



中國熱帶農業科學院

CHINESE ACADEMY OF TROPICAL AGRICULTURAL SCIENCES



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I. Words from the President

Tropical crops include rubber tree, tropical food crops, bio-fuel crops, oil-bearing crops, tropical fruits and cash crops and so on, among which natural rubber from rubber tree is crowned as one of “the four industrial raw materials” together with steel, petroleum and coal; oil palm is known as “Oil King in the World”; cassava is the staple food for many developing countries and is also a bio-fuel crop; sugarcane is a main sugar crop; coffee and cocoa are listed as the second and third leading beverages after tea; banana is the largest tropical fruit in terms of consumption. Most developing countries are located in tropical areas, and tropical agriculture plays an important role in the global economy and society, shouldering the important task to eliminate global hunger and poverty, and to ensure food security.

Tropical crops with various species and wide use enjoy large market potential. It is the main source for agriculture industry economy and farmer income in tropical areas. China's tropical area referred to the tropical and south subtropical parts covers 500 000 km², about 5% of China's land total, distributed in Hainan, Guangdong, Guangxi, Yunnan, Fujian, Hunan, Jiangxi, Sichuan Guizhou and Taiwan, homed by 170 million people, 13% of China's national population.

For developing production and processing technology of tropical agriculture, Chinese Academy of Tropical Agricultural Sciences (CATAS) was established in 1954. As the only national tropical agricultural research organization directly under the Ministry of Agriculture, PRC, CATAS carries out fundamental and applied researches on tropical agricultural sciences, enjoying comparatively high popularity for scientific research on tropical agriculture both in domestic and overseas, especially in the fundamental research field such as researches on rubber, cassava and banana. It affords technology support for tropical agricultural development in China. At the same time, for improving agricultural productivity to help developing countries in tropical areas, CATAS actively participates in the “South-South Cooperation”, carrying out a series of projects offering aid and training, such as construction of China-Aided the Republic of Congo Agricultural Technology Demonstration Center and holding 57 international training courses on production and processing technologies of tropical agriculture for about 1474 participants from 90 developing countries since 1984, and commissioned over 60 experts to more than 20 countries to provide technology assistance.

CATAS, with its 14 institutes and 3,100 staff, would like to share knowledge and technology with colleagues and friends at home and abroad to develop the capacity of tropical agriculture innovation for eliminating hunger and poverty to construct a harmonious and prosperous world with sustainable development.



Prof. WANG Qinghuang
President of CATAS

II. Chinese Academy of Tropical Agricultural Sciences

i. Brief Introduction

Chinese Academy of Tropical Agricultural Sciences (CATAS) is the only national institution engaged in tropical agricultural researches and graduate student education, which is administrated and financed by the Ministry of Agriculture of the P. R. China.

The precursor of CATAS was South China Special Forestry Research Institute established in Guangzhou in 1954, which was relocated to Hainan Province four years later. In 1965 it was renamed as South China Academy of Tropical Crops, and renamed again as Chinese Academy of Tropical Agricultural Sciences in 1994 to broaden its research areas and mandates.

CATAS has three campuses namely Haikou Campus, Danzhou Campus and Zhanjiang Campus and 14 institutes and one experimental farm with land area of more than 4,000 ha for trials and experiments. CATAS holds 2 postdoctoral stations for recruiting and training those young scientists who newly obtains a doctorate. CATAS has a staff size of over 3,100 among which 2,000 are research scientists, including nearly 500 senior scientists.

CATAS is engaged in researches on rubber tree, tropical fruits, tropical bio-fuel crops, tropical vegetables, tropical forage, tropical textile fiber crops, tropical arboreal oil crops, tropical spice and beverage crops, tropical medicinal crops, agricultural machinery, environment and plant protection, biotechnology, genetic resource conservation and development for tropical agriculture, as well as agro-product quality and safety standards and monitoring and test technology for tropical agriculture.

CATAS has good platforms for tropical agriculture research. In 2006 the State Key Research Centre for Tropical Crops Engineering Technology was built at CATAS. It has one ministerial and provincial joint effort state key laboratory incubation base, one state level breeding center, seven ministerial level test centers, five Hainan provincial key laboratories, and four Hainan provincial engineering & technology research centers.

CATAS is active in international cooperation and collaboration activities and has set up 11 international cooperation platforms to support such activities, such as CATAS-CIAT Collaboration and Cooperation Office, China-Aided the Republic of Congo Agricultural Technology Demonstration Center, International Research Center for Advanced Tropical Agricultural Materials established by CATAS and Deakin University of Australia, International Joint Laboratory for Research and Development of Tropical Medicinal Plants, CATAS - University of Hawai'i Cooperative Research Center for Tropical Plant Protection, International S & T Cooperation Base for Tropical Agriculture approved by Ministry of Science and Technology of the P. R. China, National Introduction Intelligence and Extension Base for Tropical Forage approved by State Administration of Foreign Experts Affairs of the P. R. China, Hainan-ASEAN Tropical Crops S&T Cooperation Base approved by Department of S & T of Hainan Province, etc. CATAS has an extensive collaborative relationship with tropical and subtropical agricultural research institutions from more than 30 countries and regions. It has offered over 57 international training courses to over 1474 participants from 90 developing countries spread in Asia, Africa, South Pacific Islands and Latin America since 1984.

ii. Present Administrators of CATAS



WANG Qinghuang
President



LI Shanglan
Vice President and Secretary of Party Committee



ZHANG Wanzhen
Vice President



GUO Anping
Vice President



LIU Guodao
Vice President



ZHANG Yishan
Vice President

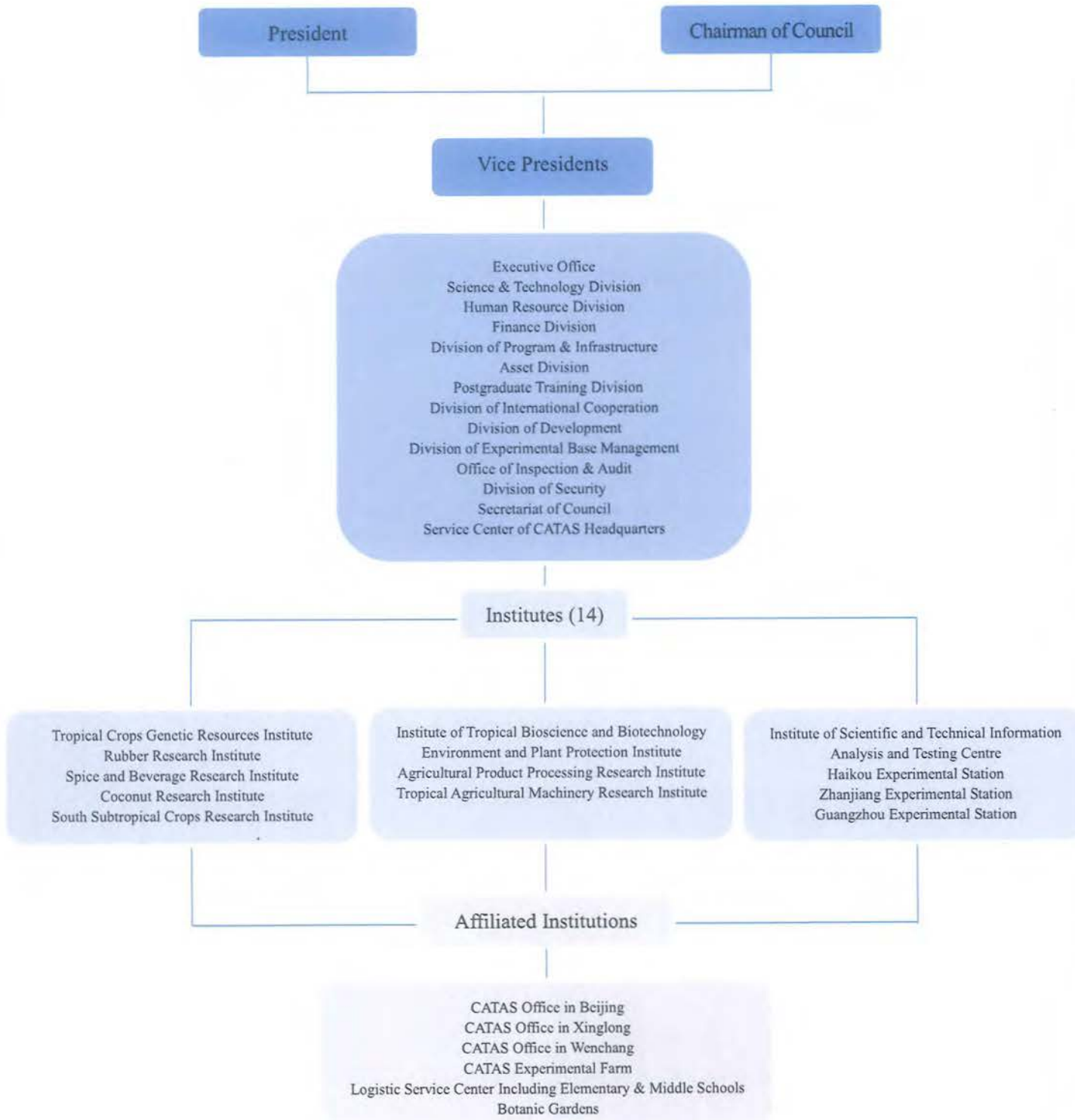


SUN Haoqin
Vice President



WANG Xuejun
Vice President

iii. Organization Structure



iv. Vision

- To be a world-class R&D center for tropical agriculture for the benefit of our society.

v. Mission

- To address emergent and predicted challenges in scientific theory and technology in the process of tropical agricultural development in China through development-oriented applied fundamental research, applied research and fundamental researches.
- To improve China's science and technology innovation capacity in tropical agriculture through directly making science and technology innovations on tropical agriculture and construction of an award-winning science and technology innovation system.
- To improve the efficiency of technology transfer, popularization and contribution to tropical agricultural development by developing a novel system for new technology transfer, integration, demonstration and extension of tropical agricultural research achievements.

vi. Strategic Objectives

To achieve the vision and accomplish the mission, CATAS is ambitious to develop into five bases with special reference to tropical agriculture development in China:

- ◇ Scientific & Technical Innovation Base
- ◇ Talents Training Base
- ◇ International Cooperation Base
- ◇ Technology Transfer Base
- ◇ Scientific & Technical Service Base

vii. Main Research Fields

- ◇ Rubber Tree
- ◇ Tropical Fruits & Flowers
- ◇ Tropical Vegetable & Food
- ◇ Tropical Bio-fuel Crops
- ◇ Tropical Forage and Livestock
- ◇ Tropical Crops Genetic Resources Conservation and Distribution
- ◇ Crop Health

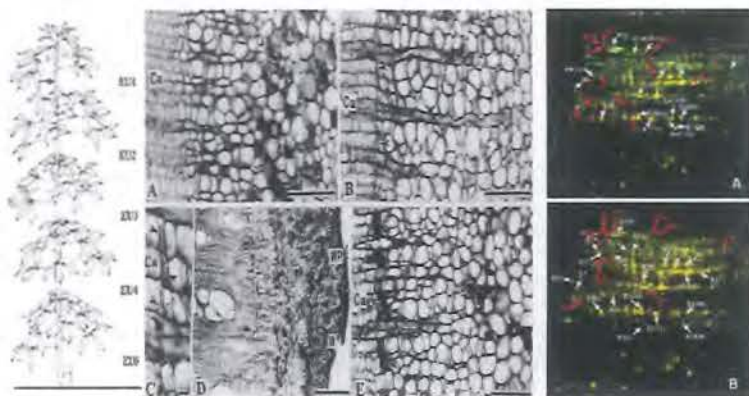
- ◇ Environment and Natural Resource Conservation
- ◇ Tropical Crop Biotechnology
- ◇ Ocean Microorganism
- ◇ Agro-machinery
- ◇ Agro-products Processing
- ◇ Scientific and Technical Information Services

viii. Main Achievements

CATAS has gained great achievements in scientific research on tropical agriculture, especially recently in the fundamental research fields in cassava, rubber, banana and other tropical crops. It has made significant breakthrough in researches on a draft sequence of the cassava, decoding the fungi genome of banana *fusarium* wilt, latex producing mechanism of rubber tree, etc. In applied researches, CATAS concentrates its efforts to meet the practical needs of the tropical agriculture sector with continuous release of new technology and crop varieties of rubber, cassava, fruit, spice & beverage and other tropical crops. By so doing, CATAS has contributed greatly to social-economy and rural development of tropical China, to security of provision and safety of tropical agriculture products to the country, to gradual increase of farmers' income, and to poverty alleviation in tropical area of the country in particular.

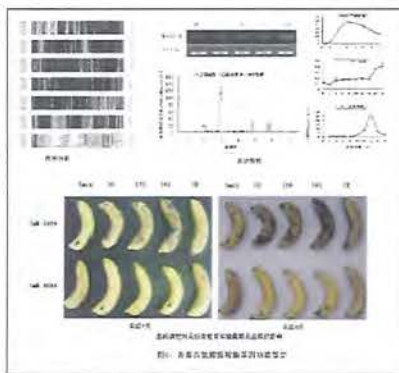
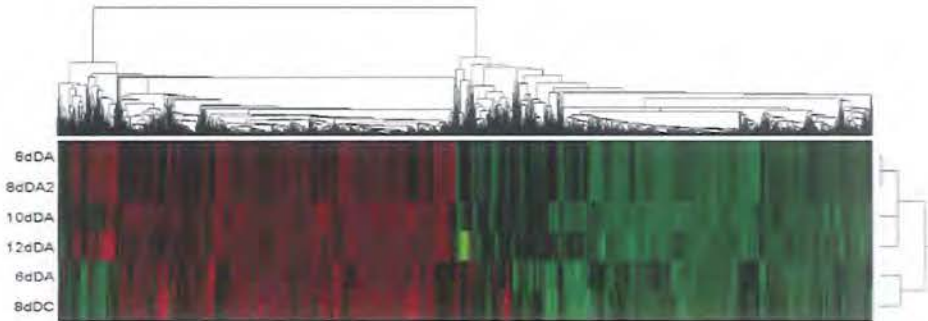
CATAS has successively completed a number of state key research projects and some projects funded by international organizations such as UNDP, FAO, ADB and cooperation projects with CIAT. It has accomplished over 1000 scientific and technological achievements, among which 50 were awarded state prizes with one First Prize for State Invention and one First Prize for State Science and Technology Progress, over 400 were awarded ministerial and provincial prizes. Some 200 or more of these achievements were in the form of innovative products, and some were patented to give rise to a total of 500 patents, in addition to large number of scientific publications.

❖ Science and technology innovation



The regulation theory of rubber tree latex yield is by far in a leading position.

Completion of the cassava genome sequencing and gene annotation to clarify the efficient accumulation of starch and high stress resistant mechanism of the crop.



Clarify the molecular mechanism governing banana fruit ripening and quality; complete genome sequencing of *Fusarium* Wilt of banana physiological race 1, 4, and first in the world decode Banana *Fusarium oxysporum* genome, providing an important foundation for the study of the pathogenic mechanism of the disease.

❖ **Fundamental research**

Research on the mechanism of rubber tree tapping panel dryness, TPD

Identified the function of HbMyb1 gene associated with the rubber tree TPD by over-expressing in tobacco, the result was innovative to the mechanism of rubber tree TPD disease, drawing the attention of the international counterparts.

Tissue culture of rubber tree seedling



Through nearly 40 years efforts, CATAS scientists solved the teething technical problem of low efficiency in rubber seedling propagation so as to enable industrialization of juvenile planting materials production that is conducive to higher latex yield and hence farmers' income.

❖ Applied research

New technology of latex harvesting

Through 30 years of researches and trial applications, a package of methods to improve latex production were invented including reduced number of tapping, shallow cut, and adequate nutrients supplements. The tapping technology includes techniques of dynamic analysis of latex production, continuously progressive stimulated tapping, low concentrations of stimulants and short cycle of stimulated tapping with compound formulation ethephon, etc. This new technology is applied in main rubber planting areas of China, which has brought additional US\$ 1.6 billion to farmers. It was granted the second prize of State Science and Technology Progress Award in 2006.



Extension of South China Series of cassava varieties



Some new additions to South China series of cassava variety bred by CATAS has been extended to 35 cities and counties in Hainan, Guangdong, Guangxi and Yunnan provinces of China, and the planting area is about 133 000ha. This achievement was given the second prize of State Science and Technology Progress Award in 2009.

Innovative utilization of characteristic tropical crop germplasm



One of CATAS endeavors is to collect, conserve, evaluate and innovatively use genetic resources of tropical crops, such as mango, pineapple, sisal and coffee, etc. Through 30 years of selection and breeding efforts, CATAS has brought about 34 new varieties, and established corresponding cultivation technology systems including seedling production, which are widely grown in 5 provinces of South China, with planting areas at about 1200 000 ha. This achievement won the second prize of State Science and Technology Progress Award in 2012.

Product processing of some tropical crops

For value addition, CATAS developed a series of technology and machinery for the processing of a number of tropical crops products. In collaboration with commercial food and cosmetic companies such as Hainan Coconut Juice Beverage Co. Ltd. and Hainan Yeguo, as well as other research institutions, CATAS and its collaborators formed packages of products processing technology and equipment for some tropical crop products with independent intellectual property rights, which completely changed the poor status of tropical crop product processing in China, providing theoretical basis and technical support for the realization of the great-leap-forward development from "workshop" to modern machining. This achievement was presented the second prize of State Science and Technology Progress Award in 2010.



Industrialization of banana tissue culture technology

On the basis of screening out an excellent exotic banana cultivar Williams, a Brazilian variety suitable for Hainan planting, tissue culture technology for the cultivar and other banana lines was developed before a tissue culture plant set up for commercialized production of banana seedlings through tissue culture. An annual production of 40 million plantlets was achieved, which accounted for about 80% seedling supply of Hainan Province. This achievement was awarded the special prize of Hainan Science and Technology Achievement Transformation in 2005.



Application of natural rubber standardized processing technology



The application of natural rubber standardized processing technology improved qualification rate of rubber product to 98%, of which first class product rate was over 95% with lower cost. This achievement obtained the second prize of State Science and Technology Progress Award in 2008.

Using parasitic wasps to control major invasive pest of coconut leaf beetle

The coconut leaf beetle *Brontispa longissima* (Gestro) damaged coconut trees seriously and caused great loss to coconut farmers. Through systematic biology and ecology research on the beetle and its natural enemies, parasitic wasps, *Asecodes hispinarum* and *Tetrastichus brontispa* Ferrière, CATAS developed a set of advanced, simple, easily-promoted breeding and release technology of those parasitic wasps to control the pest. This achievement was given special prize of Hainan Science and Technology Progress Award in 2010.



❖ Service for agriculture, rural areas and farmers

CATAS has been conducting extension projects of agricultural science and technology, serving agriculture, rural development and farmers, establishing science and technology demonstration bases of rubber tree, cassava, tropical fruits and tropical forage etc. to promote new varieties and new technology in tropical areas of 9 China provinces, the Republic of Congo and Cambodia. Cooperating with other China and world agricultural research institutions, CATAS has strived hard to foster industrial upgrading and development of modern tropical agriculture.

ix. International Cooperation

Based on the ideology of "Platform - Project - Talent" and "win-win" principle, CATAS cooperates with international institutions of agricultural scientific research to speed up the development of tropical agriculture science and technology in the world. At the same time, CATAS actively participates in the "South-South Cooperation" for improving agricultural productivity to help developing countries in tropical areas, for world food security and poverty elimination.

So far CATAS has established exchange and cooperation relationship with 16 international scientific organizations and with national and regional institutions of over 30 countries and regions, hosted 20 international conferences such as international rubber conference and international mango forum. CATAS has 11 important platforms for international cooperation, among others China-Aided the Republic of Congo Agricultural Technology Demonstration Center was established in 2008 and 10 CATAS scientists stayed there for demonstration and training of local government officers/farmers on state-of-the-art tropical agriculture technology. CATAS has offered 57 international training courses on production and processing technologies of cassava, rubber, cashew nuts, spice and beverage crops and horticultural crops for over 1474 participants from 85 developing countries since 1984, while commissioned over 60 tropical agricultural experts to more than 20 countries for

technical assistance on tropical agriculture. Since 2012, CATAS has been a partner of FAO Tropical Agriculture Platform. CATAS has won high international reputation through collaboration, cooperation and training activities. Three CATAS scientists were awarded the gold medal for research excellence by International Rubber Research and Development Board (IRRDB). One CATAS scientist was elected Chairman of IRRDB and Chairman of Association of Natural Rubber Producing Countries (ANRPC), which are in effect the only two international natural rubber organizations in the world.



China-Aided the Republic of Congo Agricultural Technology Demonstration Center has been established since 2008 by CATAS



Training Course on Corn Cultivation in the Republic of Congo in 2013



Training Course on Tropical Spice and Beverage Crops Production Technology for Developing Countries in 2013



Prof. Chen Qiubo of CATAS as Chairman of IRRDB



Prof. Hao Binzhong and Prof. Wu Jilin were awarded the gold medal for research excellence in 2004



Prof. Chen Qiubo was awarded the gold medal for research excellence in 2012



CATAS-CIAT office was established in Dec.2011



Chinese scientists received training on cassava breeding at CIAT in 2010



The Journal of *Tropical Grasslands* Co-sponsored by CATAS, CIAT and ACIAR in 2012



Training Course on Tropical Forage Organized by CATAS and CIAT

x. Contact Information



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III. Institutes

i. Tropical Crops Genetic Resources Institute

1. Overview

Tropical Crops Genetic Resources Institute (TCGRI), Chinese Academy of Tropical Agricultural Sciences (CATAS) is a national research institution. TCGRI was formerly known as Tropical Crops Cultivation Institute (TCCI) under South China Academy of Tropical Crops established in 1958. In 1994, the Crops Research Lab and the Tropical Forages Lab were separated from TCCI and formed Institute of Tropical Agriculture and Animal Husbandry (ITA AH). In the same year TCCI was renamed as Tropical Horticulture Institute (THI). In 2002, TCGRI was formed by an amalgamation of ITAAH and THI in response to increasing concerns for plant genetic resources.

TCGRI has 178 staff presently, of which 64 are senior scientists. TCGRI consists of 10 research divisions, namely, Germplasm Propagation and Conservation, Germplasm Resources of Tropical Crops, Tropical Pasture, Cassava, Animal Science, Tropical Fruits, Tropical Vegetables, Tropical Medicinal Herbs and Tropical Rice.

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3. Research Areas

With the mandates of serving the tropical and south subtropical areas in China, TCGRI undertakes applied basic, integrated, strategic and perspective researches on conservation, identification, evaluation and utilization of plant and animal genetic resources mainly from the tropical and subtropical areas of China as well as of the whole world. So far four MOA germplasm banks including tropical forages, cassava, mango and tropical subtropical medicinal herbs and a tropical botanical garden in Danzhou have been set up, and another three germplasm banks including tropical fruit trees, tropical vegetables, and tropical flowers are under construction. Some 20,000 accessions of tropical crops and 3000 accessions of tropical poultry and livestock have been collected and conserved in very good condition within the germplasm banks. A mid-term conservation bank in low temperature and an *in vitro* conservation bank which cover an area of over 600m² with a containing capacity of more than 100,000 accessions of tropical crop seeds are the first one in tropical China and have been providing services already. TCGRI has set up Trial Stations in Dehong of Yunnan Province, Wuming of Guangxi Zhuang Autonomous Region, Panzhihua of Sichuan Province and Changjiang of Hainan Province serving as demonstration windows on its research achievements, and as permanent regional and pilot trial locations as well as close links with the local governments and farmers.

TCGRI possesses 2 MOA Professional Key Laboratories, 1 Provincial Key and Open Laboratories, 2 National and 3 Provincial/Ministerial Engineering Research Centers, 2 Ministerial Testing Centers and a “110” Service Station for Agricultural Science and Technology. TCGRI has a Postdoctoral Workstation, and is a Joint-training bases for postgraduates of Hainan University, Huazhong Agricultural University and Guangdong Pharmaceutical University. There are 4 international platforms including China-Congo (Brazzaville) Agricultural Technology demonstration Centre and China-Nigeria Cassava Centre, etc. TCGRI has conducted long-term and stable academic exchange and cooperation with more than 20 international organization, universities, and research institutions in 14 countries, such as CIAT, Embrapa, IITA and Kasetsart University, etc.

4. Main Achievements

TCGRI was ranked the twelfth in the Comprehensive Strength Evaluation Exercise among over 1000 Chinese Agricultural Institutions from 2002 to 2012, namely “The Tenth Five Year Plan” and “The Eleventh Five Year Plan” periods. TCGRI has collected about 1300 accessions of different kinds of tropical forages, more than 200 accessions of cassava. Besides, the tropical crop germplasms affiliated to TCGRI contain 5000 varieties in more than 1600 species in over 720 genera within 190 families, including tropical cash crops, tropical fruit trees, vegetables, medicinal plants, tropical spice crops, tropical trees of economic value, tropical woody oil plants, palms, tropical ornamental plants and flowers. Some 183 research achievements have been made, including 89 National, Provincial/Ministerial awards, with 2 Second Prize of National Scientific and Technological Progress. Scientists of the institute have published 107 monographs and over 1200 academic papers at home and abroad, containing 54 SCI papers. Meanwhile, breeding programme of the Institute has brought about some new varieties or cultivars to the tropical agricultural sector, e.g., 11 cassava varieties of South China series, 24 varieties of tropical forages, 7 varieties of vegetables and 2 varieties of rice.



ii. Rubber Research Institute

1. Overview

Rubber Research Institute, Chinese Academy of Tropical Agricultural Sciences (CATAS-RRI), the only national institute mainly specializing in research and development of rubber tree (*Hevea brasiliensis*) in China, was set up by the Central Government of China in Guangzhou in 1954 and owed its origin to the South China Institute of Special Forestry, CATAS-RRI was relocated from Guangzhou to the present site, Danzhou, Hainan Province in 1958.

CATAS-RRI has a total of 190 staff members and is composed of six research divisions, viz. Economics, Breeding, Agronomy, Soil and agro-chemistry, Latex harvesting, and Rubber wood utilization, and one technical service centre. CATAS-RRI is also the supporting organization of "National Natural Rubber Research System", "State Center for Rubber Breeding", "Key Laboratory of Biology and Genetic Resources of Rubber Tree, Ministry of Agriculture", "State Key Laboratory Breeding Base of Cultivation & Physiology for Tropical Crops", "State Engineering Technology Research Center for Key Tropical Crops", "Danzhou Investigation and Experimental Station of Tropical Crops, Ministry of Agriculture", "State Rubber Tree Germplasm Repository", which are well equipped with a number of advanced instruments and equipment and large-area experimental bases. All these affiliates are a good innovation platform for R & D in rubber tree.

The key research fields of CATAS-RRI include genetics and breeding, cultivation principle and technology, latex harvesting principle and technology, sustainable rubber production principle and technology, economics in natural rubber industry, rubberwood utilization, etc. Transfer of technology (TOT) is an important activity of CATAS-RRI and the TOT activities include technical extension, farmers' training courses and a 24-hour technical service hotline opened specially for farmers.

CATAS-RRI is a prestigious research institute in the world natural rubber scenario through its R & D contributions in the non-traditional areas and has played an important role in achieving high productivity in China through R&D innovations and technology transfer.

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3. Research Areas

CATAS-RRI research priorities are improvement in production and productivity through breeding and selection of location-specific clones with high yield and better stress tolerance, molecular biology and engineering, and disease and pest control; integrated approaches to reduce cost of production and to improve quality competitiveness through efficient field management systems, latex harvesting systems to raise the efficiency of labour; investigation on natural rubber markets and socioeconomic aspects. Research fields include genetics and breeding, agronomic principle and technology, soil and fertilizer, latex harvesting principle and technology, biology and ecology, biotechnology, rubber wood utilization economics of natural rubber.



Reyan No. 7-33-97 bag seedlings and its growth

4. Main Achievements

CATAS-RRI has achieved over 140 research achievements, most of which have been applied in commercial production already. The efforts on the large-scale commercial cultivation of rubber tree in the marginal areas of the north fringe of the Tropics and the introduction of rubber tree clones from traditional rubber growing countries have made great contributions to natural rubber industry development in China and won the First Prize of State Award for Invention and the First Prize of the State Science and Technology Progress Award, respectively. Three of the senior scientists, Professors HAO Bingzhong, WU Jilin and CHEN Qiubo, won the IRRDB Gold Medal for Research Excellence Awarded by the International Rubber Research and Development Board (IRRDB) in 2004 and 2012.



Awards

iii. Spice and Beverage Research Institute

1. Overview

Founded in 1957, Spice and Beverage Research Institute (SBRI), Chinese Academy of Tropical Agriculture Sciences (CATAS), is the only one national research institute engaged in R&D in tropical spice and beverage crops to meet the national demand on the tropical specials and to improve people's livelihood, especially those growers of the crops.

SBRI, although as good as its name, taking care for various tropical spice and beverage crops, emphasizes on Black pepper, Coffee, Vanilla, Cacao, Cola, Kudingcha (Plumleaf Oxwood), and Nuomixiang (Manghua Germander added Tea. Within SBRI, some special platforms have been established to enable the institute to fulfill its mandates, e.g., National Center of Important Tropical Crops Engineering and Technology Research Base, Hainan Provincial Engineering Research Center for Tropical Spice and Beverage Crops, Hainan "Technological Services 110" Spice and Beverage Crops Service Station, and a National 4A-Level Tourism Attraction —Xinglong Tropical Botanical Garden.

SBRI is located in Xinglong Hot Springs Tourism Attraction Spot, southeast of Hainan, covering an area of 42 hectares. It has 114 permanent staff, among them 60 are scientists. Since its establishment, more than 80 project achievements were obtained; more than 600 scientific papers and 50 works have been published; more than 80 kinds of products have been developed; more than 30 invention patents have been granted. By applying the model of "research institute plus farmer household" and "research institute plus enterprises and farmer household" in technology dissemination, more than 30 demonstration bases have been established, and remarkable economic and social benefits were achieved. SBRI has provided necessary technical support for sustained and sound development of the tropical spice and beverage crops industry in China.

After years of research and exploration, the integrated development model of "scientific research, product development and technology demonstration" has been set up. SBRI is endeavoring to be an innovation center of tropical spice and beverage crops, agricultural product processing base of tropical spice and beverage crops, demonstration base of tropical ecological agriculture, and transformation window of tropical agriculture scientific and technological achievements, making due contribution to not only Chinese tropical spice and beverage crops industry development, but to that of other parts of the world as well.

2. Contact Information



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3. Research Areas

SBRI is an institute devoted to research on tropical spice and beverage crops with emphasis on Black pepper, Vanilla, Cacao, Cola, Kudingcha, and Nuomixiang. The mission of the Institute is:

- a. Collection, conservation, identification and utilization of germplasm resources
- b. High yielding, high quality and resistant varieties breeding
- c. High efficiency cultivation techniques research
- d. Integrated control of insect pests and diseases
- e. Post-harvest technologies research and product development
- f. Tropical agro-tourism development and science popularization education

4. Main Achievements

Since the establishment of SBRI, more than 80 achievements were obtained, of which 35 of them have been entitled for national, ministerial and provincial scientific award; more than 600 papers and 50 monographs have been published; more than 80 kinds of products have been developed; 30 invention patents have been granted.



Vanilla continuous washing and killing machine

Artificial shade net for Vanilla

Awarded Achievements

35 national, ministerial and provincial scientific awards have been received, among them there are 3 National Prizes for Science and Technology Progress, 8 Ministry of Agriculture Prizes for Science and Technology. Progress.

Scientific Products

Making use of its science and technology, SBRI has developed 80 kinds of products featured by tropical and local characteristic, such as series products of vanilla tea, pepper, coffee and cocoa, etc. which received high favour from customers, Xingke Coffee and Vanilla Green Tea have gained the title of Famous Brand Products of Hainan Province in 2005, 2006 and 2011. "Xingke" trademark has been awarded as Famous Brands of Hainan Province in 2011.

Serving "Agriculture, Rural Areas and Farmers"

Since 1996, in order to disseminate scientific and technological knowledge, to raise the farmers' scientific and cultural level, scientists of SBRI have been sent to participate into activities like voluntary consultation, training, poverty alleviation, etc. It is recorded that more than 30,000 technicians and farmers have been trained. Manual about high-yielding cultivation, insect pests and diseases prevention and control, control measures for chilling injury of Black Pepper, Vanilla, Cacao and Coffee have been printed and disseminated. Educational films regarding the same content have also been shot and provided to rural technicians and farmers.

iv. South Subtropical Crops Research Institute

1. Overview

The South Subtropical Crops Research Institute (SSCRI) of the Chinese Academy of Tropical Agricultural Sciences, is the only national public research institute engaged in south subtropical crops research. It is located in Zhanjiang City, Guangdong Province. It was established in Xuwen County, Zhanjiang City, Guangdong Province in January 1954 and was called Xuwen Experimental Station at that time. Upon relocating to Zhanjiang City in 1958, it was renamed as Yuexi Experimental Station. In 1987, the Yuexi Experimental Station was replaced by the South Subtropical Crops Research Institute. In October 2002, SSCRI was listed as a national non-profit research institute, as part of the results of the national research institutes management system reform.

SSCRI has presently 182 staff of whom 38 are senior scientists, 2 postdoctoral fellow, 30 PhD holders or candidates, and 38 master degree holders

The SSCRI is located and based in Zhanjiang, servicing the whole south subtropical area for rural development, agricultural development and farmer benefits. The dry-hot region of Jinsha River in Sichuan and Yunnan provinces, the river valley region of Youjiang of the Guangxi Autonomous Region, Zhanjiang area in Leizhou Peninsula, Guangdong Province, and Dehong area of Yunnan Province are key service areas of the institute. The Institute promotes the exploration and innovation of science and technology services in the form of practical technology to "new peasant schools," "small science and technology courtyards," and "farmhouse classrooms." It also endeavours to increase farmers income, as well as improve social and economic benefits in the south subtropical area of China.

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3. Research Areas

The SSTR I is mandated to perform basic, applied basic and common key technology applied investigations on economically important crops in south subtropical regions, focusing on germplasm resources and genetic breeding, cultivation and physiology, post-harvest storage and preservation, effective utilization of agricultural resources, and environmental protection. The Institute tries to develop new elite cultivars or varieties of various subtropical crops, and form corresponding farming technology for the varieties to give high quality and high yield output, and strengthen technical integration, demonstration, and extension services.

Key research areas include innovative use of germplasm resources and genetic breeding, studies on the physiology and cultivation of crops, study of south subtropical agricultural

resource utilization and environment management, and post-harvest physiology and storage technology

4. Main Achievements

In the past 10 years, it has undertaken over 50 national projects and has completed more than 120 science and technology achievements, including 5 national awards and 22 provincial and ministerial awards, and held 44 patents.

Currently, the institute conserves over 2600 accessions of tropical crops collected domestically and exotically. It is the biggest mango, pineapple, and sisal germplasm resources keeper in China. In cooperation with a number of local institutions and farmers, SSTRl developed key technology for late-mango production, and brought about some new mango varieties, CATAS No. 1, No. 2, R2E2, and Zillate late-maturing new variety, found out methods to control mango anthracnose, solved the problem of on- and off-year bearing, and a series of key technical problems. SSTRl has boosted the development of the mango industry belt in the dry and hot Jinsha River Valley with late-ripening mango varieties. In addition, SSTRl also has also solved the country's problem of poor old lychee orchard planting density, unreasonable product structure, and low product quality and safety level. "The transformation of low-yielding lychee technology" has been extended to approximately 50 000ha, bringing in an annual increase of income of more than RMB 500 million.



The new varieties of macadamia and mango

Additionally, SSTRl established a preliminary framework for the construction of pineapple industry's technology system in China. For this, some new and excellent pineapple varieties have been recommended and released by the institute, as well as a variety of renewal and structure adjustments in the main pineapple region of the country. Further, the institute promotes research, assembly, integration, optimization of high yield, high quality, and cost-effective cultivation techniques of pineapple, an open service industry, and the sustainable development of China's pineapple industry.

Moreover, the institute fosters the introduction of H2, Nanya No. 1, No. 2, and other macadamia varieties. By recommendation of suitable varieties to different locations, it improved varieties of macadamia account for more than 85% of the planted area. Development of seedling cultivation and high-yield cultivation techniques for integration to the mainstream agricultural industry has been recommended and promoted by the Ministry of Agriculture. The research and extension efforts of the Institute has helped the macadamia industry from an initial zero production area to the current production area at 133 334 ha.

v. Agricultural Product Processing Research Institute

1. Overview

The Agricultural Product Processing Research Institute (APPRI), Chinese Academy of Tropical Agricultural Sciences, was founded in 1964, and is the only national scientific and technological research institute engaging in research and developments on the processing technology and applied basic research for tropical agricultural products, mainly natural rubber (NR). APPRI possesses 10 national, ministerial or provincial research and development platforms, and 125 staff.

Research in APPRI embraces NR processing and application, Organic macro -molecule materials, food processing, and quality and safety of agricultural products. Over the years, about 170 achievements have been made in APPRI with 50 awards at national and ministerial or provincial levels including 2 China National Scientific and Technology Progress awards, which had greatly contributed to the development of tropical agricultural products processing in China,

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3. Research Areas

Research in APPRI embraces NR processing and application, Organic macro -molecule materials, food processing, and quality and safety of agricultural products.

NR processing and application: New processing technology and equipment of NR preservation, coagulation, drying, and treatment of waste water and gases, with the eye on the demands of society and industry development. "12th five year plan", the institute concentrates on the third generation technology of the natural rubber processing (low-carbon processing).



Microwave drying beltline of NR



Microbial coagulation beltline of NR



Foundation of International Research Center for Advanced Tropical Agricultural Materials

Organic macromolecule materials: New methods and technology of NR molecular modification, nano-reinforcement and blends for high performance NR materials and homogeneous nano technology and application for tropical crops fiber.



Nano scale cellulose pilot equipment

Food processing: Tropical crop products' preservation and storage, rough machining, deep processing, basic theory of product quality control and its application. In this respect emphasis is placed on preservation and storage of tropical fruits and vegetables, the processing of tropical fruits and vegetables, tropical oil crops, tropical spices products and the tropical medicinal plants, and the related basic theories of their applications.



Products of tea tree oil and bromelin



Synsepalum dulcificum tablet

Quality and safety of agricultural products: New detection technology and quality control, and risk assessment of agricultural products are part of the mission of the institute. Agricultural products' quality and safety monitoring tasks from national and local government authorities are regular activities of the institute every year. Testing on certificating products, environment supervision, third-party notarization data to the society, and standard preparation or revising are also undertaken.

Achievements

Since the "11th five year plan", APPRI has undertaken more than 100 key projects, such as projects from the National Natural Science Foundation of China, National Key Basic Research Program, the Special Fund for the Industrial Technology System Construction of Modern Agriculture, Agro-research Projects in Public Interest, projects of Agricultural Technology Transfer Programme, the Introduction of Foreign Advanced Agricultural Science and Technology Program, and so on. The Institute was Honoured twice by the Second Prize of National Science and Technology Progress Award, by forty granted patents, sixty-three proposals or emendations of national and ministerial standards, by publishing of over 300 academic papers of which more than 100 papers were recruited by SCI, EI and ISTP. APPRI has made significant contribution to the progress of tropical agricultural products processing in China.

vi. Institute of Tropical Bioscience and Biotechnology

1. Overview

The Institute of Tropical Bioscience and Biotechnology (ITBB) of the Chinese Academy of Tropical Agricultural Sciences (CATAS) is a national agricultural research organization, founded in June 2003. It is mainly engaged in biological science and biotechnology research of the economically important tropical crops and distinctive bioresources. It enjoys a favorable global reputation and currently has 163 academic staff, 82 of whom hold Doctorate degrees while 49 of whom Master's degrees. Among the academic staff, 67 are Senior Scientists with 20 as principal senior scientists. In addition, there are an Academician of the Chinese Academy of Engineering (CAE), a member of the National Thousand Person Plan (youth project), and 3 Scientists of the Modern Agricultural Industrial Technology System.

Since its inception in 2003, ITBB has been granted 261 National, Ministerial, and Provincial research projects/programs including 1 National Basic Research Program of China, known as the "973 Program". To date, the institute has already published 1,649 papers, including 298 peer-reviewed international publications, and 946 Chinese core publications. Furthermore, ITBB has also published 27 monographs, has been granted 53 different patents, and has won 44 scientific and technical awards.

The Institute has also developed a number of technologies and integrated solutions to positively benefit agricultural sector, farmers, and rural areas in Hainan, Guangdong, Guangxi, Hunan, Guizhou and Yunnan provinces of China. It provides technical support on cultivation and planting techniques for tropical crops such as sugarcane, papaya, galangal and eaglewood. It also extends its scientific knowledge and technical expertise to the aquaculture industry.

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3. Research Areas

Research areas of ITTB are mainly concentrated on the following fields: germplasm and gene resource, crop genetics and breeding, sugarcane biotechnology, tropical biomass energy, natural products chemistry, microorganism resource and utilization, marine biological resources, biosafety of genetically modified plants and winter breeding in Hainan.

4. Major Achievements

The major achievements of the Institute since its inception in 2003 include: during the "Eleventh Five-Year" period, the overall ranking of ITBB was 27 in the National Evaluation

of the Overall Capacity of the Agricultural Science Research Institutions, while it was ranked as number one in the Bioscience field. ITBB has been granted 261 National, Ministerial, and Provincial research projects/programs including 1 National Basic Research Program of China, known as the “973 Program”, has already published 1,649 papers. This includes 298 peer-reviewed international publications and 946 Chinese core publications. In the past 10 years, ITBB has been granted 53 different patents, won 44 scientific and technical awards, and published 27 monographs.

Furthermore, ITBB has led cassavas research to report draft and fine genome sequencing maps of three different genotypes of cassavas, completed the genome sequencing of the banana wilt pathogen *Fusarium oxysporum* f. sp. cubense races 1 and 4, and has made breakthroughs in self-rooting juvenile-type clone of rubber (*Hevea brasiliensis*) and high-quality papaya and application of molecular markers in seedless Litchi.



Transgenic Cassava plant



Disease-Free Sugarcane Seedlings

vii. Environment and Plant Protection Institute

1. Overview

Environment and Plant Protection Institute (EPPI), Chinese Academy of Tropical Agricultural Sciences is a national research institution, established in 1954, with 131 staff in 20 groups under 6 research centers, including 53 senior scientists, 56 PhD holders, 36 supervisors for master and PhD candidates.

The mission of EPPI is to seek solutions to the main problems theoretically and economically of important tropical crops and environmental protection in China, committing to develop and extend research achievements in plant protection to the tropical agricultural industry, to promote eco-agriculture in tropical China for environmental protection purposes, and develop international collaboration and exchange in the mandated area.

EPPI pays more attention to monitor and control of important tropical pests, early warning and controlling of invasive species, bio-control resources research and utilization, innovation and application of tropical plant protection resources. Other high priorities include tropical fruit and vegetable post-harvest storage and transport, ecological agriculture, environmental safety assessment and pollution control, and important pathogen functional genomics research. Besides research, EPPI is committed to provide technical services to farmers in the tropical area.

In the last decades, EPPI has developed a successful technology to control the coconut leaf beetle by using parasitoids. We also use natural enemies to control the important rubber tree pests -- *Cerococcus quercus Comstock* and six-spotted mite. Testing, monitoring and control technology of important rubber tree leaf disease have been developed. The emergency prevention and the control technology of invasive spiral whitefly were also invented.

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3. Research Areas

The EPPI is mainly engaged in the basic and applied research on pests & disease detection and control for major tropical crops including rubber tree, cassava, oil palm, sugarcane, banana, mango, litchi, longan, coconut, areca nut, melon and vegetables, etc., on agricultural environment protection and pollution control, ecological or circular agriculture, and environmental impact assessment and risk analysis.

There are eight areas for EPPI studies: (1) Monitoring and control of tropical important pest, (2) Early warning and controlling of invasive species, (3) Bio-control resources research and utilization, (4) Innovation and application of tropical plant protection resources, (5) Tropical fruit and vegetable post-harvest storage and transport, (6) Ecological agriculture, (7) Environmental safety assessment and pollution control, and (8) Important pathogen functional

genomics research.

4. Main Achievements

EPPI has accomplished over 90 achievements at national and ministerial level, 26 national patents authorized, and preparation and revision of 41 agricultural industry standards for Ministry of Agriculture and 13 for Hainan Province, and over 1500 scientific articles and 30 monographs published.

In the last decades, the coconut leaf beetle has caused big damage to coconut industry in Hainan. Parasitoids of *Asecodes hispinarum* Bouek and *Tetrastichus brontispae* Ferriere were introduced to solve this problem. A companion predator release technology was developed specially. These technologies helped to reduce economic losses directly more than 56 million RMB and made the environment much better, as was awarded a special prize by Hainan Provincial Department of Science and Technology.



Morphology of *Brontispa*

Parasitic wasps

Natural rubber pests damage and diseases affection are the big threaten to rubber production. EPPI was committed to develop methods for the control of *Parasaissetia nigra* Nietner and *Eotetranychus sexmaculatus* (Riley), which are important pests of rubber tree. Application of these techniques resulted in a gain of additional output at the value of about RMB 264 million each year. This achievement was awarded first prize by Hainan Provincial Department of Science and Technology in 2011.

Besides pests of rubber tree, control studies were also made on important diseases of rubber tree, such as corynespora leaf fall disease (clfd), collectrichum leaf disease, and powdery mildew. For these three diseases, the genetic diversity has been found and molecular detection techniques has been used. A test product named Bao Ye Qing for the control of the diseases was developed. Achievement of this project was awarded the first prize by Hainan Provincial Department of Science and Technology in 2012.



Powdery mildew

Anthrax

Corynespora leaf fall disease

Spiral whitefly can damage vegetables and pollute environment. The emergency prevention and control technology system, chemical control technology, and biological control techniques based on local natural enemies were developed, and a nice control result was achieved, as was awarded a first prize by Hainan Province in 2012.

viii. Coconut Research Institute

1. Overview

Coconut Research Institute (CRI), Chinese Academy of Tropical Agriculture Sciences, founded in 1980, researching on tropical oil-bearing crops and palmaceous plants including coconut, oil palm, and oil camellia in China.

CRI has 141 staff, including 19 senior scientists and 12 academic advisors to postgraduates. With the tropical oil crops as the main research thrust, CRI is focusing on the innovative utilization of germplasm resources, cultivation technologies for high yielding and high benefits, prevention and control technologies for major pests and diseases, comprehensive utilization of products, biotechnology research and other basic and applied basic research. CRI has undertaken key technology integration, demonstration and promotion of major tropical oil crop industry. Relying on CRI, 9 scientific and technology platforms such as Scientific Observing and Experimental Station of Tropical Oil Plants, Ministry of Agriculture, P. R. China had been established. CRI has won more than 30 prizes which included the second prize of National Science and Technology Progress Award and the first prize of Scientific and Technological Achievements. Facing development of "agriculture, farmers and countryside", it provides services to farmers through disseminating popular science, giving reading materials and scientific and technological advice free of charge, and scientists and technicians' going to the field. CRI has been extending the high-yielding and high-benefit cultivation technology for palmae plants such as coconut and arecanut, pests and diseases control technologies, superior varieties and comprehensive product processing technologies for tropical area, and solving the problems in production encountered by the farmers. CRI has provided a strong scientific and technological support to the tropical oil science and technology and the sustainable industrial development in China.

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3. Research Areas

CRI has undertaken applied basic and applied researches and major key technologies research of tropical palmae plants and woody oil plants. The research areas are:

To carry out coconut oil, oil palm, oil camellia and areca nut germplasm introduction and trial planting of elite varieties, preservation and utilization of germplasm resources, cultivation technologies development for high yielding and high benefits, three-dimensional agriculture, development and application of special fertilizer, transformation of low-yielding garden.



Tropical oil crops germplasm resources collection and evaluation



Tropical oil crops prevention and control warning system

Developing integrated prevention and control technologies for major pests and diseases, introduction of nature enemies and its application, performing research on integration and application of key technologies including pest epidemic and damage, warning and monitoring, outbreak prevention or minimization, and so on.

Developing tropical oil crops comprehensive products processing including coconut, areca nut, studying the active substances extraction, activity assessment and functional product development, the fruit preservation and processing characteristics after postharvest, the key technology of oil processing and comprehensive utilization of by-products of oil processing, the key technology of risk analysis, traceability and rapid detection of tropical agricultural products in circulation, etc.

To carry out research on the molecular mechanism of cold-responsive and adaptation, fatty acid synthesis and metabolism regulation mechanism of oil palm and coconut, development of molecular markers and functional gene and trait analysis of desirable traits for tropical oil crops; important agronomic trait QTL association analysis and positioning.

4. Main Achievements

After 30 years' efforts, CRI has developed into a stronger research institution. CRI has undertaken more than 200 various research projects at national, ministerial or provincial levels and international level, and it has obtained more than 30 scientific research achievements, including 30 national, ministerial and provincial achievement award, published more than 500 papers and 11 monographs, has been authorized 39 patents. CRI has imported and cultivated 7 new varieties of coconut, of which 4 new varieties of coconut have been certified. Most of the research achievements are widely used in the field of tropical oil crops. CRI has made great contribution to the development of tropical oil crops industries in China.



Tropical oil crops processing products

ix. Tropical Agricultural Machinery Research Institute

1. Overview

Tropical Agricultural Machinery Research Institute (TAMRI) under Chinese Academy of Tropical Agricultural Sciences (CATAS) funded in 1959, located in Zhanjiang, Guangdong Province, is a comprehensive research institute for tropical agricultural engineering.

It is specialized in technology development and experiment & demonstration of tropical agricultural equipment, tropical agricultural machinery's standardization, and quality control and inspection. It focuses on Agricultural Mechanization Engineering and Recycling of Solid Wastes from tropical agriculture production process. There are 6 research sections and 4 innovation platforms, such as Sub-center of State Engineering and Technology Research Center for Key Tropical Crops, Quality Supervision & Testing Center for Tropical Crops Machinery and the Pilot Plant of Pineapple Leaf Fiber Processing under the Ministry of Agriculture of China. It offers two master programs on Mechanical Manufacturing & Automation and Agricultural Mechanization Engineering through cooperation with universities.

The institute has made 120 main achievements, including 2 National S&T Progress Awards, more than 30 provincial and ministerial S&T Progress Awards, more than 50 patents, covering the research, development and demonstration of machinery of land reclamation in tropical areas, natural rubber machinery, sisal machinery, sugarcane machinery, cassava machinery, processing machinery for coffee, coconut, and pepper, machinery for recycling and comprehensive utilization of field trash of sugarcane, pineapple and banana.

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3. Research Areas

TAMRI aims to establish a comprehensive agricultural machinery research institute which focuses on modern tropical agricultural equipment, and whose research includes mechanization of tropical agriculture, preliminary processing of tropical agricultural products, comprehensive utilization of tropical agricultural wastes, and tropical agricultural machinery's standardization, quality control and inspection. It targets not only to carry out basic research, applied basic research and application technical research, but also to undertake personnel training, technical training and science & technology extension in tropical agricultural machinery, providing technical supports for the mechanization of tropical agriculture in the country.

The research priorities include sugarcane production mechanization, tropical agricultural field machinery, tropical agricultural product processing equipment, rural energy equipment

in tropical area, tropical fibers and fiber products, marine fisheries and animal husbandry machinery and standardization, quality control & inspection for tropical crops machinery.

4. Main Achievements

The institute has made 120 main achievements, including 2 National S&T Progress Awards, more than 30 provincial and ministerial S&T Progress Awards, more than 60 patents granted, formulation of more than 30 industrial standards. The faculty developed tractor-mounted tree rooter, land clearing machine, and hole borer etc. Some machinery products were exported to aid African countries and many products won awards granted by the Ministry of State Farms and Land Reclamation.



WSL-900 Root-digging and Subsoiling Machine



W80C Hole Borer



Coffee Wet Process System



Sugarcane trash shattering machine

The faculty successfully developed series of technologies and equipment for coffee wet process, pineapple leaves comprehensive utilization, sugarcane trash shattering, cassava harvesting, dry anaerobic fermentation of solid wastes, palm oil extraction and processing, macadamia nut processing and banana leaf stalk comprehensive utilization. It also develops series of pineapple leaf fibre textiles.



Pineapple leaf fiber extraction



Pineapple leaf fiber textiles

x. Institute of Scientific and Technical Information

1. Overview

The Institute of Scientific and Technical Information (ISTI) of Chinese Academy of Tropical Agricultural Sciences, was founded in 1954, which is a national research institute focusing on tropical agricultural economy, information innovation and other public service. ISTI has maintained a strong commitment to researches on agricultural economy, rural development and relative policy in tropical area, and on tropical agricultural information and technology application. The Library and Archives are traditional departments of the institute, providing free service. ISTI has 107 staff members, 48% of whom holds a master degree 24 of whom are senior Scientists. In recent years, ISTI undertook over 60 national, ministerial and provincial projects. Since establishment, ISTI won 18 national, ministerial and provincial awards on tropical agriculture information resources, information management, regional planning, including one second prize of Chinese Agricultural Science and Technology Progress Award, one second prize and two third prizes of Science and Technology Progress Award granted by Hainan Provincial Department of Science and Technology. ISTI owns seven software copyrights and several published monographs. It held activities to serve agriculture, rural area and farmers, such as Month of Science and Technology Activities, Science and Technology to Rural Areas, Sun Training and so on. About five thousand or six thousand farmers are trained per year.

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3. Research Areas

ISTI mainly carries out researches on tropical agricultural information, tropical agricultural economy and development strategy, and affords information services such as editing and publishing Sci-tech journals, and providing books and archive. Its priorities include:

Tropical Agriculture Information and Digital Agriculture

Carring out comparative analysis of domestic and overseas tropical agriculture, safety assessment of tropical agricultural products, analysis and assessment of impacts of tropical natural resources and environment on tropical agriculture, tropical agricultural information collection, collation, processing, analysis and the construction of network information service platform, development of tropical agricultural intelligent decision system and technology expert system and its application, tropical agricultural information acquisition and monitoring technology, tropical agriculture information standard system, etc.

Tropical Agricultural Economy and Industrial Policy

Researching on tropical agricultural macro economy and policy, regional development in tropical agriculture, tropical agricultural resources and environmental economy, industrial economy of tropical agriculture, and international tropical agriculture economy, it establishes and improves the dynamic database of tropical agricultural industrial and economic development at home and abroad, and establishes the analysis and decision-supporting system of socio-economy's impacting policy. Analyze the impact of the changes of tropical agricultural economy and relative policies domestically and exotically, so as to provide policy advices to Chinese government and commercial sector to participate in international competition of tropical agriculture and agriculture internationalization.

4. Main Achievements

The institute has won one second prize of Chinese Agricultural Science and Technology Progress Award, one second prize and two third prizes of Science and Technology Progress Award given by Hainan Provincial Department of Science and Technology, nine software copyrights, published 10 books, 305 papers in core journals.

The farmer production precision database system, crop production management decision-making system, and major tropical crops intelligent management system were developed by ISTI. The application of these systems makes informationization level in planting management enhanced and the management efficiency increased. The traceability technology for tropical agricultural products quality and safety was developed based on one-dimensional and two-dimensional codes so that core technology security has been provided for full traceability of tropical agricultural products quality and safety in Hainan, and applied and popularized in tropical fruits, areca nut and others to promote the healthy development of relevant industries. Researches were made on the construction of tropical crops standardization system framework. Guidance was given to the establishment of 8600 hectares of tropical agricultural standardization demonstration base in Yunnan and Guangdong Provinces, so that the qualified rate of sampled products from the base increased by 3.6%, the net income at the demonstration base increased by 84.14 million RMB, i.e. the economic income increased by more than 8%, the standardized production level of main tropical crops was significantly uplifted.



Journals Sponsored by ISTI



Main Information Platforms
Developed by ISTI

xi. Analysis and Testing Center

1. Overview

The Analysis and Testing Center (ATC) of Chinese Academy of Tropical Agricultural Sciences was established in 1984, which is an agricultural research institute administered by the Ministry of Agriculture of the People's Republic of China. Its major responsibilities include carrying out scientific innovation, analysis and testing as well as scientific services in terms of the quality and safety of tropical agricultural products. It has 62 technical professionals, including 9 staffs with Ph.D, 15 senior scientists. The laboratories of ATC are equipped with modern precise analytical instrumentations, e.g. LC/MS/MS, GC/MS/MS, AAS, ICP-MS, UPLC etc.



LC-MS/MS



ICP-MS

ATC undertakes researches in the following fields: Risk assessment of tropical agro-products, standards for tropical agriculture, good agricultural practices and analytical technology etc.

With continuous improvement and complies with the international standard ISO/IEC 17025:2005, ATC provides technical support for Chinese government in monitoring the quality and safety of agro-products.

The goal of ATC is to become a world-class research institute, which server as the scientific innovative center for quality and safety of tropical agro-products in China and is the key technical provider of quality and safety supervision and inspection of tropical agro-products for Chinese government.

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3. Research Areas

For food safety, ATC devotes itself to improve the quality and safety of tropical agro-products through developing key technologies and solving the crucial problems affecting quality and safety. The research areas include analytical technology of tropical agro-products, safety evaluation of pesticides in the tropics, good agricultural practices, risk assessment technology, policies and regulations concerning the quality and safety of tropical agro-products.

ATC is an official institute of notification comment on TBT/SPS in China. It also undertakes the national monitoring projects and risk assessment programs for quality and safety of agro-products, carries out international cooperation, and offer training to technical professionals.

4. Main Achievements

Over a decade, ATC has established 6 scientific research platforms and undertaken more than 30 projects including 8 state projects. More than 300 papers and 4 monographs have been published. ATC participated in formulation of over 80 national and agricultural industry standards, 52 of them have already been accepted and issued. It has obtained 8 provincial awards and 32 patents granted, among which 2 are invention patents, i.e. the fast measurement of dry rubber content in latex by thermal radiation techniques, a method to reduce the cadmium content in *Sauropus androgynus* plant.



Instrument for dry rubber content measurement



Fertilizer for reducing the cadmium content in vegetable

xii. Haikou Experimental Station (Institute of Banana and Plantain)

1. Overview

Haikou Experimental Station of CATAS has been reconstructed as a research agricultural institution since December 2002. Its aim is to carry out technical experiments on planting and stimulate the development of agriculture. Its activity scope covers demonstration, popularization and application of new varieties of banana/plantain and tropical agricultural technology, as well as the training and services for farmers.

It is being built up as Institute of Banana and Plantain on the basis of Haikou Experimental Station since 2008, its orientation is to solve the key scientific problems during the developing of banana industry and achieve the target of independent creativity, integrated innovation and re-creation on the base of introduction, digestion and absorption, with banana as the research object. The overall objective of the institute is to lead, support and serve the development of banana industry in China. Currently, there are 72 employees, including 18 senior scientist, 18 with PhD degree, and 25 with master degree at the station.

By gearing its efforts to agriculture, farmer and rural area, the institute carries out various sci-tech popularization services. Firstly, with the aid of the office platform related agriculture, farmer and rural area, many important events have been successfully prepared and organized in the institution including Hainan Monthly Campaign of Science and Technology, Action Plan to Help Farmers in Six Towns and Cities of Middle Hainan for increasing their income and enhancing their capability against abrupt natural disasters. Secondly, the Station provides technical guidance and standardized cultivation technology demonstration and training for banana planting.

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3. Research Areas

Taking tropical fruit (banana and plantain) as the main research object, Haikou Experimental Station focuses on the key scientific problems which exist in the fruit field, engaged in tropical fruit genetics and breeding, tillage and cultivation, plant diseases and insect pest prevention and control technology research and postharvest technology.

The Station has been applying tissue culture technique in the production of quality planting materials of banana to ensure uniform growth and yield as well as disinfected conditions. In fact tissue culture plantlets account for 90% of China's banana growing area.

It has established an excellent management mode for water and fertilizer coupling and has formed system of resource utilization, which improves the yield and fruit quality of banana efficiently; standardization cultivation techniques have already been explored and integrated.

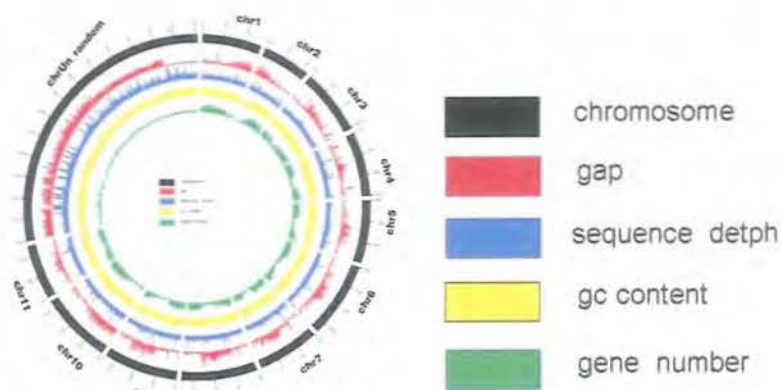
A field nitrogen deposition gathering station, an automatic meteorological observing station and field ecological observing station are coming into use.

The station researches on the pathogenesis of banana Fusarium wilt, the development of disease-resistant varieties, the development, demonstration and extension of green pests and diseases-controlling techniques, the identification and utilization of tropical Bacillus strains and actinomycetes, as well as the obstacles of continuous cropping in banana plantations and its mechanisms.

Besides, the mechanisms of banana COL gene control on fruit ripening and caducity and regulatory effect of RING gene which on banana chilling injury after harvest have been clarified. Steam degumming technology, nano fiber preparative technology, fruits browned control and new fruit products development have been tried successively.

4. Main achievements

One hundred and thirty four academic papers have been published, 15 patents have been applied and 5 of them have been authorized. Haikou Experimental Station has bred two new varieties of banana with fusarium wilt resistance. One piece of ministerial standard related banana production was formulated. It has carried out Banana B genome sequencing. The physiology, biology and functional genomics research system of banana have been established from the aspect of fruit ripening.



Compared A gene with B gene



Dietary fiber of banana flower



Banana fiber yarn



Banana wine



Banana enzymatic browning and its control



xiii. Zhanjiang Experimental Station

1. Overview

Zhanjiang Experimental Station (ZES) of Chinese Academy of Tropical Agricultural Sciences (CATAS) located in Zhanjiang, Guangdong Province was founded in 1979. ZES has three research laboratories with 48 staff, including 7 senior scientists and 5 with doctor degree. In recent years, ZES makes fully use of resources and regional advantages, and actively carries out technical trials of tropical farming, new varieties of tropical crops and production of tropical agricultural technology demonstration and promotion of scientific and technological achievements into production application, serving tropical agriculture, rural development and farmers, and providing technical training and consulting work. In 2012, ZES undertake more than 30 research projects from various sources, such as Comprehensive Experimental Station of Natural Rubber Industrial Technology System, Ministry of Agriculture, Hainan Provincial Natural Science Foundation, National Nonprofit Research Institution Fund, etc. The research funding totaled more than 6 million RMB, primarily related to the resources and genetic improvement in rain-fed agriculture, water-saving technology development, as well as the efficient use of water and other areas of research. In recent years, ZES published more than 50 research papers, got 6 patents. More than 34 ha pilot demonstration base of rubber trees are built. In Guangdong and Guangxi state farms, ZES promoted planting with healthy tissue culture plantlets at the area of more than 300 ha, while offers 10 training courses on rubber tapping with trainees nearly 3,000 and carries out special technology services more than 30 times.

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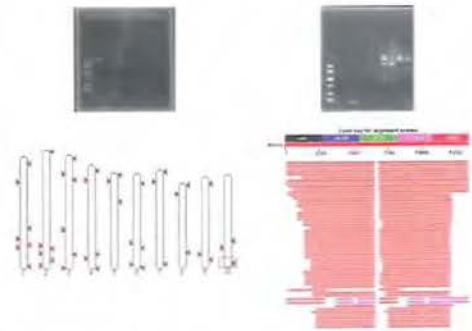
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3. Research Areas

Our research mission is based on the requirement of national water-saving agriculture development, mainly focusing on upland crops in the tropical and south subtropical zone in China. Researches are made on rain-fed genetic resources identification and breeding as well as cultivation technology, water-saving farming system and technology development.



Study on rubber yield of *Taraxacum koksaghyz* under different planting density



Cloning of drought resistance genes

4. Main Achievements

Since 2002, Zhanjiang Experimental Station has undertaken about 30 scientific research projects. Up to now, a total of 50 papers have been published, including 3 SCI papers, six patents have been granted. In the service for rural areas and farmers, a rubber tree demonstration site with 34 ha has been set up in Guangdong state farm, and the extension of healthy sugar cane plantlets from tissue culture process has been made in Guangdong and Guangxi. Ten training courses on rubber tapping technology have been sponsored by ZES with 3000 trainees.

xiv. Guangzhou Experimental Station

1. Overview

Established in 1958, the Guangzhou Experimental Station (GES) of the Chinese Academy of Tropical Agricultural Sciences is an agricultural research institution with full national financial allocation. It was formerly known as the Guangzhou Office of South China University Tropical Agriculture and Chinese Academy of Tropical Agricultural Sciences, and changed to its present name in 2002. The station has 30 staff members, including 7 senior scientists, 7 of whom are PhD holders, and 6 of whom Masters holders.

In recent years, with stable annual research funding of 1 million RMB, the station has undertaken a number of ministerial and provincial research projects, including the Comprehensive Experimental Station of the National Modern Agricultural Technology System (Cassava), the Standardized Production Demonstration Garden for Tropical Crops (Cassava) of the Ministry of Agriculture, the Standardized Production Demonstration Garden for Tropical Crops (Beautiful Millettia Root) of the Ministry of Agriculture, the Crop Pest and Rodent Monitoring and Prevention of the Ministry of Agriculture, as well as projects supported by the Hainan Natural Science Foundation. It has also established a number of pilot demonstration bases for new tropical crop varieties and technologies in Guangdong, and provided training for more than 5,000 grassroots agricultural technicians.

During the "12th Five Year Plan" period, GES will focus on the construction of the Tropical Energy Ecology Research Center, CATAS, the Jiangmen Comprehensive Experimental Station for Tropical and South Subtropical Agriculture, CATAS, and other scientific and technological innovation platforms and agencies. GES will perform basic and applied research on energy plants and ecological and environmental protection in tropical and subtropical regions, carry out experiments and demonstrations of scientific and technological achievements in tropical and subtropical agriculture and provide related technology training and consultation, and conduct international cooperation and exchange in the field of tropical energy ecology research. With the development of scientific research, the station will promote energy, ecology and scientific research transformation based in Jiangmen to create a public platform according to the medium- and long-term development plans and strategic development goals of CATAS.

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3. Research Areas

The station has established three functional research labs: Energy Crop and Ecology Research Lab, Urban Landscape Research Lab and Tropical Agricultural Technology

Integration and Application Research Lab. Their responsibilities and functions are to carry out research on energy crops and the ecological environment, the efficient cultivation of tropical energy crops, cold-resistant variety breeding and waste disposal and comprehensive utilization, to promote the development of green, low-carbon, eco-city models based on its Huadu Base, to undertake urban landscape planning and construction; to carry out research on innovative use of edible, medicinal, and ornamental plants, and to provide personnel training in urban landscape and horticultural research.

4. Major Achievements

The station has successfully applied for funds for more than twenty projects, including one special project on modern agricultural technology systems (Comprehensive Experimental Station for Cassava), projects supported by the Hainan Natural Science Foundation, agricultural extension projects, and projects supported by regular research funds for central non-profit research institutes. GES has so far published more than forty papers and has one appearance patent granted.

It has two research platforms, that is, the Tropical Energy Ecology Research Center and the Comprehensive Experimental Station for Tropical and South Subtropical Agriculture. A 138 m² space has been added for scientific research and four greenhouses well equipped have been constructed in the Cangcheng Base in Jiangmen. Moreover, fifteen counties have been selected in northern, western and eastern Guangdong for pilot demonstration of new cassava varieties and technologies, with a total pilot demonstration area of nearly 400 ha.



Innovative use of ornamental plants anthurium and edible plant okra



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