

ETHNOBOTANY OF *AMORPHOPHALLUS* OF CHINA

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Abstract A general ethnobotanical survey of konjac (*Amorphophallus* spp.) in China has been carried out. In China, people in 34 nationalities have indigenous knowledge of konjac. Its history is as long as 2000 - 3000 years. Some indigenous perceptions, traditional cultivation systems and propagation methods of konjac are reported in the present paper. Local people in SW China use nine species of konjac for food, medicine, cultural symbol, animal fodder, gum or wine - making.

Key words Ethnobotany, *Amorphophallus*, konjac, indigenous knowledge.

According to the latest taxonomic treatment, there are 21 species of konjac (*Amorphophallus* spp.) in China. All of them are distributed in Southern China, especially in Yunnan Province (Li, 1979, 1988; Li and Long, 1992, 1998). Thirty - four nationalities live in the Chinese distribution area of konjac. All of the nationalities such as Han, Yi, Miao, Zhuang, Buyi, Dong, Yao, Tujia, Hani, Lisu, Wa, Lahu, Shui, Jingpo, Nu and Jinuo in this area have rich indigenous knowledge (IK) about konjac. Because of the long history of understanding and utilizing konjac in China, much valuable IK has been handed down from generation to generation.

UNDERSTANDING OF KONJAC BY INDIGENOUS PEOPLE

It has been known for thousands years that konjac is somewhat poisonous. People have to process it with certain methods. The process to make konjac edible varies from one place to another, and from one ethnic tribe to another. For example, *A. paeoniifolius* is believed to be very poisonous. The people in Southern Yunnan, however, understand that the poison can be eliminated after cooking with plant ash in boiled water. Indigenous people in Hunan, Central China also use plant ash or plaster to treat konjac when processing.

Folk classification of konjac depends on local konjac species numbers. Usually, indigenous people classify konjac based on their morphology, biological characteristics, edibility and quality. The folk classification of konjac can correspond with scientific taxonomy in many ethnic groups. For instance, the Jinuo people in Southern Yunnan give a general name "bulai" for the genus *Amorphophallus*, while they divide konjac in the area into four folk species named as *bulaiduo*, *labong*, *sakuo* and *hululu* respectively. These names correspond to *Amorphophallus yunnanensis*, *A. yuloensis*, *A. krausei* and *A. sp.* taxonomically. It is interesting that *hululu* is an unknown species botanically because its flower has not been observed yet (Wang and Long, 1995). The Dai people in Yuanyang of Southern Yunnan classify two konjac species as "real konjac" and "false konjac". The "real konjac" is *A. nanus* scientifically and edible, and the "false konjac" is *A. paeoniifolius* and is not edible.

Reproductive growth of most of konjac species occurs after 3 - 5 years of vegetative growth. The vegetative growth stops during the year of reproductive growth. Therefore the carbohydrate and other nutrients in the konjac corm will be consumed for reproductive growth. This biology was understood by indigenous people and used in cultivation. In Central Hunan, people will pick the "male corm" out of the seed - corms before they cultivate konjac. The so - called "male corm" is what has produced flower and fruit, and consume the corm for its propagation development. Then the yield of konjac will decrease. These male corms can be used for making konjac cake, wine and as fodder.

There are several methods to preserve and store konjac in indigenous societies. The Dai people in Yuanyang of Southern Yunnan store konjac corms (*A. nanus*) in cellars near their houses. The Jinuo people pile up konjac corms (*A. yuloensis* and *A. krausei*) near the fireside. Several ethnic tribes in Yunnan cut the konjac corms into pieces and then dry them in the sun. This method can store konjac for 3 – 5 years. Indigenous people in Central Hunan sometimes store konjac the dry konjac – cake. The indigenous people like to use the big leaves of *A. paeoniifolius* to feed pigs.

Several species of *Amorphophallus* have been acclimatized by indigenous people in Southwest China. For example, the Yi in Northeast Yunnan and Southeast Sichuan have moved *A. albus* into their farming systems. The Dai, Hani, Bulang and Jinuo in Southern Yunnan have acclimatized *A. krausei*, *A. yuloensis* and *A.* sp. The Buyi in Guizhou have domesticated *A. yunnanensis*.

TRADITIONAL CULTIVATION SYSTEM

As early as the Tang Dynasty (AD 608 – 907), the biological property of shade – preference of konjac as a crop was reported according to ancient literature. It is usually cultivated around houses.

The interplanting and rotation techniques of konjac cultivation can be found from Central to Southwest China. For instance, the Yi and Naxi people have been practicing agroforestry for hundreds years within the model of fruit trees (apple, pear, peach, plum and persimmon) + konjac. The interplanting of corn and konjac is also a common model. The fruit trees and corn plants provide konjac with shade so that the konjac yield can be increased. In autumn and winter, the rotation of konjac and other crops or vegetables such as soybean and radish is usually adopted in this farming system by the indigenous people.

TRADITIONAL PROPAGATION

1. Propagating by Seeds

It is difficult for the seeds of *Amorphophallus* to germinate under natural condition. They can germinate only when they pass through the alimentary canal of some birds like *Corvaceae*. In some indigenous communities, however, people use artificial methods to improve germination. They collect mature seeds of konjac, eliminate the skin and pulp, mix seeds with moist sand in the ratio of 1:4, and then put them into the cellar or cover them with a thick soil layer in the winter.

2. Vegetative Reproduction

There are two types of vegetative propagation materials. One is seed – corm/tuber, and the other is rhizome and mini – corm (Table 1). To use the tuber as “seed” is very common in indigenous societies because it can be harvested in a year, and less labor and management is needed. The tuber yield will greatly increase when seed – corms with a weight of 300 – 500 grams is used. However, it will cost a lot. Rhizomes and mini – corms, each weighted from 3 grams to several dozen of grams, are produced during the growing season of several common species in Yunnan. Indigenous people understand the value of rhizomes and mini – corms for konjac plantation. They can harvest konjac in 2 – 3 years when these little corms are used as “seeds”. It takes a long time to harvest tubers but it costs less.

INDIGENOUS USES

It was about 210 BC that konjac was first recorded as a useful plant in Chinese ancient literature (Sun, 1990). Undoubtedly the indigenous people had known and used konjac for more than 2000 – 3000 years already. Konjac was used as herb at the early time (Li and Long, 1989). Around 1500 years ago, it became a

Table 1. Numbers of rhizomes and mini - corms produced in a year (mother - corm weights around 750g)

Species	Rhizomes	Mini - corms	Total
<i>A. konjac</i>	5	16	21
<i>A. albus</i>	11	4	15
<i>A. krausei</i>	9	2	11
<i>A. yunnanensis</i>	/	10	10
<i>A. nanus</i>	2	6	8
<i>A. yuloensis</i>	1	6	7
<i>A. paeoniifolius</i>	/	4	4
<i>A. kachinensis</i>	/	2	2

multi - purpose plant in Southern China.

1. Food

The most extensive use of konjac nowadays is for food in China. To make konjac cake from the corms is the common type of processing konjac food in all the ethnic groups mentioned above. However, there are differences among different tribes or societies. The Bai in Dali, Western Yunnan, can make very purified konjac cake. They eliminate the corm skin and then process the clean core corm in a short time. In the cold winter, people in Wanyuan, a mountainous county of Sichuan, put the newly - made konjac cake outside their houses in the evening. The physical structure of konjac cake are not only good - looking but also good - tasting.

In addition to konjac cake, the indigenous people use konjac to make noodles and sauce. Konjac snack in Western Hunan is very popular. To taste konjac snack is a part of some local people's night life.

Konjac leaves are also edible. The Jinuo people collect the young leaves of konjac (*A. yunnanensis*, *A. yuloensis*, *A. krausei* and *A. sp.*) for vegetables in the spring (Wang and Long, 1995). It is necessary to cook the leaves in boiled water before they are fried with oil, otherwise they taste very bitter and sting the tongue.

The bulbils of *A. yuloensis* are eaten by the indigenous people in some areas of Southern and Southwestern Yunnan. They call bulbul "konjac fruit". The bulbul weighs around 30 - 200g and will mature and drop automatically in winter.

2. Medicine

As one of the earliest traditional Chinese medicinal herbs, konjac has been used to treat many kinds of diseases and wounds such as tumors, skin diseases, indigestion, scalding and bites by poisonous insects or snakes by many ethnic groups.

3. Culture

The Buyi in Southwestern Guizhou will hang the leaves of *A. konjac* and *A. yunnanensis* on their house gates in summers. They explain that konjac leaves have magic to prevent them from mosquitoes and other insects (Long and Wang, 1994). The Jinuo people do not eat the wild konjac corms from forest lands but they barter them with Dai for salt, farming tools, tobacco and clothes, because they think the wild konjac is endowed with deities and is too strong to eat for them.

4. Other Uses

Konjac is also used as fodder, gum and for wine - making by indigenous people in China.

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