

BIBLIOGRAPHY

CALASIAO, TAÑIEDA B. APRIL 2013. Collecting and Splitting wild nest, and Management of Stingless bees (*Trigona biroi* Friese) in Benguet. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study was conducted in Poblacion, Kibungan, Benguet from June 2012 to February 2013 to collect wild nests and domesticate them in artificial hives. The processes involved in sighting, collecting, splitting and transferring of the wild nests into hives and the practices involved in managing the hived bees until harvesting were documented.

Wild nests were found in the forest and in man-made structures. Wild nests can be collected, splitted and put in artificial hives such as plastic pails of any color or wooden hives provided that the arrangement of the brood combs in the original hive is followed in the new hive. Domesticated wild nests could stay in their new site for as long as 20 years provided these are put in protected and/or partially shaded areas. About ¼ kg of honey could be harvested in a colony.

Further study on the management of stingless bees may be conducted. In addition, a study on the abundance and distribution of stingless bees in Cordillera is worth considering.



RESULTS AND DISCUSSION

Locating Wild Nest Sites of Stingless Bees

Procedure. Nests of stingless bees in the wild can be located by asking wild honey hunters in the locality. They are more knowledgeable as the procedure in sighting the nest sites of wild honeybees that produce more honey than stingless bees such as *Apis cerana* and *Apis dorsata*, is more or less the same. Another method is to ask those who sell wild honey in the locality as they are familiar of wild honey hunters who bring to them honey products to sell.

In sighting the nests of stingless bees, one has to view the horizon against the sun early in the morning when the sun is rising. At this time, the bees start to forage and they can be seen against the backdrop during sunny days. Sighting is never done during cloudy days or when it is raining.

It is difficult to site the wild nest of stingless bees because they are small unlike the other wild honeybees, and they also seem to fly faster than the later.

The nest sites. There were two nests that were collected, both were located far from houses. One nest was located inside a dried and hollow fallen trunk (horizontal) of a giant fern on a branch of a citrus tree. The fern trunk has a diameter of 6 to 7 inches and a length of 1.5-2.0 feet. It is about 4 to 5 feet above the ground. The fern trunk is rough. It is partially shaded. It is situated at Luta-an, Poblacion, Kibungan, Benguet.

The other nest was established on the bark of a trunk called “tikem” tree that is about 5 m high above the ground and partially shaded. The trunk is rough just like the fern trunk. The distance of this nest site to the one above is about 1 km and is situated at Buwalan, Poblacion, Benguet.



The result implies that stingless bees build their nests in rough surface materials and in partially shaded areas. It also indicates that one nest is established in only one tree as there was no more than one nest on the trees that were surveyed. Moreover, it seems that stingless bees in Kibungan are few or less abundant compared to other places such as Atok where wild honey harvesters claim to find nests of stingless bees closer to each other.

The nests. The nest is located inside the hollow trunk of a fallen giant fern trunk. The entrance hole was located on the side facing the west. When the trunk was opened the nest measures about 5 inches, a little bit smaller than the diameter of the fern trunk. The nest has 14 layers of brood combs. The general color is yellowish. It is estimated to be one year old by one of the wild honey harvesters.

The nest on the “tikem” tree is hanging outside the tree trunk. The entrance hole is facing east. The nest is about 12 inches in diameter which is more or less twice bigger than the one on the fern trunk. It has 16 layers of brood combs which is also bigger than the above. With this size, the nest could have been established on the said tree for more than one year or possibly more. The general color is also yellowish possibly indicating that they foraged on more or less the same plants.

Collecting Wild Nests of Stingless Bees

Bee Attire. The collector of the wild nests of stingless bees used white bee veil. There was however a difficulty in sighting the bees at the color “blurs” the eyesight. A black bee veil similar to what is used by *A. mellifera* beekeepers but white was the only available mesh cloth during the study in the locality. The bee veil had with small holes (less than 1 mm) to prevent the bees to pass through and “attack” the hairs, ears, nose, and



mouth of the collector. The body of the adult stingless bee measures 2mm in diameter and 4.5mm long.

The collector also used a green shirt with long sleeve. The advantage of wearing long sleeve shirt is to minimize the irritating swarm of bees when they are disturbed. As to the color, white must have been better as practiced by *Apis mellifera* beekeepers. Nevertheless, the collector was able to collect the wild nest without difficulty in dealing with the swarm of bees indicating that the color of the attire is appropriate.

The collector also used short pant and the lower limbs were not “attacked” by the bees, indicating that such kind of attire can be used when collecting wild nests of stingless bees.

Reaction of bees on disturbed nest. The adults of the stingless bees are readily attracted to the black hair once a part of their nest is disturbed or an intruder gets very near the nest. Although they do not sting, they get in between the hair and start to “bite” and “pull” the hair that cause irritation. The bees likewise like to enter into the eyes, nose and ears and cause irritation. The disturbed bees continue to increase in number as time goes on and the swarm thickly in the head region of the collector. The bees seem to “tell” or recruit the other members of the nest that there is “danger” by making faint and unique sound that can still be overheard by the human ear.

Procedure. In collecting the nest on the fallen fern trunk, the collector pulled the fern trunk and put the whole of it inside a sack (rice sack, 52cm x 95cm). This was done six to seven o’clock in the morning with the belief that not all of the foraging bees have left the nest. The photographs are shown in Figures 1 to 3.



For the other nest high above the ground, the collector climbed up the tree with bolo and sack. The bolo was used to detach and scrape the nest (Figure 4). The nest was collected seven to eight o'clock in the morning during a sunny day. It was observed that despite this early, many of the adults that possibly left earlier to forage were left. They swarmed over the original nest. Some might have died as a result of the removal of the nest but probably they rebuilt their nest which was not followed through. According to wild honey hunters who collected some wild nests of stingless bees, those left reestablished their nest.

Sacks were used to transport the bees to prevent the adult bees from skipping and getting lost while in transit as well as to secure the brood combs. Other wild honey hunters use polyethylene bags as it is easier also to handle or carry especially when the nests are collected in a forested area and the terrain is difficult to pass through such as in precipice.

Transferring Nests of Stingless Bees in artificial hives

The Artificial hives. A wooden beehive was made by the researcher following the design and measurement of the UPLB Standard Beehive for Stingless Bees, however, the Nara and pine tree wood used was thicker by ½ inch to fit with the climatic condition which is cooler than in the lowlands. The finished box and carpentry materials that were used are shown in Figures 5 and 6.





Figure 1. Collecting a nest of wild stingless bee from a fallen giant fern and the bee attire used



Figure 2. The giant fern trunk with nest of stingless bees



Figure 3. Collected wild nest was put in a sack for transport



Figure 4. Collecting nest from tree trunk of a “tikem” tree



Figure 5. Stingless beehive boxes



Figure 6. Materials used in making the box

Other artificial hives. Two kinds of artificial hives were noted in the locality. One consists of a plastic pail (5 inches in diameter and 10 inches tall) with pink in color. This was over hanged inside a balcony with an opening of about 1 inch facing the east. On the other hand, an empty cooking oil can (8 inches x 12 inches) with white and green color was used. The opening faced east. The colony when it was observed was almost about to be harvested, as the original entrance was already covered with cerumen. This hive is covered by a corrugated GI sheet to prevent the nest from rainfall as it was located in between the branches of a citrus tree. These artificial hives were established by researcher's father as shown in Figure 7a-b. The later colony has been in such location for almost 12 years and has become a part of the family. Through the years, there were no instances wherein the family members or visitors have been frightened by their swarms as they became so gentle unlike the wild populations.

The observation show that wild stingless bees can be domesticated in simple hives such as plastic pail and tin cans provided that the colonies are not destroyed and are protected from rainfall and other elements such as strong winds, strong sunlight and probably natural enemies such as birds, ants or lizards.

Time of transferring. The researcher transfers the nests of the stingless bee just after collection or any time. Based on the practices of the father's researcher that nest of stingless bees can be transfer in any time.

Procedure in preparing the standard stingless beehive. The procedure that was done in transferring the collected wild nests are as follows: (a) use proper attire, (b) prepare all the materials needed, (c) cover all the entrance or exit using a masking or packing tape shown in Figure 8.



Preparing the wild nest from the fern trunk to be transferred. In removing the wild nest from its original site the following were done on the fern tree trunk: (a) the fern tree trunk was carefully opened to exposed the brood combs (Figure 9), (b) slice horizontally the bottom of brood combs that was attached to the fern, (c) lift up slowly and transfer immediately to the new hive box (Figure 10).



Figure 7. Pail and Cans used as Stingless bee's colony

Transferring the wild nest from the “tikem” tree trunk. The procedure is as follows: (a) slice horizontally the bottom of the brood combs, (b) slowly lift and then immediately transfer into a box (Figure 11).

The position of the brood in its original position before it was collected must be followed or in the same position when transferred into the box. Thus, the brood combs must be placed at the center and surround with pollen and honey pockets on the corner sides. Likewise, the brood combs shall be covered with extra propolis (top of the brood) for faster recovery (Figure 12). The entrance cover shall be removed after 3 days (Figure 13) for the bees to settle down and will never abscond.



Figure 8. Covering the entrance with packing tape



Figure 9. Opened nest (fern trunk)



Figure 10. Transferring the brood from the fern trunk



Figure 11. Transferring the brood (nest collected from tree trunk)

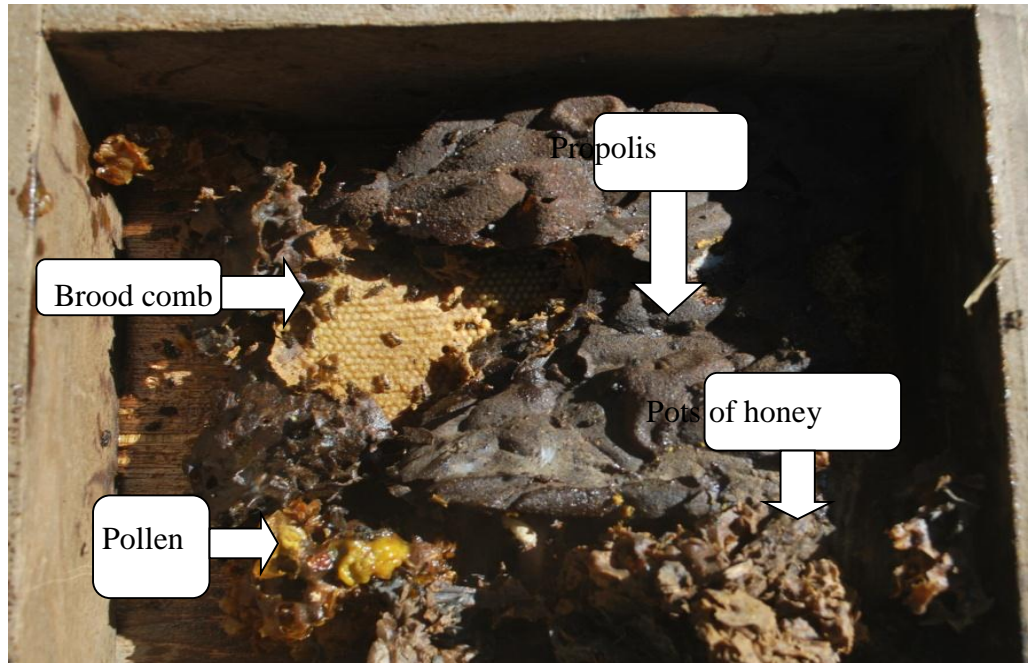


Figure 12. Brood placed in center portion covered with propolis and supported with pollen and honey



Figure 13. Removing the entrance cover after 3 days

Managing Stingless beehives for Honey Production

After the nests were transferred into the box, the colonies were set up near chayote plantation on the same at four o'clock to five o'clock in the afternoon. The hives were set up closed to the ground or it did not have a hive stand. The opening of one of the colonies was set up facing south while the other one was set up facing north. These were left in the area for 5-6 months for honey production at the same time for pollination. Visits were made every Saturday thereafter to make sure that the introduced colonies will not abscond or are in their proper position.

The colonies were set up near the chayote plantation, at a distance of 5-6 meters apart (Figures 14 and 15).



Figure 14. The colony were set up above a chayote plantation



Figure 15. The colony was set up near a chayote plantation (roof top)

Honey Harvesting

How to determine a matured colony. A matured colony of stingless bee is when a cerumen was build and developed around into their entrance and exit hanging like a big ear of a rat shown in Figure 16.

Time of harvesting. The researcher harvests the stingless bee honey last week of February 2013, ten o'clock in the morning to twelve o'clock in the afternoon.

Preparing materials to be used. Procedure were as follows: (a) the researcher prepared 2 or more new set of box, small basin (stainless), (b) wears hat, bee veil and long sleeve shirt (Figure 17).

Procedures in harvesting. (a) choose the matured and strong colony to be harvested, (b) cover all the main entrance, (c) gently open the cover of the colony, (d) gently slices

the mid-part connection of the colony (Figure 18), (e) detached the secondary from primary box because the researcher likes to gather honey at the primary box and look the pots of honey (Figure 19), (f) transfers the detached secondary box to the provided bottom board (Figure 20), (g) slices the pots of honey at the corner side of the primary box where the honey is stored (Figure 21), (h) after harvesting, provide a new secondary box of the harvested primary box and the secondary box detached from the source becomes the primary box provided with a secondary box then 2 colonies are formed (Figure 22), (i) switches the main box with the new box (Figure 23a-b), (j) cover of the entrance of main box shall be removed after 3 days.

The weight of harvested honey including propolis per colony is shown in Table 1.

Table 1. Mean weight of harvested honey and propolis from four colonies

| COLONY | WEIGHT OF HONEY AND PROPOLIS |
|--------|------------------------------|
| 1 | 1.0 kg |
| 2 | 1.1 kg |
| 3 | 1.1 kg |
| 4 | 1.2 kg |
| TOTAL | 4.4 kg |





Figure 16. Developed cerumen around the entrance and exit



Figure 17. The bee attire used, a modified bee veil (fine mesh cloth) and long sleeve shirt



Figure 18. Slicing the mid-part connection of colony

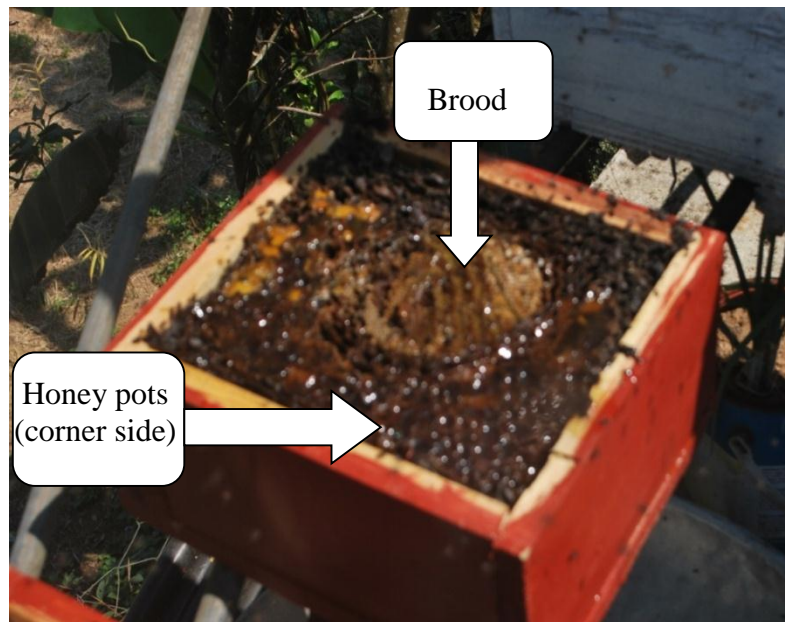


Figure 19. Honey pots in corner side (primary box)



Figure 20. Transferring the detached secondary box to the provided bottom board



Figure 21. Slicing the honey pots

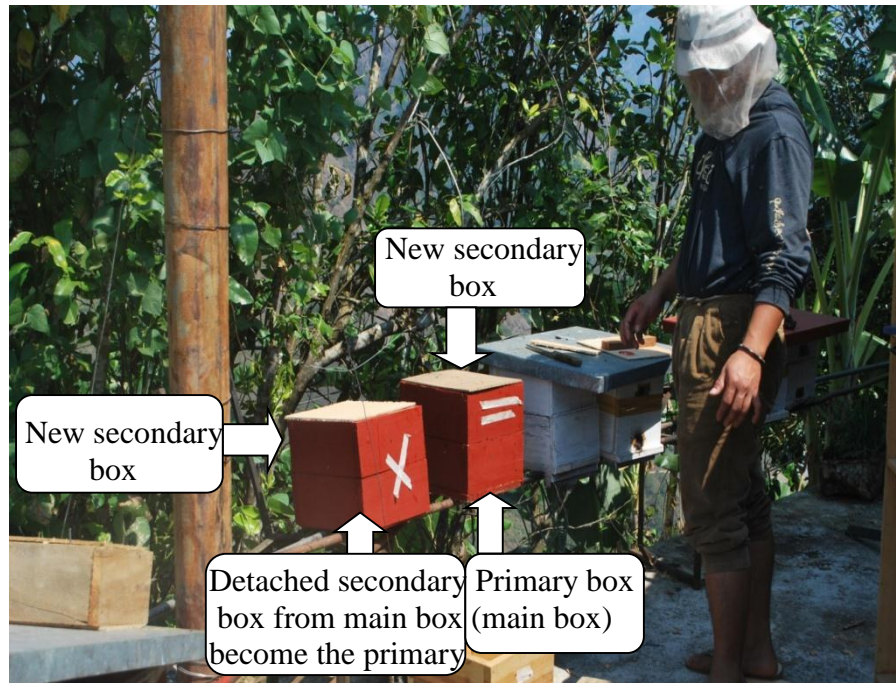


Figure 22. The colony after harvested and splitted



(a)



(b)

Figure 23. The switches of box: a) Before; b) After

Splitting Stingless Bee Colony

Brood cutting. Cutting a brood of stingless bee brood should be done by cutting in horizontal position the brood combs because the stingless bee brood combs are laid horizontally unlike the other honeybees that have vertical combs such as *A. cerana*. The procedure is as follows: (a) prepare a new hive box (b) wear proper bee attire same as in collecting wild colonies or in harvesting activity, (c) cut the brood combs at the center and get 3-7 layers using cutter blade or a sharp knife (Figure 24), (d) transfer the sliced brood combs at the center of the new box or hive, (e) cut a portion of pollen and honey pockets at the corner of the brood comb in the original box and transfer in the same location in the new box, (f) cut some propolis if there are in the original box and transfer also to the new box (Figure 25), (g) put a secondary box on top of the new hive, (h) cover all the entrances of the original hive with molded paper or any available materials so that they will not abscond (Figure 26) while the new hive is left opened. There are now two hives or colonies of stingless bees.

After the colony was splitted, move the original hive at least 1 foot away from the original site and instead put the new hive in such location as in Figure 23. After 3 days, remove the cover entrance of the original hive.





Figure 24. Cutting the brood combs using the cutter blade

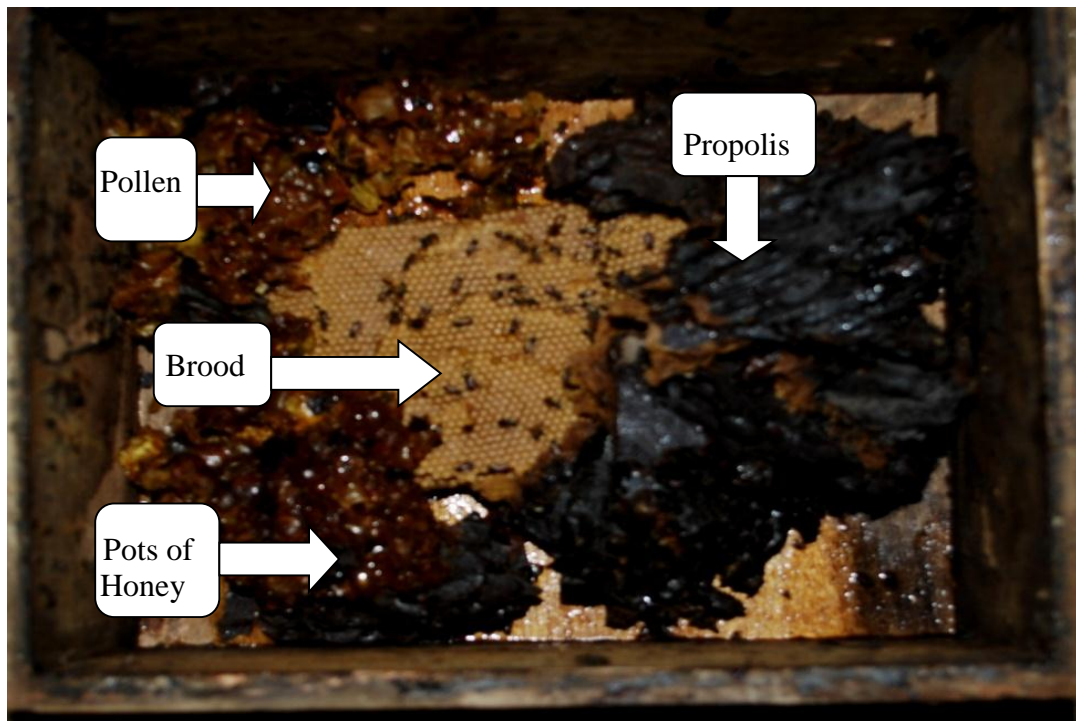


Figure 25. Newly transferred brood combs with pollen and honey in the new hive



Figure 26. All entrances were covered with folded paper

Other observations

Indigenous practices. There are some indigenous practices of wild honey hunters of stingless bees in Kibungan. They collect nest of wild stingless bees from the forests and put them into recycled plastic pails or any empty cans that can contain the colony.

These wild honey harvesters include Mr. Dension Cayad-an who has a colony of stingless bees using a plastic pail. He has two big pails (round, yellow and blue) of stingless bee colonies that are hanged outside the entrance of the house with the hive entrance facing the north. According to him, one of the pails (about 1.5 ft diameter and 3 ft high) took almost 7 years before it was fully filled with bees (Figure 27a-b).

Another wild honey hunter is Mr. Martin G. Ancheta. He has also two colonies of stingless bees using also recycled plastic pails (round and square, yellow and white). The nest was just transferred into a pail last week of December, 2012 (Figure 28a-b).



Figure 27. Mr. Dension Cayad-an's stingless bee colonies



Figure 28. Mr. Martin Ancheta's stingless bee colonies

Other nests of stingless bees. There are stingless bees that built their nests inside a house particularly in the ceiling protected with GI sheet at a height of 10 ft from the ground.

There are two colonies that were observed in this house (Figure 28a-b).

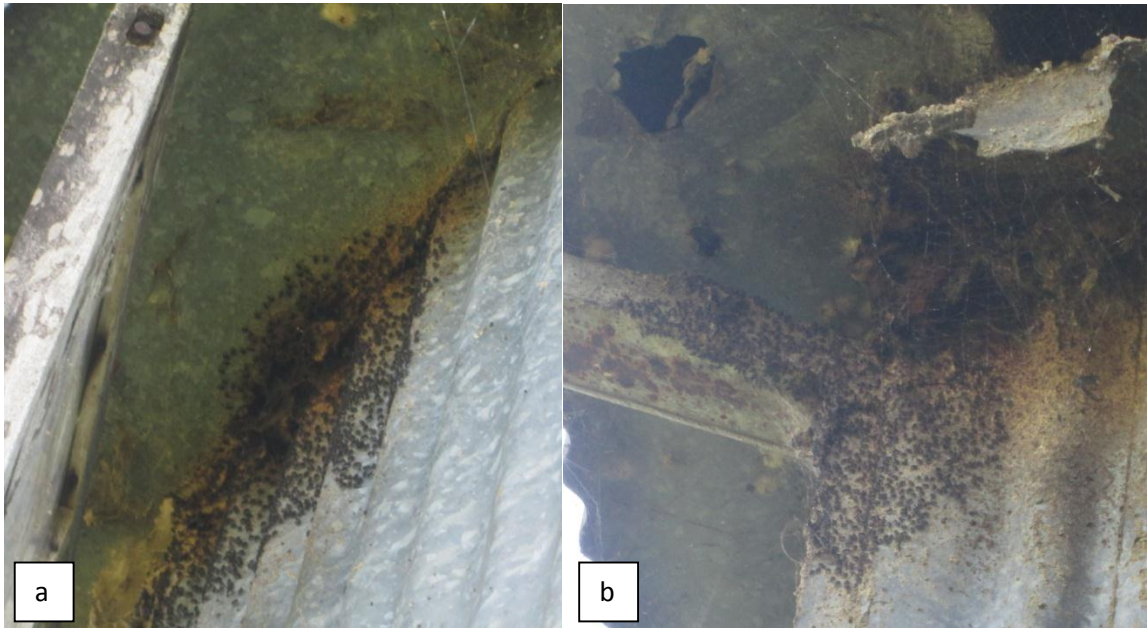


Figure 29. Stingless bee colonies inside the ceiling

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted at Poblacion, Kibungan, Benguet from June 2012 to February 2013 to observed, apply and document the management practices of stingless bees.

The following activities were conducted: collecting wild nests, transporting wild nests, preparing hives for stingless bees, transferring wild nests to hives, managing the stingless beehives for honey production, and splitting stingless bee colonies. There were four colonies collected which then were splitted and produce 4.4kg of propolis and honey.

Conclusion

Locating stingless bees in the wild is difficult. It requires experience in sighting the flying foraging bees. Stingless bees build their nests in the wild and in man-made structures such as pails, wooden hives, or in-between ceilings of houses as long as they are partially shaded or protected. Collecting wild nests, harvesting or splitting colonies need appropriate attire as the bees swarm to the ears, nose, mouth and hairs and cause irritation.

Transferring wild nests of stingless bees in artificial hives is possible. The nest maybe transferred as is or it may be splitted into two provided that the same position of the brood combs in the original hive is followed in the new hive.

Splitted colonies survive and multiply if these are located in chayote plantation or other areas where there are food sources for the bees. At the chayote plantation, a colony can produce about ¼ kg of honey.



Recommendation

An intensive study on the abundance and distribution of stingless bees in the Cordillera is recommended. Follow up studies on the domestication of stingless bees is also worthwhile to consider.

To help conserve the wild colonies of stingless bees, collecting and domesticating them is recommended.



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