

# Exploration and Practice of Popularization of Plant Science Research Resources- Take the Popularization of Characteristic Economic Plants in High-value Regions as an Example

Rubing Tan, Ying Wang\*

South China Botanical Garden, Chinese Academy of Sciences, Guangzhou 510650, Guangdong, China

---

**Abstract:** The popularization of scientific resources is to transform the scientific resources into science popularization resources effectively. Botanical gardens are ideal places for the popularization activities of scientific resources. This paper has analyzed the science popularization activities of characteristic economic plants in high-value regions, with the conclusion that it is an effective form of the popularization of plant science research resources to integrate popularization contents with scientific achievements closely and combine science popularization activities with scientific resources broadly and that the development of cultural and creative products of plant science popularization provides a new way for promoting the popularization of plant science research resources.

**Keywords:** Plants; Popularization of scientific resources; Exploration

---

## 1. Overview of scientific resource popularization

In recent years, with the vigorous implementation of scientific and technological innovation projects in China, the general public has paid more and more attention to scientific innovation and achievements. In the National Action Plan for Scientific Literacy 2021-2035, the Chinese government has clearly put forward a plan to implement the “popularization project I of scientific and technological resources”. In September 2022, the General Office of the CPC Central Committee and the General Office of the State Council printed and issued the Opinions on Further Strengthening the Popularization of Science and Technology in the New Era, demanding that scientific and technological innovation should play a leading role in science popularization and that basic research and frontier fields should be focused on to popularize new scientific discoveries and technological achievements to the general public and promote the popularization of scientific and technological resources.

Generally, scientific and technological resources refer to the people, money, and materials invested in the development of scientific and technological undertakings and their organizational environments. Popularization of scientific and technological resources refers to the expanding and extending of scientific and technological resources to the resources of science popularization and assigning scientific and technological resources with new functions to broaden the application range of scientific and technological resources and facilitate an effective transformation of scientific and technological resources into resources of science popularization based on the development and utilization of scientific and technological resources <sup>[1]</sup>.

A prerequisite for the popularization of scientific and technological resources is that it should not affect scientific and technological innovation. Therefore, the most common form of science popularization activity is that institutes open their scientific apparatus, field stations, or public laboratories to the general public on specific days such as National Science Popularization Day, Science and

Technology Activity Week, and Public Science Day and arrange visits to, and hold exhibitions of scientific achievements and lectures at these sites to interpret the cutting-edge scientific progress for the general public, guide them to experience scientific experiments and help them understand the objective truth of science. These activities show very effective results. However, the number of open-day activities is limited, and the public academic papers, and patents presenting scientific achievements are hard to read for the general public. Therefore, botanical gardens, museums, and observatories normally opened to the general public have become the mainstream forms of scientific resource popularization.

## **2. Status quo of scientific resource popularization activities in botanical gardens**

Compared with the indoor venues of museums and observatories, the green areas in botanical gardens have a natural affinity for the general public. Nowadays, with the continuous development of botanical gardens, they have gradually become an important base for science popularization education, and the general public enjoys traveling and resting in botanical gardens and learning the relevant plant science knowledge there. Theoretically, botanical gardens have the inherent advantages of carrying out classes and activities of scientific resource popularization that combine learning with traveling and playing. Botanical gardens are comprehensive research and cultivation institutions that conduct basic plant biology research and collect, evaluate, explore, and use plant resources. Especially throughout the development history of the botanical garden, scientific research with a core of collecting, cultivating, exploring, and using living plants has been the soul of botanical garden<sup>[2]</sup>. Botanical gardens have professional and scientific researchers, perfect laboratories and field stations, adequate scientific research funds, and various scientific and technological project resources. Therefore, they are an ideal place for science popularization activities. Carrying out scientific resource popularization activities in botanical gardens is conducive to promoting the understanding and participation of the general public in scientific research. In reality, the contents of science popularization activities carried out in botanical gardens in China are rarely integrated with their own scientific achievements. Most of these activities focus on nature education and environmental education, with primary school students as their education objects. These activities lack a system that introduces the development of frontier science and technology favored by the adult population and associates scientific achievements with daily life. At present, botanical gardens regularly conducting practice and exploration activities of scientific research resource popularization in China are mostly those botanical gardens of the Chinese Academy of Sciences. Such activities include the “forest exploration and growth” summer camp carried out in the Wuhan Botanical Garden under the guidance of the China-Africa Joint Research Center and the science popularization activity of characteristic high-value economic plants carried out in the South China Botanical Garden under the guidance of the Agricultural Biology and Technology Research Center.

## **3. Case analysis of popularization of plant science research resources**

The science popularization activities of high-value characteristic economic plants carried out in the South China Botanical Garden of the Chinese Academy of Sciences include a series of exploration and practice activities of science popularization course development, video production, scientific and technological achievement presentation, and research and study training based on the project of regional characteristic plant excavation and industrialization. The project of regional characteristic plant excavation and industrialization represents an outstanding achievement of key cultivation direction in the first phase of the “First Action” plan of the Chinese Academy of Sciences, and its activity program of high-value characteristic economic plant popularization won the second prize of Guangzhou science popularization innovation achievements in 2022. Therefore, this paper has taken the science popularization activity program of high-value characteristic economic plants (referred to as project hereinafter) as an example to analyze the characteristics of the science popularization practice of plant science research resources.

### **3.1 Integrating contents of science popularization with scientific achievements closely**

The project has taken the scientific achievements of the South China Botanical Garden as the content of science popularization. In recent years, the technology of new variety cultivation and rapid seedling propagation of *Paphiopedilum* of South China Botanical

Garden has taken a leading role in the world. New varieties of dendrobium and its cultivation technique have been promoted to 80% of enterprises in the industry. Large-scale production of sandalwood has been realized. *Hippeastrum striatum* got the reputation of “rising star in South Guangdong.” Year-round harvesting of red matsutake has been achieved. The planting technology of *Lycium barbarum* and *glycyrrhiza* has played a leading role in industrial upgrading, with good economic benefits generated. Based on the achievements of scientific research mentioned above, the project has originally created such science popularization courses as “Finding the interest of picking Zhongke No.1 red matsutake”, “Dendrobium and its relationship with a healthy life,” and “Tracing fragrance to find sandalwood.” These courses, which have been run multiple times, are characterized by knowledge, interest, innovation, and exploration. Among these courses, the course “Finding the interest of picking Zhongke No.1 red matsutake”, with its great significance for the transformation and utilization of agricultural and forestry wastes, has won the title of superior teaching plan in the development of the first environmental education base in Guangdong province, and been promoted by the educational journal, *BOOTS*, of Botanic Gardens Conservation International.

### **3.2 Combining science popularization activities with scientific resources broadly**

The project has exhibited the scientific achievements of plant research in the main venues of the 2020 World Digital Agriculture Conference and the 2020 Youth Science Festival of the Chinese Academy of Sciences. Experts were invited to present such science popularization reports as “A common origin of Medicine and Food” and “The Power of Pollination: Revealing the plant matchmaker under the Stars” in the Pearl River Science Popularization Lecture Hall and at the reputed forum of the main venue in Guangzhou on the National Science Popularization Day. More than twenty activities promoting science popularization on campus have been performed by scientific workers organized in the project, with more than 15,000 online and offline audiences. Based on nine research programs of South China Botanical Garden, the project has organized the special sci-tech training camp under the talent program of middle school students in Guangzhou and the environmental protection extending nature camp of the vernal equinox project of the University of Chinese Academy of Sciences. In the herbarium, with a collection of more than 1.2 million specimens, the project has arranged a scientific painting activity of rare and endangered plants. Also, the project has organized a scientific practice activity of “Keeping the fresh taste of plant fruit on the tip of your tongue” for young people in the public laboratory with both CMA and CNAS certifications. Furthermore, with the Dinghushan Nature Reserve Administration Bureau, the project has arranged a parent-child camp for exploring the natural plant diversity. From all these activities, participants can gain knowledge about the changes brought about by scientific achievements in their daily lives, and their interest in natural science can be stimulated.

### **3.3 Developing the relevant science popularization, cultural and creative products of scientific research.**

The project aims to help the general public learn more about the plants, botanical gardens, and changes botanists bring to everyone’s life in a way that can be easily understood by people. In the science popularization book, *How your life is changed by these plants*, there are stories of seven characteristic plants, namely, *Lycium barbarum*, Sandalwood, Tea, *Paphiopedilum*, *Dendrobium*, *Magnolia* and *Glycyrrhiza uralensis*, and hundreds of beautiful illustrations drawn for the text, as well as reading notes and botanical scientific illustrations in each chapter, for readers to think, review, appreciate and copy. In addition, to cater to the understanding and feeling of the general public about plant science and their appreciation of and interest in natural aesthetics, this project has launched a variety of cultural and creative products, such as souvenir folders of characteristic high-value economic plants, cultural and creative ice cream, canvas bags, file folders, T-shirts, mobile phone racks, and refrigerator stickers, so that with the scientific elements integrated into their daily lives, the general public can gain emotional satisfaction while understanding science.

## **4. Conclusion**

The practice has proved that the development of science popularization courses, the dissemination of scientific knowledge, the exhibition of scientific achievements, and the activities of science popularization research and learning based on the scientific

personnel, achievements, and places in botanical gardens can deepen the understanding of the general public on and their support for scientific research. Cultural and creative products of plant science popularization can build an effective connection between science and the general public, disseminate scientific knowledge and spirit during the process of being consumed, and help the general public derive inspiration from scientific culture. Therefore, they represent a new way of promoting the science popularization of plant sci-tech resources.

## **References:**

- [1]Dapeng Wang, Rongli Huang. “Dilemma and breakthrough of science popularization of scientific resources - Take the connection and transformation between academic theses and science popularization articles as an example”[J]. Science-Technology and Publication. 2020,No.311(11):116-121.DOI:10.16510/j.cnki.kjycb.20201116.016.
- [2]Hongwen Huang, 2018. “Appearance of art, connotation of science, and undertaking of mission - vicissitude of scientific and social functions of botanical gardens during the last 500 years (II): science connotation and biodiversity, 26(3): 304-314.

**\* Corresponding author: Ying Wang**