



## ORIGINAL ARTICLE

Developed Skills for Cultivation and Phenological Pattern of *Ceiba pentandra* L.

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## ABSTRACT

We study the cultivation and phenological pattern of *Ceiba pentandra* L. trees, located at Agra. To determine the cultivation and phenological pattern of this species, we recorded the leaf fall, flowering, fruiting and seed germination January through July over year 2009. *Ceiba pentandra* L. commonly known as white silk cotton tree is an upright erect with a height of 10-15 m. Leaf fall occurs in the month of January to March. Maximum flowering period is February to March. The fruit formation initiate in the month March and the ripening in the month of May to June.

**Key words:** Skill, Phenological Pattern, *Ceiba pentandra* L.

## INTRODUCTION

*Ceiba pentandra* L. (Bombacaceae) is large tree. It is native of South America it now has spread to the primary Malay Peninsula and the Indonesian archipelago, tropical America and either native or long ago introduced and established in Africa and it is found in various type of moist evergreen and deciduous forest as well as in dry forest (Borchert 1994). Kapok tree *Ceiba pentandra* L. are cultivated as well as found naturally in the evergreen forest of South India. They bloom at night and flowers emit odour that attracts nocturnal pollinators (Heithaus, *et al.* 1975).

*Ceiba pentandra* L. has compound leaf with 5-7 leaflets. Flowers are hermaphroditic and chiropterophilic with five stamens around a protruding style, yellowish white petals and nocturnal anthesis, the fruits are elliptic and seeds are surrounded by white silk cotton, used for wind dispersion. We studied the cultivation and phenological pattern of *Ceiba pentandra* L.

## MATERIALS AND METHODS

The present investigation was carried out on *Ceiba pentandra* L. growing at R.B.S. College in Agra during a period of 2008-2009. Present investigation was carried out on the following lines. For phenological studies, four plants were selected and marked. Phenological data were recorded throughout life cycle of the plant. The following phenological events are recorded in Table-1.

Table 1: Phenological Studies

S.No.	Character	Observation
1.	Leaf shedding	- Time of leaf fall and how long it continued.
2.	Leaf Renewal	- Time of flush of new leaves.
3.	Flowering	- Time of flower initiation and its duration.
4.	Fruiting	- Time of fruit formation and how long they remain attached.
5.	Seed maturity	- Time of seed maturity
6.	Dispersal of seeds	- Time of dispersal of seed from fruit.

## OBSERVATION

The main goal of this study was to provide data on the cultivation and phenological pattern of *Ceiba pentandra* L. population located at Agra. In order to determine the sequence of phenology of tree, we recorded the phenological pattern of marked tree every week from January 2009 to July 2009. Leaf fall is recorded in month of January to March and leaf renewal is March to April. Flowering

period is February to April. Fruit formation recorded in March to April and ripening of fruit in month of May to July. Seed maturity and seed dispersal is recorded in June to July.

**Tab. 2:** Phenological Events in *Ceiba pentandra L.*

S.No.	Events	Months
1	Leaf fall	January to March
2	Leaf renewal	March to April
3	Flowering period	February to April
	Initiation	February
	Maximum	February to April
	Minimum	March to April
4	Fruit formation	March to April
5	Fruit ripening	May to June
6	Seed maturity	Last May to June
7	Seed dispersal	June to July

### 1. PHENOLOGY OF LEAVES:

The leaf is globrous and digitate being composed of 5-7 leaflets. Leaves are alternate with slender green petioles. There are usually 7 leaflets in a mature form. The leaflets hang down on short stalks, short pointed at the base and apex, not toothed on edges, thin, bright to dark in colour but turns dull green towards apex. The shape and size of leaf is quite variable. Average size of long petiole leaves is 37x25 cm. with total area of 250cm<sup>2</sup> with 14 pairs lateral veins and that of short petiole.

### 2. PHENOLOGY OF FLOWERS:

Flowers are pendulous fascicles and arrange in a clustered at the tip of the twigs (fig.1-2), hermaphroditic, whitish, large, complete, actinomorphic and pentamerous. The maximum floral length is 5.65 + 0.519 cm. (fig.3).

Calyx is cup-shaped with 5-10 shallow teeth, with average size of 16.85 + 0.807mm. green, campanulate, thick, fleshy and persistent corolla consist of 5 petals (average size of 34.7 + 1095 mm), large, creamy white in colour, imbricate aestivation, free and covered with silky hairs, stamens 5, pale yellow in colour, united into a column at the base (monodelphous), longer than the petals(epipetalous) and anthers bisporangiate and one locular, dehiscing by longitudinal allits. The anther is 6.1 + 0.7mm in length with 31 + 1.41mm long filament (fig-4).

**Plate 1:** Fig. 1-4 showing phenology of leaves and flowers

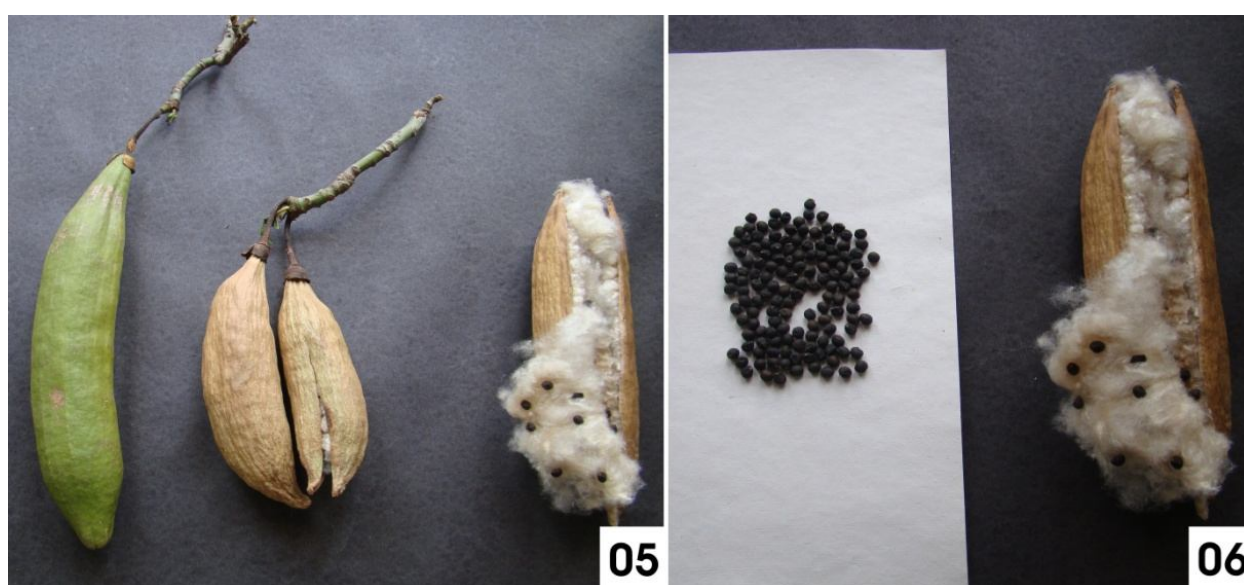


Ovary superior ( $9.3 + 1.004\text{mm}$ ), syncarpous, pentacarpellary, 5 locular, with many ovule in each locule, placentation is axile. Style cylindrical and creamy white in colour and an enlarged terminal entire to deeply lobed stigma ( $2.59 + 0.413$ ).

### 3. PHENOLOGY OF FRUIT:

Fruits are green, 7-20 cm long, oblong ellipsoid, smooth, pendulous, eventually dehiscent, the interior filled with soft long copious hairs (Kapok or Silk cotton), which turns light brown on maturity (fig-5). It opens by 5 longitudinal slit. Fruiting start in month of March and last up to May. Normal fruit matures in 30-35 days. Overall fruit-set is 67.58% in this species. Observed fruits farmed in all the tree sets of inflorescence of kapok tree, *Ceiba pentandra*. They also observed 81% fruits set from the uncovered inflorescence that were visited by both bats and insects. Weight of dry fruit is 31-57gm in a fruit. However, one fruit have produces 10-15gm silk.

**Plate 2:** Fig. 5 & 6 showing phenology of fruits and seeds



### 4. PHENOLOGY OF SEED:

Seeds are round and 4-5 mm in diameter, dark brown in colour (fig-6). There are many seeds in each fruit and seed-set% was 84.34 recorded. Weight of 100 seeds is 7.95gms has been recorded.

### 5. CULTIVATION OF *CEIBA PENTANDRA* L.:

These studies are essential for the conservation, improvement, establishment and skill development of cultivation to increase the frequency of occurrence of this species. This species of *Ceiba pentandra* L. provided different types of products, essential for the human and animals. These products/uses are as follows-

#### A. FODDER:

The pressed cake is cattle feed containing about 26% protein. Sheep, goats and cattle relish the foliage.

#### B. APICULTURE:

The tree is an important honey source. Honey light amber with a characteristic flavor.

#### C. FIBRE:

The fibre from the inner wall of the fruit is unique in that it combines springiness and resilience and is resistant to vermin, to make it ideal for stuffing pillows, mattresses and cushions. It is an excellent and buoyant, making it ideal for life jackets, lifeboats and other naval safety apparatus. It is an excellent material for insulating iceboxes, refrigerators, cold-storage plants, offices, theatres

and aeroplanes. It is a good sound absorber and is widely used for acoustic insulation, it is indispensable in hospitals, since mattresses can be dry sterilized without losing original quality. Practically the entire supply of kapok is obtained from Java.

#### **D. TIMBER:**

*Ceiba pentandra* L. wood is variable in colour, from white to light brown, but sap-staining fungi may darken it. The wood is very light, with specific gravity of 0.25g/cc. The wood machines easily but not satisfactorily. Machining characteristics include excellent planing and sanding and resistance to splitting when scewed. Shapes and bores poorly but mortises well. Longs and lumber are very susceptible to insect and fungal attack, but preservation treatment is easy, either pressure-vacuum systems or open-tank methods give good absorption and penetration. The wood is easy to peel for veneer. Reported uses of wood include plywood, packaging, lumber core stock, light construction, pulp and paper products, canoes and rafts, farm implements, furniture and matches (ICRAF 1992).

#### **E. LIPIDS:**

*Ceiba pentandra* L. seed contains 20-25% non-drying oil, similar to cottonseed oil, used as a lubricant, in soap manufacturing and in cooking.

#### **F. MEDICINE:**

Compressed fresh leaves are used against dizziness, decoction of the boiled roots is used to treat oedema, gum is eaten to relieve stomach upset, tender shoot decoction is a contraceptive and leaf infusion is taken orally against cough and hoarse throat. In Tamilnadu, India, the leaves are pounded together with fermented boiled rice water and the extract is administered to cows orally as remedy for reproductive problems. The dose is approx 500 ml three times a day for three consecutive days (Perry 1980).

#### **G. ORNAMENTAL:**

*Ceiba pentandra* is grown around villages and temples in Tamilnadu, India, as an ornamental tree. As the floss is irritating to the eyes and nose, the tree is not recommended for planting.

### **RESULT**

In the present observation we studied the Phenological pattern and cultivation of plant *Ceiba pentandra* L. growing at Agra, the leaf fall is recorded in month of January to March and leaf renewal is March to April. The flowering period is February to April, fruit formation recorded in March to April and ripening of fruit in the month of May to June. Seed maturity and seed dispersal is recorded in June to July. These studies are essential for the conservation, improvement and establishment of cultivation to increase the frequency of occurrence of *Ceiba pentandra* L.

The plant *Ceiba pentandra* L. has great medicinal value, the fresh leaves are used against dizziness, decoction, the boiled roots is used to treat oedema. The gum is eaten to relieve stomach upset and tender shoot decoction is a contraceptive and leaf infusion is taken orally against cough. The fruits of *Ceiba pentandra* L. have large amount of silk cotton fibre. The fibre is used to make it ideal for stuffing pillows, mattresses and cushion. It is light, water repellent and buoyant, making it ideal for the jackets, life boats and other naval safety apparatus.

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