Foundation for Sustainable Development to A Prosperous, Hormonius and Greener Asia

Genomics-based Comparative Analyses of Gene Expression of Wild Asian Honeybees for Improving Domestic Honeybees

Beekeeping (=Apiculture)

Honey Production:

Low cost/High yield industry

From small scale family based industry

to large scale enterprise

Pollination

ex. Estimated value:$15 billion/ year:in the case of USA)

Essential to Global Ecology

Beekeeping in Asian Countries

Plenty Bee Plant (nectar source)

A long history of honey-hunting and traditional beekeeping

Suitable area for development of beekeeping

but

Improvement of genetical traits are needed for accelerating beekeeping

Asian Honeybee

(*Apis cerana*)

European Honeybee

(*Apis mellifera*)

Which species is more suitable in Tropical Asia?

European Honey Bee vs. Asian Honey Bee

- high productivity
- gentle
- susceptible to infectious disease
- susceptible to parasitic mites
- no escaping

- low productivity
- **very gentle**
- **tolerant to infectious disease**
- **resistance to parasitic mites**
- often escaping

Exhaustive Gene Expression Analyses of Honey Bee genes

- Using sequence information of European Honey bees, picking genes up from Asian Honey Bees.
- Expression analyses of each gene
- Compare the gene expression in European and Asian Honey bees
- Favorable traits will be improved by genetic transformation or other systems

Target traits to improve

- Resistance to pathogens
- Gentleness
- Behavior
- Honey Production

And more

Workshop Program

1. Introduction

Toward understanding Honeybees in Asia — Kiyoshi Kimura

2. Asian Honeybee

Rural Beekeeper: a conservator of honeybees and their diversity

RWK Punchihewa

3. Honeybee diseases

Honey Bee Viruses and Viral Diseases in Honey Bees, *Apis mellifera*

Yanping Chen

4. Defense mechanism

Innate immune system in the honey bee

MikioYoshiyama

5. Differences between Asian and European honeybees

1) Queen signal bias in ovarian activation in mixed-species colonies of honeybees

2) Predator-prey coevolution: differential behavioural reactions of *Apis cerana* and *A. mellifera* to a predatory wasp, *Vespa velutina*

Ken Tan

6. Honey

Antibiotic and Organoleptic Properties of Honey from *Apis dorsata* (Giant Honeybee) and *Trigona laeviceps* (Stingless Bee)

Chenpen Chanchao