

# Beekeeping in Southern Mexico

Clifton V. Dixon

*Department of Geography*

*Memphis State University*

*Memphis, TN 38152*

Pre-Hispanic populations in southern Mexico had only a few domesticated animals. These included the dog (*Canis familiaris*), turkey (*Melagris gallopavo*), and perhaps a tree duck (Allen 1920; Schorger 1963). Also several social insects can be considered "semi-domesticated:"<sup>1</sup> cochineal (*Coccus spp.*), llave, or lac bug (*Llaveia axin*), and stingless bees of the family Melipona (*Melipona spp.* and *Trigona spp.*) (Jenkins 1967; Donkin 1977; Kent 1984). These insects were maintained for specialized purposes. For example, cochineal was used for the production of a crimson dye and llave was used in making a lacquer based wax.

Perhaps the most important semi-domesticate was the stingless bee. Stingless bee honey was used as a sweetener and medicinal; wax may have been the material used in lost wax casting; honey and wax were important trade and tribute items; and honey was frequently fermented and drunk as an alcoholic beverage in religious rituals (Schwarz 1948; Bird 1979).

There were apparently four areas in Mexico where stingless beekeeping, or meliponiculture, was important during the sixteenth and seventeenth centuries:<sup>2</sup> the Yucatan Peninsula, which is today Mexico's leading center for stingless bee culture (Calkins 1974); the Gulf Coastal lowlands of Veracruz, and eastern San Luis Potosí (Foster 1942); the Pacific lowlands of Sinaloa and Nayarit (Bennett 1964; Brand n.d.); and the Balsas River basin of Michoacán, Guerrero, and the State of Mexico (Hendrichs 1941).

Today stingless bees are still raised by aboriginal populations in many parts of Mexico and meliponid honey is still important as a sweetener, medicinal, and trade item, and it is also occasionally allowed to ferment. Its use as an alcoholic drink has been lessened, however, by the loss of many indigenous religious practices. Although stingless bees are still kept, their importance as a semi-domesticate has been greatly eclipsed by the European stinging honeybee (*Apis mellifera*), which was introduced to New Spain in the seventeenth century (Brand n.d.).

Both the indigenous stingless bee and the European honeybee are kept today by traditional agriculturalists in the Balsas River basin of southern Mexico.

Historical data presented here suggests that the Balsas basin was important in pre-Hispanic and colonial periods for producing honey and wax. Bee products were used for tribute and trade in the adjacent highland valley of Tenochtitlan. Because of the importance of these products in the past economy of the basin, the Balsas area may have been a more important beekeeping center than was previously believed.

The purpose of this paper is to discuss how stingless beekeeping was incorporated into sixteenth-century economic systems and how it is incorporated, along with honeybee keeping, in present-day agricultural systems in the central and eastern Balsas River basin of Guerrero. First, historical evidence is examined to help better understand the importance of bee products in the basin during times past; then, data from recent fieldwork in eastern Guerrero is used to explain today's beekeeping methods and the role of beekeeping.<sup>3</sup>

From the data (historical and present-day) it appears that stingless beekeeping is diminishing, but the pre-adaptation of aboriginal populations to keeping bees was important in the diffusion of honeybee keeping (apiculture). Today, honeybee keeping is more widespread than stingless beekeeping and honeybees now

serve an important niche in the agroecosystems of the eastern Balsas basin.

### **HISTORICAL EVIDENCE FOR BEEKEEPING IN SOUTHERN MEXICO**

Hernán Cortés in 1519 provides the first record of stingless beekeeping in Mexico. The report stems from an observation on Cozumel Island, located off the east coast of the Yucatan peninsula (Cortés 1908, 145). While later sixteenth-century accounts from Mexico refer to stingless beekeeping, meliponiculture no doubt began much earlier.<sup>4</sup> In these sixteenth- and seventeenth-century reports, the methods and technologies employed in stingless[**end p. 66**] beekeeping are not detailed in any clear fashion. These accounts do, however, provide information useful in reconstructing the distribution of stingless beekeeping and insight into the past importance of bee products and their use.

#### **The Balsas River Basin**

One of the earliest sources suggesting the importance of honey in the Balsas River basin was the Matrícula de Tributos, which appears to have been a record of tribute paid to the Triple Alliance (Aztec, Texcoco, Tlacopán) in the Valley of Mexico. The record was made by Indians in the Valley of Mexico for Cortés about 1520 (Barlow 1949). From this document, it appears that five groups of communities within the basin of the Balsas River provided an annual tribute of nearly 2,000 jars of honey, 1,900 of which came from within the present state of Guerrero (Figure 1). Honey collected from the Balsas River basin was brought to the highland valley of Mexico and adjacent highland areas where temperatures are too cool for stingless bees.

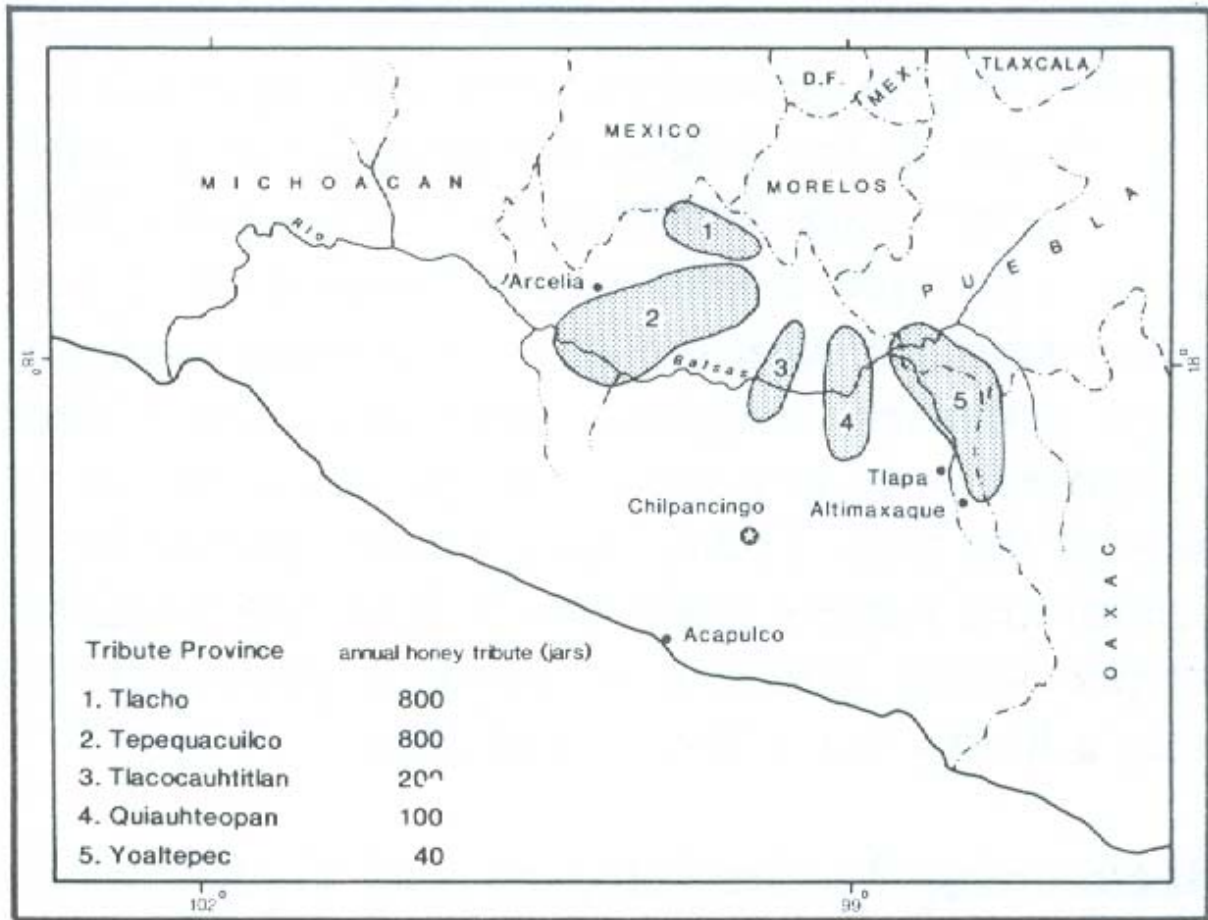


Fig. 1. Annual honey tribute of five provinces.

Evidence that bee products were important highland commercial items comes from Cortés (1908, 113) who mentioned that honey and wax were important trade items in the great market of Tenochtitlan. In 1578 Francisco López de Gómara also mentioned the importance of honey as a trade item in Tenochtitlan (Gómara 1578, 200).

Another sixteenth-century tribute list, the "Suma de Visitas de Pueblos" of 1547-51, relates that nearly half of the 42 localities reporting wax tribute and 34 localities reporting honey were within the present state of Guerrero (Borah and Cook 1960). Tribute was paid every four months. From the Sumas a somewhat extreme example of the importance of honey and wax in the Balsas River basin comes from Altimaxaque, a tribute area associated with the municipio of Tlapa (Figure 1) in eastern Guerrero. Altimaxaque had to provide a total tribute of six burro loads of honey and four loads of wax every 80 days.<sup>5</sup> Although nowhere in the Sumas, or other historical documents, is there mention of stingless beekeeping, such seems to be implied by the number of communities, the quantity of the honey and wax tribute, and the frequency of that tribute, for much of the Balsas River basin.

Historical materials presented here indicate that the Balsas River basin was an important region for keeping stingless bees and for the dissemination of bee products. However, colonial accounts neither explain nor describe, in detail, the methods and technologies employed in traditional beekeeping, nor do they discuss beekeeping's association with native subsistence systems. To better understand these questions contemporary beekeeping systems must be examined.

## **PRESENT-DAY BEEKEEPING ASSOCIATIONS AND TECHNOLOGIES**

### **Beekeeping in the Eastern Basin: Its New Look**

A 1941 travel account documents traditional beekeeping among native populations in the Balsas River basin of Guerrero (Hendrichs 1941, 1945-46). Hendrichs' account focused on the remote town of Arcelia, then accessible only by foot or burro (Figure 1). According to Hendrichs, almost every village he visited during two years of travel in the basin had someone keeping stingless bees. His description provides the best twentieth century account of how bees were kept, including the seasonality of beekeeping, and the uses of bee products.

Hendrichs noted that stingless bee honey was used as a food item and medicinal. He made no mention of the importance of beeswax, which suggests that the substance was no longer considered domestically important. Also, by 1941, the use of honey in religion may no longer have been widespread for he has no mention of the practice of making alcoholic beverages from honey, nor does he mention using honey in other ceremonial events.

The importance of stingless beekeeping and its distribution in the Balsas River basin have changed considerably since Hendrichs' observation of nearly 50 years ago. Only 28 percent of the stingless beekeeping localities he reported still maintain stingless bees. Similar declines have also occurred in other parts of the eastern basin. The decline in stingless beekeeping is attributable to the introduction of the stinging European honeybee and increased accessibility into the Balsas River basin. Because honeybees produce a higher annual yield of honey than do stingless bees (about 13 liters annually per colony for honeybees while stingless bees produce 2 liters), beekeepers are adopting the European bee. **[end p. 67]** Furthermore, greater accessibility into the basin has allowed wholesale honey buyers, willing to pay reasonable prices for honey, the opportunity to establish a honey trade within parts of the basin. These markets provide incentives for campesinos to keep honey bees for cash income. As a consequence of these activities, stingless beekeeping has slipped considerably in importance in its role in the economy of the area. Today, nearly every pueblo in the central and eastern basin has at least one honeybee keeper while stingless beekeeping appears to be only a hobby for a few campesinos.

### **Beekeeping Methodologies and Technologies**

Although the uses of stingless bee products have changed with time, the methods for meliponiculture did not change from the earliest sixteenth-century descriptions to those of Hendrichs (1941) account; today in eastern Guerrero the old ways still continue among the few people who keep stingless bees. To establish a stingless bee colony, campesinos go into the *monte* searching for wild swarms. These bees generally nest in the hollows of trees (Wille and Michener 1973). No defense, such as a bee veil or smoke, is needed for protection against stingless bees.

The process of gathering bees often consists of little more than locating a colony of wild bees in the hollow of some tree, cutting an appropriate section of tree branch or trunk that contains the wild swarm, and removing it from the woods to a position near the house, either under the eaves of the house, or to a bench or stand nearby. The open ends of the hollow trunk are capped and a single flight entrance is made in the center of the trunk. Beekeepers are aware of the importance of the queen to the colony, although no special care is given to ensure that she moves to the new hive. Sometimes attempts at making new colonies are unsuccessful because the queen does not take to the new location.

Wild swarms of honey bees are collected in a similar fashion, and despite the stinging nature of these bees, most traditional beekeepers do not wear protective clothing nor do they use smoke to sedate the insects.

Because stingless bee honey is very thin and watery, beekeepers wait until the dry season (November-December), when the honey becomes thicker, to open the hive. Honey is collected only once a year. Stingless bee honey is extracted from log hives by removing the end-cap, then breaking loose part of the comb with a knife or stick. The broken comb is removed and honey is squeezed from the waxy material;

also while the hive is open, a little honey may be drained from the hive into a pot. The intent is to acquire as much honey as possible without destroying the colony.

Honeybee hives, by contrast, are totally destroyed during honey collecting; keepers remove all of the comb and squeeze the honey from its wax cells. After the comb is removed, the hive container is placed back in its location to be recolonized for the next season's harvest. Usually an empty hive will be taken over by bees from a nearby swarming colony. Honey from honeybees can be collected at any time of the year, although the spring is preferred because new hives are easier to begin in the rainy season.

Honeybees will nest almost anywhere; their defensive habits (including stinging) release them from the protective sealed environments required by stingless bees, consequently honeybees are easier to manage than stingless bees. Honeybees are kept in crudely built rectangular boxes (*rústicas*), straw baskets, terra cotta pots, and gourds of *Langenaria siceraria*.

Some honeybee keepers are adopting the modern Langstroth hive. These removable frame hives make it possible to extract honey several times a year without destroying the colony. A well-managed colony, in a Langstroth hive, may annually produce 46 liters of honey (as compared to *rústicas*, which produce about 13 liters). The Langstroth's high honey yield potential and the rising value of honey make these hives attractive to the serious commercial beekeeper. To efficiently work Langstroth hives, beekeepers use a smoker and bee veil. A centrifugal multi-frame honey extractor (usually made from scrap parts) is also needed to remove honey from the frames.

### **Use of Bee Products**

Bee products, that is, honey and wax, are most frequently used in the household, although some campesinos sell honey for cash income. Honey is far more important than wax, and bee pollen is rarely utilized. Honey's most common use is as a food sweetener.

Indians (Mixtec, Nahuatl, and Tlapanec) in the Tlapa area recognize varying qualities of honey and they are aware that honey quality is dependent upon the plants bees visit during their nectar foraging expeditions. Frequently beekeepers will place a few hives near dooryard gardens so bees may forage on medicinal plants maintained in these plots. Honey from these hives is believed to possess medicinal qualities acquired from the plants.

Medicinal honey, especially that of stingless bees, is still used in folk pharmacology. Indian women use honey, generally mixed with lemon juice and *aguardiente* (home distilled alcohol), to relieve the symptoms of ailments such as sore throat, chest cough, and dysentery. Honey [end p. 68] from Meliponids kept near medicinal gardens is also used to sweeten teas brewed from medicinal herbs. These teas help cure ailments ranging from common colds to evil eye. Honeybee (*Apis*) honey is considered unsuitable for medicinal use but will be used in substitution of Meliponid honey when such is not available.

In other uses, both types of bee honey are occasionally used by Indians to make fermented alcoholic beverages. These intoxicating drinks are only consumed as a medicinal or when a *curandero* prescribes them. During the spring planting season honey is mixed with turkey blood and poured onto the ground during a fertility ritual. Beeswax (from honeybees) is used by Indians in the Tlapa area to make candles. These candles are used in the Catholic church and may be traded or used as barter among villagers. (The wax of stingless bees is too soft for candle making.) If honey is used in trade, its value is considered higher than any other agricultural product (except for livestock); thus among peasant agriculturalists, honey is generally recognized as one of the highest valued agricultural commodities produced on the family farm or milpa. In 1986, honey was selling at Mex\$800 per liter.<sup>6</sup>

Because bees and bee products are so evident in daily life, one can easily overlook their role in peasant

farming. The importance of bees transcends the household, however, and bees also make a significant contribution to the maintenance and productivity of traditional agricultural systems.

### **Bees as Pollinators**

One of the main functions of bees is to pollinate plants. As plant pollinators, bees play a vital role in the survival and productivity of many wild and domesticated plants. In fact, plant pollination may be one of the most crucial roles of bees in agro-ecosystems.

An examination of pollen from bee hives (*Apis* and *Meliponid*) in eastern Guerrero reveals that flowering shrubs and composites, found in abundance in abandoned agricultural fields and other disturbed areas, are important forage. Furthermore, pollen samples taken from stingless beehives and honeybee hives indicate that many agricultural crops, such as squash (*Cucurbita moschata*, *C. maxima*, *C. ficifolia*, *C. pepo*), maize (*Zea mays*), and various beans (*Phaseolus calcaratus*, *P. vulgaris*, *P. coccineus*, *P. lunatus*) are frequently visited by bees.

During the dry winter months and fallow periods, weedy secondary vegetation invades the milpa and its disturbed surroundings. Many of these plants are preferred bee forage. When crops are replanted in these fields, bees continue to forage the plots. In some instances, a campesino with a sense of the bee's pollination role may leave a border of brightly flowering composites for bees to visit, thinking that the bright flowers (usually yellow) will attract bees to the milpa.

Some farmers place *rústicas* for honeybees near their milpas in hopes of gaining better crop yields. Because of the aggressive and highly opportunistic foraging behavior of honeybees, these bees are able to out-forage stingless bees and have thus become a dominant pollinator for many milpa and garden plants.

The economic future of stingless beekeeping in the Balsas River basin is uncertain. The maintenance of stingless bees has become less important as subsistence populations adopt the more productive European honeybee and the efficient Langstroth hive. Within the Balsas basin, Indian populations keep stingless bees, but the number of these beekeepers is diminishing. Although stingless bees and their products are an important aspect in the economy of some agricultural populations in the upper basin, the bees' role has been greatly reduced. While vestiges of a once important stingless beekeeping center remain, the activity will not retain its importance, yet the honeybee and apiculture will continue to become agriculturally important.

As agriculturalists in the Balsas River basin become more involved with cash economies, the potential of honey, as a cash commodity, increases. The few beekeepers who manage their hives for economic gain are able to produce supplemental income. Their profits are generally funneled back into the household economy. In some instances this income may release a farmer from having to perform other agricultural activities for extra cash.

On the other hand, many campesinos in the Tlapa area are converting marginal agricultural lands into fields for cash crops such as maize and chili peppers. During the rainy season, such agricultural activities are detrimental to the steep, heavily eroded, and badly weathered hillsides. Soil loss has become a major problem for many traditional farmers in Guerrero. Attempts by these farmers to become more cash oriented have resulted in their losing the soil resource, thus decreasing the food producing capacity of their ejidos.

Possibly, the acceptance of honeybees and modern beekeeping practices may be a more profitable long-term cash source than expanding milpa agricultural activities. Certainly many of these campesinos have had a long tradition with folk beekeeping practices and already have a knowledge of bees and their habits.

Honey is an important agricultural export for Mexico, and in many remote areas of the country, co-operatives have been established for buying honey and getting the product into national and [end p. 69] international markets. To this end, the Instituto Nacional Indigenista in Tlapa is providing beekeeping equipment (hives, veils, tools, smokers, and honey extractors) to indigenous farmers interested in developing the modern technologies. Also the Institute supplies information on beekeeping through monthly workshops and weekly broadcasts over their radio station "La Voz de la Montana."

Beekeeping (with honeybees) and the selling of honey appears to be a more profitable expenditure of time and energy than the expansion of cropping systems with increased land and labor inputs. Bees require little attention during the agricultural cycle and farmers can spend their extra time and energy on other activities. On the average, a beekeeper may visit his hives only four times a year. Because beekeeping is a low time, low labor, and low cost input activity and honey is a high value and high demand product, the economic input to output ratio of beekeeping is attractive. Beekeepers find that honey earns six times more profit (per hour of labor input plus input costs) than selling maize. Substituting honey for mono-agricultural crops like maize that occupy marginal land may be an opportunity for these campesinos to regularly acquire supplemental cash income without increasing labor or environmental costs.

## NOTES

1. Semi-domesticated animals are those kept or maintained outside their natural habitat, but their breeding is not controlled by man. No genetic control is maintained over these insects and they may easily return to the wild. Management strategies generally mimic the animals' native habitat.
2. Stingless bees are kept as semi-domesticates throughout their natural range in the Americas. Their range extends from a line cutting across northern Mexico (northern Veracruz to southern Sonora) southward to northern Argentina and southern Peru. Throughout their range, Meliponids are intolerant to temperatures below 18° Celsius and thus this isotherm appears to limit their range to lowland tropical areas.
3. Fieldwork for this study was conducted in August 1983, August 1984, and from September 1985 to August 1986. Much of the work was centered around Tlapa, Guerrero. Funding was provided by the Organization of American States.
4. Brand's (n.d.) treatise on bees in New Spain is perhaps the best look at the historical literature on beekeeping in Mexico. For other surveys of the sixteenth-century beekeeping literature, see Schwarz (1948), Bennett (1964), and Kent (1984). Hall (1824), Beechy (1831) and Schwarz (1948) provide excellent descriptions of the domestication process of wild bees and the use of traditional hives.
5. There is no way to obtain a standard of measure for a "jar" of honey in sixteenth-century Mexico, nor is there a way to calculate the volume of honey and wax in a "burro load," thus the point made here is one of comparison. These tribute amounts are high when comparing similar historical descriptions from other parts of New Spain.
6. In mid-1986, Mex\$800 was worth approximately \$1 US.

## REFERENCES CITED

- Allen, Glover M. 1920. Dogs of the American aborigines. *Bulletin of the Museum of Comparative Zoology* 69(9):478-90.
- Baker, H. G., and P. D. Hurd, Jr. 1968. Intra floral ecology. *Annual Review of Entomology* 13:385-414.
- Barlow, Robert H. 1949. The extent of the empire of the Culhua Mexica. *Ibero Americana* 28.

- Beechy, F. W. 1831. *Narrative of a voyage to the Pacific and Bearing's Strait, to co-operate with the Polar expeditions*. London. 2 vols.
- Bennett, Charles F. 1964. Stingless beekeeping in western Mexico. *The Geographical Review* 54:85-92.
- Bird, Junius. 1979. Legacy of the stingless bee. *Natural History* 88(9):49-51.
- Borah, W., and S. F. Cook. 1960. The population of central Mexico in 1548. An analysis of the "Suma de Visitas de Pueblos." *Ibero Americana* 43.
- Brand, Donald D. n.d. The honey bee in New Spain-Mexico. Manuscript, University of Texas, Austin, TX.
- Calkins, Charles F. 1974. *Beekeeping in Yucatan: A study in historical-cultural zoogeography*. Ann Arbor, MI: University Microfilms International.
- Casas, Bartolomé de las. 1877. *Historia de Las Indias*, ed. José M. Vigil. Mexico: Imprenta y Litografía de Ireneo Paz.
- Cortés, H. 1908. *Letters of Cortés*, ed. & trans. Francis A. McNutt. New York, NY: G. P. Puttnam's Sons.
- Donkin, Robert A. 1977. Spanish red: An ethno-geographical study of cochineal and the opuntial cactus. *Transactions of the American Philosophical Society* 67(5):1-84. [end p. 70]
- Foster, George M. 1942. Indigenous apiculture among the Popoluca of Vera Cruz. *American Anthropologist* 44:538-42.
- Gómara, Francisco López de. 1578. *The pleasant historie of the conquest of the West India, now called New Spayne*, trans. Thomas Nicholas. London: Herbert Ingram Priestly.
- Hall, Basil. 1824. *Extracts from a journal written on the coasts of Chile, and Mexico in the years 1820, 1821, 1822*, 2 vols. London.
- Hendrichs, Pedro R. 1941. El cultivo de abejas indígenas en el Estado de Guerrero. *México Antiguo* 5:365-73.
- Hendrichs, Pedro R. 1945-46. *Por Tierras Ignoras: Viajes y Observaciones en la Región del Río de las Balsas*. Pan American Institute of Geography and History 77 & 83.
- Jenkins, Katherine D. 1967. Lacquer. In *Social anthropology*, ed. Manning Nash, 125-37. Vol. 6 of *The Handbook of Middle American Indians*, ed. Robert Wauchope. Austin, TX: The University of Texas Press.
- Kent, Robert B. 1984. Mesoamerican stingless beekeeping. *Journal of Cultural Geography* 4(2):144-28.
- Michener, Charles D. 1946. Notes on the habits of some Panamanian stingless bees. *Journal of the New York Entomological Society* 54: 179-97.
- Nordenskiöld, Erland. 1930. On the history and geographical distribution of beekeeping by American Indians. *Comparative Ethnographical Studies* 8: 196-210.
- Oviedo Y Valdés, Gonzalo Fernández de. 1944-45. *Historia General y Natural de las Indias*, ed. José

Amador de los Ríos, vol. 10. Ascunción.

Roubik, D. W. 1981. A natural mixed colony of *Melipona*. *Journal of the Kansas Entomological Society* 54(2):263-68.

Sahagun, Bernadino de. 1938. *Historia General de las Cosas de Nueva España*, ed. J. Ramirez Cabañas. Mexico.

Schorger, Alfredo W. 1963. The domestic turkey in Mexico and Central America in the sixteenth century. *Wisconsin Academy of Science* 52: 132252.

Schwarz, Herbert F. 1948. Stingless bees (*Meliponidae*) of the Western Hemisphere. *Bulletin of the American Museum of Natural History* 90: 546 pages.

Wille, Alvaro, and C. Michener. 1973. The nest architecture of stingless bees with special reference to those of Costa Rica. *Revista de Biología Tropical* 21: 278 pages. **[end p. 71]**