

Comprehensive development of Calotropis fiber

Yang JingYa, Xu wei, Xu jianchu, Li xiong

Center for Mountain Futures, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming 650201, Yunnan, China
University of Chinese Academy of Sciences, Beijing, 100049, China

Calotropis fiber is a new natural textile fiber recently discovered, which comes from the seed of *Calotropis*. It is a perennial plant of the *Asclepiaceae* family. The fabric has a silky smooth texture and is similar to cotton. Breathability and comfort are cashmere from the plant kingdom. At the same time, Calotropis fiber also has biodegradability, natural antibacterial activity and significant warmth retention, and is an eco-environmental fiber resource worthy of research and promotion.

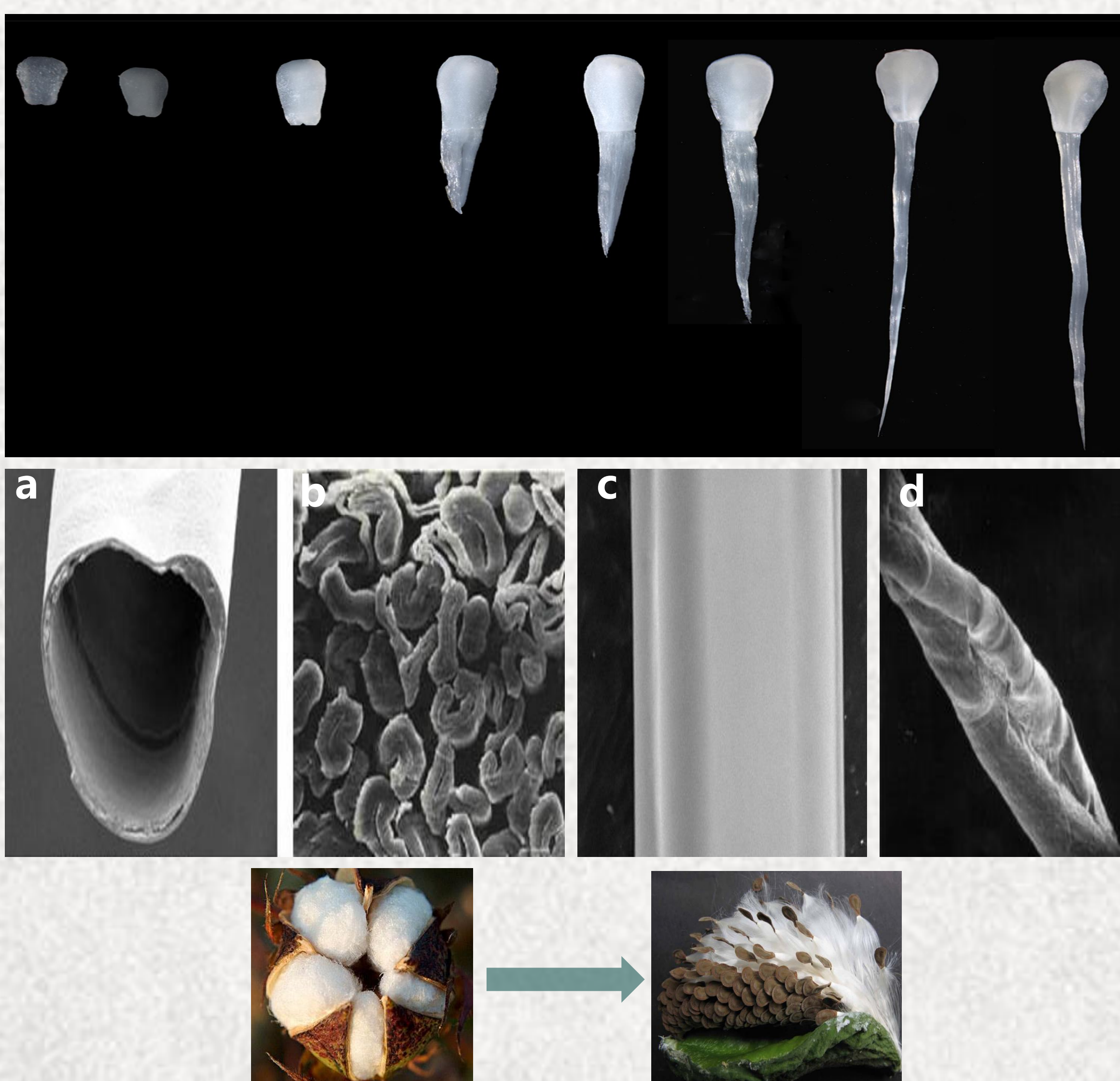
The *Calotropis* is mainly distributed in tropical arid regions. China is mainly distributed in the dry and hot valleys of Yunnan, Sichuan, Guangxi and Hainan, and along the "Southern Silk Road" from Myanmar, India, Sri Lanka to Africa and other arid, semi-arid and saline land Areas are distributed. *Calotropis* is a common species in arid and semi-arid areas of Africa and a representative plant in the desert grassland ecosystem. It prefers open and rarely competitive habitats, especially in overgrazing grasslands, pastures, roadsides and protected areas. Tolerance to barrenness and drought, can play a role in preventing wind and sand fixation and controlling soil erosion. In the folk, *Calotropis*' stem bark can be used as fiber, the milk can be used as medicine and insect repellent, and the branches and leaves can be used as green manure. It is an important energy plant, and it is a rare ecological economic plant.

What is *Calotiropis*?



- **Habit:** Plants have strong drought resistance and barren resistance, and they are also excellent native tree species for ecological restoration
- **Medicine:** the white juice of rhizome, leaf and fruit is rich in a variety of cardiac glycosides, which has significant medicinal effect
- **Food:** in African countries such as Benin, local residents mash tender leaves as a coagulant for cheese
- **Feed:** stem and leaf biomass, high protein content, comprehensive nutrition, after detoxification as high-grade feed
- **Textile:** fiber with high holocellulose value is one of the most valuable plant fiber resources.
- **Energy:** rich in hydrocarbon liquid, the hydrocarbon ratio and crude oil is similar, can be used to replace oil

How about *Calotiropis*' fiber?



category	Cotton fiber	Calotropis fiber
life cycle	Annual	perennial
habitat	There are regional restrictions, need to enrich the supply of nutrition	It can grow in drought, high temperature and barren land
Fiber morphology	Flat ribbon with natural twist	smooth, no turning, closed at the top, thick at the middle and open at the end
	Round, solid	Round, large hollow wall
Fiber composition and content	Cellulose 97%, wax 0.8%	Cellulose 69%, lignin 23% Hemicellulose 8%, wax 3.69%
Fiber length/ mm	23~33	29.5~40
Fiber fineness/ μm	8.41~13.7	15~22
Fiber density (g/cm^3)	1.54	0.93
regain	7	11.9
Breaking strength	8.37	4.45

Light weight and long length

Hard to control the floating fiber, poor strip drying, low strength and large waste

High rigidity and brittleness

Smooth surface, straight lengthways, no nature curling, easy to swell

Small friction and cohesion

The spinnability is poor, so it is difficult to form the web into strips

Our research

Comprehensive analysis of **genomic** information, **transcriptome** data and **metabolic** components---

To reveal the physiological and molecular mechanism of the adaptation to extreme dry and hot environment, to provide a new understanding for plants to adapt to the changing extreme environment;

To providing a theoretical basis for the cultivation and adaptation of other crops in dry and hot areas.

To reveal the formation mechanism of the new fiber in the seeds of *Cerasus angustifolia*, and to provide theoretical and practical support for the development and utilization of Calotropis fiber,

At the same time, it can provide an important research basis for the improvement of cotton fiber length.



RESEARCH PROGRAM ON
Forests, Trees and
Agroforestry

