180			9.28
Sig.			.054	.506

Means Plot



Inference:-

Pot Size in 2nd year - 12" X 14"

Treatment (T1) is 25% Agro-net Shed

Treatment (T2) is 50% Agro-net Shed

Treatment (T3) is 75% Agro-net Shed

The 2nd year growth performance of Shed experiment of Mohul in terms of Height and Collar diameter during June-21, the shed type of T1 (25% shed) & T3 (75% shed) is better than T2 (50% shed).

Watering Experiment

For trials, 3 types of species are selected for 3 types of watering schedule each year in dry, rainy and winter season with 3 replications with 20 seedlings in each trial. Best results of first year will be tried.

Watering(in a day)	Dry			Rainy			Winter		
Year 1	twice	daily	alternate	twice	once	alternate	twice	once	alternate
Year 2	twice	daily	alternate	twice	once	alternate	twice	once	alternate
Year 3	twice	daily	alternate	twice	once	alternate	twice	once	alternate

in second year and best results of second year will be tried in third year. Annexure IV)

Currently prescribed

Measurements to be taken

1. Height
2. Collar girth of seedlings

Time of Measurements

1. Every month

Watering Experiment & Data Analysis Report Of Arjun During June-2021.

One way

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	180	174.08	17.787	1.326	171.46	176.69	126	216
	2	180	171.66	23.613	1.760	168.19	175.13	118	284
	3	180	163.59	16.258	1.212	161.20	165.98	127	204
	Total	540	169.78	19.954	.859	168.09	171.46	118	284
D_JUN_21	1	180	13.04	2.419	.180	12.68	13.39	10	21
	2	180	13.61	2.819	.210	13.20	14.03	10	23
	3	180	11.74	1.842	.137	11.47	12.01	10	19
	Total	540	12.80	2.515	.108	12.58	13.01	10	23

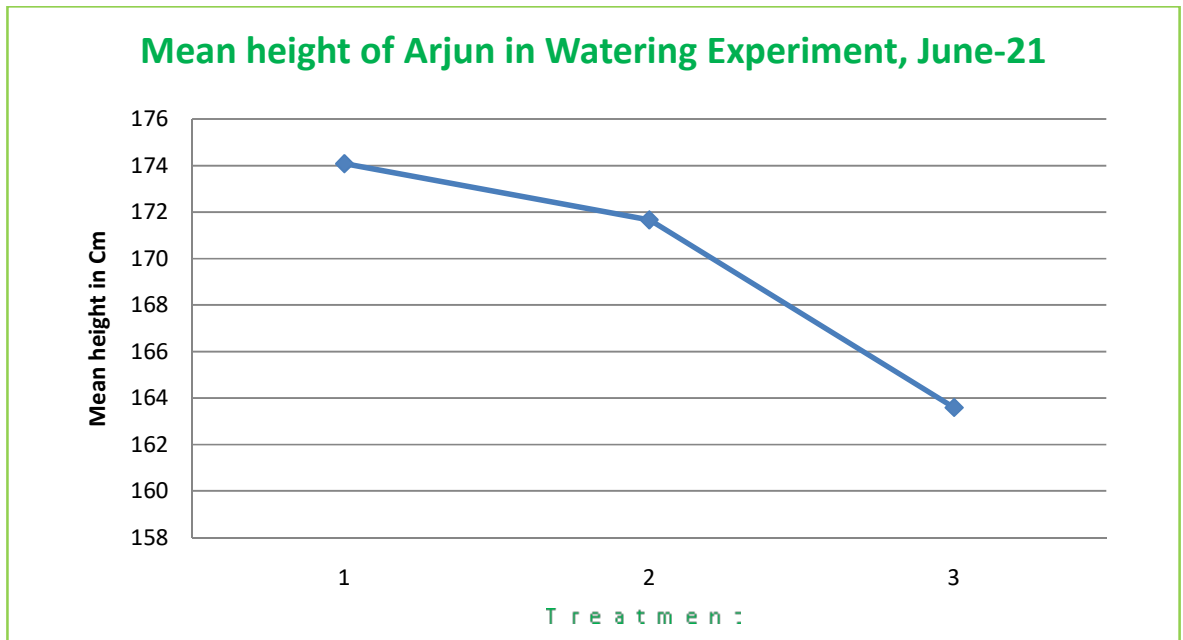
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	10861.070	2	5430.535	14.312	.000
	Within Groups	203752.817	537	379.428		
	Total	214613.887	539			
D_JUN_21	Between Groups	331.139	2	165.570	28.896	.000
	Within Groups	3076.980	537	5.730		
	Total	3408.120	539			

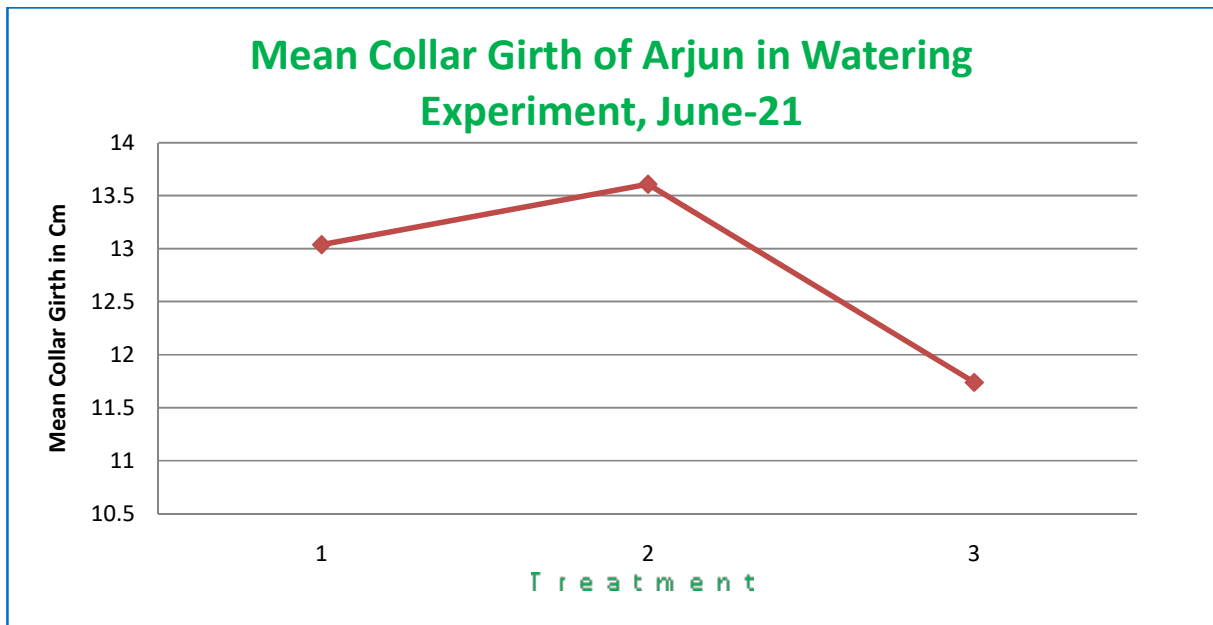
**Post Hoc Tests
Homogeneous Subsets**

HT_JUN_21			
Duncan			
		Subset for alpha = 0.05	
TREAT	N	1	2
3	180	163.59	
2	180		171.66
1	180		174.08
Sig.		1.000	.240

CD_JUN_21				
Duncan				
		Subset for alpha = 0.05		
TREAT	N	1	2	3
3	180	11.74		
1	180		13.04	
2	180			13.61
Sig.		1.000	1.000	1.000

Means Plots





Inference:- Treatment – 1(T1) is Twice watering daily during Dry, Rainy & Winter season
 Treatment – 2(T2) is Daily watering in Dry, Rainy & Winter season
 Treatment – 3 (T3) is Every alternate day watering during Dry, Rainy & Winter season

The 2nd year growth performance of Watering/Irrigation experiment Arjun in terms of Height and Collar diameter during June-21, Treatment – 2(T2) (Daily watering in Dry, Rainy & Winter season) & T1 (Twice watering daily during Dry, Rainy & Winter season) is better than T3 (Every alternate day watering during Dry, Rainy & Winter season)

Watering Experiment & Data Analysis Report of Mohul During June-2021.

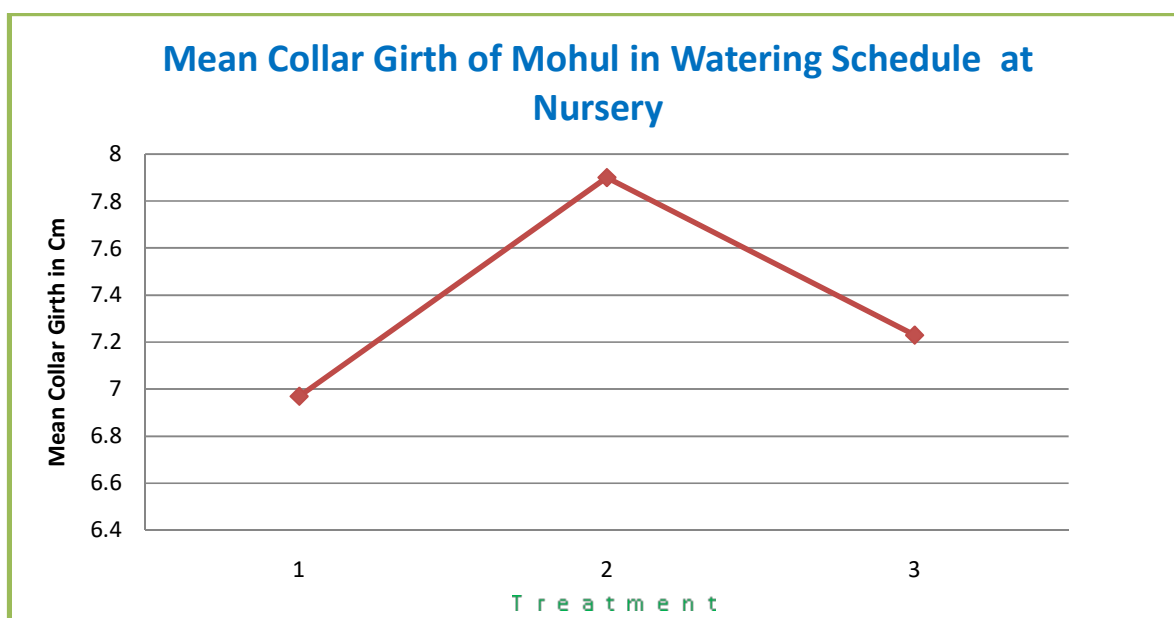
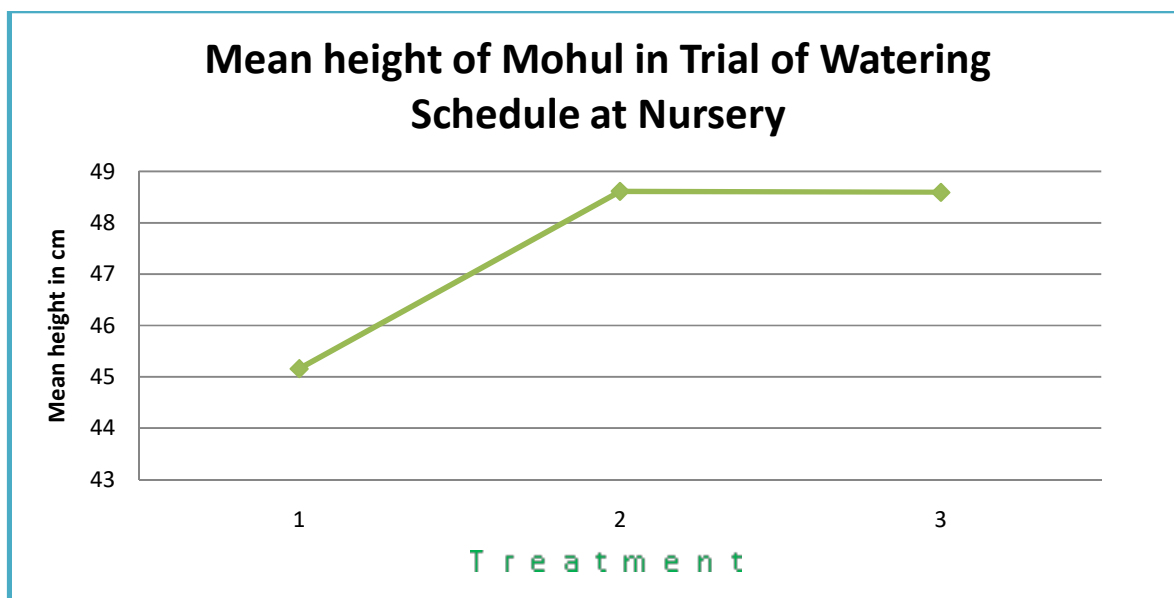
Oneway - Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
H_JUN_21	1	180	45.16	9.474	.706	43.76	46.55	24	71
	2	180	48.61	10.490	.782	47.06	50.15	22	74
	3	180	48.59	9.753	.727	47.15	50.02	24	78
	Total	540	47.45	10.029	.432	46.60	48.30	22	78
D_JUN_21	1	180	6.97	1.304	.097	6.77	7.16	5	13
	2	180	7.90	1.697	.127	7.65	8.15	5	13
	3	180	7.23	.978	.073	7.09	7.37	6	12
	Total	540	7.36	1.412	.061	7.24	7.48	5	13

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
H_JUN_21	Between Groups	1421.433	2	710.717	7.229	.001
	Within Groups	52792.217	537	98.310		
	Total	54213.650	539			
D_JUN_21	Between Groups	82.782	2	41.391	22.427	.000
	Within Groups	991.094	537	1.846		
	Total	1073.876	539			

Post Hoc Tests Homogeneous Subsets

HT_JUN_21			
Duncan			
		Subset for alpha = 0.05	
TREAT	N	1	2
1	180	45.16	
3	180		48.59
2	180		48.61
Sig.		1.000	.987
CD_JUN_21			
Duncan			
		Subset for alpha = 0.05	
TREAT	N	1	2
1	180	6.97	
3	180	7.23	
2	180		7.90
Sig.		.066	1.000

Means Plots



Inference:- Treatment – 1(T1) is Twice watering daily during Dry, Rainy & Winter season
Treatment – 2(T2) is Daily watering in Dry, Rainy & Winter season
Treatment – 3 (T3) is Every alternate day watering during Dry, Rainy & Winter season

The 2nd year growth performance of Watering/Irrigation experiment of Mohul in terms of Height and Collar diameter during June-21, Treatment – 2(T2) (Daily watering in Dry, Rainy & Winter Season) & T3 (Every alternate day watering during Dry, Rainy & Winter season) is better than T1 (Twice watering daily during Dry, Rainy & Winter season)

Conclusion and Discussion -

1. Pot size Experiment:-

Treatment (T1) is 8" X 12" Poly pot , Treatment (T2) is 10" X 12" Poly pot

Treatment (T3) is 12" X 14" Poly pot , Treatment (T4) is 14" X 16" Poly pot

Inference for Pot size experiment & Data analysis report of ARJUN DURING - JUNE-21:-The 2nd year growth performance of Pot size experiment of Arjun in terms of Height and Collar diameter during June-21, the bigger pot size is better growth. The growth performance wise pot size in descending order i.e. Treatment - 4 (14" X 16"), T3 (12" X 14"), T2 (10" X 12"), T1 (8" X 12") poly pot.

Inference for Pot size experiment & Data analysis report of MOHUL during June-21:- The 2nd year growth performance of Pot size experiment of Mohul in terms of Height and Collar diameter during June-21, the bigger pot size is better growth. The growth performance wise pot size in descending order i.e. Treatment -4 (14" X 16"), T3 (12" X 14"), T2 (10" X 12"), T1 (8" X 12") Poly pot.

2. Potting mixture Experiment:-

Pot Size in 2nd year - 12" X 14"

Treatment (T1) is (Soil : Compost : Burnt Rice Husk = 1:1:1),

Treatment (T2) is (Soil : Compost : Burnt Rice Husk = 1:1:0)

Treatment (T3) is (Soil : Compost : Burnt Rice Husk = 2:1:0)

Inference for Potting mixture experiment & Data analysis report of MOHUL during June-21:-The 2nd year growth performance of Potting mixture experiment of Mohul in terms of Height and Collar diameter during June-21, Treatment –3 (Soil : Compost : Burnt Rice Husk = 2:1:0) is better than T2 (Soil : Compost : Burnt Rice Husk = 1:1:0), Treatment (T1) (Soil : Compost : Burnt Rice Husk = 1:1:1)

Inference for Potting mixture experiment & Data analysis report of HALDU during June-21:-

The 2nd year growth performance of Potting mixture experiment of Haldu in terms of Height and Collar diameter during June-21, Treatment –3 (Soil : Compost : Burnt Rice Husk = 2:1:0) & T2 (Soil : Compost : Burnt Rice Husk = 1:1:0), is better than Treatment (T1) (Soil : Compost : Burnt Rice Husk = 1:1:1)

3. Gap Experiment:-

Treatment (T1) is 3" GAP each poly pot

Treatment (T2) is 5" GAP each poly pot

Treatment (T3) is 8" GAP each poly pot

Inference for GAP experiment & Data analysis report of ARJUN during June-21:-The 2nd year growth performance of GAP experiment of Arjun in terms of Height and Collar diameter during June-21, Treatment –3 (8" GAP) is better than Treatment –2 (5" GAP) & Treatment-1 (3" GAP)

Inference for GAP experiment & Data analysis report of MOHUL during June-21:-The 2nd year growth performance of GAP experiment of Mohul in terms of Height and Collar diameter during June-21, Treatment –2 (5" GAP) & Treatment-1 (3" GAP) is better than Treatment –3 (8" GAP).

4. Shed Experiment:-

Pot Size in 2nd year - 12" X 14"

Treatment (T1) is 25% Agro-net Shed

Treatment (T2) is 50% Agro-net Shed

Treatment (T3) is 75% Agro-net Shed

Inference for SHED experiment & Data analysis report of ARJUN during June-21:- The 2nd year growth performance of Shed experiment of Arjun in terms of Height and Collar diameter during June-21, the shed type of T1 (25%shed) & T2 (50% shed) is better than T3 (75% shed).

Inference for SHED experiment & Data analysis report of MOHUL during June-21:- The 2nd year growth performance of Shed experiment of Mohul in terms of Height and Collar diameter during June-21, the shed type of T1 (25% shed) & T3 (75% shed) is better than T2 (50% shed).

5. Watering Experiment:-

Treatment – 1(T1) is Twice watering daily during Dry, Rainy & Winter season

Treatment – 2(T2) is Daily watering in Dry, Rainy & Winter season

Treatment – 3 (T3) is Every alternate day watering during Dry, Rainy & Winter season

Inference for Watering/Irrigation experiment & Data analysis report of ARJUN during June-21:-

The 2nd year growth performance of Watering/Irrigation experiment Arjun in terms of Height and Collar diameter during June-21, Treatment – 2(T2) (Daily watering in Dry, Rainy & Winter season)

& T1 (Twice watering daily during Dry, Rainy & Winter season) is better than T3 (Every alternate day watering during Dry, Rainy & Winter season)

Inference for Watering/Irrigation experiment & Data analysis report of MOHUL during June-21:-

The 2nd year growth performance of Watering/Irrigation experiment of Mohul in terms of Height and Collar diameter during June-21, Treatment – 2(T2) (Daily watering in Dry, Rainy & Winter season) & T3 (Every alternate day watering during Dry, Rainy & Winter season) is better than T1 (Twice watering daily during Dry, Rainy & Winter season)

Photographs of Tall Seedlings Experiment at Arabari under Silviculture (South) Division



Gap Experiment of Mohul at Arabari Res. Range



Gap Experiment of Arjun at Arabari Res. Range



Pot Size Experiment of Arjun at Arabari



Pot size experiment of Mohul at Arabari



Potting Mixture Experiment of Haldu at Arabari



Potting mixture experiment of Mohul at Arabari



Shed Experiment of Arjun At Arabari



Shed Experiment of Mohul At Arabari

