Sericulture Development in Guangdong, South China
-----A Successful Model for Sub-/Tropical Sericulture

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Sericulture Development in Guangdong, South China

-----A Successful Model for Sub-/Tropical Sericulture

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- **Director, Regional Sericulture Training Centre for Asia-Pacific, South China Agricultural University, Guangzhou 510642, China**
- **Director, Guangdong Renweifeng Health Research Institute, China**
- 30 years of experience in Sericulture. Presently dealing with Silkworm & Mulberry disease control and Utilization of Sericulture
- **Specialized field:** Sericulture Biotechnology
- Published over 50 Research papers, authored 4 Books, authorized 21 Chinese patents and 4 PCT
Contents

1. Distribution of Sericulture and its status in China
2. Trends of the Development of Silk Production in China
3. Experience of Guangdong sericulture development
4. PROBLEMS AND PROSPECT
1.1 History of Sericulture

- China is the cradle of sericulture.
- Production of silk from the moth *Bombyx mori* has been practiced in China since 2,700 B.C.
• Cocoon output occupied 51.35% of the total in tropical-subtropical regions in China

• Yunnan

• Guangxi

• West and North Guangdong
1.2 Sericulture distribution in China

- 28 provinces, 700 counties;
- 8,000,000 households, 850,000 hectares mulberry;
- 16,000,000 boxes
- Fresh cocoon 600,000 T, raw silk 120,000 T,
- Income CNY 20 billion
Sericulture in China is an important tool for rural development. E.g. In the Guangdong province, (South China) alone there are over 10,000 silkworm farmers, mainly women.
1.3 Purposes of Sericulture

- The silk produced from the mulberry silkworm and its byproducts can be used for many purposes.
  - **Mulberry resource**: mulberry leaves, mulberry branches, mulberry fruit, white mulberry root-bark
  - **Silkworm resource**: young silkworms, silkworm pupa, silkworm moth, silkworm excrement, natural silk
Diverse Utilization Mulberry and silkworm

This diagram illustrates various products and applications derived from mulberry and silkworm, showcasing a diverse utilization approach.
Treatment of diabetes with silkworm powder

Mechanism

Extract DNJ (1-Deoxynojirimycin) from silkworm powder

Disaccharide → monosaccharide → blood

inhibit α-glucosidase
1. 4 Function of Sericulture

- The silkworm industry plays an active part in the development of the national economy.
- It stimulates the rural economy, promotes the overall development of agriculture, forestry, animal husbandry, sideline occupations and fisheries; it boosts the development of local light industry and helps to expand trade.
World raw silk production in 2010 & 2018 (without wild silk)

Sources: International Silk Association - 2010, 2018
Sericulture Changes in China

• Sericulture in China from 1949 to 1992
  • Recovering (1949-1954)
  • Developing (1955-1958)
  • Adjustment (1959-1964)
  • Developing (1965-1983)
  • Improving and developing (1984-1995)
  • Adjustment (1996-2002)
  • Adjust to Stable development (2003-now)

• Sericulture in China in recent years
Fig. 2005-2010 silk goods export status

Sources: “The Research Report on China Cocoon Silk Industry Development China Silk Association”, Qian Youqing, General Secretary of China Silk Association, and Vice General
Cocoon and raw silk prices increased dramatically……

Spot transaction price of dried cocoon in China

✓ dried cocoon CNY 70-92 /kg in 12 Feb. 2006
✓ Dried cocoon CNY 43 /kg, raw silk~ CNY 155/kg, 17 Dec. 2008;
✓ Dried cocoon CNY 78-80 /kg; raw silk~ CNY 302-312/kg 19, Sept 2011
✓ Fresh Cocoon CNY 40/kg, Rawsilk CNY 340~370/kg April 01, 2019,
2 The development of Guangdong sericulture in 2010

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Egg production</td>
<td>1,600,000 sheets</td>
</tr>
<tr>
<td>Cocoon output</td>
<td>50,000 tons</td>
</tr>
<tr>
<td>Raw silk output</td>
<td>3,500 – 4000 tons (4A)</td>
</tr>
<tr>
<td>Pure silk fabrics</td>
<td>50,000,000 m</td>
</tr>
<tr>
<td>Value of cocoon</td>
<td>CNY 1,000,000,000</td>
</tr>
<tr>
<td>Income from Industrial selling</td>
<td>CNY 12,000,000,000</td>
</tr>
<tr>
<td>Export earning</td>
<td>USD 2,000,000,000</td>
</tr>
<tr>
<td>Total profit</td>
<td>CNY 1,000,000,000</td>
</tr>
</tbody>
</table>
Congratulations, China
(So, no need for any more aid, then?)
Advanced Mulberry Garden

Automatic sprinkler

Xinda Cocoon and Silk Ltd. Company
Mulberry garden in Karst/rock hills
So, no need you any more aid?

Chinese village in the mountain region, South/West China

horse transportation
Process of management and rearing the young silkworm

1. Rearing Preparation
2. Incubation
3. Brushing
4. The 1st instar rearing
5. The 1st molting treatment
6. The 2nd instar rearing
7. The 2nd molting treatment
8. The 3rd instar rearing
9. Silkworm distribution
Scale young silkworm collaboration-rearing base

Guangxi Yongfu

Xinda Cocoon and Silk Ltd. Company
Distribution silkworm eggs

collaboration of young larvae
Plastic-tent rearing
Silkworms distribution to farmers

• The silkworm should be distributed in the morning or evening.
distribution the big larvae
3rd instar

Rearing the big larvae on the ground
Rearing the big larvae on the ground

Saving labor

<table>
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<tr>
<th>Year</th>
<th>Labor Productivity</th>
</tr>
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<tbody>
<tr>
<td>2007</td>
<td>6hrs labor /kilo cocoon</td>
</tr>
<tr>
<td>2013</td>
<td>4hrs labor /kilo cocoon</td>
</tr>
</tbody>
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From: 鲁成等, 2018
planting the mulberry in the karst land region

Purchase the fresh cocoon from Farmer
3 Experience of Guangdong sericulture development

① Age-old tradition
② Mulberry breeding and cultivation techniques
③ Rearing bivoltine – white- cocoon silkworm for the whole year
④ The labour saving rearing techniques
⑤ Control the silkworm/mulberry diseases
⑥ Comprehensive/Diverse Utilization of Sericulture Resources
⑦ Model of “Company + Farmers”: The Sericulture Group provides mulberry saplings, silkworm eggs and technical services to the farmers, and collecting cocoons from the farmers.
4. Perpects of sericulture development in Guangdong

• Stable and high cocoon production
• Better quality and low consumption
• and for energy saving
• and high economic value
• ➔ are our pursuits.
Intelligent automatic young silkworm rearing machine.
Schematic diagram of a single laboratory application.
Artificial feeds for young silkworm
IOT practising

Real-time monitoring and management system of the incubation Room

Intelligent monitoring system for silkworm egg incubation environment
Innovation technology and products in my Lab

Enterobacter cloacae mori LAMP visualization rapid detection kit (Patent application number 201810326627.4)

Mulberry vein banding virus LAMP visualization rapid detection kit (one tube type)

Mulberry vein banding virus LAMP visualization rapid detection kit (Patent application number 201810552526.9)

Multifunctional digital liquid crystal microscope (ZL201320133424.6)

Multifunctional digital fluorescence microscope (ZL201420271367.2)

Gas concentration detection system in culture environment (ZL201620327334.4)

Yellow LED Light sericulture (CN201610048817.5)

Special Solar Insecticidal Lamps for Mulberry Field (201710318869.4)

Mulberry leaf pesticide detection ca...

PebrinePCR detection kit (ZL200610011374.9)

Bombyx mori typical microsporidium LAMP detection kit (ZL201110141178.4)

Bombyx mori densonucleosis LAMP detection kit (CN201310026869.9)

BmCPV LAMP detection kit (ZL201310215962.4)

Pebrine disease drug “CH QING” (ZL201410...
The application of mobile phone Internet in the sericultural production.

- The protection of the real-time monitoring of silkworm eggs.
- Rearing temperature and humidity monitoring.
- Monitoring of air quality in rearing environment.
- The real-time monitoring of water and fertilizer of mulberry.
- Mulberry pest monitoring.
- Real time monitoring the growth and development of silkworm and mulberry.
Supported by China Agriculture Research System CARS-18-ZJ0304

China's 'One Belt, One Road' connects the world

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Thanks!
Taking home information

one belt one road  funding from Guangdong Province to support a 7days' training seminar in Regional Sericulture Training Centre for Asia-Pacific, Guangzhou, China between July 7th to 13th, 2019

participant benefits: Free Academic fees, free local accommodation, and free local transportation, and face to face to share the experience from Chinese sericulture businessmen and Scientists, and technicians, and so on. the details pls

Contact: Prof. Jiping Liu
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Cooperation between RSTC and Institutes in Asia-Pacific

1. Jointly implement the sericulture project in your country under the international funds
2. Feasibility report and agreement on cooperation
3. Training for trainers and training for farmers
4. Demonstration farm
5. Supply of silkworm eggs and Mulberry seeds/seedlings to the farmers
6. Technical extension
7. Cocoon and silk processing