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[ **inside**view ]



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# SOWING THE SEEDS OF INNOVATION

A conversation with **HAI REN**, Director, South China Botanical Garden, Chinese Academy of Sciences



Established in 1929, South China Botanical Garden (SCBG) of the Chinese Academy of Sciences (CAS) is one of the oldest botanical research institutions in China, and features a national nature reserve that aims to popularize botanical studies beyond its home in Guangzhou. Through its four research centres, SCBG has a strong scientific focus notably for basic research and advancing public knowledge on botany, ecology, and resource conservation. Here, SCBG Director, Hai Ren, discusses the institution's rich heritage, distinctive achievements and sustainable growth.

## What are some of SCBG's significant achievements?

Pioneering research, public education and promoting environmental preservation are central to SCBG's vision and mission. In 1956, we established Dinghushan National Nature Reserve, China's first nature reserve. We pioneered a zoning plan for its management, which is still in use today. Our award-winning strategies and technologies for restoring vegetation have been used across the country. By studying Southern China's old-growth forests, we also revealed their potential as carbon sinks which led further to the establishment of a new, nonequilibrium conceptual framework to study soil carbon dynamics.

Another achievement is our breeding of economically important plants, including banana and fragrant agarwood. In the 1970s we led a project in Guangdong province to breed a new hybrid rice and helped improve its adaptability. We have successfully reproduced a new variety of rubber tree that can survive just as well in cooler areas, thus expanding its cultivation areas.

With the Institute of Botany, CAS and Kunming Institute of Botany, CAS, we also co-led the compilation of *Flora of China*, winning the First Class National Natural Science award in 2009.

## Can you elaborate on SCBG's research excellence?

Our expertise is built on the strength of our research

across plant science, ecology and environmental science, agriculture and resource plants, as well as molecular analysis and genetic improvement. This research has led to major breakthroughs, such as rapid vegetation restoration on tropical coral islands, evaluation of carbon sequestration in China's forest ecosystems and preservation technology for harvested fruits and vegetables.

We are looking to further expand our research in line with CAS's broader goals of focusing on frontier science, and better meeting national strategic and economic needs. We are working to support more major research projects, expand our laboratories and field station networks, and build stronger expert teams. Using the plants within the botanical garden, we will also continue our research on biodiversity conservation, and establish models of resource collection, scientific research and development and utilization.

## What are SCBG's contributions to biodiversity?

We have a living collection of 17,000 plant taxa, with *ex situ* conservation of 30% of Chinese native plants. In particular, we have reintroduced 28 species of rare and endangered plants, including the flowering plant, *Primulina tabacum*. With these germplasm resources, we can supply almost 70% garden species native to southern China's Greater Bay Area.

We also consult on policy-making and planning for plant

conservation and sustainable use in China. Through international collaboration, our unique protection model has been promoted beyond China. An example is expanding sustainable sandalwood plantations in Cambodia and Malaysia. We led the reports on China's implementation of the Global Strategy for Plant Conservation (2011-2020).

## What are your strategies to strengthen SCBG's growing team?

We focus on fostering and incentivizing our staff, while promoting international exchange. Our young researchers regularly attend overseas training, along with programmes dedicated to on-the-job learning, exchange and collaborative research. To attract scholars from abroad, we offer generous funds to establish research teams, as well as competitive packages. Researchers worldwide are also invited for exchange, in addition to year-round seminars and presentations.

## How about your priorities for public outreach?

As a pioneer of popularizing botanical studies, we are keen to build our audience through diverse botanical collections and a range of themed gardens. We attract more than two million visitors a year, 10% of whom are teenagers. To further broaden our audience, we enrich flower exhibitions to improve visitor experience,

organize various classes for all ages in partnership with professional institutions, and enhance educational activities for students to promote their knowledge about botany and ecology.

## How do you envision SCBG's socio-economic role in the Greater Bay Area?

As a key supplier of plants for the region, we play an important role in promoting our horticulture industry. We also support agriculture by developing new varieties of crops and other economically important plants, as well as new cultivation technologies. In addition, the discovery of active ingredients in plants and microorganisms has also promoted the development of new medicines and health products. By improving varieties, promoting large-scale cultivation and developing drug products, our R&D programs for medicinal plants have helped position SCBG as an important technological hub for innovative medicinal herbs.



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# Research strengths and achievements of SCBG:

- **Four affiliated centres:** Plant Science Center, Ecology & Environmental Sciences Center, Agriculture & Resource Plant Center, and Molecular Analysis and Genetic Improvement Center
- **Five major research areas of focus:** mechanisms of biodiversity formation and evolution of evergreen broad-leaved forests in Southern China; response of evergreen broad-leaved forest ecosystems in monsoon area to climate change; development and commercialization of high-economic-value crops; crop safety based on cloning and transgenic technologies; and compilation of cultivated flora of China.
- More than **300** SCI papers are published annually, of which over **55%** were published in top **30%** SCI journals since 2015
- **Three disciplines** (plant and animal sciences, ecology and environmental science, and agriculture sciences) were ranked among global top **1%** in ESI between 2008 and 2018
- **2,628** SCI papers, **11** technological innovation platforms, **53** awards, **225** patents and **121** new cultivated varieties over the decade

## The many firsts at SCBG:



