HEIGHT INCREMENT OF *Pinus caribaea var. hondurensis* IN THAILAND

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Summary

Pinus caribaea var. hondurensis from Honduras, Central America was introduced to Thailand. The annual average height increment is 1.21 m in 10 years.

Thailand has two species of pine which cover only less than one percent of the total forest area (less than 2,000 square kilometres).

P. caribaea thrives best among *P. kesiya,* and *P. merkusii* as indigenous species and *P. patula* as exotic one.

The volume of one tree is 0.12 cubic metres which adds up to 74.7 cubic metres per acre in 10 years.

Introduction

Pinus caribaea var. hondurensis was first introduced to Thailand in 1964 for F.A.O. Pulp and Paper Raw Material Project. There were planting trials performed in various parts of Thailand. In this study, only two of them are taken up.

Due to population pressure, pulp and paper are playing an important role in Thailand economy since there are only two long fibre species in the country: *P. kesiya* and *P. merkusii.* In order to improve the supply of such long fibre species, *P. caribaea* is the ultimate hope for it is one of the fast growing species. It is consequently expected to be a source of sawn timber as well. Besides, there is even less than one percent of forest area in Thailand. Extinction constitutes the main problem nowadays.

Environmental factors

The planting trial technique is used because it is related to all environmental factors such as moisture, temperature and soil etc.

1 Moisture and temperature

Table 1 The mean, maximum and minimum monthly relative humidity

Region		Mean monthly relative humidity percentage											
		Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
Chiengmai	Max	96.3	93.1	88.8	91.3	92.5	93.9	94.3	95.8	95.6	95.5	96.0	95.9
(North)	Min	45.3	37.0	33.5	46.0	56.6	62.2	65.0	69.5	67.5	64.2	60.0	53.8
Nakornrajasima	Max	93.0	89.1	89.2	91.5	94.0	92.1	93.0	93.7	93.4	96.3	94.9	94.6
(North-East)	Min	43.0	42.1	41.6	51.3	59.4	59.7	58.7	59.7	66.0	64.0	58.0	51.5

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Table 2 The mean temperature and rainfall (Samapuddhi, 1963)

Region	Mean annual temperature			Mean annual rainfall	
	Mean	Max.	Min.	In.	Days
Chiengmai (North)	24.8 – 26.0	31.0 – 32.3	18.5 – 19.9	36 – 100	52 – 211
Nakornrajasima (North-East)	26.0 – 27.2	32.0 – 33.6	20.8 – 21.9	24 – 86	41 – 137

2 Soils

Hod district, Chiengmai province—Reddish Brown Lateritic Soils: clayey, derived from gneiss and granite.

Pakchong district, Nakornrajasima province—Rendzina Soil: clayey to loamy, crumb structure derived from limestone, shale and slate.

Growth pattern

10-year mean annual height increment of *P. caribaea var. hondurensis* as compared with *P. kesiya, P. merkusii* and *P. patula*.

Region	10 yr. mean annual height increment/m.			
	P. caribaea	*P. kesiya*	*P. merkusii*	*P. patula*
Chiengmai	1.19	0.89	0.72	0.75
Nakornrajasima	1.23	–	0.84	–

There is no difference in growth of *P. caribaea* between both regions and an annual height increment estimated at 1.21 m. is reasonable.

Actually, trials performed in the southern and the central regions showed that trees grew quite well in the south but did not yield seeds. This was also true in the northern region where seeds were not produced.

The above figures show that *P. caribaea* thrives better than *P. kesiya* and *P. merkusii* as indigenous species and even better than *P. patula* as the exotic one.

The diameter increment has not been estimated yet, since the spacing of 2/2 m. is rather close. However, in the coming year the change in diameter could be studied.

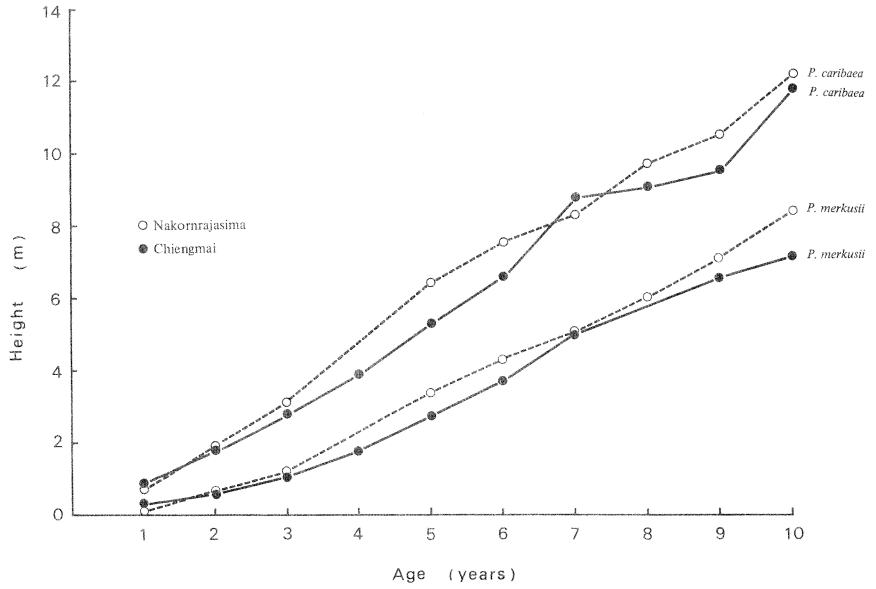

Fig. 1 Comparison of height increment of *Pinus* species growing at different sites

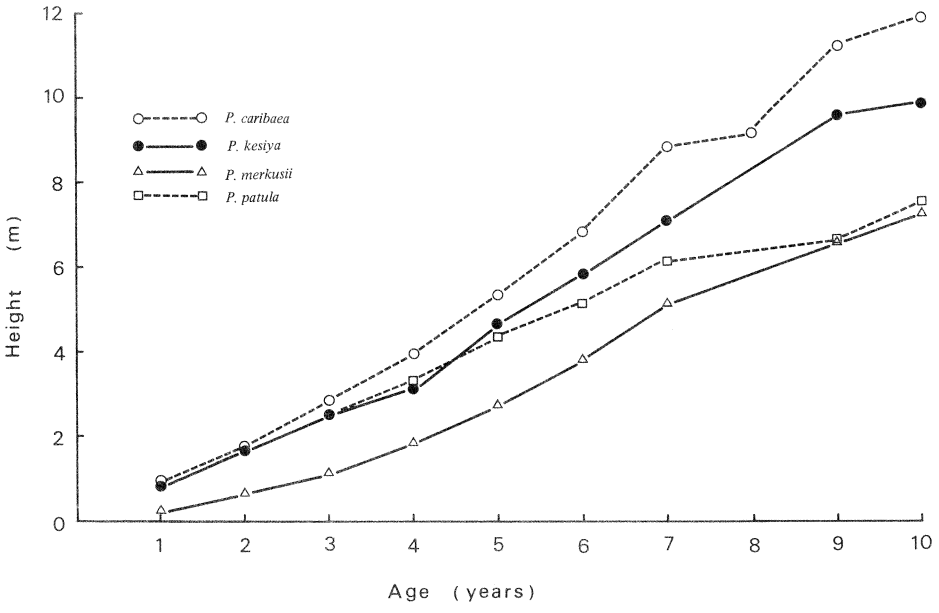

Fig. 2 Growth patterns of *Pinus* species at Hod district, Chiengmai Province

Discussion and conclusion

(1) Thailand is running short of timber especially in the case of long fibre species such as *P. kesiya* and *P. merkusii*. Due to climatic changes, pine plantations tend to deteriorate and those two species might even become extinct. Therefore the introduction of *P. caribaea var. hondurensis* is necessary.

(2) It is found that *P. caribaea* thrives best in Thailand both in the north and north-east and displays an annual height increment amounting to 1.19 and 1.23 m. in ten years.

(3) *P. caribaea* can grow both either on clayey soils, on Reddish-Brown Lateritic soils or on self-mulching crumb clayey Rendzina soils.

(4) Logs 7 m. high are merchantable as they give about 0.12 cu.m. equivalent to 74.7 cu.m. per acre. The estimate amounts to half survival in 10-year rotation with 2/2 m. spacing. (A log 15 cm. in diameter at the center and 7 m. long will produce 0.12 cu.m.)

(5) *P. caribaea var. hondurensis* grows better in Thailand than the only two indigenous pine species *P. kesiya* and *P. merkusii* and even better than the exotic pine variety *P. patula.*

(6) The mean annual height increment in 10 years is largest for *P. caribaea var. hondurensis,* ranging from 1.19—1.23 m. compared to *P. kesiya, P. merkusii* and *P. patula* which reach 0.89, 0.72—0.84 and 0.75 m. respectively.

References

1) BHODTHIPUKS, P. (1970): Forest Soils of Thailand. 63 pp.
2) SAMAPUDDHI, K. (1969): A Study of the Forest Soils of Thailand. 66 pp.
3) _____ (1966): Forestry Development in Thailand. 39 pp.

Discussion

Lee H.S. (Malaysia): There is a tendency for *Pinus caribaea* to exhibit variations in height and diameter growth in many trial plots I have seen. What sort of variability do you experience in your plots?

Answer: In Thailand, such trees show small differences in diameter growth. They usually have a good form and exhibit adequate growth.

Yunus K. (Indonesia): 1. What are the advantages of *P. caribaea* over *P. merkusii* as regards height growth, diameter/ volume increment and form? 2. Do you intend to produce also construction wood and gum resin from *P. caribaea* in addition to pulpwood?

Answer: 1. The form is excellent. The branches are small with self-pruning. There is a high stock with 2 × 2 m spacing for 25 years. The volume is expected to reach more than 75 m^3 per acre within 15 years. 2. We intend to produce timber as well as pulp. We hope to get 10—15-year rotation for pulp thinned from the plantation and 25—30-year rotation for sawn log.

Glori, A. (Philippines): You mentioned that the *P. caribaea* trial in the north planted at 600 m elevation does not bear seeds whereas one trial in the south at 300 m elevation does. Aside from the difference in climatic conditions in both sites, would it not also be possible that the difference in elevation might contribute to the variation in seed production?

Answer: Elevation along does not affect seed bearing. Abrupt changes in temperature such as those observed in the northern part of the country where the winter is cold and the summer dry and hot could induce flowering for seed production. Pollination is being attempted in addition to selfing to collect pollen stored at low temperature.