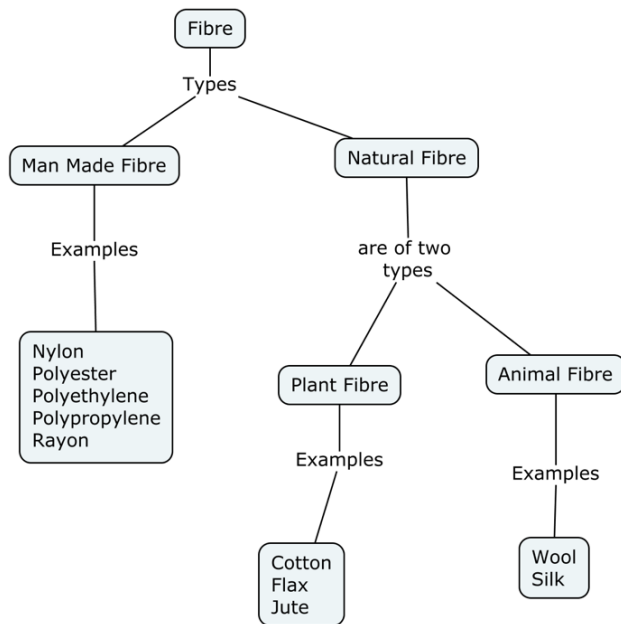


# Cotton

**Content: Classification based on the origin of fiber; Cotton (morphology, extraction and uses).**

## Natural Fiber

Natural fibers are threads obtained from plants and animals. Cotton, flax, and jute are examples of plant fibers and wool and silk are examples of animal fiber.



## Morphology

**Cotton** is a soft, fluffy staple fiber that grows in a boll, or protective case, around the seeds of the cotton plants of the genus *Gossypium* in the mallow family Malvaceae. The fiber is almost pure cellulose. Under natural conditions, the cotton bolls will increase the dispersal of the seeds.

The plants are perennials but cultivated as annuals. They range from herbaceous plants 2-6 feet high to small woody trees 15-30 feet high. The flowers arise singly from the terminal buds of sympodia, they are pedunculate, the length of the peduncle varying with cultivar. Flowers are large and showy.

They are surrounded by an involucre of large, leafy bracts (epicalyx) that are generally persistent in many cultivars. Numerous stamens with a kidney-shaped, one-celled (monothealous) anther are united by their filaments into a staminal tube surrounding the style. The cotton fruit (boll) is a spherical or ovoid leathery capsule consisting of 3-5 locules or chambers which correspond to the carpel's number of the ovary. The content of each chamber is called a "lock", within which 6-9 seeds are present.

**The cotton seeds are irregularly pyriform in shape and are covered with two types of hairs.**



Long epidermal hairs of the seed coat, called **lint**, floss or staple and very short epidermal hairs known as fuzz or lint. **Fuzz** is usually coloured, while the lint is white and the commercial cotton fiber. A mature cotton fiber is flattened, twisted tube, being a

unicellular outgrowth of the seed coat. It has a thick cellulose wall with numerous pits which facilitate absorption of water and dyes.

**Cotton fibers may be broadly classified into three large groups, based on staple length:**

### **1. Long-staple fibers:**

The staple length is 1-2.5 inches (i.e., about 2.5 – 6.5 cm), having a fine texture and good lustre. It includes types of high-quality fibers such as Sea-Island, Egyptian and American Egyptian (Pima). These are not very commonly grown because of difficulties in their cultivation. This fibre is used in high quality fabric, yarn and hosiery items.

### **2. The Standard Medium or Intermediate Staple Cottons:**



Here the staple length varies from 1.3 to 5.0 cm. The fiber is relatively coarser. It includes American upland cotton. It is quite popular because of high yields.

### **3. Short-staple fibers:**

Indian and other Asiatic cottons belong to this class. The fibers are short, coarse and lustreless. They are mostly used to make coarse and cheap fabrics, carpets and blankets etc.

### **Harvest and Yield:**

The cotton crop is usually harvested in three or four pickings, taken at suitable intervals. Picking is carried out by hand, mostly by women, the amount of cotton collected ranging from 20 to 50 lb. per day ppr person. Cotton should be picked only when the bolls are fully mature, fully open and the floss has puffed up consequent on exposure to sun.

### **Extraction of Cotton**

Several operations are necessary in order to prepare the raw cotton fiber, as it comes from the field, for use in the textile industry. In brief these operations are as follows—ginning; baling; transporting to the mills; picking, a process in which a machine removes any foreign matter and delivers the cotton in a uniform layer; lapping, an operation whereby three layers are combined into one; carding, combing, and drawing during which the short fibers are extracted and the others are straightened and evenly distributed; and finally twisting the fibers into thread.

Kapas or seed cotton collected from the field contains both lint and seed. For use in industry, cotton should be cleaned, and the lint separated from the seed. A small amount of seed cotton is ginned in villages by the use of charkha gin. The bulk of it, however, is ginned in factories by power-driven machinery. The yield and quality of lint depend on the type of cotton and the machinery used for ginning.



**Ginning** is the process of separating the cotton fibers from the cotton seeds. Perfect ginning operation would be performed if the separation of fibers from seed was affected without the slightest injury to either seeds or to the fiber. A cotton gin is a machine that quickly and easily separates the cotton fibers from the seeds, a job previously done by hand. These seeds are either used again to grow more cotton or, if badly damaged, are disposed of. It uses a combination of a wire screen and small wire hooks to pull the cotton through the screen, while brushes continuously remove the loose cotton lint to prevent jams. The term "gin" is an abbreviation for engine and means "machine".

#### **Objects of Ginning:**

1. To remove the fiber from the seed.
2. To collect the seed and seedless cotton fiber separately.
3. To separate the cotton fiber from the root position of the seeds.

#### **Economic importance**

##### **Cotton**

It is chiefly grown for its fiber which is used for manufacturing of clothes for mankind.

**Cotton lint:** It is the most important vegetable fiber and is woven into fabrics either alone or combined with other fibers.

**Fuzz:** It is used in production of mattresses, surgical cotton, photographic film and paper.

**Cotton seed:** Depending on varieties, it contains 20-25% semi-drying edible oil which is used for cooking. American cotton contains high oil.



**Cotton seed cake:** Seed cakes contain 40% protein and serves as a important concentrated feed for livestock. Not only that, cake is the good organic matter contains 5% N, 3% P<sub>2</sub>O<sub>5</sub> and 2% K<sub>2</sub>O.

**Cotton stem:** The stem can be used as organic manure or fuel.

### References

- [www.biologydiscussion.com](http://www.biologydiscussion.com)
- <https://www.britannica.com/topic/cotton-fibre-and-plant>

[The information, including the figures, are collected from the above references and will be used solely for academic purpose.]