

Economics of Honey Bee in Egypt

Soheir M. Mostafa, Nagwa M. El-Agroudy, Fatima A. Shafiq and Monia B. El-Din Hassan

Department of Agricultural Economy, Agricultural and Biological Research Division, National Research Centre, 33 El Behouth St., (Former El Tahrir St.) 12622 Dokki, Giza, Egypt

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ABSTRACT

The modern science also recognizes that honey-bee is a natural antibiotic that strengthens the human body (strengthens the immune system, which is resistant to all diseases that attack it) and has proven properties in the treatment of burns and wounds and many other diseases.

The problem of the study is embodied in the decline of Egypt's production of honey-bee, despite the availability of suitable climate and the existence of fruit farms, alfalfa and orchards of flowers necessary to feed the bees.

The study was based on the method of descriptive and statistical analysis, with reference to some scientific indicators that explain the facts of honey bee, as well as the use of studies dealing with this subject.

The study obviously shows honey and wax products in Egypt during the period (2002 - 2016). This study highly illustrates that the number of cells decreases during the study period, reaching about 1447 thousand cells in 2002, of which 1,443 thousand cells are foreign cells and only 4,000 are local cells. In 2016, it was decreased to about 905 thousand cell; 903 thousand cells are foreign cells and 2,000 are local. Moreover, the wax production reached about 84 tons in 2002 and reached about 105 tons in 2016. Besides, the highest production of wax was in 2011 and reached about 180 tons. It becomes clear from the equation of the general time trend of the production of honey that the trend of a significant statistical decline amounted to about 0.313 thousand tons. The study also pointed out that the most important problems of the bee industry in Egypt were the lack of queens of good breeds, poor Egyptian specifications of honey, lack of specifications of parcels and other bee products, in addition to non-activation of quarantine law and control of Egyptian exports of parcels and honey in cooperation with universities, research centers and the private sector to develop and select the new breeds..

The study recommended formulating a law limiting the indiscriminate establishment of queens. Besides, the law sets out the conditions for issuing licenses for building queen breeding stations and punishes those who create a station without a permit because the production of bad queens destroys this national wealth severely

Keywords: Honey bee, Wax, Imports, Exports.

Introduction

The ancient Egyptians used honey not only as food but also as a treatment and cosmetics. Moreover, they used it in embalming to preserve the tissues of mummies. Besides, it was used as a treatment for baldness. It was also used in contraceptive medicines. However, Germans used it to treat wounds, burns and fistula and its healing with fish oil. They used it as a softener cream with the addition of egg yolk with flour. It was conspicuously mentioned in the Holy Quran and the rest of the Scriptures.

Additionally, honey is an important food substance containing sugars, most of which are mono. Besides, it contains yeasts, amino acids, various vitamins and minerals. Honey is made from the nectar of flowers, which is collected by bees from various flowers and spread around the pasture around the apiary. After this nectar is transformed through partial digestion and moisture reduction to sugar, it is stored in the six honeycomb of the apiary and sealed with wax covers. The purpose of its

Corresponding Author: Nagwa M. El-Agroudy, Department of Agricultural Economy, Agricultural and Biological Research Division, National Research Centre, 33 El Behouth St., (Former El Tahrir St.) 12622 Dokki, Giza, Egypt

storage is to provide food for the cell and the incubator and to bear the winter. The honey produced by bees living wild in nature is usually called Wild Honey. This honey is classified by FAO among the list of non-wood forest products. When flowers are not available in the fields adjacent to the apiary, bees are forced to collect the honey of the honeycomb from the honeycomb secretions of some of the insects belonging to the homogeneous class of wings such as honeydew and crustaceans.

Moreover, honey is known to most people as an important food item for the human body and its health. The modern science also recognizes that honey-bee is a natural antibiotic that strengthens the human body (strengthens the immune system, which is resistant to all diseases that attack it). Besides, this honey has proven properties in the treatment of burns, wounds and many other diseases.

Problem of the Study:

The problem of the study is embodied in the decline of Egypt's production of honey-bee, despite the availability of suitable climate and the existence of fruit farms, alfalfa and orchards of flowers, as well as providing mountainous and desert areas for the production of mountain honey, which is imported in hard currency.

Objective of the Study:

The study aims at studying the possibility of increasing the production of honey-bee as well as the establishment of bee products projects that contribute to increase the productivity of agricultural crops through the pollination process carried out by bees in addition to its economic value for the owner of the project.

Methodology of the Study:

This study was based on the descriptive and statistical analysis of the subject of the study with the use of some scientific indicators that explain the facts of honey-bee, as well as the use of studies dealing with this subject to identify the problems of bee industry in Egypt.

Results of the Study:

A brief summary of the types of honey:

Honey varies depending on the variety of the source of the nectar, whether it is from flowers or plant secretions or excretions left by insects. Consequently, the color of honey, its smell, taste, crystallization, density, alkalinity and even some of its components vary with a small percentage. Also, there are other factors that mainly affect the characteristics of honey such as soil type and weather factors. Besides, there are more than 35 types of natural honey and some of its famous types are as follows:

- 1- Alfalfa Honey: Alfalfa honey is characterized by its yellow color and contains a volatile oil; which is flavone flakes, gums and extracts of coffarin⁸.
- 2 - Sunflowers Honey: The color of sunflower honey (FLAVONOIDESB) is golden yellow. If it was crystallized, it would transform into a light green. Its aroma is light and tastes bitter delicious. Besides, the hectare of each plant gives 50 kg of honey.
- 3 - Hijazi Honey Alfalfa: The freshness of it has different colors from colorless to umber color. It crystallizes quickly and turns into a white mass such as butter. It has a good smell and a special taste. It contains 40% fructose, 37% dextrose. Besides each one hectare of flowering Hijazi Alfalfa produces 380 kg of honey.
Benefits: Keep the rate of blood sugar. Besides it is diuretic and diarrhea.
- 4 - Sweet Alfalfa Honey: its taste is delicious. It has a pale umber color. Its smell is refreshing as vanilla. Besides, it contains 36% of dextrose, 39.5% fructose, and each one hectare of irrigated alfalfa produces 600 kg of honey.
- 5 - Apple Honey: it has a pale yellow color and its smell is pleasant. Besides, it has a soft sweetness. It also contains 42% fructose and 32% dextrose and each one hectare of apple trees produces only 20 kg of honey.

- 6- Carrot Honey: Its color is dark yellow and has a nice smell.
- 7 - Chestnut Honey: it has a dark color with a mild smell. However, its taste is not palatable. Besides, bees harvested from the pink flowers of the plant of the Horse's Chestnut from the ornamental plants, contrary to the Chestnut Honey because it is colorless and quickly freeze and bitter and both of them are among the poor honey.
- 8- Citrus Honey: It has an excellent aroma like orange blossom and lemon. Besides, it has an excellent taste and it is used for rubbing the face to remove the freckles.
- 9 - Cotton Honey: it is light and has a distinctive smell and an accurate taste. It freezes quickly and turns to a white color as snow. It may be yellow; containing 36% dextrose and 39% fructose. Besides, the cotton leaves give nectar that is not different from the nectar of flowers and the hectare of cotton produces from 100-300 kg of honey.
- 10 - Henna Blossoms Honey: it is an excellent honey that has a light taste and a nice smell. Besides, it can compete with Tilia Honey (Lime). It is transparent and each hectare of the plant gives 600 kg of honey.
- 11 - Mint Honey: Mint is a good source of honey. It is an aromatic plant. Its honey has the scent of mint and its color is umber.

The most important countries producing honey in the world:

Table number (1) clearly shows that China ranks first in the production of honey by about 473.6 thousand tons. Then, it is followed by Turkey, the United States of America, Iran and Russia by about (103.5, 76, 76, 80.9) thousand tons for each of them, respectively.

The Status of Honey Bee in Egypt:

Table (2) obviously shows honey and wax products in Egypt during the period (2002 - 2016). This table highly illustrates that the number of cells decreases during the study period, reaching about 1447 thousand cells in 2002, of which 1,443 thousand cells are foreign cells and only 4,000 are local cells. In 2016, it was decreased to about 905 thousand cell; 903 thousand cells are foreign cells and 2,000 are local. Moreover, the wax production reached about 84 tons in 2002 and reached about 105 tons in 2016. Besides, the highest production of wax was in 2011 and reached about 180 tons in 2016.

Table 1: The most important countries producing honey in the world in (2017)

Country	The Produced Quantity per thousand tons
China	473.6
Turkey	103.5
The United States of America	80.9
Iran	76.0
Russia	76.0
Ukraine	66.5
India	61.9
Mexico	60.6
Brazil	38.5
Canada	37.0

Source: the International Food and Agriculture Organization (FAO).

Besides, the highest production of wax was in 2011 and reached about 180 tons. It becomes clear from the equation of the general time trend of the production of honey in table (4) the trend of a significant statistical decline amounted to about 0.313 thousand tons.

Bees produce six main products (honey / pollen / wax / bee venom / royal jelly / propolis), in addition to bee production itself, which is deemed as the most important investment in the field of beekeeping in Egypt. Egypt exports about 250 thousand parcels (bees are packed in kilos) to Saudi Arabia and about 16,000 (tire) shipments to the UAE and the same amount to Kuwait, in addition to small amounts to Jordan, Iraq, Lebanon and Libya. However, export to these markets were carried out at a

very low price not less than 35 dollars per pack, i.e. about 10 million dollars, while international prices for the same parcels range from 100 dollars to 130 dollars.

Table 2: Production of Honey and Wax in Egypt during (2002-2016)

Statement	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of cells (Thousand)															
Total	1447	1437	1437	1462	1417	1432	1277	1259	1139	1091	983	965	930	880	905
Local	4	14	11.1	9	10	8	2	20	10	30	1	2	2	2	2
Foreign	1443	1423	1425	1453	1407	1344	1275	1251	1138	1088	982	963	928	878	903
Honey Production (Tons)															
Total	8713	8411	7996	8516	7922	7600	6959	7039	6029	5681	5066	5404	5443	4948	5196
Local	14	40	33	29	34	24	6	7	4	8	7	10	9	12	11
Foreign	8699	8371	7963	8478	7888	7576	6933	7032	6025	5673	5059	5395	5434	4936	5185
Wax Production (Tons)															
Total	84	98	110	105	105	108	82	172	169	180	175	148	115	94	105
Local	2	4	2	2	1	1	1	-	-	-	-	-	-	-	-
Foreign	83	95	108	103	104	107	81	172	169	180	175	148	115	94	105

Source: Central Agency for Public Mobilization and Statistics - Annual Book of Statistics.

Egyptian export prices were low due to the quality of the Egyptian parcels compared to the Australian or Argentine counterparts, which unfortunately is due to the existence of a great history of the Egyptians beekeepers for seven thousand years ago. Besides, Egypt is the only country capable of producing bees and queens throughout the year and characterized by easy mobility for bees, all of these elements make Egypt a qualified country to be a global station for global beekeepers and a good investment area that pumps millions of dollars and provides many employment opportunities for Egyptian youth.

Moreover, table number (3) shows that Egypt did not import honey-bee until 2011 except for a small quantity of about 0.02 thousand tons in 2007, which reached its maximum at about 0.24 thousand tons in 2014, which fell to about 0.12 thousand tons in 2016, and its worth reached about 0.6 million dollars. The two general time trend equations in (Table 4) showed an increasing general trend, reached about 0.513 thousand tons, 0.035 million dollars, respectively for the quantity and value of honey imports during the study period, but its statistical significance has not proven yet. Additionally, table (3) shows that exports of honey fluctuated between the two lowest levels of 0.29 thousand tons with a value of about 0.36 million dollars in 2005 and a maximum level of about 1.78 thousand tons in 2014 and value reached about 3.16 million dollars. The general time trend equations of the table number (4) indicates the existence of an increasing statistical significance significant in honey exports and value during the study period amounted to about 0.151 thousand tons and 0.402 million dollars, respectively.

Table 3: Imports and Exports of Honey-bee in Egypt during the period (2005 - 2016)
Quantity in thousands of tons, Value in million dollars

Year	Imports		Exports	
	Quantity	Value	Quantity	Value
2005	-	-	0.29	0.36
2006	-	-	0.34	0.42
2007	0.02	0.10	0.33	0.42
2008	-	-	0.5	1.22
2009	-	-	1.47	2.02
2010	-	-	1.32	2.45
2011	0.03	0.06	1.18	3.75
2012	0.003	0.1	1.32	3.61
2013	0.24	0.26	1.65	3.79
2014	0.04	0.28	1.78	3.16
2015	0.12	0.4	1.39	3.68
2016	0.12	0.6	1.63	5.10

Source: Arab Organization for Agricultural Development - Annual Book of Statistics - Miscellaneous Editions.

Table (4) General Time Equations of Production, Imports and Exports of Honey-bee in Egypt during the period (2005 - 2016)

Variables	A	b	T	F	R2
Production	8.295	-0.313	-8.076	65.22	0.879
Quantity Imports	-0.038	0.513	2.166	4.69	0.344
Value Imports	-0.101	0.035	4.39	19.77	0.682
Quantity Exports	0.148	0.151	5.458	29.79	0.768
Value Exports	-0.148	0.402	7.269	52.84	0.854

Source: Data from Table no. (1)

Problems of bee industry in Egypt:

- 1- Lack of queens of good and productive breeds.
- 2 - Lack of the original treatments for various bee diseases.
- 3 - Lack of programs for the training and certification of beekeepers working in the field of beekeeping.
- 4- The weakness of the Egyptian specifications of honey and the absence of specifications of parcels and other bee products.
- 5 - Lack of a system for registration, follow-up and inspection of cells by the Ministry of Agriculture.
- 6 - Non-activation of the quarantine law and control of Egyptian exports of parcels and honey.
7. Lack of support for bee industry exports and lack of cooperation from national airlines to allocate aircraft freight from regional airports.
8. Lack of funding programs for beekeepers to modernize their equipment and cells and expand their activities.

Problems affecting the amount of honey-bee output and low income of the profession:

- 1- Lack of plants or pasture, which represents a good source of nectar, especially after the abolition of the agricultural cycle in Egypt. This is in addition to the low cultivated areas of cotton and alfalfa, which represent major seasons for collecting honey.
- 2- Death of Bee: through the spraying of excessive non consuming pesticides and at times of bee sowing, the spread of unknown diseases to many beekeepers in addition to some sudden changes in the weather without taking precautions.
- 3- High costs of cell strengthening and buying queens and their scarcity.
- 4- High costs of transporting apiaries to the sources of nectar, especially in the winter, and the high rental value of the land where the apiaries will be placed.
- 5- The phenomenon of loss or escape of bees and the phenomenon of disorientation due to the presence of the apiaries on very narrow areas and high plants such as corn and the sunflowers among other unknown reasons.
- 6- The use of traditional production cells (clay or wood boxes) and not to use modern cells due to its high price or not knowing it. This is in addition to non-vertical expansion of multiple floors of cells or increasing its horizontal number. There are also some villages where a large number of apiaries have been found in their fields, while others have fewer or may be empty at all.
- 7- Taking the profession of beekeeping as a secondary profession and not an essential one as most of the beekeepers surveyed by this study have other jobs or work, this reduces the care and effort made in the apiaries.
- 8- The use of traditional methods may result in poor sorting and extraction of honey or honey sorting, as well as the lack of optimal utilization of all other cell products such as pollen, royal jelly, wax, etc., which reduces the overall income of beekeeping and reduces the attention of those who are working on it.

- 9- Some of the used tools are of poor and rusting metal (such as cutting knives, receptacles, packaging, flipping tools during heating and tin packaging used for marketing), which helps to pollute honey and lose some of its components, especially oxidative compounds since these metals stimulate oxidation reactions in honey contacting to them.
10. There is no place for the sorting and packaging process, where sanitary conditions and hygiene conditions are in place (ceramic-lined rooms with water, ventilation sources, and well-closed rooms to prevent insects etc.). Moreover, most beekeepers are sorting and extracting in the field which gives the opportunity to pollute honey with dust and other impurities especially because honey is a sticky material and highly adhering to foreign matter.
- 11- All beekeepers are heating the honey in primitive ways, open heating without temperature control and some of them reach boiling point, while others use wood as fuel and this leads to a great loss in the properties of honey and its nutritional and biological value in addition to get the smell of smoke and the opportunity to be contaminated by burning ash.
- 12- It was found that most beekeepers are adding different types of antibiotics for the solution of nutrition used in the feeding of bees to prevent corruption and fermentation or using chemicals to treat diseases, which leads to the presence of residues in honey, as confirmed by the applied studies.
- 13- Most beekeepers package honey and store it in tin or plastic cans of a poor and non-conforming type because they are cheap.
- 14- A large number of beekeepers leave honey bees in the incubator for a large period under sunlight directly, especially in the summer, leading to loss in its value and quality and the formation of an amount of hydroxyl methyl furfur as well as decreasing the activity of enzymes.

Proposals to solve the problems found at the level of the production stage:

It is obvious that in order to promote any industry, profession or process of production, all components should be organized and can be controlled and followed up to solve their problems and obstacles and to work on their permanent development in an attempt to maximize the return. The results of this study clearly indicate that this is not available in the profession of beekeeping and honey production. Therefore, in order to find practical solutions to the problems of beekeeping, the promotion of the beekeeping sector and the production of honey as well as maintaining the highest quality in honey produced for domestic consumption and competition for export, it is proposed to conduct the following:

First: Organizing the profession of beekeeping through a thorough and comprehensive survey of the beekeeping sector and related projects and recording them all over the cities and villages of the Republic. This can be done through one or both of the following: (1) The Ministry of Agriculture represented in its directorates, administrations and associations in all cities and villages of the Republic. (2) The establishment of supported governmental or non-governmental associations to care for the organization, supervision and development of the profession of beekeepers (such as the Beekeepers Association in Gharbia governorate) along with the establishment of many branches spread throughout the Republic.

Second: After the organization of the profession of beekeeping through one or both of the previously mentioned institutions and with the assistance of the government authorities, the following will be done:

- 1- All beekeepers and employees of this profession or trade in their products shall be notified of the participation in the membership of these associations as compulsory in return for paying a symbolic subscription through which they will provide experiences, training and various services to ensure follow-up and continuity of the system. If the participation was not obligatory, most of the beekeepers would not participate then it would be difficult to follow up and organize this profession.
- 2- New beekeepers who wish to practice this profession shall be allowed only after joining the association, registering their projects and obtaining training courses accredited in this field. Besides, these beekeepers have to be full-time and non-skilled for other jobs that may take most of their time at the expense of caring for the profession of beekeeping this is in addition to ensure job opportunities

for unemployed youth, as well as to ensure continuous development and statistics of the inputs of this industry.

3. These associations provide the following services:

- To include in its membership experts and researchers either voluntarily or in reasonable fees to carry out training for beekeepers using the latest reached in the profession of beekeeping from the process of the establishment of the apiaries to the collection and marketing of the production.
- Providing all the advanced tools and requirements for members at reasonable prices along with the service of the establishment of apiaries and feasibility studies as well as facilitating access to the necessary loans.
- Establishing technological centers for the process of sorting, extraction and packaging with the latest methods and means at a reasonable cost, in order to ensure the quality of the produced honey, especially with regard to pasteurization and heating processes, honey production for export and the opening of new markets.
- There should be a constant follow-up to developments in this industry and developing it as well as monitoring its problems in order to find a quick solution.
- Creating a comprehensive website in Arabic with all the basic information about the profession of beekeeping and respond to inquiries and questions from members. Besides, there should be a brief publishing of the most important studies applied in the field of production, quality and announcement of training courses and their timetables as well as providing new services. Consequently, this will save a lot of time, effort and the cost of correspondence especially after the spread of the Internet in most cities and villages of the Republic.
- The search for vital or natural ways to resist diseases and not to use antibiotics and harmful chemicals that hinder marketing and exporting abroad.
- These associations should request the Ministry of Agriculture to amend the wrong policies that harm the profession and ban the importation of highly toxic pesticides.
- The prices of the pollinated queens in islands or isolated areas should exceed those in open areas by about ten times the price. These areas should be invested by supplying the market with queens and also planning for export. The law should be amended to prevent the importation of queens and formulating a new law to regulate their importation. This should be under the supervision and authorization of the Ministry of Agriculture from accredited suppliers after their approval by the Ministry of Agriculture.
- It is necessary to work on drafting a law that limits the indiscriminate establishment of queens. This law specifies the conditions necessary to issue licenses for breeding queens because the queens are the most dangerous thing in the bee system. Besides, this law should impose deterrent penalties on those who build a station without a license because the production of poor queens destroys this national wealth as well as the importance of opening the operation of stations and areas isolated by the private sector POP system and allow international companies and production stations for royal queens to invest in Egypt because the market is promising and allow this investment. Moreover, a large national project should be carried out in cooperation with universities, research centers and the private sector to develop and select the new breeds.

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