



浙江大学
Zhejiang University

Honeybee multiple queen colonies in China

Authors: **Huo-Qing ZHENG^a** Shui-Hua JIN^b Christian W. W. PIRK^c
Vincent DIETEMANN ^{c,d} Robin CREWE^c Fu-Liang HU^{a*}

^a **College of Animal Sciences, Zhejiang University, China**

^b Pinghu Breeding Apiary, Zhejiang, China

^c Social Insect Research Group, Department of Zoology & Entomology, University of Pretoria, South Africa

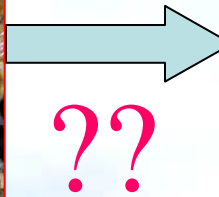
^d Swiss Bee Research Centre, Agroscope Liebefeld-Posieux Research Station ALP, CH-3003 Bern, Switzerland

Background (1)

Biology of honeybees



浙江大学
Zhejiang University



Fighting between queens



Aggressive behavior from workers

Background (2)

Previous attempts



浙江大学
ZheJiang University

- Physical separated
- Free-running
 - Kovtun, 1949, 1950
 - Melnik, 1951
 - Spoja, 1953
 - Lensky and Darchen, 1963
 - etc.*

Results were unsatisfying





浙江大学
Zhejiang University

Content

- Creation of multiple-queen colonies
- Management
- Application in China



1. Creation of polygyny (1)

Method in general



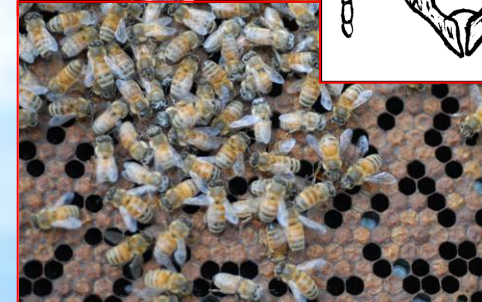
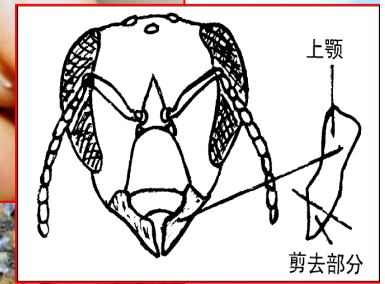
浙江大学
Zhejiang University

Key factors:

- Use queens older than 6 months and cut part of their mandibles to decrease fighting ability of queens.
- Use young workers to avoid aggressive behavior of workers toward queens.

Assistant factors:

- A strong pollen and/or nectar flow



1. Creation of polygyny (2)

Steps in practice



浙江大学
Zhejiang University

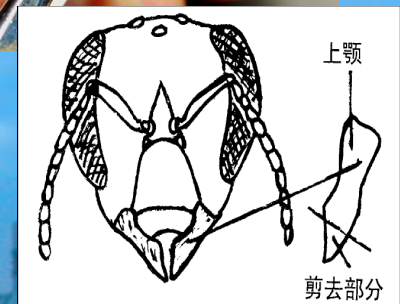
Host colonies

- Combs of emerging brood were selected and shaken
- ↓
- Placed in the hive box with the young bees
- ↓
- The host hives were placed at a distance from their original location to ensure foragers not reenter them.
- ↓
- Additional combs of honey and pollen are added to the sides of the brood combs

1-2 days' time gap

Queens

- Older than 6 months, egg-laying
- ↓
- Cut part of mandibles (Dietemann et al. 2009)
- ↓
- Introduce into receiving colonies directly or with some honey water



1. Creation of polygyny (3) Results



浙江大学
Zhejiang University



Table I. Creation and Sustainability of multiple queen colonies

Years	Number of colonies	Results	Number of colonies (%)	Kept without queen loss in two months	Kept without queen loss in six months
2005 — 2008	122	All queens accepted	97 (79.5)	114	95
		1-2 queens eliminated	22 (18.0)		
		All but one eliminated	3 (2.5)		

Table II. Results of overwintering of multiple queen colonies.

Years	Number of colonies overwintered	Results	Number of colonies (%)
2005 — 2007	80	No queen loss	55 (68.8)
		1-2 queens eliminated	15 (18.8)
		3-4 queens eliminated	7 (8.8)
		All but one eliminated	3 (3.8)



2. Management

To achieve long term keeping



浙江大学
Zhejiang University

- sufficient food must be ensured especially at initial stages and in the places and times lacking nectar and pollen flow;
- robbing and drifting must be avoided;
- newly produced queen cells must be destroyed;
- queens should not be caged over the winter;
- foragers must be abandoned before migration and young workers must be supplied when necessary.

