COMPARATIVE GROWTH STUDY OF CASUARINA (JHAUN) IN ODISHA

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INTRODUCTION:

Casuarina equisetifolia is one of the very important species for coastal plantations for stabilizing the sand dunes. It acts as a barrier for storm and cyclonic wind flow and thus forms a shelter belt. It is the most popular farm forestry tree in the coastal lands of Andhra Pradesh, Odisha, Tamilnadu, West Bengal, Maharashtra, Gujarat & Karnataka. Casuarina resembles feathery conifer in general appearance. Almost all of approximately 35 casuarina species produce top quality firewood. They are rapid growing, carefree species for sites and climates as varied as coastal sand dunes, high mountain slopes, hot humid tropics and semi-arid regions. They tend to be salt tolerant, wind resistant and adaptable to moderately poor soils. Although they are not legumes, they do have the ability to form root nodules and fix atmospheric nitrogen. Casuarina equisetifolia can attain height of 50 mtr. with diameter of around 1 metre. However, it is generally only 15-25 metres tall.

The species is indigenous to sandy shores and dunes along the coast of Chittagong (Bangaldesh), Tenasserim and in Little Andamans. It is found in North and North East Australia, some pacific islands, Indonesia, Malaysia, India and Sri Lanka. It has been introduced for firewood, beautification & other purpose to India, Pakistan, East, Central & West Africa, West Indies, Florida and Gulf of Mexico.

It thrives best in close proximity to the sea on loose sand, growing sometimes within a few yards of high-tide level and even with its roots in sea. In its natural state it is gregarious, forming pure crops with little or no undergrowth except grass and a few coastal shrubs. It is grown as ornamental tree on various soils in India but does not thrive on clay, preferring a sandy soil. On badly drained ground subject to inundations, trees become unhealthy and die off whereas on sandy soils where the water level sinks top level in the dry season they tend to become stunted and even bush like.

PURPOSE OF STUDY:

Traditionally the casuarina species grown in Odisha are *Casuarina equisetifolia, Casuarina glauca, Casuarina cunninghammiana, Casuarina junghuhniana.* These species are not high yielders in terms of biomass production, although they have wide spread adaptability. So some of the clones of the improved varieties as suggested by IFGTB, Coimbatore require to be introduced and comparative growth and other studies are to be made.

METHODOLOGY:

The planting stock received from IFGTB, Coimbatore during 2012 is as follows:- 500 no. of seedlings of Casuarina junghuhniana, 400 no. of seedlings of Casuarina equisetifolia and 150 no. of seedlings of Karunya seed orchard, Coimbatore. They were nourished in Temporary Nursery at Chandipur during the period 2012. It is pertinent to note that Casuarina junghuhniana being an inland species was planted over an area of 0.315 Ha. in Arabandh R.F. of Nilagiri Range whereas Casuarina equisetifolia being a coastal species was planted over an area of 0.4 Ha. at Chandipur in Chandipur R.F of Chandipur Range. Plantation was done in 2012. The spacing is 2.5 mt. X 2.5 mt. At Arabandh, a total of 400 seedlings were planted (380 no. of IFGTB clone and 20 no. of local Casuarina equisetifolia as control). At Chandipur, a total of 480 seedlings were planted, 460 no. of IFGTB clone and 80 no. of local as control. Height and growth of all the individual trees has been measured by the Forest Department staff in all the years since plantation in 2012. The soil report of these Casuarina research plantations has been done by Dr.Prasannajit Mishra, Associate professor, Officer-in-Charge AICRP on Agro Forestry, OUAT, Bhubaneswar and Dr. Bibhuti Bhusan Behera, Junior Scientist, Soil Science, Agro Forestry, OUAT, Bhubaneswar.

Lay out of Arabandh Research Plot.

SOIL ANALYSIS REPORT:

Location : Chandipur R.F., Chandipur:

Sample No.	pH	EC (ds/m)	Organic Carbon (%)	Avl.N (kg/ha)	Avl.P (kg/ha)	Avl.K (kg/ha)
CE-1	5.32	0.017	0.16	130.88	0.32	24.75
CE-2	5.32	0.018	0.15	119.98	0.21	20.80
CE-3	5.34	0.018	0.13	119.98	0.19	22.38
CE-4	5.41	0.010	0.17	130.88	0.25	26.88
CE-5	5.59	0.010	0.14	109.07	0.18	21.56
CE-6	5.48	0.008	0.10	98.16	0.11	34.50

Result :

The textural class of soil is sand as it contains sand 96.8%, silt 2.0% and clay 1.2%.Soil samples were collected from upper 30 cm depth therefore it is found that status is very low and phosphorus content was very negligible (< 0.5 kg/ha), pH is acidic and organic carbon content is very low. There is no marked difference among different casuarina clones in soil characters during this period. Therefore for better inference henceforth soil samples should be collected from 0-30 and 30-60 cm depth.

Location : Arabandh R.F, Nilagiri:

Sample No.	pH	EC (ds/m)	Organic Carbon (%)	Avl.N (kg/ha)	Avl.P (kg/ha)	Avl.K (kg/ha)
C-1	5.04	0.031	0.41	218.14	1.35	150.86
C-2	5.32	0.025	0.39	207.23	1.31	142.16
C-3	5.26	0.013	0.33	207.23	1.28	137.87
C-4	5.32	0.016	0.31	196.33	1.21	135.23
C-5	5.18	0.018	0.42	218.14	1.32	158.37
C-6	5.04	0.016	0.33	196.33	1.17	109.09
C-7	5.12	0.013	0.30	185.42	1.13	112.18
C-8	5.20	0.015	0.33	185.42	1.11	121.66
C-9	5.28	0.012	0.38	218.14	1.36	100.24
C-10	5.12	0.022	0.35	207.23	1.27	112.84

C-11	5.13	0.018	0.42	218.14	1.30	138.51
C-12	5.09	0.012	0.33	207.23	1.22	90.83
C-13	5.11	0.019	0.29	185.42	1.17	96.53
C-14	5.01	0.016	0.39	229.05	1.37	107.07
C-15	5.08	0.016	0.36	218.14	1.26	112.19
C-16	5.11	0.017	0.32	207.23	1.22	101.22
C-17	5.12	0.020	0.26	185.42	1.07	117.49
C-18	5.02	0.021	0.39	218.14	1.28	122.38
C-19	5.10	0.013	0.34	196.33	1.09	135.16
C-20	5.45	0.010	0.33	196.33	1.14	156.35

Arabandh Research Plot.

Result :

The textural class of soil is loamysand as it contains sand 75.0%, silt 20.0% and clay 5.0%. Soil sample were collected from upper 30 cm depth therefore it is found that nutrient status is very low to medium and phosphorus content was very negligible (< 1.5 kg/ha), pH is acidic and organic carbon content is low. There is no marked difference among different casuarina clones in soil characters during this period. Therefore for better inference henceforth soil samples should be collected from 0-30 and 30-60 cm. Depth.

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Measurement of height and girth (as on 31.10.2016)

Location : Chandipur :

Clone	Serial Number of Trees	Total Number of Trees	Total height (Cm.)	Total girth (Cm.)	Average height (Cm.)	Average girth (Cm.)
Rep-01 Ce-01	1 to 20	20	9894	2342	520.7	12.3
Rep-01 Ce-02	21 to 40	20	15664	415.5	783.2	20.7
Rep-01 Ce-03	41 to 60	20	13939	422	696.9	21.1
Rep-01 Ce-04	61 to 80	20	13593	352.6	679.6	17.6
Rep-01 Ce-05	81 to 100	20	16511	479.1	825.6	23.9
Rep-01 Local-06	101 to 140	40	27995	814.4	717.8	20.8
Rep-02 Ce-05 (kso)	141 to 160	20	14678	392.8	772.5	20.6
Rep-02 Ce-04	161 to 180	20	11561	310.4	608.4	16.3
Rep-02 Ce-03	181 to 200	20	13922	349.5	696.1	17.4
Rep-02 Ce-02	201 to 220	20	16835	398.7	841.8	19.9

Rep-02 Ce-01	221 to 240	20	15370	359	768.5	17.9
Rep-03 Ce-04	241 to 260	20	9486	239.4	474.3	11.9
Rep-03 Local-06	261 to 280	20	7562	212.6	5817	16.4
Rep-03 Ce-01	281 to 300	20	13591	266.2	679.5	13.3
Rep-03 Ce-01	301 to 320	20	16567	386.9	828.3	19.3
Rep-03 Ce-03	321 to 340	20	10347	261.2	517.3	13.0
Rep-03 Ce-05 (kso)	341 to 360	20	17876	4724	873.8	23.6
Rep-04 Ce-03	361 to 380	20	6051	134	302.5	7.0
Rep-04 Ce-01	381 to 400	20	9278	191.7	488.3	10.0
Rep-04 Ce-02	401 to 420	20	12921	290.5	646.0	14.5
Rep-04 Ce-05 (kso)	421 to 440	20	13559	329.2	753.2	18.2
Rep-04 Local-06	441 to 460	20	7189	249.2	513.5	17.8
Rep-04 Ce-04	461 to 480	20	8014	180.7	421.7	11.2

Local Clone, Chandipur Research Plot.

IFGTB Clone, Chandipur Research Plot

ABSTRACT:

IFGTB Clone : Average height = 649.1 Cm.
Average girth = 16.1 Cm.

Local : Average height = 647.7 Cm.
Average girth = 19.3 Cm.

Location : Arabandh:

Clone	Serial Number of Trees	Total Number of Trees	Total height (Cm.)	Total girth (Cm.)	Average height (Cm.)	Average girth (Cm.)
Rep-01 Line-01	1 to 25	25	28979	721.8	1159.1	28.8
Rep-01 Line-02	26 to 50	25	27152	626.4	1086	25
Rep-01 Line-03	51 to 75	25	29626	592.5	1184.9	23.7
Rep-01 Line-04	76 to 95	20	22689	507.8	1134.4	25.3
Rep-01 Local-	96 to 100	5	3795	62.6	759	12.5
Rep-02 Line-05	101 to 125	25	31877	636.1	1275	25.4
Rep-02 Line-06	126 to 130 & 136 to 150	20	23313	491.3	1165.6	24.6
Rep-02 Local	131 to 135	5	4585	75.5	917	15.1
Rep-02 Line-07	151 to 175	25	30157	659	1206.2	26.3
Rep-02 Line-08	176 to 200	25	28141	560.8	1125.6	22.4
Rep-03 Line-09	201 to 225	25	25860	545.4	1034.4	24.7
Rep-03 Local	226 to 230	5	3399	47.8	849.7	11.9
Rep-03 Line-10	231 to 250	20	22119	440.7	1105.9	22
Rep-03 Line-11	251 to 275	25	30093	655	1203.7	26.2
Rep-03 Line-12	276 to 300	25	26385	640.5	1055.4	25.6

Rep-04 Line-13	301 to 325	25	30755	652.8	1230.2	26.1
Rep-04 Local	326 to 330	5	3878	72.9	775.6	14.5
Rep-04 Line-14	331 to 350	20	19605	402.5	980.2	22.3
Rep-04 Line-15	351 to 375	25	27327	583.8	1093	23.3
Rep-04 Line-16	376 to 400	25	26572	634.8	1107	26.4

Local Clone, Chandipur Research Plot.

IFGTB Clone, Chandipur Research Plot

ABSTRACT:

IFGTB Clone : Average height = 1151 Cm.
Average girth = 24.8 Cm.

Local : Average height = 825.2 Cm.
Average girth = 13.5 Cm.

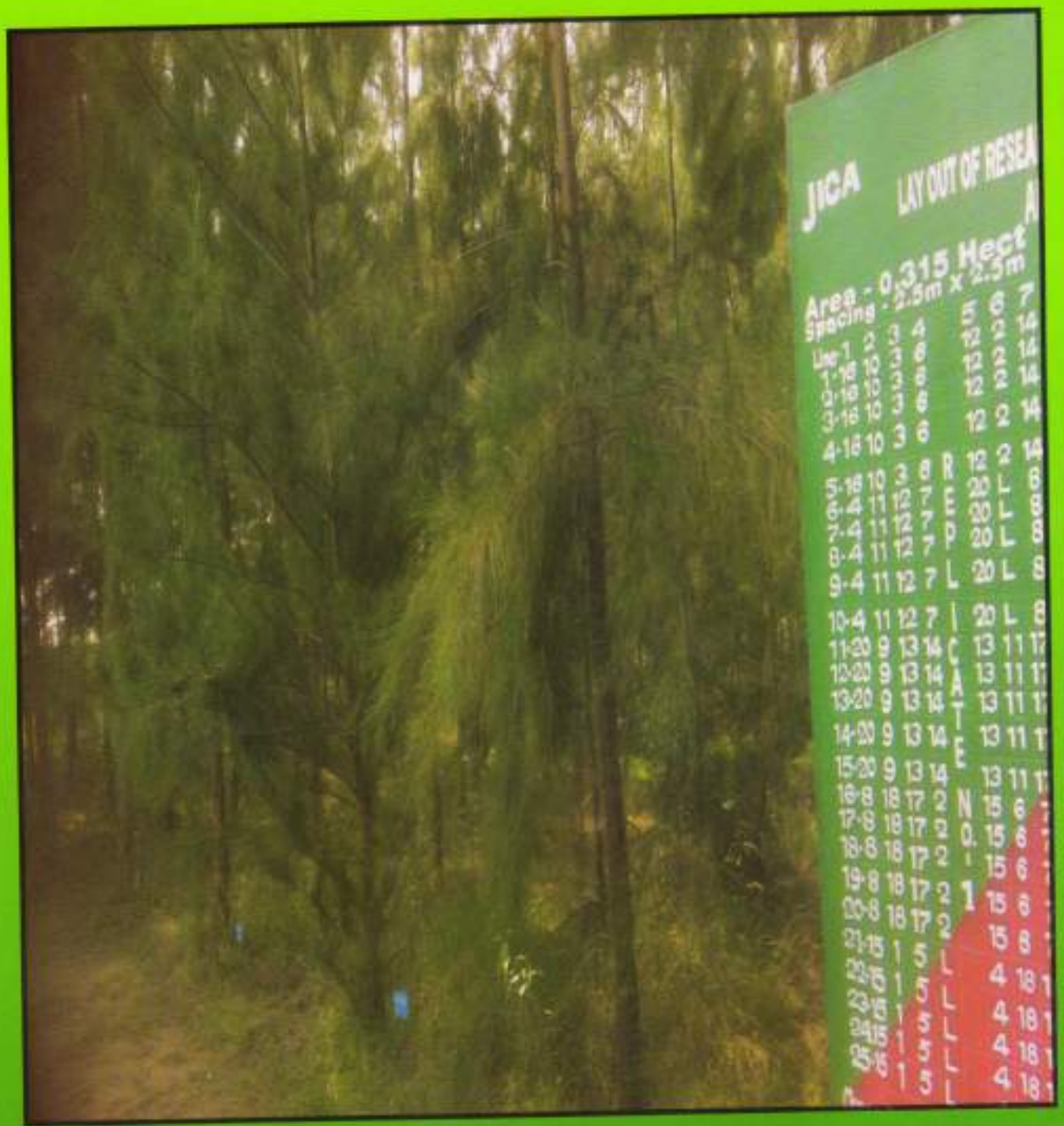
CONCLUSION:

The results for the two Research Plots at Arabandh and Chandipur clearly indicate that the IFGTB clones of Casuarina jhunghuhniana have acquired greater height and

girth in inland area of Arabandh R.F. whereas, in the coastal area of Chandipur R.F. the height and girth acquired by Casuarina equisetifolia (Local clone) is marginally better than Casuarina jhunghuhniana. In the next phase, when trials on Government lands are already in place, plantations on private lands as a part of extension forestry may be considered. Hence, seed stands or germplasm obtained from IFGTB, Coimbatore for the Casuarina jhunghuhniana may be adopted for inland areas in Odisha. This will go a long way in meeting the need of firewood and poles in the coastal districts of Odisha.

IFGTB Clone, Arabandh Research Plot.

Local Clone, Arabandh Research Plot.



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