

## Development Status and Suggestions of *Polygonatum* in Jilin Province

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**Abstract:** *Polygonatum odoratum* (Mill.) Druce is a *Liliaceae* perennial herb, which is used both for food and medicine, and has high medicinal and economic value. This article takes Jilin Province as the research object, analyzes the existing problems from the current situation of *Polygonatum* cultivation, variety approval, and product application, and proposes corresponding solutions to try to provide a reference for the development of *Polygonatum* industry in Jilin Province.

### 1. Introduction

Jilin Province is one of the northern medicine bases in China, and it is also a large province of traditional Chinese medicine resources. Wild *Polygonatum* has a long history of cultivation, but because of its low yield, artificial cultivars in Jilin Province are mainly artificial. Due to the influence of many factors such as its biological characteristics and environmental adaptability, the cultivation of *Polygonatum* in Jilin Province is concentrated in Jilin, Changbai, Tonghua, Yanbian and other places. Judging from the country's planting areas, Jilin Province belongs to the main producing areas of *Polygonatum* in the north, and the main producing areas in the south include three varieties of *Xiang Polygonatum*, *Xi Polygonatum* and *Haimen Polygonatum*. Compared with the main producing areas in the north, the southern *Polygonatum* market price often influences the national *Polygonatum* production trend. From the perspective of cultivation techniques and methods, *Polygonatum* mainly has asexual propagation and seed propagation. Due to the dormant characteristics of *Polygonatum*, the seed treatment is difficult and the cost is high. Currently, asexual cultivation is the main type in market cultivation.

From the perspective of the nationwide varieties of *Polygonatum*, *Xiang Polygonatum*, *Haimen Polygonatum*, and *Xiyu Polygonatum* are the main ones. *Guan Polygonatum* and *Jiangbei Polygonatum* in the three northeast provinces are listed as wild *Polygonatum*. In recent years, Jilin Province has gradually introduced and domesticated wild *Polygonatum* to screen new varieties. Like the *Polygonatum* Research Group of Jilin Institute of Agricultural Science and Technology, after several years of research and experiments, according to systematic breeding, through individual selection, strain comparison experiments, 9 *Polygonatum* strains were selected. They are long-leaf green stalk, long-leaf green stalk and armpit purple, long-leaf purple stalk, round-leaf green stalk, round-leaf green stalk and armpit purple, round-leaf purple stalk, wrapping *Polygonatum*, multi-flower *Polygonatum* and small *Polygonatum*. And on this basis, the new *Polygonatum* variety "Jizhu1" was examined and approved, which has made great contributions to the development of the *Polygonatum* industry and even the Chinese medicine industry in Jilin Province.

Table 1 Origin and characteristics of *Polygonatum*

number	Name	Main origin	Features
1	Xiang <i>Polygonatum</i>	Zhangjiajie and other places in Hunan Province Nantong, Haimen and other places in Jiangsu	Thick rhizomes, and pale yellow
2	HaimenPoly	Province	The stems are also straight and plump, flat, yellowish in color

	gonatum		
3	Xi Polygonatum	Lianxian and other places in Guangdong Province	Lianzhou Polygonatum head is thicker and has fewer links; Xi Polygonatum is denser and thinner
4	Guan Polygonatum	Northeast, Inner Mongolia, Hebei and other places	Slender, light yellow, with obvious longitudinal lines on the surface, light and hard body, sweet taste

Jilin Province is a large province of traditional Chinese medicine resources. As an important part of traditional Chinese medicine products, *Polygonatum* plays a vital role in promoting the economic development of Jilin Province. At present, more than 70% of *Polygonatum* is used in medicine, increasing research and treatment of *Polygonatum* polysaccharide, saponin and other components, and increasing its application in lowering blood sugar and blood lipid. 20% *Polygonatum* is used in health and food fields, such as *Polygonatum* biscuits, *Polygonatum* oleifera tea, dried *Polygonatum* fruit, *Polygonatum* fructose and *Polygonatum* odoratum. With the increase of people's health awareness, the demand for *Polygonatum* will further increase. About 10% of *Polygonatum* is used in the food industry. In addition to its medicinal properties, it can also be used as food to become a wonderful ingredient on people's dining tables.

Table 2 Origin and characteristics of *Polygonatum*

number	Field	Weights	Application
1	Drug field	70%	Research on lowering blood sugar and blood lipids
2	Health products	20%	Polygonatum cake, Polygonatum tea, Polygonatum fruit, etc.
3	Food sector	10%	Daily food
4	Field	Weights	Application

## 2. Problems of *Polygonatum* in Jilin Province

Jilin Province is a major agricultural province, and food crops are the main source of income for farmers in Jilin Province. From the perspective of market demand, grain prices have continued to rise in recent years. *Polygonatum* is a perennial herbaceous plant with a long planting cycle and unstable prices. Often it takes three years to plant and it will pay off. Compared with the main agricultural cash crops, people are more inclined to food crops under the influence of traditional planting concepts. Even compared with the cultivation of similar traditional Chinese medicine, such as compared with the advantageous ginseng industry in Jilin Province, the research on *Polygonatum* is relatively late, especially in recent years, the price of ginseng has increased significantly, and the advantages of *Polygonatum* cultivation are not obvious.

In the market of Jilin Province, there are few cultivated varieties of *Polygonatum*, which has not formed an industrial advantage. Jilin Province approved the first new *Polygonatum* variety in 2012, which can be said to be a breakthrough in Jilin Province. On the one hand, it is difficult to verify the variety of Chinese herbal medicines compared with field crops. The second is *Polygonatum* combination of food and medicine. In addition to focusing on economic value, more important is quality and higher standards. Third, Jilin Province is the main producing area of ginseng. For many years, scientific researchers have focused on the research of ginseng industry. Little research has been done on small varieties of *Polygonatum*, and most applications have not yet been tapped.

Scale is an inevitable direction of industrial development. The development of the *Polygonatum* industry in Jilin Province is relatively late, and the system is not strong. The corresponding supporting cultivation technology and management technology are not standardized. These require scholars and operators to accumulate years of research and experience. From the perspective of

production, *Polygonatum* planting bases are mainly concentrated in the northeast mountainous area of Jilin Province, near the forest. The second is from the processing, although *Polygonatum* as a health care product, there are many varieties, but mixed, no brand advantage.

### 3. Countermeasures and Suggestions

With the increase of market demand, germplasm resources of *Polygonatum* are becoming less and less. Introduction and domestication of *Polygonatum* is very important to change from wild to artificial cultivation. In terms of publicity, on the one hand, from the perspective of culture, *Polygonatum* is used as the starting point to promote the knowledge of traditional Chinese medicine and increase its popularity in the eyes of consumers. The second is to increase environmental protection, in particular to increase the intensity of returning farmland to forests, accelerate the speed of returning forests to the forest land as soon as possible, and provide a high-quality environment for the cultivation and production of *Polygonatum*. The third is to strengthen policy protection, through legislation and other measures, increase artificial punishment for the destruction of wild *Polygonatum* resources, and improve the protection and management of *Polygonatum* resources.

Make full use of the production and management experience of rural cooperatives and organize scattered *Polygonatum* farmers through reasonable distribution and management systems to form a large-scale economic professional cooperative organization. Uniform price and unified management will form a market advantage and promote the development of production by the market. Establish awareness of brand and intellectual property protection, increase variety approval, cultivate well-known brands at home and abroad, and improve product competitiveness.

The government carries out reasonable planning and management based on the regionalization of *Polygonatum* industry. On the one hand, leading enterprises, specialized cooperatives, and planting bases are encouraged to take advantage of industrial resources and provide them with policy guarantees and financial support. The second is to take advantage of the benefits of the leader to drive more farmers to participate. The third is to increase scientific research projects, starting from the cultivation, breed selection, product development, processing, and sales of *Polygonatum* to conduct in-depth research on *Polygonatum*, strengthen the research on disease prevention and control techniques of *Polygonatum*, and screen high-quality varieties as soon as possible. The fourth is to strengthen the construction of information networks, realize resource sharing, establish and improve the market information system, achieve international standards, and lead the healthy development of the *Polygonatum* industry.

Establish and promote poverty alleviation models such as “Government + Enterprise + Poor Village”, “Rich Village + Finance + Poor Village”, “Company + Finance + Poor Household”. With the government as the lead, give play to the demonstration and leading role of industries such as *Polygonatum*. Carry out deep processing of *Polygonatum* and promote standardized cultivation techniques in poor areas, select high-quality and high-yielding varieties for demonstration and promotion, and form a four-level management operation model such as “government, finance, enterprise, and farmer”. There are policy guarantees, financial support, corporate recycling, and market sales.

Establish a Chinese herbal medicine planting + characteristic (red) resource tourism model. For areas with tourism resources, carry out village appearance, village appearance rectification planning, tourism construction planning, characteristic town planning, etc. The cultivation of medicinal materials with medicinal and ornamental value (such as peony, purple perilla, platycodon grandiflorum, chrysanthemum, etc.) is combined with the cultivation of *Polygonatum*, and the characteristic (red) tourism culture is deeply digged to create a tourist village with Chinese medicinal materials.

### 4. Conclusion

As an important part of traditional Chinese medicine resources in Jilin Province, it is of great

significance to promote the economic development of Jilin Province by rationally planning the development of *Polygonatum* industry in Jilin Province, improving the famous brand of *Polygonatum*, meeting the overall requirements of increasing farmers' income and increasing enterprises' efficiency.

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