

BEEKEEPING BUSINESS OPPORTUNITY ON THE FOREST PLANTATION OF *Acacia mangium* WILLD IN INDONESIA

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ABSTRACTS

At the early of 1970's decade, beekeepers in the island of Java started to perform beekeeping with the European honey bee (*Apis mellifera*) instead of the local honey bee species (*Apis cerana*) with the kapok (*Ceiba petandra*) plantation as the main honey plant. This beekeeping is managed on the commercial basis result in the increasing number of beekeepers and their colonies. The fast growing number of honeybee colonies leads to competition among the beekeepers in finding the location due to limited number of kapok trees. On the one hand, the development of *Acacia mangium* forest plantation in Sumatera Island that has been carried out in the past decade provides a great potential of honey plants which has so far not been used for the mellifera's beekeeping.

This paper reports a preliminary study on the potential of *Acacia mangium* forest plantation for beekeeping with *Apis mellifera* conducted in 2001 – 2003 Sumatera Island where the beekeeping with local honeybee species (*Apis cerana*) and honey harvesting of the wild honeybee (*Apis dorsata*) have been practised for years by the local people there.

Introduction

The forestry development paradigm in Indonesia has changed recently, in the past decades forestry development was mainly directed to increase the timber production to maximize the state revenue. At present, the forestry development should always be managed on the principles of community based management on the overall forest resources covering various forestry commodities. Beekeeping is one of the non-wood forest product business which is known as an environmentally sound generating income activity of the people who live surrounding the forest. The benefit of beekeeping for human being has long been recognized by people in many countries.

In Indonesia, most people in the rural area of Java have been performing *Apis cerana* beekeeping since long time and certain communities who live at the forest periphery in the islands of Sumatera, Kalimantan, Sulawesi and Nusa Tenggara have long been undertaking the honey harvesting of the wild honeybee *Apis dorsata*.

At the beginning of 1970's, beekeepers in Java started to carry out beekeeping with the European honeybee *Apis mellifera*. They kept the bees in the kapok (*Ceiba petandra*) plantation as a commercial beekeeping. The beekeepers relied on the kapok trees as the main honey source. They understood that kapok flowers containing abundant pollen and nectar. This beekeeping activity grew in the past few years results in a great number of

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beekeepers and the number of honey bee colonies. In line with the rapid development of this beekeeping, a new problem arose, that was a competition among the beekeepers in finding the location for their apiaries since little hectareage of the kapok plantation imbalance with the number of beekeepers. This situation was exacerbated by the conversion of the kapok plantation. A great number of kapok trees were cut down by the owner of the trees mainly for logging purposes.

Within the framework of overcoming the problem, the government urges the beekeepers to find out other localities. In this instance, the Island of Sumatera and other islands offer a high potential of honey plants to meet the need of beekeeping sites. One of the alternative is the *Acacia mangium* forest plantation covering a total area of 1.2 million hectares. This forest plantation has not been utilized for the *mellifera*'s beekeeping. The existing beekeeping activities which have been undertaken by the local people are beekeeping with *Apis cerana* and honey harvesting of the wild honeybee *Apis dorsata*. The migration of *mellifera*'s beekeeping to the new area is expected to boost the development of beekeeping business there.

Role of *Acacia mangium* Willd in the beekeeping

One of the important factors determining the success of beekeeping business is the availability of honey plants. Honey plants should always be able to produce sufficient amount of nectar and pollen at the longer period to meet the requirement of honey bee colonies in maintaining their life cycle. Potential honey plants in certain area can be assessed by measuring the amount of nectar secretion and the pollen yield and nutrition value of nectar and pollen. The honey bee preference on the most honey plants which grow in the area also determines the success of beekeeping. Other crucial factors influencing the success of migration beekeeping are micro-climate condition, pests and diseases, predators, natural enemies, socio-culture behaviour of the local people.

Within the program of development beekeeping on the *Acacia mangium* forest plantation, the Ministry of Forestry of Indonesia in collaboration with the Bogor Agricultural University in the year 2001 – 2003 has conducted a preliminary research with the aim to acquire the potential of *A. mangium* forest plantation in Sumatera as foraging area of honeybees.

Results of the research study can briefly be described as follows :

1. Identification of the availability of nectar and pollen on *Acacia mangium*

- Nectar extra flora is secreted through the stomata of the buds of the plant in the above 6 months of age and available in the whole year with the maximum nectar secretion on June up to October of the year.
- *Acacia mangium* starts to bloom at 1.5 years of age to produce pollen, the peak pollen production occurs on July up to October

2. Alternative pollen producing plants in *Acacia mangium* forest plantation

The amount of pollen produced by *Acacia mangium* was not sufficient to support the life of honey bee colonies throughout the year. Observation in the field found that the two species of pollen producing plants, *Ageratum conyzoides* and *Mimosa pudica*. Pollen grains produced by these plants were effectively collected by the bees.

3. Species of insects collecting nectar extra flora

This was intended to understand the preference of honey bee in collecting nectar extra flora secreted by *A. mangium*. Insects visiting the *A. mangium* were 90% dominated by honey bees (*Apis spp*) and sting less bee (*Trigona spp*) and the red ants.

4. Nectar secretion

The measurement of nectar secretion was done in three times, morning at 6.30 up to 7.30 am, afternoons at 1.00 up to 2.00 pm, and at 5.00 up to 6.00 pm. Results of the measurements can be illustrated in the following table.

	<i>A. mangium</i> at 13 months of age	<i>A. mangium</i> at 22 months of age
Amount of nectar secretion per stomata per day (cc/day)	0.05	0.045
Amount of nectar secretion per tree per day (cc/tree/day)	50	67.5
Amount of nectar per hectare (cc/ha) **)	83,250	112,387,5
Sucrose content (%)	24.50	24.30

**) The number of *A. mangium* tree is 1,650 per hectares

5. Trial on *Apis cerana* beekeeping in Riau Province

9 colonies of *Apis cerana* were kept in *Acacia mangium* at 22 months of age. The following parameters were observed in this study : brood development, honey yield and water content in honey.

Results of the study :

- Average brood 35.16% per colony
- Average honey collected in the brood chamber 27.49 % of the total space
- Observation on honey yield of *A. cerana* in Suban Jeriji, South Sumatera : average 2 – 5 kg per hive in each harvesting period.

6. Trial on *Apis mellifera* beekeeping in Suban Jeriji, South Sumatera.

In October 5, 2003, 20 colonies of *A. mellifera* which were brought from Central Java were kept in *A. mangium* at 6 years of age. The bees actively foraged on the plants to collect nectar. However, only little amount of pollen grain was obtained,

This was due to the competition with *Apis dorsata* foraging on the *Mimosa pudica*. The wild honey bee *Apis dorsata* very often entered the hive of *mellifera* colony to rob honey.

On January 28, 2004 number of colony decreased sharply, only 5 colonies were able to survive with low population of worker bees. Colonies were attacked by wasps of the family *Vespidae*. There were two species of *Vespidae*, commonly found in the location, *Philantus ventilabris* and *Vespa sumatranensis*. The wasps prey on the worker honey bees during the day, biting on the honey sac of forager honey bees and ultimately the honey bees could not survive.

7. Honey harvesting of the wild honey bee *Apis dorsata* in the *A. mangium* forest plantation of South Sumatera and Riau Province.

This activity plays an important role in beekeeping development in the country, most of the Indonesian honey production derived from this species of honey bee. In Riau Province 90% of the population of the *Apis dorsata* bees live in the *A. mangium* forest plantation. The main source of honey is secretion of nectar extra flora of *A. mangium*. Number of the *dorsata*'s colony has been calculated as many as 10,350 managed by 159 groups of honey hunter with the average honey production of 605.5 tonnes annually. In the past decades, when the natural forest had not been converted into the *A. mangium* forest plantation, the honey harvesting of *Apis dorsata* could only be performed as many as 2 – 3 times a year, the characteristic of honey produced at that time was typically light amber with the yellowish colour. After most of natural forest had been cleared and converted into the *A. mangium* forest plantation, the honey harvesting could be undertaken up to 5 times a year with the darkest colour of honey in contrast to the characteristic of honey produced in the natural forest area.

In the *A. mangium* forest plantation of South Sumatera Province, the number of *A. dorsata* colony is now increasing. A single bee tree can be occupied by at least 40 colonies of *dorsata* with the average honey yield ranging from 5 to 15 kg per colony per year. The main problem encountered by the honey hunters is the honey marketing system has not been developed yet. In the peak honey season, price of honey decreases sharply, so the honey hunters reluctant to harvest honey.

Conclusion

A. mangium forest plantation has a great amount of nectar secretion and pollen of other species of plants which appropriate for the foraging area of the indigenous honey bees *Apis cerana* and *Apis dorsata* as well as the exotic honey bee species *Apis mellifera*. Nevertheless, for migration of the latter species of honey bee to this area, special treatment need to be undertaken to overcome predators and other natural enemies problem.

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