

PINUS ELLIOTTII - ITS PRELIMINARY TRIALS IN
BANGLADESH

Someswar Das

and

Md. Haroon Rashid

INTRODUCTION

With the rapid industrialisation and establishment of wood based industries in our country, a wide gap between supply and demand is being created. If we depend on our slow growing hardwood species for bridging the gap, it will widen the gap only, instead of closing the same. Secondly our wood based industries require softwood specially long-fibre species, which cannot be met from our existing wood stands. Along with the growing of indigenous light wood species, search has to be made also to find out some conifers of exotic origin which can be established in our soil and climatic conditions to meet the growing demand of long fibre species.

Introduction of Pinus species in this country dates back to 1929. Pinus khassya as an ornamental tree, was first planted in the Sylhet Government College campus in 1929. Few trees were also planted in the Dacca University Botanical Garden and in the Balda Garden. These were planted in the late thirties. Pinus longifolia was introduced in the Silvicultural Research Garden at Hazarikhil in 1938. Pinus caribaea and Pinus sinensis were also planted in the Hazarikhil Silvicultural Garden in 1940. These two species of Pinus are still growing. (4) In Bangladesh tests of Alabama Slash Pine (Pinus elliottii) have been made by the Forest Research Institute, Chittagong in 1958. Test plantings as to exposure and soils showed promise of supplying a much needed conifer to Bangladesh. In three years, height growth upto six feet had been noticed from seed on good site. (5)

Depending on this test, in the year 1961, about 1/2 lb. seeds of Pinus elliottii was brought from Louisiana, U.S.A. for further trial in Bangladesh.

Habitat, habit and other characteristics of Pinus elliottii:

Pinus elliottii varies from 60 to 100 ft. in height and about 2 ft. in diameter. It is indigenous to the U.S.A. and grows from the coastal plains in South Carolina in the North to the Mississippi river in Louisiana in the South. This is a fairly fast growing species with dense foliage and long needles, usually of good forms. It is a species of wet or intermittently wet sites, but it is also found in lime stone ridges. This is suitable at fairly low to

medium elevations, usually less than 300 ft. above sea level. It tolerates acid surface soils. It can grow on very varied soils. The species is light demanding but competes well with surrounding grasses under wood. It is very resistant to fire. The tree flowers during January to March and the seeds attain maturity during September and October of the next year. One pound of seeds require 14, 000 to 17,000 seeds. Germination capacity of the seeds is fairly high. The viability of the seeds remain one year without any preservative arrangements. Germination is usually protracted taking from one to three months.(2 & 3)

The timber is hard and strong and suitable for construction work, but tends to contain compression wood causing it to twist or split during sawing. It is also used in making pulp. (2 & 3)

Factors of locality considered:

1. Topography of the area:- The area is a part of Sitakunda Ramgarh Hill Range. The area is undulating and bounded by small hillocks whose height will not exceed 200 ft. from the sea level. These hillocks are composed of very soft sand stones and shales. They erode very easily as soon as the vegetation is removed.(1)

2. Soils:- The soil varies from sandy loam to sandy clay and often is impregnated with iron. On the level ground and valley, the soil is sandy loam. Where blue shales appear at the surface, there is little surface soil and trees do not grow well. Very little humus is present in the soil. The soil is deficient of magnesium. The mechanical analysis of the soil taken from a slope shows the following composition at different depths (Analysiss have been done in the Soil Section of the Forest Research Institute, Chittagong).

Mechanical composition	% of different particles at the depth of		
	0"-6"	6"-12"	12"-24"
1. Coarse sand	34.24	30.24	24.24
2. Fine sand	10.00	12.00	12.00
3. Silt	14.00	14.00	18.00
4. Clay	41.76	43.76	45.76
Texture of soil	Sandy silty clay	Sandy clay	Sandy clay

D. Climate:- The area is situated very close to the Bay of Bengal. It has moist tropical climate with a pronounced low range of temperature variation and a short cold season. The average temperature during the cold months is 66.9°F and that of the warm months 83°F. The lowest and the highest temperature recorded is

45°F. on the ~~17th January, 1937~~ and 102°F. on the ~~12th April, 1938~~ respectively. The relative humidity varies from 86% to 59%, highest being during rainy season (June to November). (1)

4. Vegetation of the Area:- The area was covered with mixed tropical semi-evergreen forests. This is evident from the examination of the surrounding flora of the area. The original vegetation has been completely destroyed by the biotic interference due to nearness of town. The present vegetation has a tendency to become Xerophytic.

SEED COLLECTION, NURSERY AND PLANTATION TECHNIQUE

1. Seed collection:- The seeds were collected through the then Forestry Adviser Mr. D.N.Kee. The seeds were procured from Louisiana State of the U.S.A. The seeds were received in the middle of November, 1961 and were sown in the nursery in the third week of the same month.

2. Technique:- The nursery was located in the Institute Campus. The nursery was made in the following way. 10 ft. wide pit of 16 ft. length and 3 ft. depth was dug. Over the pit wooden planks of sufficient strength was spread over supporting pillars. Then soil mixed with cowdung and other green manure was thoroughly pulverised and two nursery beds of 16 ft. by 4 ft. were prepared over the planks. Four sides of each bed was edged by wooden planks slightly raised from the level of the ground. The depth of the nursery bed was 1 ft. 8 in. Sowing was done in lines 6 in. to 1 in. (line to line 6 in. and seed to seed 1 in. at a depth of $\frac{1}{2}$ in. After sowing, the seeds were covered with good quality of fine sand. The nursery germination percentage was more than 80. The attack of white ant was noticed after germination due to which large number of casualties were noticed. Dusting with D.D.T. around the four sides of the bed gave good results in preventing the attack. Watering was done with a sprayer. The reason for construction of nursery beds over a pit was to drain out the water of the beds in order to prevent damping off.

3. Transplanting in the field:- During the month of July/August, 1962, when the seedlings were of 7 to 10 in. high, it was transplanted in the different planting sites. The seedlings were transported with ball of earth in polythelene bags. Before planting, the sites were cleared of local vegetation. The planting was done in pits of 18 in. diameter and 18 in. depth. The survival percentage in the field was high. It was planted in the valley (approach road to the Forest Research Institute), the western slope, eastern slope and northern slope of the hillocks of the Forest Research Institute, Chittagong.

4. Subsequent treatments:- No other treatments were given except yearly weeding and cleaning.

MORPHOLOGICAL CHARACTER OF THE SPECIES GROWN IN THE SITES

1. Appearance:- Branching is normally horizontal. They become shorter towards the top of the tree. The maximum diameter of the crown is measured 15 ft. in the valley and minimum 4 ft. in the eastern slope. The crown is heavy normally occupying 60% of the bole.

2. Branching:- Pinus elliottii has a morphogenetic cycle with zones on each slope: (i) at the base a zone of no growth without needles but with scaly bracts, (ii) above this, the zone of needle fascicle and (iii) finally, the bud zone with a terminal bud at the tip immediately below auxillary buds in a pseudowhorls which ultimately grow into long branches. The buds are cylindrical and conical at the tip. These are resinous. The scales are free but overlapping, acuminate, nonresinous, and grey in colour.

Some characteristics of the branching habit have been noticed in the plants growing in valley. Firstly number of branching in the southern direction is less in number. Secondly, the growth of southernly branches is very stunted. This can be explained due to the effects of heat and wind but needs a thorough investigation.

3. Needles:- (i) Position of the needle:- The needles have been found in cluster of two sometimes three. The needles are pressed together at the base in a membranous sheath.

(ii) Size, form and colour:- Needles are slender, semi-circular, 12 cm to 30 cm long, breadth 0.5 mm to 1.5 mm and thickness 0.5 mm to 1 mm. The leaves are painted acicular, at the tip, convex at the outer face with a very minute groove on each side. The margin is denticulated and rough to touch. The needles are green in colour.

STATISTICS OF GROWTH

1. Materials and equipments:- The data used in this study were the measurements of diameter and height taken during June and July, 1971. All trees were tagged and numbered with galvanized iron plates. The point of measurement at D.B.H. was marked in every tree with white paint. The D.B.H. of the trees were measured with a diameter calliper in inches. The corresponding total heights of the trees were measured with the use of graduated straight bamboo.

2. Collection and recording of Data:- 351 trees were measured in four different sites. All measurements were entered in a permanent record book.

3. Computation and statistical analysis:- The data gathered from each site were arranged in a table of array, then classified into diameter and height 1.in and 2 ft intervals respectively. The average height and diameter of the trees in each site were computed separately together with corresponding standard deviation. The trees having exceptionally poor growth were discarded. Then the average of the entire area were computed.

Location	No. of trees measured in.	Average Diam. in.	Standard Deviation in.	Average height ft.	Standard Deviation ft.
Western slope	97	3.382	1.02	13.91	2.99
Eastern slope	77	2.468	0.60	12.039	2.746
Northern slope	128	3.52	1.04	13.89	2.960
Valley	49	3.898	1.232	15.44	2.991
Mean average of the four sites.	351	3.302	1.096	13.679	3.128

The average growth in diameter and height were more similar in Western and Northern slopes but there is a marked variation in diameter and height growth in valley and eastern slope.

This variation in growth of eastern slope may be due to fire in the sites once in 1968 and another in 1969. Secondly the spacing are also close here.

The maximum diameter and height growth have been found in the valley. This is due to the wider spacing and more enriched soil of the valley in comparison with that of other slopes.

CONCLUSIONS

It appears that Pinus elliottii can be grown in the soil and climate of Bangladesh by applying the nursery technique employed in this trial which gave high percentage of germination. Damping off can be avoided by raising the seedlings in winter season as it is the greatest enemy of the Pinus in the tropics. The seedlings which are raised during November and December become ready for planting during the rainy seasons (July/August). The planting with ball of earth during rainy days gives good percentage of success.

The average diameter and the average height of the species show very slow growth. The mean average diameter growth is only 3.302 in \pm 1.096 during the period of eight years and that of height growth is 13.128. This seems to be very slow in growth in comparison with the growth of this species in its homeland where it reaches 20 ft to 25 ft height in five years. (3b) But considering our need of long fibre pulp for industries, more trials on experimental basis may be done in different places of Chittagong and Chittagong Hill Tracts in forest conditions where soil condition will be better than this area.

R E F E R E N C E S

1. Baten, S.A. 1969. Revised Working Plan for the Forests of Chittagong Division. Pages 12-14. Directorate of Forests. E.P. Govt. Press, Dacca.
2. Anon. 1958. Choice of Tree species, F.A.O., Rome. Pages 232-233.
- 3a. ———. 1957. Tree Planting Practices in Tropical Asia, F.A.O., Rome, Pages 146-147.
- 3b. ———. 1956. Tree Planting Practices in Tropical Africa, F.A.O., Rome, Page 243.
4. Hasan, S.M. ———. General Guideline Plan for Management Research in Bangladesh (Unpublished). Silvicultural Research Division, Forest Research Institute, Govt. of Bangladesh, Chittagong.
5. Kee, D.N. 1961. Pakistan Forestry Development. U.S. AID/Pakistan, Chittagong. Page 14.

সারসংক্ষেপ

আমাদের বন্যে বিভিন্ন শিল্পখণ্ডি বিশেষ করে বস্ত্র ও কাগজের শিল্পখণ্ডি প্রভিৎসনর
 বহু পরিমাণে দীর্ঘ পাতার বস্ত্র ব্যবহৃত হলে থাকে । এই দীর্ঘ পাতার বস্ত্রের প্রয়োজন
 আমাদের বন হতে স্টাটালো সম্ভব নয় । এই উদ্দেশ্যে বাংলাদেশের জমি এবং আবহাওয়ায়
 দীর্ঘ পাতার গাছ গাই না । এলিয়টাই (Pinus eliottii) জন্মালো যার কিনা তা
 গ্রাথমিক গদক্ষেপ হিসাবে স্টাট করা হয় । গ্রাথমিক স্টাট হিসাবে দেখা যায় ইহা
 বাংলাদেশের স্টাট ও আবহাওয়ায় জন্মালো সম্ভব । এই গাছের নিজের জন্মভূমিই সুদূর
 তুদনাল এখানে এক সুদূর, (উচ্চতা এবং বয়স সুদূর) বেশ কম । তবে কিনা আমাদের
 প্রয়োজনের কথা বিবেচনা করলে, স্টাটগ্রাম ও পার্কট্য স্টাটগ্রামের বিভিন্ন এলাকায় যেখানে স্টাট
 পারও উর্কর সে সমস্ত স্টাটগ্রাম বেশী পরীক্ষা মূলক তবে রোগণ করা প্রয়োজন ।