A STUDY ON SOME PHENOLOGICAL CHARACTERS OF SILK COTTON TREE

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A study on phenological characters of Silk Cotton tree revealed that the species commenced to shed leaves in December and became almost leafless in January, when it flowered. Fruits ripened in March-April and after shedding of fruits, new leaves and shoots appeared. Out of total dry matter of fruits, 21.1% was cotton-fibre (floss) and 12.6% was seed by weight. The average yield of cotton-fibre was 5.67 kg per tree per annum and the reproductive capacity of the species was found to be 33251.

INTRODUCTION

Silk Cotton tree (*Ceiba pentandra* Gaertn.) is a fast-growing deciduous species of family *Bambacaceae*, growing to a height of 25 m to 30 m with a diameter of 1.5 m to 1.8 m. It occurs mainly in the tropics, where it is a component of secondary forest. The tree has been introduced from Burma to the Southern part of Chittagong. In the villages of Chittagong, it is often planted for its fruit. The fruit gives silk cotton (floss) which is the true 'Kapok' of commerce. This floss is superior in quality than that obtained from the fruit of Simul (*Bombax* Spp.) (Gamble 1972). Being elastic, the floss is mostly used for filling and stuffing cushions, pillows, mattresses and saddles. As it is light and impervious to water, the floss is eminently suitable for use in life-boats and life-preservers. Mixing with other types of fibres, it is also used in the manufacture of textiles (Cobley 1970). Oil of seed is suitable for lubrication and soap manufacture and after purification, for cooking. The residual cake after expression of the oil is a good cattle food. The wood of the tree is used in making packing cases and boxes, and also for other purposes requiring a soft and easily worked wood.

Information regarding phenological characters of a species is of great importance for its scientific cultivation and proper management. The paper presents certain phenological characters of Silk Cotton tree like leaf-shedding, flowering, fruit-setting and reproductive capacity.

MATERIALS AND METHODS

The phenological behaviour that occurred with the changes of seasons were recorded from 8 trees of 13 years old growing at the Forest Research Institute campus, Chittagong.

In recording other parameters, sample fruits were collected from all the trees, when they were just beginning to dehisce. Length, diameter and fresh weight of the fruits were recored. Diameter was measured at the middle part of the fruit by taking two readings perpendicular to each other. The fruits were then dried in trays in the sun. The fruit-wall, the floss and the seeds were separated from the dried fruit for taking their weights. In all the cases, 25 observations were taken for each parameter.

For germination test, 50 seeds were drawn at random from the freshly collected lot and sown on moist blotting papers inside petridishes. The petridishes were placed at room condition (22–26°C) and the test was replicated thrice.

The reproductive capacity was calculated with the formula (Salisbury 1946) given below :

$$\text{Reproductive capacity} = \frac{\text{Average seed output} \times \text{Percentage germination}}{100}$$

RESULTS AND DISCUSSION

Leaf-shedding, flowering and fruit-setting : The leaves turned yellow and commenced to fall in the beginning of December. Flower buds appeared in January when the trees were almost leafless. By the end of January, trees were covered with masses of creamy white blossom. Fruit-setting took place in Fabruary. During the period of fruit-setting, flocks of bats visited the trees at every night. Licking the nectar and distributing the pollens on their fur, they brought about pollination in flowers. Baker and Harris (1959) also recorded the bat-pollination in the species. The successful mating was likely to be dependent on the visits of the bats at the time of fruit-setting.

Young fruits were green in colour and developed very rapidly. The colour remained green till maturity. Ripening of fruits started from the mid of March and the fruit fall was completed within mid April. At this time, new leaves and shoots appeared. The young leaves were reddish in colour and soon turned pale green. Dried matured fruits were brown in colour and dehisced longitudinally.

Fruit and its components : The fruit was a capsule, pendulous, not truly cylindrical but bulged in the middle and tapered at both ends. On average, the fruit was 17.2 cm long with a mid diameter of 5.4 cm. Green fruits were about four times heavier than dry fruits. In a dry fruit, fruit-wall was 47.3%, floss was 21.1%, and the total seed content was 12'6% of its total weight (Table 1). The fruit contained brownish black seeds embedded in tight ball of silky floss derived from the epidermal cells of the inner capsule wall. On average, the seed was 0.61 cm in diameter and 0.076 g in weight.

Yield of floss : A Silk Cotton tree produced on average 1031 fruits per annum and

Table 1. Measurements of fruit and its components

Green fruit (g)	Dry fruit (g)	Fruit wall (g)	Floss (g)	Seed content	
				(g)	(no.)
99.1±22.8	26.0±8.3	12.3±3.8	5.5±1.3	3.3±0.9	44±13

± *Standard deviation*

the average dry weight of floss per fruit was found to be 5.5 g (Table 1). Therefore, the yield of floss per tree might be expected as 5.67 kg per annum. These findings corraborate with that of Record and Hass (1949).

Seed germination and reproductive capacity : Seeds started germinating after 4 days of sowing and continued for more 6 days. The average germination percentage was 73 3. As on average, a fruit contained 44 seeds (Table 1) and the number of fruits produced per tree was 1031, the seed output of the species could be around 45364. So, the reproductive capacity was calculated as 33251.

CONCLUSION

The study reveals that the number of fruits produced per tree and the floss production per fruit are quite good. The seed output and seed germination are also promising in terms of supply of seeds and seedlings for plantations. These information may also be considered useful in commercial exploitation of the species.

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