

Chapter 7 Meliponiculture in communities as a business unit for indigenous women

Capítulo 7 La meliponicultura en las comunidades como unidad de negocio para las mujeres indígenas

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Abstract

Meliponiculture or breeding of native stingless bees (*escaptotrigona*) is an activity that economically benefits those who sell honey, as well as the generation of new colonies of melipona bees, it can also be an alternative medicinal source and good quality food. Rational management of domesticated hives, based on knowledge of the biology of the species, can increase honey production, thus improving the economic income of indigenous women in marginalized areas of the northern highlands of Puebla, since these ancient insects are not dangerous. A short and medium term project is proposed aimed at indigenous women as a business unit, meliponiculture is an ancestral activity and Mexican heritage, in which women will be the main authors in the development of this interesting project, having an environmental, social, educational impact , economic and cultural for the northern mountains of Puebla.

Meliponas, Bees, Scaptotrigona, Honey, Pollen, Meliponario

1. Introduction

Bees or meliponas are a group of insects typical of tropical and subtropical areas, which play an important role as pollinators of native flora. Before the arrival of colonizers, who introduced the common African bee (*Apis mellifera*), stingless bees were the only bees that stored honey within colonies and were used by many indigenous cultures of South and Central America, who used its honey, wax and pollen. Meliponiculture was particularly important within the Mayan culture, which developed interesting management processes. This type of management forms the basis of the guidelines for modern rational breeding.

Stingless bees represent a group of culturally very important organisms for the natives of the country, since they have historically been a source of food and natural medicine for thousands of years. Although, it is necessary to say it, now, in urban areas, the traditional knowledge about the uses and benefits of the products of these bees has been lost due to the separation of the city dwellers from the rural environment. Their nests (hives), of unique or original construction, are always densely populated. Many are built in natural cavities, usually in the ground or in the hollows of tree trunks, although it is common to find them in rare places such as animal skeletons or even in termite or ant nests.

These bees are part of our culture, since before the Spanish conquest the natives knew of the importance that honey and wax had for their subsistence, products that provided them with food and elements for the healing of their ills, in addition to other applications. The honey of these bees, known as "wood honey" or "wild honey", is attributed greater medicinal properties than that of domestic bees, being used to treat conditions of the nose, ear, throat, lungs, wounds and burns. , creating the first ancestral meliponaries by the Mayan culture.

One of the many problems that the northern highlands of Puebla and the entire world are going through is the lack of pollination of the ecosystem and the aggressive use of fertilizers in planting, as well as the lack of employment in marginalized communities and more so for women. natives.

2 Development

The implementation of meliponiculture in marginalized communities for indigenous women is of the utmost importance since they are used in something totally different from the everyday, without investing in the process of supervision or development of the hives, they are totally self-sustaining and for good management . It is essential to follow the following steps as mentioned (Amazon Conservation Team, 2020)

Sensitization and introduction to meliponiculture

In this activity it is very important to highlight the ecological function and present the main characteristics of the different kinds of bees, for their familiarization by the members of the community.

Subsequently, the participants are asked about the type of honey and bees found in the territory and the appropriate species to breed are identified. With this information, a list of potential meliponiculturists is prepared based on their disposition and the knowledge they have of native bees in favorable situations for their management.

Melipona Bees

Anyone interested in developing meliponiculture must first become familiar with some basic characteristics that define the biology of native bees. First of all, native bees are classified as insects and are close relatives of wasps and ants. The main difference between native bees, also called “meliponas” and European or African bees (*Apis mellifera*), is due to the fact that they do not have a poisonous stinger as a defense mechanism. In addition, native bees tend to be hairier and more robust (with the exception of angel bees) and the wings are generally shorter than the body.

Another important characteristic is honey and the way it is stored; In this sense, each type of bee produces a different honey, even some bees produce honey that is not suitable for human consumption, which is why it is very important to know which bees we must breed to produce excellent quality honey. For this reason, below, we will delve a little more into the life cycle of native bees and the organization of the hive, followed by a brief description of some of the most suitable native bee species to develop meliponiculture in the Huauchinango region.

Figure 1 Melipona bee life cycle Consultation



Source : (Amazon Conservation Team, 2020)

Selection of the most suitable native bees for honey production in the Huauchinango region

Some species of native bees use droppings or carrion and produce unpleasant and even toxic honey for humans. For this reason it is very important to know how to identify what type of native bee should be managed in the meliponary.

Transfer or racking

Transfer or transfer is a management practice that consists of moving a colony of native bees from one place to another. For example, transfer should be made when a swarm of native bees has colonized a temporary nest and has been properly established for a period of approximately two months. At this time the colony must be transferred to a technified box so that it can continue to grow fully.

Obtaining new hives by the division method

The hive division or multiplication method is a management practice that allows us to obtain two colonies from a large hive with a large population, causing the least possible impact thanks to the use of technified boxes. This method also allows meliponiculturists to select the reproduction of their best hives, when they want to increase the number of colonies they have in the meliponary.

The products of the hive and their harvest

The quality and quantity of the honey harvest and of the other products of the hive will also depend to a great extent on the climatic conditions and the vegetation that surrounds the meliponary, being the summer time the most favorable for the native bees to obtain the largest amount of food that allows them to fill their reserves.

Another factor of crucial importance at the time of harvesting is to be especially careful with the hygiene of the utensils to avoid contamination of the honey, which after being extracted should be bottled in a sterilized glass container with an airtight lid and preferably, it should be kept refrigerated to prevent fermentation. Under these conditions, stored honey can last for several years without losing its properties.

Management of natural enemies of native bees

Meliponary area very clean and prevent the boxes from coming into contact with the surfaces where the ants walk. An ant trap can be installed at the base of the posts that support the breeding boxes, where small amounts of grease or oil mixed with some natural ant repellent are periodically placed.

Follow-up of the meliponario and monitoring of the floral calendar

All meliponarios that want to grow in an orderly and efficient manner must keep a complete inventory, as well as a detailed record of the management practices carried out in each hive. This exercise will allow the meliponiculture family to plan and coordinate the necessary activities for each of their hives at the appropriate time of the year.

Colony inventory: Allows you to keep track of each meliponary hive, as well as its age and origin. This information is vital and must be constantly updated (Annex 1).

Follow-up of the meliponario: It allows keeping a detailed record of the state and the management practices carried out in each of the colonies. This information facilitates the planning and coordination of the necessary activities at the correct times of the year (Annex 2).

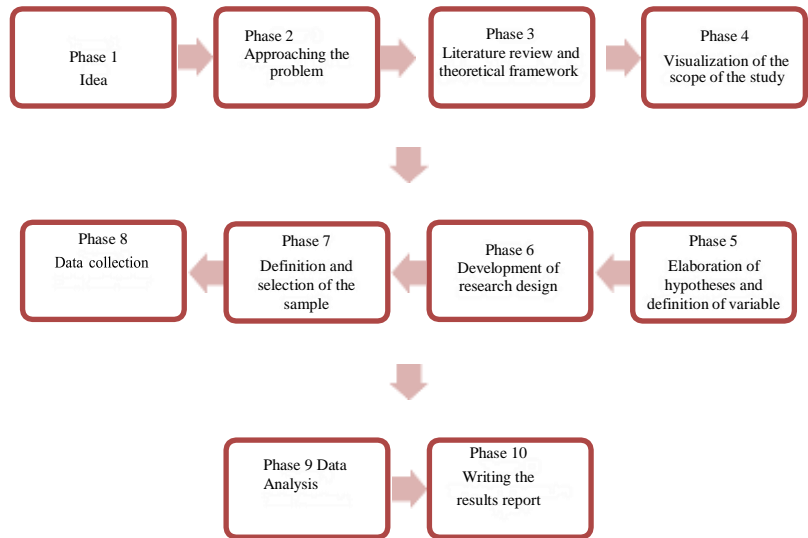
Floral calendar: The monitoring and registration of the floral calendar should also be considered valuable tools to be able to estimate which plants our native bees are visiting at each moment of the year (Annex 3).

3 Methodology to be developed

It is aware that everything is changing at great speed, from the way of knowing to the way of investigating; You must be attentive to these changes, otherwise you will not be able to understand the world around us and the phenomena that will impact your professional and personal life. (Paz, 2017)

According to what Sampieri establishes (Sampieri, 2014) in this research, the quantitative approach is used, which consists of data collection to test a hypothesis based on numerical measurement and statistical analysis, in order to establish behavior patterns and test theories. The phases of this process are shown in Figure 2.

Figure 2 Quantitative process



Consultation Source: (Sampieri, 2014)

4 Results

The result of this project will be reflected one year after its implementation, it depends on the care and timely monitoring of the aforementioned points for good management and control of hives, as well as a good harvest of honey and its derivatives in accordance with the ecosystem in which melipona bees develop .

Table 1 shows the investment for 20 hives.

Description	Cost
1. Infrastructure	\$8,300
2. Hives (20 pcs)	\$24,000
3. Training	\$3,500
4. Lodging (instructor)	\$800
5. Meals (instructor)	\$600
Total:	\$37,200

Table 1 Project investment for 20 hives Consultation source: personal information

Table 2 shows the income after one year starting with 20 hives

Table 2 Income at one year with 20 hives

Description	One year income
Honey (20 hives)	20 lt.(1500 x liter) =\$30,000
20 hives	20 new (\$2,600 x hive) =\$52,000
Total:	\$82,000

Source: Own Elaboration

6 Thanks

My appreciation and affection to the indigenous women of the Cuacuila community for their desire to get ahead in the implementation of the meliponiculture project as a business model to be able to contribute economically to marginalized families and achieve good for both the environment and society.

7 Financing

This project was a donation by Engineer José Miguel Ahuacatitla Pérez, who had the initiative to contribute 20 beehives to 10 indigenous women from the community of Cuacuila , Huauchinango, Pue.

8 Conclusions:

The economy in indigenous communities is very difficult to maintain or have employment opportunities on a constant basis and even more so for indigenous women, who with effort and dedication lead the integration of a family, which is why this project called " Meliponiculture " is implemented. in communities as a business unit for indigenous women”, with the aim of contributing to the activation of the economy for marginalized communities. Below is a projection of recovery of the initial investment in one year, with the sale of hives.

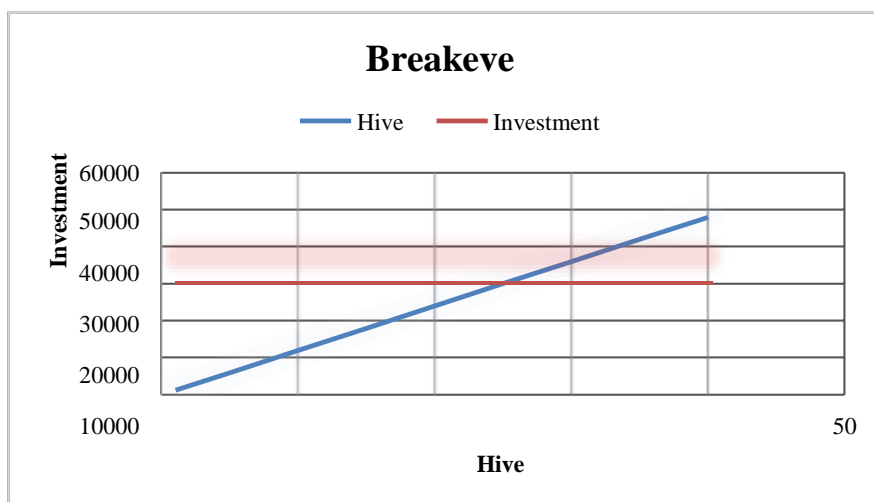
Table 3 Price per number of hives

Years	Nope.	Number of hives	\$ sale
1 year	1	1	1200
	2	5	6000
	3	10	12000
	4	15	18000
	5	20	24000
2 year	6	25	30000
	7	30	36000
	8	35	42000
	9	40	48000

Source: Own Information

As a proposed break-even point, it is shown below:

Graphic 1 Balance point



Consultation Source: Own Information

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