Let me tell you 'bout the Bees!

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POLLINATOR CONSERVATION IN AN AGRICULTURAL LANDSCAPE


Key Inputs
NABARD
Farm Inputs
Agricultural (Input & Output) Marketing

http://google search

BOUNTIFUL HARVEST

Pollinators = Food

At least 1/3 of the world's agricultural crops depends **upon pollination provided by insects and other** animals

Values of Pollinators and Pollination

- regulates ecosystem services
- 87.5% (308,000 species) flowering wild plants depend on animal pollination
- 94% in the tropics; 78% in temperate
- ¾ of food crops benefit from animal pollination

POLLINATION

Not all plants benefit from insect/bee pollination

self pollination

cross pollination

SOLITARY BEES

SOCIAL BEES

Threats to beekeeping

- Loss of bee pasture
- Pest and diseases
- Pesticide poisoning
- Changes in weather patterns

Stingless bees used in large scale mango plantation

Co-exists with *A.cerana*

***T.* colonies with *A. cerana* in a local apiary**

METHODOLOGY

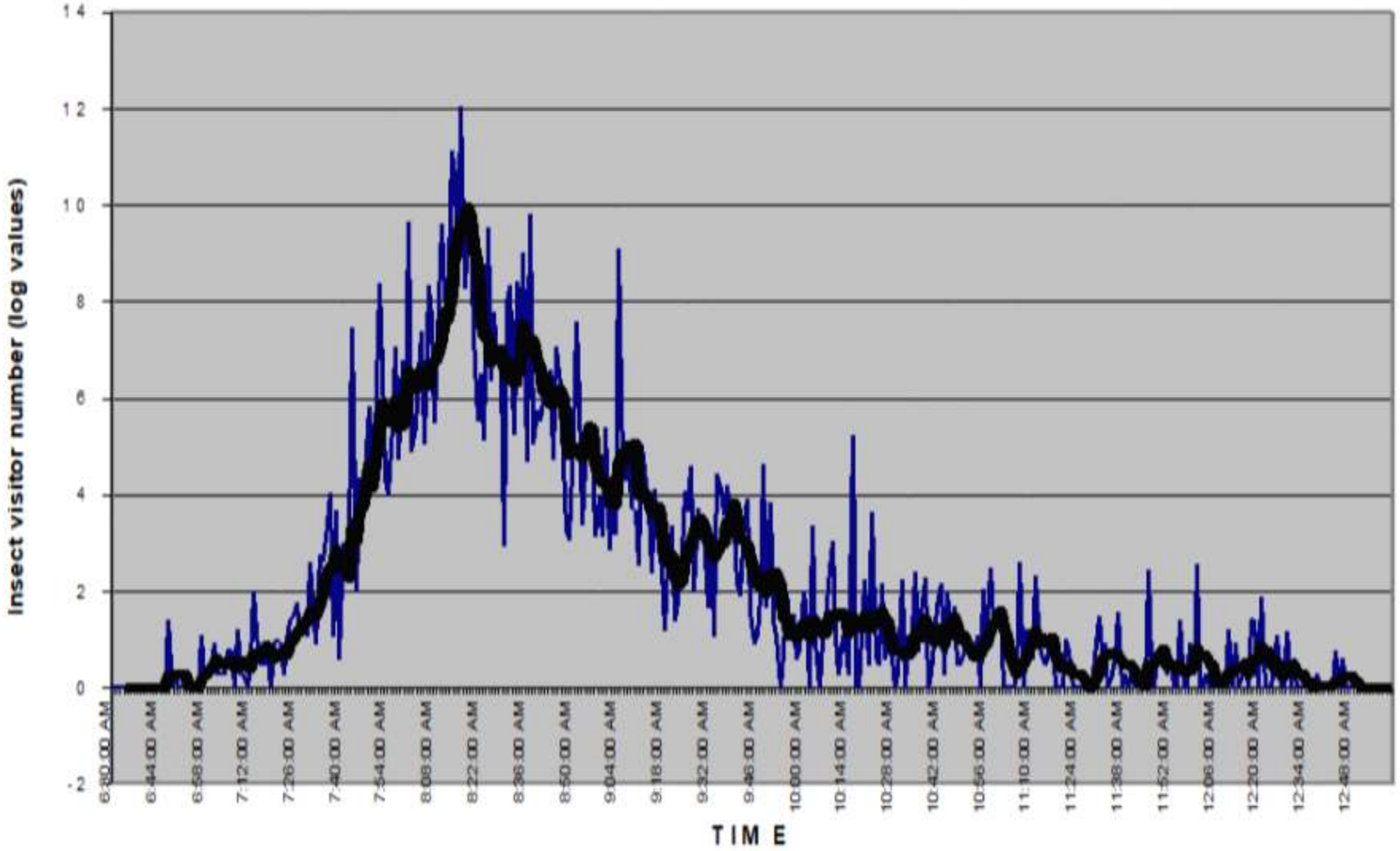
- Floral biology
  - Anthesis/ longevity
- Foraging rates
- Effects of pollinators on fruit set

Results of Mango Trials

- Natural pollinators are scarce in large plantations
- *T. biroi* is the primary pollinator of mango
- *Chrysomya* and E*ristalis* are secondary
- Introduction of managed pollinators significantly increased fruit set (42-98%)

RESULTS AND DISCUSSION

Peaks of insect activity during mango bloom



Considerations:

Spread the colonies; make sure that the inner portion of the field has colonies

Bees forage only on the periphery

Conservation

- Do not overhunt wild colonies
- Protect habitat
- Develop bee pasture

Conservation

- Use agricultural inputs wisely
- When necessary, do not spray at anthesis (morning hours) where pollinators are most abundant
- Do not overhunt wild colonies

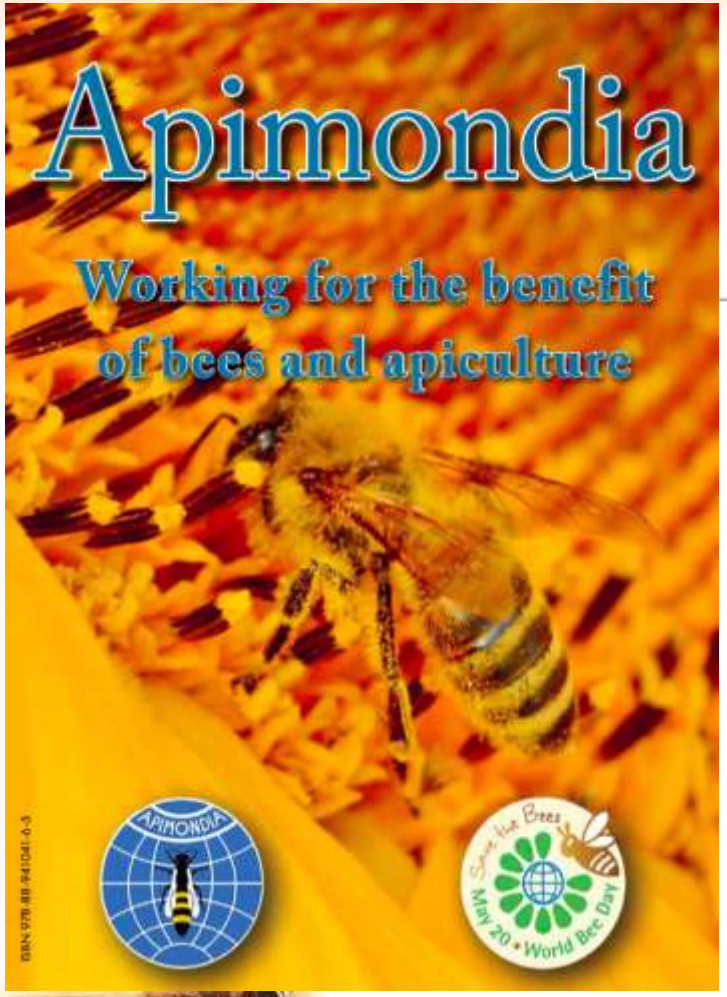
Conservation

Responsible grower/farmer

No calendar method of pesticide application.

Better still: Practice IPM

ASIAN POLLINATION MODEL (APM) FOR SUSTAINABLE FOOD SECURITY AND BIODIVERSITY MAINTENANCE



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ASIA IS A HAVEN FOR BEES

Cleofas R. Cervancia

> The Asian region, being in the tropics is high in pollinator diversity. Its rich vegetation and mild climate supports the population of pollinators. Solitary and social bees are among the important pollinator species

The Asian region, being in the tropics is high in pollinator diversity. Its rich vegetation and mild climate supports the population of pollinators. Solitary and social bees are among the important pollinator species. Other insect pollinators are butterfly, moth, beetle and fly. Birds and mammals pollinate bigger flowers. However, honey bees are the most widely studied species of pollinators. Of the 12 species of honeybee, 11 are native to Asia, namely: dwarf honey bees (*Apis andreniformis* and *Apis florea*), giant honey bees (*Apis dorsata, Apis laboriosa, Apis dorsata binghami* and *Apis breviligula*) and cave nesting honey bees (*Apis hoeckemboei, Apis cerana, Apis nigrocincta, Apis nuluensis* and *Apis indica*). The European honey bee *Apis mellifera* is not native to Asia. Most pollination studies were focused on high value agricultural and plantation crops.

The giant bees, *Apis dorsata, A. breviligula, A. dorsata binghami* and *A. laboriosa* are providing pollinator services in forest ecosystems and are sources of livelihood opportunities derived from honey and beeswax. *Apis laboriosa*, the Himalayan giant bee is the largest bee species.

Koeniger et al. (2010) described the bees of Borneo and advocated for sustainable beekeeping with indigenous bees. The cavity-nesting honeybee *Apis nuluensis* inhabits only the highlands of Mount Kinabalu of Sabah, Borneo Island.

A promising species for crop pollination and production of valuable products such as honey, pollen and propolis is represented by the stingless bees. In the Philippines, Malaysia and Thailand stingless bees are being used for large scale orchard pollination especially mango, rambutan and lanzones. The following technologies have been developed and adopted (www.teca.fao.org): propagation of stingless bees using coconut shells, harvesting of honey, pollen and propolis from stingless bees and utilization of stingless bees for pollination. Based on pollen analysis, stingless bees visit more wild and economic plants than honey bees, *Apis cerana* and *Apis mellifera*. This shows that they are truly polylectic with 69 families and 179 genera of plants recorded as hosts in the Indo-Malayan/Australasian region *(Rasmussen, 2008)*. Further, stingless bees are more diverse than honey bees, consisting of 50 genera and around 600 species, with about 80 species in Southeast Asia and 11 in Australia *(Heard, 2016)*.

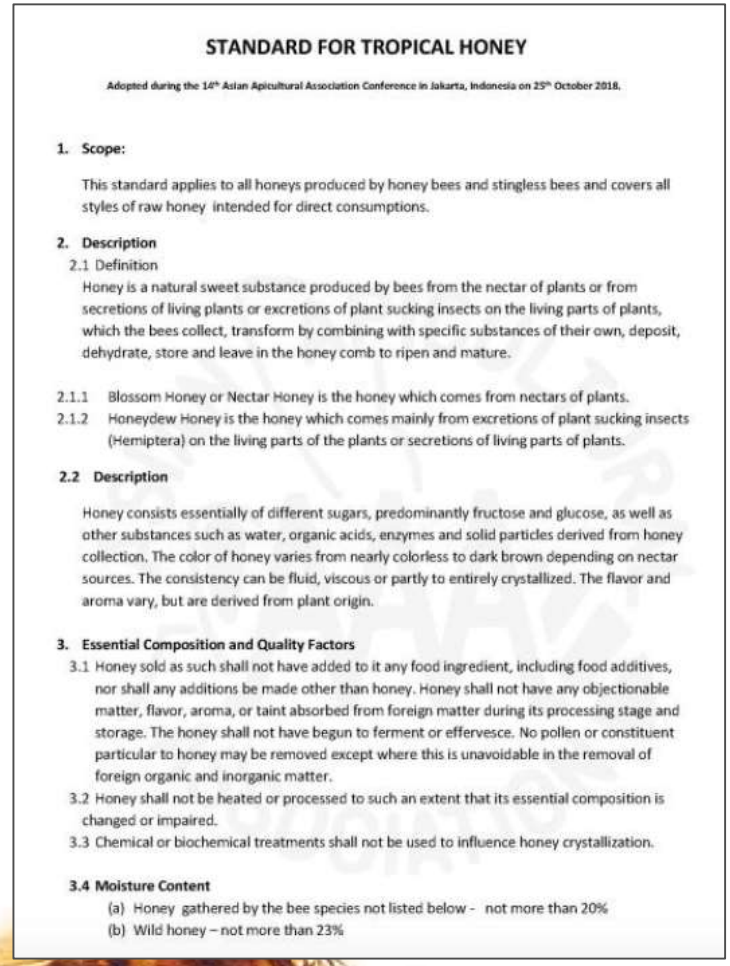
In Asia, the most significant threats to local honey bee populations are deforestation, excessive hunting pressure, loss of nest sites, parasites and pathogens, climate change, forest fire, pesticides, street lighting, anthropogenic evanescence, tourism and competition with introduced *Apis mellifera (Oldroyd and Nanork, 2009)*. The introduction of *A. mellifera* negatively impacted the population of local bees *(He and Liu, 2012)*.

Yong (2005) reported a reduction of the population of *A. cerana* by more than 75%. While pollinator diversity is still high in China, *Teichmann et al. (2016)* identified

Stingless bee beekeeper.

Giant bee, *Apis breviligula*, foraging on Mimosa pudica.

Contribution to the Bee World



STANDARD FOR TROPICAL HONEY

Adopted during the 14th Asian Apicultural Association Conference in Jakarta, Indonesia on 25th October 2018.

1. **Scope:**

This standard applies to all honeys produced by honey bees and stingless bees and covers all styles of raw honey intended for direct consumptions.

2. **Description**

2.1 Definition

Honey is a natural sweet substance produced by bees from the nectar of plants or from secretions of living plants or excretions of plant sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in the honey comb to ripen and mature.

2.1.1 Blossom Honey or Nectar Honey is the honey which comes from nectars of plants.

2.1.2 Honeydew Honey is the honey which comes mainly from excretions of plant sucking insects (Hemiptera) on the living parts of the plants or secretions of living parts of plants.

2.2 Description

Honey consists essentially of different sugars, predominantly fructose and glucose, as well as other substances such as water, organic acids, enzymes and solid particles derived from honey collection. The color of honey varies from nearly colorless to dark brown depending on nectar sources. The consistency can be fluid, viscous or partly to entirely crystallized. The flavor and aroma vary, but are derived from plant origin.

3. **Essential Composition and Quality Factors**

3.1 Honey sold as such shall not have added to it any food ingredient, including food additives, nor shall any additions be made other than honey. Honey shall not have any objectionable matter, flavor, aroma, or taint absorbed from foreign matter during its processing stage and storage. The honey shall not have begun to ferment or effervesce. No pollen or constituent particular to honey may be removed except where this is unavoidable in the removal of foreign organic and inorganic matter.

3.2 Honey shall not be heated or processed to such an extent that its essential composition is changed or impaired.

3.3 Chemical or biochemical treatments shall not be used to influence honey crystallization.

3.4 Moisture Content

(a) Honey gathered by the bee species not listed below - not more than 20%

(b) Wild honey – not more than 23%

Afraid of stings ? Then go for stingless bees ! Learn how to ... - TECA

teca.fao.org › Exchange groups › Beekeeping Exchange Group › Discussions

Sep 6, 2014 - Learn how to keep **stingless bees** for pollination **and** production of ..... **Go** to the top of the top of the page of 2014 Black Jar Honey Contest **and** ...

You visited this page on 5/14/19.

Let's give a toast for tropical honey - TECA - FAO

teca.fao.org/pt-br/comment/2716

Sep 28, 2016 - **Let's give a toast** for **tropical honey** ... Our aim is to establish **honey standard** including for wild **honey** from giant bees and stingless bees. ... and Nepal have **developed** quality assurance systems for **honey**. ... I had the privilege to be a part of the Intensive Beekeeping Program **lead** by Dr. Cleo Cervancia.

Developed Technologies

TECA
Published on *TECA* (http://teca.fao.org)

Use of Stingless Bees for Pollination

SUMMARY:
While the coconut shell technology is the easiest and cheapest way to propagate stingless bees, it may not be practical for inter-island transport for pollination of large plantation crops like mango. Thus, a suitable wooden hive was designed for this purpose. This technology explains how to build the wooden hive as well as the requirements for utilizing stingless bees for pollination.

KEYWORDS:
Hives [1]
Beehives [2]
Pollination [3]
Melipona [4]
Bees [5]

TECA
Published on *TECA* (http://teca.fao.org)

How to Harvest Honey, Pollen and Propolis from Stingless Bees

SUMMARY:
On top of the role of stingless bees in crop pollination, additional income could be derived from the valuable hive products they produce: honey, pollen and propolis. This technology discusses the simple procedure for gathering honey, pollen and propolis from stingless bees in coconut shells hives and wooden boxes.

KEYWORDS:
bee keeping [1]
bee culture [2]
Honey production [3]

CATEGORY:
Livestock production [4]

TECA
Published on *TECA* (http://teca.fao.org)

Harvesting honey from giant honey bees in the Philippines

SUMMARY:
Harvesting honey from colonies of giant honey bees, Apis breviligula and Apis dorsata can be a profitable village enterprise. Smoke is used to drive away the bees from their nest. The honey comb is cut and separated from the pollen and brood. The comb is processed in a honey house to limit contamination. Dehumidification is done when necessary to lower the moisture content to at least 23%. Extracted and dehumidified honey is bottled in glass jars.

KEYWORDS:
Honey collection [1]
Honey production [2]
honey bees [3]

CATEGORY:
Livestock production [4]

TECA
Published on *TECA* (http://teca.fao.org)

Propagation of Stingless Bees Using Coconut Shells

SUMMARY:
Coconut shells are used to make honey harvesting easy and to decrease mortality of young bees or brood. The usual way of harvesting honey from wild colonies destroys a large portion of the nest. The bees spend long time to mend the damaged nest. This problem is minimized by the method described here, where the coconut shell serves as the ?honey chamber? equivalent to the honey super in modern bee hives. A major advantage of this method is that there is no need to relocate the nests, thus wild populations of bees are conserved. A coconut shell is simply added to an already established colony. This technology is adapted from Bees for Development 2003, volume 67.

KEYWORDS:
propagation [1]
wooden [2]
boxwood [3]
Coconuts [4]
Shell [5]
Hives [6]
Beehives [7]

CATEGORY:
Capacity development [8]
Natural Resources Management [9]

Philipp. Ent. 2018.

A REVIEW OF POLLINATION BIOLOGY RESEARCH IN SELECTED ASIAN COUNTRIES.

Cleofas R. Cervancia

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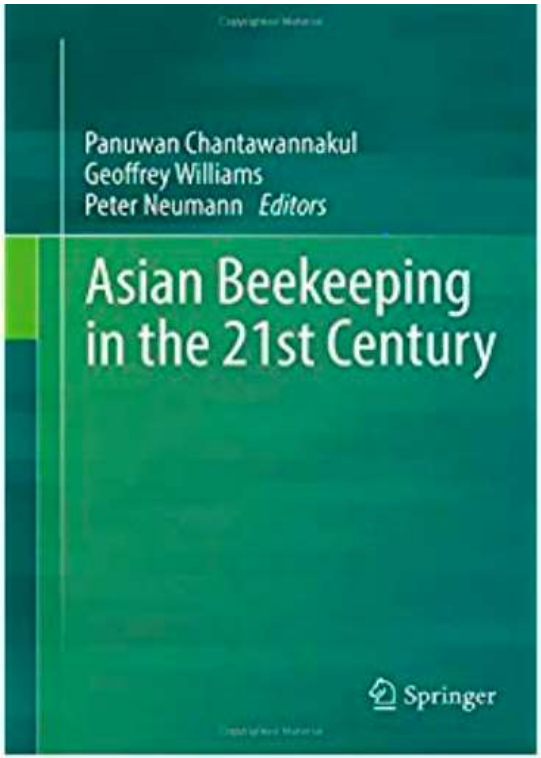



Chapter 14

APPLIED STINGLESS BEEKEEPING

14.3 STINGLESS BEES AND CROP POLLINATION IN THE PHILIPPINES

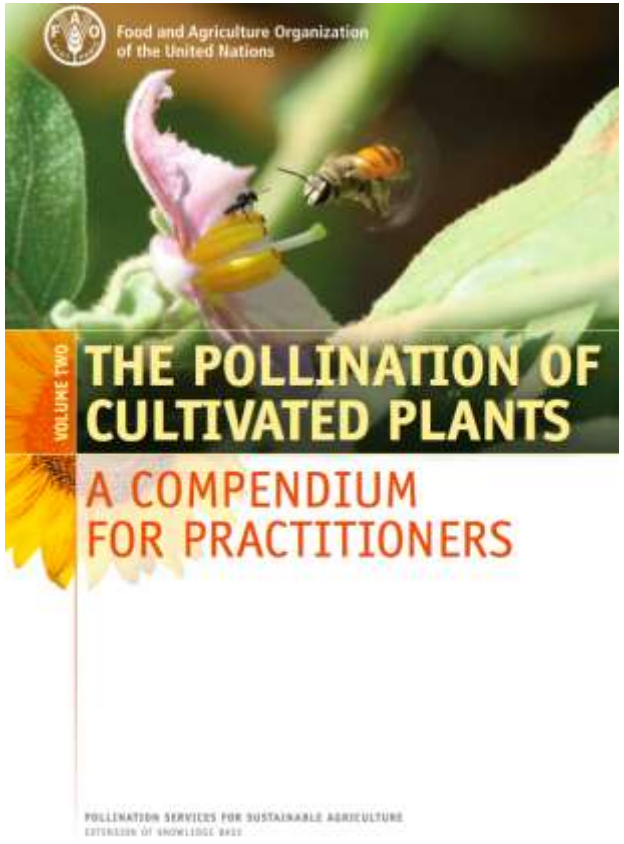
C.R. Cervancia and A.C. Fajardo, Jr.

14.3.1 Pollination potential

In the Philippines, stingless bees are successfully mass-produced in coconut shells [1] and wooden hives [2, 3]. They are used for large-scale mango pollination, and may be more effective pollinators than honey bees, syrphids or blowflies in mango orchards [3]. In mangrove ecosystems, honey bees and stingless bees co-exist, but the latter visit more plant species [3, 4]. As an alternative species for glasshouse pollination, stingless bees are effective pollinators of tomatoes [5, 6], sweet pepper [7] and eggplant [8], and also pollinate Macadamia flowers (see Chapter 16.2) [9]. One study undertaken in an open farm [10] presents a model using stingless bees to help beekeepers select the best hive location site. The model is based on the "fuzzy preference" of the beekeeper, potential numbers of available colonies, the carrying capacity of the plant assemblage and the spatial orientation of the meliponary. This section focuses on the conservation and utilization of stingless bees for pollination in the Philippines. About 42 meliponines occur in Asia and Indonesia west of the Wallace-Weber line, and 20 in Australia, New Guinea and the Solomon Islands [11, 12]. Eusocial bees in the Old World are generally less species-rich than in the New World Tropics. In the Philippines, most Meliponini belong to the taxonomically difficult genus Tetragonula [13]. A further Palawan stingless bee is Lepidotrigona palawanica [14].

14.3.2 Nesting behaviour

Stingless bees establish colonies in hollow tree trunks and branches, and among the roots or older leaves of the epiphytic fern Drynaria sp., attached to a host tree. Nests are also found in unoccupied termite chambers, in spaces within the walls of buildings, and in natural crevices in rocks and many suitable sized cavities (Figure 14.1) Several stingless bee colonies are also found sharing nesting chambers with active ant and termite colonies, separated only by the batumen lining or sheet [10].



Gaps

a. Inventory of wild pollinators (non-*Apis* species)
b. Use of harmonized method of pollinator sampling
c. Knowledge of crop biology, especially the anthesis (flower opening)
d. Vulnerable pollinator scenarios
e. IPM, Best Beekeeping Practices
f. Bee pasture development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