

## PERFORMANCE OF MESOPHYTIC SPECIES PLANTED IN THE COAST OF CHAR KASHEM, PATUAKHALI, BANGLADESH

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### Abstract

Mesophytic species such as *Acacia nilotica*, *Albizia labeck*, *Albizia procera*, *Casuarina equisetifolia*, *Pithecellobium dulce*, *Samanea saman* and *Thespesia populnea* were raised in the western coast of Char Kashem under Patuakhali district of Bangladesh. After seven years of planting highest survivability was found in *A. labeck* followed by *P. dulce*, *C. equisetifolia*, *S. saman*, *A. procera*, *A. nilotica* and *T. populnea*. The mean maximum diameter at breast height was found in *S. saman* followed by *C. equisetifolia*, *A. procera*, *A. labeck*, *P. dulce*, *A. nilotica* and *T. populnea*. The maximum plant height was found in *C. equisetifolia* followed by *S. saman*, *A. procera*, *T. populnea*, *A. nilotica*, *A. labeck* and *P. dulce* indicating suitability of all the seven species for plantation at Char Kashem.

Coastal afforestation in 1966 was primarily initiated to save lives and properties of the coastal dwellers from the devastating cyclones and tidal surges (Das and Siddiqi 1985) and secondarily to (i) reclamation and stabilization of newly accreted land and acceleration of further accretion, (ii) production of timber and fuel wood and (iii) creation of employment opportunity in the coastal areas (Saenger 1987). The coastal afforestation programme gained a momentum with the involvement of World Bank in 1975 (Imam 1982). Up to 2001 a total of 1,48,526 hectares of mangrove plantation has been established under different projects. Now the total plantation area stands as 1,70,000 hectare (Aziz 2010). *Sonneratia apetala* and *Avicennia officinalis* proved to be most successful species by their higher survival and growth performance (Siddiqi *et al.* 1992).

The coastal ecosystem is a highly dynamic ecosystem (Serajuddoula *et al.* 1995). Due to lack of regular inundation, the raised area lost the suitability for growth and yield of mangrove species and thus it is necessary to cover these vacant areas by non-mangrove (mesophytic) species (Imam 1982). Therefore on the basis of preliminary observation a study was undertaken to find out the suitability of seven mesophytic species *Acacia nilotica*, *Albizia labeck*, *Albizia procera*, *Casuarina equisetifolia*, *Pithecellobium dulce*, *Samanea saman* and *Thespesia populnea* in the western coast belt of Char Kashem, Rangabali Police Station under Patuakhali district of Bangladesh in 1998 (Table 1). The experiment was laid out in the raised areas of the western coastal belt at Char Kashem, under Patuakhali district of Bangladesh. Soil characteristic are mentioned elsewhere (Hasan 1987, Chowdhury and Chowdhury 1994, Karim 1994, Khan *et al.* 1998).

**Table 1. Vernacular name, scientific name and family name of the species tried.**

Treatments	Vernacular name	Scientific name	Family
T1	Raintree	<i>Samanea saman</i>	Fabaceae
T2	Shownd balai	<i>Thespesia populnea</i>	Malvaceae
T3	Khair	<i>Pithecellobium dulce</i>	Fabaceae
T4	Sada Karai	<i>Albizia procera</i>	Fabaceae
T5	Jhaw	<i>Casuarina equisetifolia</i>	Casuarinaceae
T6	Babla	<i>Acacia nilotica</i>	Fabaceae
T7	Kala Karai	<i>Albizia labeck</i>	Fabaceae

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The seeds/fruits were collected from phenotypically superior tree from January to April and sown in polybags of 15 cm × 23 cm filled with powdered loamy soil and cowdung at 3 : 1 ratio. Seedlings were raised in a nursery bed and were kept for six month under shed and one month exposed.

The experimental site was prepared by jungle cutting, burning and removing debris. Heaps of size 60.96cm×60.96cm×60.96cm were prepared and the experimental plots were fenced with barbed wire to protect the plants from biotic interference.

In each plots 49 (7 × 7) seedlings were planted at 2.13 m × 2.13 m spacing. Seven plots were made in each block and each block is considered as a replicate. The experiment was laid out in Randomized Complete Block Design (RCBD) with seven treatments and three replications. The experimental lay out is shown in Table 2.

**Table 2. Experimental layout.**

Plot/ block	Plot no. 1	Plot no. 2	Plot no. 3	Plot no. 4	Plot no. 5	Plot no. 6	Plot no. 7
Block-1	T3	T5	T2	T6	T1	T7	T4
Block-2	T6	T4	T7	T3	T5	T2	T1
Block-3	T7	T1	T5	T2	T6	T4	T3

Data on survival, diameter and height growth were collected in June and December of a year for about 6 years. The final data were collected in June 2005 and statistically analyzed. The mean highest survivability (as %) was found in *A. labeck* (97.96) followed by *P. dulche* (97.28), *C. equisetifolia* (96.60), *S. saman* (90.48), *A. procera* (88.24), *A. nilotica* (82.99) and *T. populnea* (80.27), shown in Table 3.

**Table 3. Mean survivability (%), diameter (cm) and height (m) of seven mesophytic species after seven years of planting. n = 3, mean ± standard deviation.**

Treatments	Taxa	Survivability (%)	Diameter growth (cm)	Height growth (m)
T1	<i>Samanea saman</i>	90.48 ± 8.25	13.17 ± 1.76	10.70 ± 1.18
T2	<i>Thespesia populnea</i>	80.27 ± 6.56	7.39 ± 0.66	8.07 ± 2.38
T3	<i>Pithecollobium dulce</i>	97.28 ± 3.12	7.89 ± 1.22	6.40 ± 0.63
T4	<i>Albizia procera</i>	88.44 ± 6.24	11.24 ± 1.17	10.65 ± 2.26
T5	<i>Casuarina equisetifolia</i>	96.60 ± 3.12	12.15 ± 1.22	13.17 ± 0.76
T6	<i>Acacia nilotica</i>	82.99 ± 14.77	7.57 ± 0.10	7.47 ± 0.76
T7	<i>Albizia labeck</i>	97.96 ± 00.00	9.56 ± 0.70	7.42 ± 1.26

The mean maximum diameter (in cm) at breast height (DBH, 1.30 m) was found in *S. saman* (13.17) followed by *C. equisetifolia* (12.15), *A. procera* (11.24), *A. labeck* (9.56), *P. dulche* (7.89), *A. nilotica* (7.57) and *T. populnea* (7.39), shown in Table 3.

The mean maximum height (in m) was found in *C. equisetifolia* (13.17) followed by *S. saman* (10.70), *A. procera* (10.65), *T. populnea* (8.07), *A. nilotica* (7.47), *A. labeck* (7.42) and *P. dulche* (6.40 m), shown in Table 3.

Siddiqi *et al.* (1994) found the *S. saman*, *A. procera*, *A. nilotica*, and *Lagerstroemia speciosa* (Jarul) as promising for large scale plantation in raised Non-Commercial Cover (NCC) areas of the Sundarbans. According to Serajuddoula *et al.* (1995) *C. equisetifolia* and *A. nilotica* are the most promising species followed by *S. saman*, *A. procera*, *T. populnea* and *P. dulche* after four years of

planting at Rangabali under Patuakhali District. At Char Kukri-mukri under Bhola District *A. nilotica*, *S. saman*, *P. dulce*, *A. labeck*, *D. sisso* and *Syzygium cumini* (Jam) showed the best performance (Serajuddoula *et al.* 1995).

The plantation of mesophytic species in the coastal areas is likely to offer sustained yield and render a permanent forest cover in the coastal belt. On the basis of survival and growth performance all these seven species were found promising for plantation in the accreted land at Char Kashem under Patuakhali District.

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