

## **BIBLIOGRAPHY**

CALASIAO, TATCHIN B. APRIL 2009. Practicum on Beekeeping at Kibungan, Benguet. Benguet State University, La Trinidad, Benguet.

Adviser: Lita Molitas-Colting, PhD.

## **ABSTRACT**

The study was conducted at Poblacion Kibungan, Benguet from November 2008 to January 2009 to observe and document the beekeepers practices by working with the beekeepers.

The following activities were conducted with the beekeepers: food supporting, brood supporting, adding of frames, reducing of frames, splitting of colonies and harvesting honey. A total of nine sealed honey combs yielded ranging from 1.0 to 2.5 kg or an average of 1.75 kg per frame was harvested. One colony was splitted into two colonies and only three frames were added to each of the splitted colonies. The colonies were generally healthy.

Beekeeping requires hands-on training to learn the techniques of experienced beekeepers.

## TABLE OF CONTENTS

	Page
Bibliography.....	i
Abstract.....	i
Table of Contents.....	ii
INTRODUCTION.....	1
REVIEW OF LITERATURE	
Beekeeping.....	2
Bee Pollination.....	2
Beekeeping Management of Mother Colonies.....	2
Bee Pests and Diseases.....	3
Dividing Colonies.....	3
Checking Colonies.....	4
Equalizing Colony Strength.....	4
MATERIALS AND METHODS.....	5
RESULTS AND DISCUSSION	
Before the Start of the Study.....	7
Activities Before Honey Harvesting.....	7
Activities During Honey Harvesting.....	9
Activities After Honey Harvest.....	13
SUMMARY, CONCLUSION AND RECOMMENDATION.....	16
LITERATURE CITED.....	17
APPENDIX.....	18

## INTRODUCTION

Beekeeping is the ability to manage honeybee colonies in such a way to obtain large adult populations to coincide with the major nectar flow of a given area and utilize this population to the best advantage for collecting nectar and/or pollinating crops (Gruszka, 1998). In addition, honey bees are highly valued for their products and services they provide. Their products such as honey, is a good source of carbohydrates, minerals, protein, amino acids and vitamins. Other bee products are used as ingredients in food, drink, and cosmetics. Medicinal properties can be derived from bee venom to cure arthritis and honey with lemon to cure asthma and cough. The most important contribution of honey bees is the pollination of crops and maintenance of biodiversity.

Benguet is a suitable place for beekeeping favored by its climate and various vegetations. Along the road at Poblacion Kibungan, Benguet are mostly chayote plantations. Other areas are planted with coffee; near the houses are bananas, citrus, guavas, avocados and other fruit bearing trees. Most of its untilled lands are covered with perennial weeds and sunflowers making the area a good site for beekeeping.

Benguet beekeepers have different practices. Since the introduction of *Apis mellifera* Linn. at Poblacion Kibungan, Benguet, no study was made to document the practices of the beekeepers.

This study provides beekeepers, researchers and students additional information concerning beekeeping practices. The study was conducted to observe and document the beekeepers practices by working with the beekeepers.

The study was conducted at Hillside, Poblacion, Kibungan, Benguet from November 2008 to January 2009.



## **REVIEW OF LITERATURE**

### Beekeeping

Beekeeping is like farming or like any entrepreneurial activities. The prospective beekeeper must have the interest to raise honeybees and is not allergic to bee stings (Colting and Ligat, 2007). He should have some knowledge or idea of the life and habits of bees (Asuncion, 1977).

Finklestein (1999) as cited by Galasa (2007) states in his introductory page in the Apiculture internet page: “logically then there is no “proper” way to keep bees, no “right” way to manage for honey production, or to rear queens. The best we can do as good beekeepers and as good neighbors is to share our techniques, knowledge, and experience, basing them upon a rigorous foundation in insect biology.

### Bee Pollination

Wind pollinates most of the staple foods while vegetables and fruits are dependent or benefited by insect pollination. Among the insects, the honey bees are noted to be the most efficient pollinators. Unlike other insects, honeybees visit only one kind of flower per foraging trip and pollen grains get attached to and or dislodge from their fine hairy body as they transfer from one flower to another. Most of the honeybee species can be mass-reared in artificial diets so that the desired adult population can be attained in the time for flowering of the crop to be pollinated. They can be reared in movable wooden hives that allows the beekeeper to bring them to places where they are needed (Molitas-Colting, 2006).



### Beekeeping Management of Mother Colonies

According to EFRAT (N.D.) the main problem in selection and improving breeding stock is the difficulty in keeping a queen in a colony forever. When the queen becomes old, she reduces her egg laying and decreases the amount of pheromones. The bees want to supersede her by supersede queen cells and it can destroy efforts in many years. It was further recommended that the beekeeper must reduce the normal rate of egg laying to keep mother queens for a long period of time. This can be done by placing her in a small hive box or in a full brood chamber where the queen will lay only on 2-3 combs divided by two vertical queen excluders.

### Bee Pests and Diseases

Molitas-Colting (2002) reported that Filipino beekeepers are aware of the presence of parasites and predators and they adopted some management practices abroad, as well as management measures which are considered traditional. To earn maximum profit from beekeeping industry a strict follow up plan of recommended preventive measures and treatment procedures for the diseases and pests of honeybees should be done to minimize the losses (Karnatak and Rathour, 2004).

### Dividing Colonies

Morse (1985) as cited by Kitongan (2006) suggested that when making a simple colony division, it is necessary that each unit has eggs or day old larvae from which they may raise a new queen. There should be sufficient bees to keep the brood in the hive warm. It is also advisable to give each colony sufficient food to sustain it while the new queen is raised.



### Checking Colonies

The beekeeper must assess each colony, determine its needs and apply the appropriate management. At the same time, note the general condition of the apiary including the duration of spring flow and likelihood of dearth periods. While checking the brood chambers, cull any broken or misshapen combs or combs with large areas of drone comb and replace with good quality worker combs. Culled combs containing developing brood may be marked and placed on the outside edges of the second brood chamber, or the third box, to allow the brood to hatch out. These frames can be removed when the honey is extracted and melted down or destroyed. Bottom boards, frames and hive covers should be repaired or replaced when broken or rotting (Gruszka, 1998).

### Equalizing Colony Strength

Gruszka (1998) added that to boost the strength of a weaker colony, one or two frames of capped brood are taken from a stronger colony. It is important to shake the bees off and check the frames for disease before they are installed. The transfer of open brood is not recommended, as it merely demands more work to the weaker colony. Close brood will cause colony to expand rapidly and offer more bees to help expand the brood nest. The frames can be moved with adhering bees if the recipient hive has too few bees to cover the brood adequately.



## **MATERIALS AND METHODS**

The materials that were used were honey bee colonies, smoker, hive tool, saw dust, match, two frame hand driven extractor, kitchen knife, pail, mesh cloth, basin, digital camera, ball pen and notebook.

### Apiary Site

ELAMFLA apiary is located at Hillside, Poblacion, Kibungan, Benguet. The four colonies in standard hive were used in the study. The observation was every Saturday starting from November 2008 to January 2009.

### Data Gathered

1. Before the start of the study
  - a. Condition of the colonies at the start of the study
  - b. Problems of the beekeepers
2. Activities before honey harvest
  - a. Food supporting
  - b. Adding frames
  - c. Splitting
3. Activities during honey harvest
  - a. Selecting frames to be harvested
  - b. Extraction
  - c. Number of harvested frames per colony
4. Activities after honey harvest
  - a. Number of frames added per colony



- b. Brood supporting
  - c. Reducing frames
  - c. Condition of colonies
5. Photo documents





## RESULTS AND DISCUSSION

### Before the Start of the Study

Condition of the colony at the start of the study. There were four colonies in standard hive. Colony 1 was twelve framers, colony 2 was nine framers, colony 3 was eight framers and colony 4 was seven framers. It was located the beekeepers backyard facing South- East. The colonies were going into honey flow as indicated by the light yellow extended combs along the top bars in most of the frames.

Problems of the beekeepers. The beekeepers claimed that there was incidence of decrease in the number of bees. The possible causes mentioned in the questioner were pests such as mites, bee louse, wax moth, ants, cockroach, and wasp; bee poisoning, negligence, inclement weather, failing or old queen, and swarming.

### Activities Before Honey Harvesting

Food supporting. Food frames were taken from strong and disease-free colony. The frames were shaken to dislodge adhering bees and placed in the recipient hives. This was done in the 2<sup>nd</sup> week of November to support colonies with inadequate food and avoid the use of sugar syrup to avoid adulteration of honey since feeding of sugar syrup should cease two weeks before the honey flow.

Adding frames. Frames with wax foundation were added (Figure 1) during honey flow to avoid honey or pollen bound especially if all frames are filled and bees are crowded.





Figure 1. The colony set up and the adding of frame

Splitting. A queenless colony was splitted into two colonies. A grafted queen cell was introduced in both colonies. All queen cells were removed to ensure that the emerging queen was the introduced grafted queen. After a day, the colonies were checked if the queen emerged. Splitting was done to expand the number of colonies (Figure 2).





Figure 2. Transferring the splitted colony in standard hive

### Activities During Honey Harvesting

Selecting frames to be harvested. Honey was harvested in January 10 (Figure 3). Sealed combs were shaken to dislodge the adhering bees and brought to the extracting area. Unsealed honey frames were left in the hive for further processing.





Figure 3. Selecting honey frames to be harvested

Extraction. Sealed combs were uncapped with the use of kitchen knife (Figure 4). The uncapped combs were placed inside a two-frame hand driven extractor. The honey was extracted from the comb by centrifugal force. A mesh cloth was used to strain the honey from foreign objects (Figure 5). Extracted frames were returned to the hive for the bees to clean and feed on the excess frames were returned to the hive for the bees to clean and feed on the excess honey.



Number of harvested frames per colony. The number of harvested frames per colony is shown in Table 1. The highest number of honey frames harvested was in colony 1 with three frames, followed by colony 2 and 4 with two frames, and colony 3 and 5 with only one frame. Number of harvested frames decreased due to cold temperature at about 14 °C and below in the moth of December until January.

Table 1. The number of harvested frames per colony

COLONY	NUMBER OF FRAMES
1	3
2	2
3	1
4	2
5	1
TOTAL	9





Figure 4. Uncapping the honey frames



Figure 5. Straining the extracted honey



### Activities After Honey Harvest

Brood supporting. Capped brood frames were taken from a strong colony and disease-free colony (Figure 6). The frames were shaken to dislodge adhering bees and placed in the recipient hives. Brood supporting was done to support weaker colonies.

Reducing frames. Honey frames that has less stored honey were uncapped and scrapped (Figure 7) with the use of hive tool. The frames were placed after the feeder box (Figure 8) in order that the house bees will transfer the honey to the inner frames. The purpose of reducing frames is to keep the hive warm due to low temperature at about 14 ° C and below.



Figure 6. Brood supporting activities for weaker colonies





Figure 7. Uncapped and scrapped honey frames that has less stored honey

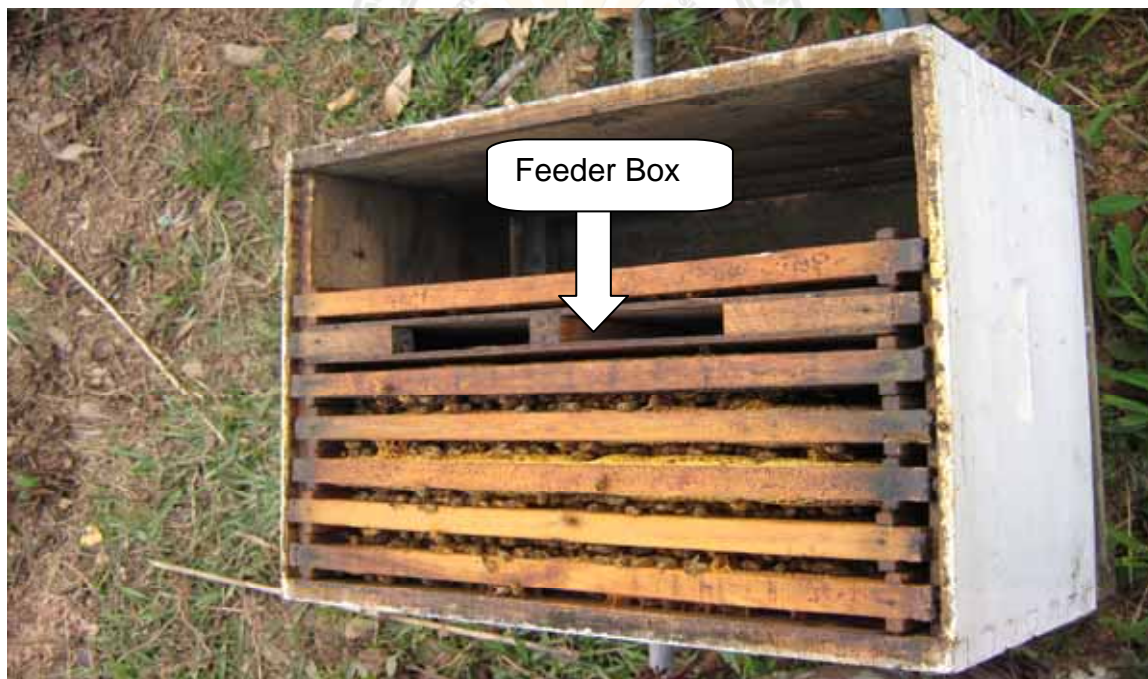


Figure 8. The uncapped and scrapped frames placed after the feeder box  
(Top view of a honeybee colony in standard hive)





Number of frames added per colony. The number of frames added per colony from spitting is shown in Table 2. Only one colony was spitted due to lack of queen. Three frames each were added to the splitted colonies which is colony 3 and 5. No frames were added to colony 1, 2 and 4.

Condition of colonies. All the colonies were healthy, free from disease, defenseless and has plenty of food stored. The colonies are queenright, three old queens and two new queens. The queens' rate of egg laying increased after the main honey flow and egg laying is normal. Different stages of brood are present. Colony 1 was ten framers; colony 2 and 3 was seven framers, colony 4 was eight framers and colony 5 was six framers.

Table 2. Number of frames added per colony

COLONY	NUMBER OF FRAMES
1	0
2	0
3	3
4	0
5	3



## **SUMMARY, CONCLUSION AND RECOMMENDATION**

### Summary

The study was conducted at Poblacion Kibungan, Benguet from November 2008 to January 2009 to observe and document the beekeepers practices by working with the beekeepers.

The following activities were conducted with the beekeepers: food supporting, brood supporting, adding of frames, reducing of frames, splitting of colonies and harvesting honey. A total of nine sealed honey combs yielded ranging from 1.0 to 2.5 kg or an average of 1.75 kg per frame was harvested. One colony was splitted into two colonies and only three frames were added to each of the splitted colonies. The colonies were generally healthy.

### Conclusion

Beekeeping requires hands-on training to learn the techniques of experienced beekeepers.

### Recommendation

Attending seminars and trainings in beekeeping is recommended to learn more techniques.



## LITERATURE CITED

- ASUNCION JR. R. G. 1977. How to Raise Honeybees and Produce Honey. 1308P. Guevara, Sta Cruz, Manila: Saint Mary's Publishing. P. 23.
- EFRAT, E. (N.D.). The Colony Life: Social Behavior in Honeybees. Ministry of Agriculture Extension Service, Foreign Training Department. State of Israel. P. 5.
- GALASA, E. O. 2007. Management of *Apis mellifera* Linn. as backyard enterprise in Tublay, Benguet. BS Thesis. BSU, La Trinidad, Benguet. P.4.
- GRUSZKA, J. (Ed). 1998. Beekeeping in Western Canada. Edmonton, Alberta: Alberta Agriculture, Food and Rural Development. Canada. Pp. 52,-53.
- KARNATAK, D. C. and S. RATHOUR. 2004. Bee pests and diseases – a major hindrance in apiculture. The 9<sup>th</sup> Asian Apicultural Association (AAA) Conference, November 1-4, 2008, Hangzhou, China. P. 87.
- KITONGAN, J. P. 2006. Suitability of improvised cell cups using local materials in queen rearing. MS Thesis. MPSPC, Bontoc, Mountain Province. P. 20.
- MOLITAS-COLTING, L. 2002. Abstract of studies on honeybees and related fields in the Philippines. Department of Entomology, Benguet State University. La Trinidad, Benguet. P.60.
- MOLITAS-COLTING, L. 2006. Bee Pollination in the Cordillera. PARRFI Professional Chair Papers (1992-2006). Philippine Agricultural and Resources Research Foundation, Inc. Los Baños, Laguna. P.173.
- MOLITAS-COLTING L. and B. S. LIGAT, 2007. Beekeeping for Beginners. Department of Entomology. BSU, La Trinidad, Benguet. P. 12. (leaflet).



APPINDEX A

Survey Questioner

Name \_\_\_\_\_

Address \_\_\_\_\_

Number of Colonies \_\_\_\_\_

What are the problems that you have encountered that caused decrease in the number of bees?

\_\_\_\_\_ 1. PESTS AND DISEASES

a. What are the pests that you have encountered?

\_\_\_\_\_ mites

\_\_\_\_\_ bee louse

\_\_\_\_\_ wax moth

\_\_\_\_\_ ants

\_\_\_\_\_ cockroach

\_\_\_\_\_ birds

\_\_\_\_\_ Others (specify) \_\_\_\_\_

b. What are the diseases that you have encountered?

\_\_\_\_\_ American Foulbrood

\_\_\_\_\_ European Foulbrood

\_\_\_\_\_ Sack Brood

\_\_\_\_\_ Chalk Brood

\_\_\_\_\_ Nosema Disease

\_\_\_\_\_ Others (specify) \_\_\_\_\_

\_\_\_\_\_ 2. BEE POISONING

\_\_\_\_\_ 3. NEGLIGENCE

\_\_\_\_\_ 4. INCLEMENT WEATHER

\_\_\_\_\_ 5. FAILING QUEEN OR OLD QUEEN

\_\_\_\_\_ 6. SWARMING

\_\_\_\_\_ 7. OTHERS (specify) \_\_\_\_\_

