



**APICULTURAL DEVELOPMENT IN CENTRAL AMERICA AND PANAMA:
SOME HISTORIC AND ECONOMIC CONSIDERATIONS**

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(original contribution)

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Original Contribution

Establishment of the Honey- Bee

It is believed that honeybees were first introduced into Central America in Costa Rica, at an unknown date that must have been before the 1830s, when honeybees were introduced to Guatemala from Costa Rica⁽⁸⁹⁾. About 25 years later, honey bees were reported in the mountainous districts of Honduras⁽⁸⁸⁾. The recency of this introduction is noteworthy, since the Spanish had been in Central America for nearly 300 years previously, but the Yucatan Peninsula, for instance, had no honeybees until near the beginning of the 20th century^(13,84). their presence in the whole of Latin America is astonishingly late.

How extensively the honeybee was distributed in Costa Rica, Guatemala and Honduras during the 19th century remains unclear, and it is equally unclear exactly when honeybees were introduced into the other Central American countries. Gerstacker⁽⁴⁷⁾ reviewed Wagner and Scherzer's regional study, "Die Republik Costa Rica", in Central America (1856), and found no references to either honeybees or beekeeping. Apparently, honeybees were not well known in Costa Rica even at that time, and they were either overlooked or considered too unimportant to mention. It is believed that at that time, most of the apiaries were in the highland districts of Costa Rica, Guatemala and Honduras, where settlements and population were concentrated. The only Central American country where beekeeping developed commercially before 1900 was Guatemala. Early beekeeping there was practised in simple box hives and hollow logs, and concentrated in the central highlands between the old colonial capital of Antigua and the Lago de Amatitlan⁽⁸⁹⁾. Although beekeeping practices were rudimentary, large quantities of honey were marketed annually in Antigua. Indian groups were the principal consumers of the honey, for fermenting into mead⁽⁸⁹⁾. Very little beekeeping was practised around Guatemala City, or to the north near Salama in the Sierra de las Minas, and it was absent from the hot tropical lowlands of the Pacific and Atlantic coasts and the cool highland areas above 2000 m⁽⁸⁹⁾. In other Central American countries beekeeping was on only a small scale until the end of the 19th century⁽⁸⁵⁾.

At the beginning of the 20th century the first professional beekeeper came to Guatemala from Germany, and commercial beekeeping was initiated⁽³²⁾. Although the original goal was to improve coffee yields through honeybee pollination, coffee production did not increase. Honey production was excellent,

however, especially on the Pacific watershed in a region known as the upper Boca Costa⁽⁸⁵⁾. Gradually beekeeping became a secondary agricultural activity on some coffee farms, German beekeepers teaching local people the fundamental techniques of beekeeping⁽⁸⁵⁾. The beekeeping industry expanded tremendously after the First World War, when Guatemala exported honey to Germany, the Netherlands and Britain. In 1920, 200 tons * were exported, in 1923 about 650 tons, and between 1931 and 1933 over 1000 tons annually^(32, 85).

By the 1930s the Pacific coastal plains and foothills of the Boca Costa were the centre of apicultural activity in Guatemala. A few of the coffee plantations in the foothills operated over 1000 colonies, but most had less than 100. Beekeeping was also practised on a much more limited scale on the Atlantic watershed in the department of Alta Verapaz, where honeybees had also been introduced in the hope of increasing the fruit set on coffee trees. Beekeeping was only profitable on a small scale, probably because the annual precipitation there is high (3000 to 4000mm), and the dry season is poorly defined

Commercial beekeeping developed more slowly in Costa Rica. The earlier introduction of honeybees in Costa Rica may also have been associated with the establishment of coffee as an agricultural crop; many of the coffee farms there were owned by Germans and North Americans^(54,66,91) who might have introduced honeybees from their homelands and encouraged their husbandry to increase coffee yields. As in Guatemala, foreigners - especially Germans were instrumental in developing the beekeeping industry^(61,82,87). The first commercial apicultural activity in Costa Rica was initiated during the 1890s by Ricardo Pfau⁽⁷⁹⁾ who imported honeybees from Jamaica and sold both nuclei and beekeeping supplies in the vicinity of San José. By the mid-1930s several commercial operations existed in the foothills and valleys near the port of Puntarenas on the Pacific. Although most enterprises had less than 100 colonies, one German immigrant has over 2000. Conditions for apiculture were so good in some places that two apiaries of this enterprise had over 350 colonies each⁽⁸⁵⁾. While honey exports began before 1920, Costa Rica's production lagged behind that of Guatemala in the 1930's its exports totalled about 150 tons annually^(17,60)

Little is known about the development of commercial beekeeping in the other countries of the Isthmus. In El Salvador it probably came about through the diffusion of information and materials from the coffee-growing areas of the Boca Costa in Guatemala. In Honduras and Belize commercial apiculture is a recent phenomenon^(65a)

Current Economic Status of Apiculture

Between 250,000 and 300,000 honeybee colonies are found in Central America today, over half being located in Guatemala; next in importance are El Salvador and Costa Rica (Table 1). While the official agricultural censuses for these three countries include hives and honey production, those for Honduras, Nicaragua and Panama do not^(57,67,73)

* All references to tons in this paper refer to the short ton (2,000 lb.); this is 10% less than the metric ton (1,000kg)

TABLE 1

RECENT STATISTICS ON HIVES, BEEKEEPERS AND HONEY PRODUCTION
IN CENTRAL AMERICAN COUNTRIES (in short tons)

COUNTRY	YEAR	HIVES	OPERATORS	HONEY PRODUCTION
Guatemala	1964 ⁽⁵²⁾	162,411	--	1,671
El Salvador	1971 ⁽³⁸⁾	65,182	5,421	376
Costa Rica	1973 ⁽²⁰⁾	19,083	1,719	452
Honduras	1975 ⁽⁶³⁾	14,643	--	466
Nicaragua	1973 ⁽²⁹⁾	6,000	--	--
Belize	1975 ⁽⁶⁵⁾	5,321	201	146
Panama	1973 ⁽²⁹⁾	3,200	--	--

TABLE 2

CENTRAL AMERICA HONEY EXPORTS BY COUNTRY:
1954, 1959, 1964, 1969+

COUNTRY	1954	1959	1964	1969
Guatemala	2,134 ⁽⁴⁹⁾	2,856 ⁽⁵⁰⁾	1,853 ⁽⁵¹⁾	2,821 ⁽⁵³⁾
El Salvador	432 ⁽³³⁾	497 ⁽³⁴⁾	1,407 ⁽³⁵⁾	1,367* ⁽³⁷⁾
Costa Rica	330 ⁽²³⁾	384 ⁽¹⁸⁾	316 ⁽²⁴⁾	338 ⁽¹⁹⁾
Honduras	--	--	114 ⁽⁵⁶⁾	115 ⁽⁵⁸⁾
Belize	--	--	38 ⁽¹²⁾	--
Nicaragua	--	--	--	--
Panama	--	--	--	--

* 1968 data.

+ In short tons.

The use of the less productive fixed-comb hive varies from country to country. It is estimated that between 3% and 25% of all hives in Guatemala have fixed combs^(29,49), and in Costa Rica about 15%⁽⁷⁵⁾. Estimates for Honduras have ranged from 25% to 75%^(70,72), but there are few in Belize⁽⁶⁵⁾, and none in Panama⁽²⁹⁾. Reports for Nicaragua are contradictory. Ordetx⁽⁶⁹⁾ believed there was no fixed comb beekeeping but Drescher⁽²⁹⁾ reported that half the colonies were fixed comb hives. There are no data for El Salvador.

Annual honey production per colony for modern hives in Central America lies between 15 and 40 kg. Average within this range have been reported for Belize⁽⁶⁴⁾, Honduras⁽⁶³⁾, Guatemala^(32,48), El Salvador^(5,39), Costa Rica⁽⁷⁷⁾, Nicaragua⁽²⁸⁾ and Panama⁽²⁸⁾. Normal yields for most beekeepers probably lie at the lower end of this range. Annual honey production in fixed comb hives is only about 25% as much.

In exceptional years or in good foraging areas, yields can be much higher than normal. On the better bee forage in Guatemala yields per colony can reach 70 kg.^(32,85) while in Nicaragua yields as large as 88 kg. were reported during the 1960-61 season⁽⁶⁹⁾. Phenomenal yields of nearly 100 kg.⁽⁴⁾ were predicted for the 1975-76 season in El Salvador, and in some areas of Belize averages are said to exceed 75 kg.^(65a)

Total annual honey production for Central America is in excess of 5,000 tons, the bulk being exported to Germany, the Netherlands and the United States. Only a small proportion of honey is sold on the domestic markets of Central American nations. Honey is produced for export in Guatemala, El Salvador, Costa Rica, Belize and Honduras, and for the national market almost exclusively in Nicaragua and Panama.

Nearly all the honey exports are made by the first three countries in Table 1. Guatemala's annual production ranges from 1000 to 2800 tons⁽²⁹⁾, and about 75% is exported, most to Germany and the United States^{43,52}. Production in El Salvador according to agricultural censuses was 419 tons in 1961⁽³⁶⁾, and 376 tons in 1971⁽³⁸⁾. These data must be too low or production must have increased in the last few years, because in 1974 the German Federal Republic purchased 1200 tons of honey from El Salvador⁽¹⁾. Honey has been exported from Costa Rica for about 60 years, except during World War II to European markets⁽⁶⁰⁾. During the mid 1970s, annual production was nearly 500 tons⁽⁷⁷⁾, about 400 tons being exported^(21,22) (Table 2).

Belize started exporting honey (31 tons) in 1960⁽¹⁰⁾. Most has come to the United Kingdom, although recently some also to health food stores in the United States⁽⁶⁵⁾. Production was 165 tons in 1974 and 132 tons in 1975⁽⁶⁴⁾.

Honey was first exported from Honduras in the early 1960s. In 1965 the largest individual exporter was near Puerto Cortes on the Caribbean coast⁽⁷⁰⁾; there were about 200 colonies and a well equipped honey house. According to Government statistics for 1963, 145 tons were exported, about 75% to the German Federal Republic⁽⁵⁵⁾. There have recently been increases, to

391 and 466 tons in 1974 and 1975 respectively⁽⁶³⁾ and to about 738 tons in 1976^(58a), the United States purchasing 366 tons.⁽⁷⁾

In Nicaragua and Panama honey is not a source of foreign exchange, and is often insufficient to meet national needs. In Nicaragua the annual crop probably does not exceed 100 tons, and in Panama it is about 80 tons⁽²⁸⁾. Before the 1950s Panama often imported honey from Costa Rica and it is still reported to be a net importer of honey⁽³⁹⁾. The position appears to be about the same in Nicaragua, which imported Costa Rican honey as recently as 1975⁽²²⁾.

Regional differences in honey quality in Central America can be attributed to differences in climate and bee forage. Honey produced in a seasonally dry environment normally has an acceptable water content. Almost all honey of the Pacific coast of Central America has a water content not above 20% and thus meets the requirements of honey buyers⁽⁹⁰⁾. Honey with a higher water content is produced in the more humid areas of the Caribbean lowlands, for example, in the El Peten region of Guatemala⁽⁴⁴⁾, and more frequently in the region near Limon, Costa Rica, directly adjacent to the Caribbean coast⁽⁶⁰⁾.

A few Pacific coast areas also produce unsatisfactory honey from specific nectar sources. Mangrove honey has a salty taste and its sale is difficult^(83,85). Mangrove trees are found along several portions of the Pacific coast, specifically along the Gulf of Panama, the Golfo Dulce, the Gulf of Nicoya, and the Gulf of Fonseca⁽⁸⁶⁾, and large honey surpluses are obtained from them. When sugar cane is grown, bees gather large quantities of sap from freshly cut stumps⁽²⁷⁾, giving rise to a dark, sour-tasting honey of inferior quality, fetching only about half the normal price^(32,42,65a). Nearly 30% of the honey in Panama is of this type⁽⁴²⁾.

National And International Aids to Apiculture

The only countries in Central America with extension services for the beekeeping industry are Costa Rica (since 1943)⁽¹⁴⁾ Nicaragua, Belize and Panama (recently)^(28,72). Beekeeping became well developed in Guatemala and El Salvador without government aid^(32,39), but the current distribution of honeybee disease in Central America demonstrates the value of extension services.

Until recently no bee diseases were found in Central America; although in the early 1950s beekeepers in Guatemala⁽³²⁾ and Costa Rica⁽³¹⁾ inspected thousands of colonies. Costa Rica remains free of American foul brood, but this is now present in most parts of Guatemala⁽²⁸⁾, in Panama in the western province of Chiriqui and two central provinces Panama and Colon^(28,44), and in Belize although no details of the distribution are available^(65a). Costa Rica's apicultural extension officer Orlando Huñoz, believed the introduction of American fould brood to be a serious danger during the late 1940s and early 1950s, through the importation of honeybees or used equipment. He was responsible for the passage of laws prohibiting their indiscriminate importation⁽³¹⁾. Honduras⁽⁷⁰⁾ and Nicaragua^(28,69) are believed free of American foul brood, and no known precautions against the disease have been taken. Nevertheless, the value of a carefully planned and administered programme of

apicultural extension services must be clear to many beekeepers in Guatemala and Panama whose apiaries are infected with American foul brood.

A recent outbreak of European foul brood in El Salvador further illustrates the value of these services. In Central America in 1963 European foul brood was first reported near Tegucigalpa, Honduras⁽⁷⁰⁾, and the next report was not until 1975, in El Salvador⁽³⁾. Since beekeepers there were unfamiliar with the disease, lack of its early identification⁽³⁾ aided its spread and destructiveness. Such a situation could have been avoided or mitigated by the existence of apicultural extension services. Such services are now being expanded in Central America. Guatemala will soon have extension agents in apiculture, and Costa Rica and Panama are increasing the number and ability of their extension agents through a training programme sponsored by the German Federal Republic^(30,78).

Although not as effective as extension personnel, books and pamphlets on beekeeping fundamentals are useful and have been published by either government agencies or private individuals in Guatemala⁽⁶²⁾, El Salvador⁽⁹⁾, Costa Rica^(15,59), and Panama. Governments have also sponsored short courses on various beekeeping topics in lieu of, or in addition to, full-scale extension services. A course in tropical apiculture was offered in Nicaragua by the Instituto de Fomento Nacional in 1965, and in Guatemala by the Instituto de Fomento de la Produccion in 1966⁽⁴⁰⁾. The late Dr. Gonzalo Ordetx was prominent in the administration of these courses. Geng⁽⁴⁴⁾ toured Panama for about two weeks in 1969 giving short courses at various locations, instructing local beekeepers and officials of the agricultural ministry.

Programmes of credit assistance have been employed by the governments of Guatemala, Honduras, and Costa Rica. In Guatemala, the Banco Nacional Agraria has provided beekeepers with special credit arrangements⁽⁴⁸⁾, although it has been noted that a lack of technical knowledge among the beekeepers has probably reduced the effectiveness of these loans⁽⁴³⁾. Other Guatemalan agencies have administered programmes on a local level. The Servicio de Fomento de la Economia Indigena operated a technical assistance and credit programme for about 200 beekeepers with a total of 23,000 colonies. The agency assisted them in moving their apiaries from the southern Pacific coast to the valley of Salama in the Sierra de las Minas, because widespread insecticide treatments of cotton plantations in the former area had destroyed tens of thousands of colonies⁽⁴⁸⁾. A programme instituted in the highlands of Guatemala in 1966, to aid the Indians there failed because they had no previous knowledge of apiculture⁽⁴³⁾. In Costa Rica a programme of apicultural credit is sponsored by the Banco Nacional, but unfortunately most of the loans have gone to middle-class individuals and not peasant farmers⁽⁸⁾. The Banco Nacional de Fomento de Honduras initiated a programme of apicultural development in the northern portion of the country in 1964⁽⁷²⁾.

Today the bank operates an office in San Pedro Sula and one in Tegucigalpa, which supply equipment and credit to beekeepers

at reduced rates (68) In the tributary area of the Tegucigalpa office 50 beekeepers have received approximately US\$ 2,000 each in credit, and are operating with between 50 and 100 colonies each (54a) Nearly 4000 colonies have been funded in the Tegucigalpa area, and the San Pedro Sula office has reportedly financed over 7000 (1a) The bank also purchases honey and wax from beekeepers in 22 regional agencies (1a)

Foreign governments have been involved in the development of apiculture in Central America. During the last ten years, American and German apiculturalists have worked in Costa Rica, Guatemala, Belize, Nicaragua, and Panama, and research tours by foreign experts have been common. An American apiculturist served in Costa Rica during 1967 (12,16) and Costa Rica has received aid from the government of the German Federal Republic through which a teaching and laboratory building was constructed in Turrialba, in 1973. This served as an apicultural training centre for beekeeping instructors for the governments of Costa Rica, Guatemala and Panama between 1973 and 1976. When the project terminated at the end of 1976, the facility and equipment became the property of the Costa Rican government, to be maintained by them for the beekeeping industry in Costa Rica. The contracts with the other participant nations call for the construction of similar centres in Guatemala and Panama, the host government financing the construction of the buildings, and the German Federal government providing complete modern equipment (76) Germans also worked with a regional development agency in Guatemala in the late 1960s, organizing the colonization and agricultural exploitation of the department of El Peten, which constitutes the northern third of Guatemala (46) In the early 1970s the Rockefeller Foundation financed the investigations of a beekeeping expert in Nicaragua (28) and an American Peace Corps apiculturist recently served in Belize (6) Two years ago, the American based International Executive Service Corps sought an experienced beekeeper to aid the Panama government in developing and marketing bee products other than honey (3) The results of their search are unknown.

Studies of beekeeping conditions in Central America have been made especially by Germans. Geng (42,43,44,45,46), and Drescher (28) have written unpublished reports on all countries there except El Salvador and Belize. Recently both Petersen (78) and Drescher (30) have described the operation of German apicultural development programmes. Ordetx (69, 70, 71), toured Guatemala, Honduras and Nicaragua in the mid-1960s at the request of these governments, to evaluate their honey flora. His works remain the only substantive statements on the bee plants of Central America. Espina (39) made an economic analysis of the beekeeping industry in El Salvador, which included specific suggestions to improve and expand the industry. Calkins (12) and Kent (60) have studied conditions in Costa Rica.

Equipment Supply

Movable-frame hives are produced in all Central American countries, similar to those of the United States except that the frames often lack the Hoffman side shoulder (41) The hive bodies and frames are frequently constructed by the individual beekeeper, or by carpenters and other beekeepers who specialize in this work to supplement their income. The rising cost of

wood in Costa Rica has given impetus to the development, construction and sale of cheaper hives of asbestos-cement⁽⁸¹⁾ In Belize, Mennonite settlers have developed a cottage industry for manufacturing hives and extractors and the majority is used in the country⁽⁶⁵⁾ In Nicaragua, it was often difficult to purchase these items until a few years ago, when a government agricultural experiment station initiated a programme to supply them to local beekeepers⁽²⁸⁾

Most manufactured beekeeping equipment, however, is imported directly from the United States or Germany⁽²⁸⁾, and only a small proportion is manufactured locally. Smokers are commonly imported, but a few are constructed locally using imports as models. Centrifugal extractors, mostly manual models, are also imported, but again some are built nationally using half of a 55 gallon drum for the centrifuge body. All wax foundation mills are imported. In Costa Rica there are 10 foundation mills⁽⁶⁰⁾, and there are possibly twice as many in both Guatemala and El Salvador. In the apiculturally less developed countries there are probably three or four mills per country, except in Belize where there is one^(65a) and in Nicaragua where there may be none. Nicaraguan beekeepers have been known to ship their wax to San José, Costa Rica, to have it rendered into new foundation.

Conclusion

The countries which constitute Central America are characterized by extreme differences in apicultural exploitation and development. The number of hives, annual honey production, and honey exports show tremendous differences (Tables 1 and 2). El Salvador, the country with the smallest land area, ranks second in the number of honeybee colonies; Honduras with the largest land area, has only a quarter as many as El Salvador. Concerning honey exports, Guatemala is one of the important honey producing and exporting nations in Latin America, while Nicaragua and Panama sometimes import honey.

The existence of extension services, credit programmes, or foreign aid for apiculturists, cannot account for this variability. Guatemala and El Salvador, for example, became the two largest honey exporters on the Isthmus without any government extension services to beekeepers. In Costa Rica, the only country where an extension officer served the beekeeping industry for a significant length of time, the beekeeping industry was fairly well developed prior to the initiation of this service. Credit assistance programmes exist or have existed in several countries, but without any major impact on their beekeeping economies. Foreign aid has tended to centre in countries where apiculture is already well developed, like Costa Rica and Guatemala, while the lesser developed countries have received little or no aid. El Salvador is an exception, having a thriving beekeeping industry but receiving no known foreign aid for apiculture. Generally apiculture has tended to grow independently of the provision of extension services, credit assistance, or foreign aid.

Equipment supply does not play a role in the variation of apicultural development within this region. Most supplies can be manufactured locally, and those that are not are usually available for sale in the national capital of each country. Besides the suppliers in the national capitals, local suppliers

may develop when and where the demand justifies.

Historical forces account for much of the disparity found. Two factors seem to be common historical denominators. The first is the settlement of immigrants of European or North American origin during the mid-1800s, and the second is the establishment of commercial coffee production. Foreign settlers, especially Germans, established many of the coffee farms between 1830 and 1860 in both Guatemala and Costa Rica, and may have brought honeybees with them from their homelands. Then at the turn of the 20th century coffee growers, especially Germans in Guatemala, made concerted efforts to improve coffee yields through honeybee pollination. Although these efforts failed, honey production in coffee-growing areas was excellent, and many coffee growers continued beekeeping as a secondary enterprise. Eventually, both honeybees and beekeeping technology diffused to the local residents, and beekeeping became popularized and firmly established in Guatemala and Costa Rica. Beekeeping in El Salvador was probably initiated in much the same fashion, through the influence of coffee growers, most of whom were, however, not immigrants. In Belize the existence of a beekeeping industry is attributable to foreign influences. The country's past status as a British colony, its continuing status as a Commonwealth member, and the influence of Mennonite colonists from Canada, have all contributed to the development of its beekeeping.

Underdevelopment in apiculture appears to be associated with a lack of foreign settlement in the mid-1800s, and little coffee cultivation. In Honduras and Panama coffee production has not been significant until recently, nor was foreign settlement important during the mid-1800s. The beekeeping industry in Panama is very small, and that in Honduras is seriously underdeveloped in view of the country's size and apicultural potential. The underdevelopment of apiculture in Nicaragua is more difficult to understand. Coffee has been cultivated in Nicaragua since the mid-1800s, but foreign planters and colonists were not influential until the end of the 19th century.

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