



A Comparative Study between Four Different Hybrid Local Races of Honey Bee in Some Biological Activity

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ABSTRACT: In this study, experiments were carried out during two seasons of 2017, 2018 using twenty colonies which contain four groups of hybrid strains, each strain contains five replicates. The experiments were carried out on four different hybrid local races bees of, Italian hybrid, Carniolan hybrid and Egyptian hybrid from two different sources (Upper Egypt and Alexandria). This study was established at the experimental apiary of the El-Sabaheia Research Station, Alexandria (27.2831North (°N) and 30.7632 East°(E)).

Honey and pollen grains were measured during the two seasons 2017 & 2018. The honey stored in cells of wax combs was measured by using a typical langstroth frame which is sub-divided into square inches by means of wire for twenty colonies during the two seasons 2017 and 2018 to denote the total amount of honey in wax cells per season.

The obtained data showed that the highest mean of honey yield during the season of 2017 was hybrid Carniolan local 1040.85 (inch²) /colony followed by Egyptian Upper Egypt 1013.65 (inch²), then hybrid Italian local 487.33(inch²)/colony and the lowest mean was Egyptian Alexandria.

Meanwhile in the season of 2018 the data showed that the highest mean of honey yield was for the Egyptian Upper Egypt 418.88(inch²) followed by hybrid Italian local 367.84 (inch²) then Egyptian Alexandria 303.16 (inch²) and the lowest mean of honey yield was recorded during the season of 2018 for the hybrid Carniolan local 294.80 (inch²)/colony .

The stored pollen in cells of wax combs that has been measured by subdivided langstroth frame in square inches was calculated and the area of stored pollen by workers in the twenty colonies were compared.

The results of the current study showed that the collected pollen grains of the selected races during the season of 2017 recorded the highest mean of pollen grains in Egyptian Alexandria 142.77 (inch²)/colony followed by Egyptian upper Egypt 109.31(inch²)/colony then hybrid Carniola local 108.07 (inch²)/colony and the lowest mean of pollen grains was recorded in hybrid Italian local strain 87.82 (inch²)/colony .

The highest general mean of pollen grain during season 2018 was recorded in hybrid Italian local 202.84 followed by Egyptian upper Egypt 221.32 then hybrid Carniola local 190.09 (inch²)/colony and the lowest general mean was recorded in Egyptian Alexandria 183.04 (inch²) /colony .

Keywords: Pollen grains; Honey; Langstroth frame Colonies

1.INTRODUCTION

Honeybee colonies are essential for agriculture and the environment, they ensure plant reproduction by pollination, whilst beekeeping contributes to the development of rural areas. Pollen is the powder found in the flowers. This powder is attached to the hair in the body of the bee and there are pockets in the back legs of the bee called the pollen basket. The bee collects this powder in its body and brings it to the hive. The hive also has traps for pollen grains in which the latter collects and is extracted from the hive. It is

considered an ideal food, as it contains 18 vitamins, more than 25 minerals and thirty percent of amino acids and the same amount of sugars. Bees collect nectar, transform it by combining with specific substances of their own deposit, dehydrate, store and leave the honey in the combs to be ripened and matured according to the international standards of honey products .The amount of pollen and brood in the colony can be used to expect the honey yield produced at the end of the season. **Nabros (2000); Hegazi et al. (2001) and Taha (2005).**

It is well known that there are three seasons of honey yield in many parts of Egypt according to blooming of plant species that can be available for bees to collect their food (nectar and pollen). For example, citrus honey (first yield of the season) is produced by honey bee workers from the nectar of flowers of different citrus trees at the beginning of spring until the end of flowering period of citrus species. Citrus honey has a light yellowish or golden color with light consistency, light acidic taste and aroma of citrus flavour. Clover honey (second yield) is being produced by honey bee workers throughout the period of May-June during the flowering of clover. Cotton (*Gossypium barbadense*) honey is also produced at the mid of August (as third yield). **Elaidy Waleed et al. (2017).**

Therefore, the present work was initiated to study pollen & Honey gathering activity of the honeybee colonies (four races) under the prevailing local environmental conditions of El-Sabaheia. Region of 2017 till 2018.

2. MATERIALS AND METHODS

Honey stored yield:

Honey and pollen grains stored were measured during two seasons of 2017, 2018. The honey stored in cells of wax frames was measured by using a typical langstroth frame which is subdivided into square inches by means of wire (Al-Tikrity et al., 1971 and Hassona, 2006) Fig (1) for twenty colonies during two seasons of 2017, 2018 to denote the total amount of honey in wax cells per season Figs. (2&3)



Fig.(1) Measuring Inch square



Fig. (2) pollen grains



Fig.(3) Honey in wax cells

Evaluation of stored pollen grains :

The stored pollen in cells of wax frames that has been measured by subdivided langstroth frame in square inches was calculated and the area of stored pollen by workers in the twenty colonies were compared Fig (4).



Fig. (4) Measuring pollen by inch square

Statistical analysis

Using "F" and "L.S.D." tests were performed for the comparison and evaluation of the tested materials. Data were subjected to the analysis of variance test (ANOVA) with mean separation at 5% levels of significance. Computer programs IRRISTAT and Duncan's Multiple Range test were used to compare the averages of detected results according to the method of **Snedecor and Cochran (1967).**

3. RESULTS AND DISCUSSION

Biological activities of honey bee colonies during seasons 2017 and 2018

Pollen grains measured during season 2017 and 2018

The collected pollen grains of the selected races were measured during season 2017. Table (1) showed that the highest mean of pollen grain was recorded in Egyptian Alexandria 142.77 (inch²) followed by Egyptian upper Egypt 109.31 (inch²) then hybrid Carniolan local 108.07 (inch²) and the lowest mean of pollen grains was recorded in hybrid Italian local strain 87.82 (inch²)/colony .

Table (2) showed that the highest general mean of pollen grain during season 2018 was recorded in hybrid Italian local 202.84 followed by Egyptian upper Egypt 221.32 then hybrid Carniola local 190.08 and the lowest general mean was recorded in Egyptian Alexandria 183.04 (inch²)/colony .

It could be revealed from these cited results that the highest detected quantities of collected pollen grains in the following months of June and July , was in parallel with the higher estimated areas of sealed brood or/ and honey production .

These results are close to those reported by **Bobrzeeki and Wild (1991)** who found that the brood area was reduced in colonies of small amount of pollen grain

On the other hand, **Ghazala and Nowar (2014)** indicated that mean amounts of pollen trapped during citrus season were 247.66 g/ colony. They also concluded that the mean amount of pollen trapped was 355.00 and 1043.33 g/colony during the whole season of clover and corn seasons.

Honey yield measured during seasons 2017 and 2018

Honey is produced by honey bees from the nectar of plants, secretions of living parts of plants and excretions of plant sucking insects (honey dew). Bees collect nectar, transform it by combining with specific substances of their own deposit, dehydrate, store and leave the honey in the combs to be ripened and matured according to the international standards of honey products . **Sugden and Furgala (1982)** stated that the variation of honey production between colonies in the same apiary might be due to variation of genetic makeup of the colony. **Kathy and Hultgren (1985)** indicated that Carniolin bees can be considered as a good honey production insect which have a good reputation as honey gatherers and they are very prolific. It is well known that there are three seasons of honey yield in many parts of Egypt according to blooming of

plant species that can be available for bees to collect their food (nectar and pollen). The apiary of El-Sabahia Research Station in Alexandria , the main flowering season occurs from September to October or November, all the hives produce considerable amounts of honey and pollen grains are collected from *Schinus terebinthifolia* in October and the average honey yield is about 6.85 kg per colony

Table (3) showed that the highest mean of honey yield during the season of 2017 was hybrid Carniolan local 1040.85 (inch²)/colony followed by Egyptian Upper Egypt 1013.65 (inch²)/colony , then hybrid Italian local 487.33(inch²) and the lowest mean was Egyptian Alexandria 453.33 (inch²)/colony. These results are in accordance with that reported by the above mentioned authors.

Table (4) showed that the highest mean of honey yield during the season of 2018 was Egyptian Upper Egypt 418.88(inch²)/colony followed by hybrid Italian local 367.84 (inch²) then Egyptian Alexandria 303.16 (inch²) /colony and the lowest mean of honey yield during season 2018 was hybrid Carniola local 294.80 (inch²)/colony

Table (1): Comparison between the four races in collecting pollen grains in the season of 2017

Date	Strains																			
	Hybrid carniola local					Hybrid Italian local					Egyptian (upper Egypt)					Egyptian (Alexandria)				
	1*	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
23-Mar	102.00	68.00	136.00	68.00	68.00	102.00	170.00	138.00	45.00	68.00	102.00	204.00	138.00	102.00	136.00	104.00	272.00	68.00	68.00	102.00
6-Apr	238.00	45.00	45.00	68.00	102.00	204.00	17.00	102.00	136.00	15.00	272.00	408.00	272.00	272.00	102.00	136.00	272.00	102.00	102.00	136.00
20-Apr	102.00	45.00	102.00	136.00	136.00	204.00	34.00	34.00	68.00	68.00	102.00	136.00	272.00	204.00	68.00	272.00	136.00	204.00	272.00	102.00
4-May	17.00	4.00	68.00	45.00	34.00	102.00	34.00	34.00	102.00	68.00	102.00	204.00	45.00	136.00	68.00	204.00	340.00	136.00	204.00	238.00
18-May	136.00	170.00	68.00	204.00	204.00	34.00	5.00	45.00	170.00	102.00	68.00	204.00	272.00	68.00	170.00	136.00	136.00	68.00	408.00	340.00
25-May	102.00	45.00	102.00	34.00	238.00	136.00	34.00	136.00	68.00	102.00	102.00	170.00	136.00	45.00	136.00	68.00	204.00	340.00	120.00	120.00
15-Jun	136.00	238.00	68.00	17.00	272.00	14.00	5.00	68.00	68.00	102.00	68.00	45.00	55.00	68.00	102.00	102.00	68.00	272.00	68.00	102.00
29-Jun	102.00	136.00	102.00	17.00	14.00	34.00	6.00	68.00	102.00	68.00	15.00	2.00	68.00	170.00	170.00	102.00	204.00	68.00	102.00	102.00
13-Jul	68.00	204.00	68.00	34.00	204.00	4.00	5.00	102.00	204.00	17.00	45.00	23.00	4.00	136.00	136.00	204.00	68.00	170.00	102.00	170.00
27-Jul	68.00	102.00	102.00	204.00	204.00	17.00	34.00	1.00	68.00	17.00	23.00	25.00	1.00	34.00	45.00	204.00	34.00	136.00	204.00	272.00
10-Aug	136.00	102.00	272.00	136.00	204.00	17.00	136.00	204.00	238.00	204.00	45.00	23.00	15.00	136.00	136.00	17.00	204.00	34.00	204.00	204.00
24-Aug	102.00	170.00	136.00	45.00	136.00	68.00	204.00	340.00	4.00	272.00	6.00	68.00	0.50	68.00	68.00	34.00	4.00	136.00	17.00	68.00
7-Sep	204.00	272.00	68.00	170.00	136.00	34.00	136.00	68.00	408.00	408.00	3.00	45.00	3.00	408.00	204.00	1.00	5.00	68.00	34.00	68.00
21-Sep	136.00	204.00	68.00	4.00	1.00	15.00	0.50	3.00	68.00	68.00	2.00	2.00	68.00	408.00	340.00	68.00	102.00	408.00	1.00	68.00
5-Oct	102.00	2.00	2.00	3.00	2.00	34.00	6.00	45.00	2.00	23.00	2.00	23.00	68.00	102.00	4.00	17.00	204.00	408.00	68.00	102.00
Mean	116.73	120.47	93.80	79.00	130.33	67.93	55.10	92.53	116.73	106.80	63.80	105.47	94.50	157.13	125.67	111.27	150.20	174.53	131.60	146.27
General mean	108.07 b					87.82 c					109.31 b					142.77 a				

LSD at 0.05=31.34

Table (2): Comparison between the four races in collecting pollen grains in the season of 2018

Date	Strains																			
	Hybrid camiola local					Hybrid Italian local					Egyptian (upper Egypt)					Egyptian (Alexandria)				
	1*	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
25-Mar	66.00	66.00	66.00	33.00	132.00	33.00	66.00	132.00	264.00	132.00	33.00	264.00	297.00	33.00	165.00	132.00	132.00	132.00	132.00	33.00
8-Apr	264.00	66.00	297.00	165.00	99.00	198.00	264.00	264.00	264.00	198.00	198.00	99.00	297.00	165.00	231.00	165.00	66.00	66.00	297.00	99.00
25-Apr	330.00	132.00	330.00	132.00	264.00	264.00	198.00	198.00	132.00	264.00	132.00	132.00	264.00	198.00	264.00	198.00	132.00	132.00	330.00	132.00
6-May	132.00	132.00	264.00	198.00	132.00	132.00	330.00	132.00	132.00	132.00	264.00	264.00	132.00	264.00	264.00	198.00	132.00	132.00	330.00	264.00
20-May	198.00	198.00	330.00	264.00	198.00	198.00	264.00	198.00	198.00	198.00	330.00	330.00	198.00	330.00	330.00	264.00	198.00	198.00	264.00	330.00
3-Jun	462.00	198.00	264.00	66.00	264.00	396.00	297.00	396.00	264.00	264.00	660.00	660.00	132.00	396.00	264.00	198.00	198.00	198.00	198.00	198.00
17-Jun	396.00	264.00	330.00	132.00	264.00	330.00	330.00	396.00	198.00	264.00	297.00	396.00	330.00	264.00	198.00	462.00	330.00	264.00	264.00	132.00
1-Jul	132.00	132.00	198.00	198.00	132.00	66.00	33.00	66.00	99.00	66.00	132.00	231.00	99.00	66.00	165.00	165.00	132.00	165.00	165.00	33.00
15-Jul	66.00	66.00	33.00	66.00	66.00	99.00	66.00	99.00	132.00	99.00	99.00	165.00	132.00	99.00	165.00	132.00	165.00	132.00	132.00	66.00
29-Jul	330.00	66.00	99.00	132.00	264.00	99.00	198.00	264.00	132.00	264.00	132.00	165.00	132.00	198.00	198.00	132.00	99.00	132.00	99.00	231.00
12-Aug	264.00	165.00	132.00	165.00	297.00	165.00	231.00	297.00	198.00	297.00	198.00	231.00	165.00	231.00	330.00	165.00	132.00	165.00	132.00	264.00
26-Aug	198.00	198.00	231.00	132.00	165.00	165.00	132.00	165.00	198.00	198.00	132.00	132.00	99.00	330.00	231.00	198.00	198.00	165.00	132.00	198.00
9-Sep	330.00	264.00	396.00	66.00	297.00	330.00	198.00	330.00	396.00	396.00	264.00	132.00	66.00	462.00	396.00	264.00	264.00	132.00	198.00	264.00
23-Sep	132.00	132.00	264.00	264.00	330.00	198.00	264.00	132.00	264.00	66.00	66.00	264.00	165.00	66.00	396.00	330.00	198.00	330.00	99.00	297.00
7-Oct	198.00	198.00	132.00	66.00	132.00	231.00	132.00	198.00	264.00	66.00	132.00	330.00	132.00	132.00	264.00	330.00	33.00	198.00	33.00	99.00
Mean	233.20	151.80	224.40	138.60	202.40	193.60	200.20	217.80	209.00	193.60	204.60	253.00	176.00	215.60	257.40	222.20	160.60	169.40	187.00	176.00
General mean	190.08 bc					202.84 b					221.32 a					183.04 c				

LSD at 0.05 = 35.25

Table (3): The measured Honey yield of the es in the season of 2017

Date	Strains																			
	Hybrid carniola local					Hybrid Italian local					Egyptian (upper Egypt)					Egyptian (Alexandria)				
	1*	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
23-Mar	884.00	952.00	204.00	1224.00	1632.00	204.00	272.00	204.00	884.00	340.00	272.00	408.00	136.00	544.00	408.00	340.00	272.00	340.00	272.00	272.00
6-Apr	884.00	1496.00	204.00	2176.00	1564.00	340.00	340.00	272.00	680.00	204.00	884.00	952.00	204.00	1224.00	1632.00	204.00	272.00	204.00	884.00	340.00
20-Apr	680.00	952.00	136.00	952.00	816.00	272.00	340.00	272.00	306.00	340.00	884.00	1496.00	204.00	2176.00	1564.00	340.00	340.00	272.00	680.00	204.00
4-May	272.00	408.00	136.00	544.00	408.00	340.00	272.00	340.00	272.00	272.00	1088.00	952.00	170.00	1156.00	1360.00	170.00	204.00	408.00	340.00	204.00
18-May	408.00	408.00	170.00	544.00	544.00	136.00	68.00	408.00	340.00	136.00	952.00	136.00	952.00	816.00	272.00	340.00	272.00	306.00	340.00	272.00
25-May	1088.00	816.00	306.00	952.00	1224.00	272.00	374.00	544.00	816.00	272.00	408.00	408.00	170.00	544.00	544.00	136.00	68.00	408.00	340.00	136.00
15-Jun	1088.00	952.00	170.00	1156.00	1360.00	170.00	204.00	408.00	340.00	204.00	1088.00	816.00	306.00	952.00	1224.00	272.00	374.00	544.00	816.00	272.00
29-Jun	408.00	170.00	544.00	544.00	136.00	68.00	408.00	340.00	136.00	170.00	680.00	952.00	136.00	952.00	816.00	272.00	340.00	272.00	306.00	340.00
13-Jul	884.00	952.00	204.00	1224.00	1632.00	204.00	272.00	204.00	884.00	340.00	1428.00	1768.00	340.00	2312.00	1088.00	68.00	408.00	544.00	408.00	204.00
27-Jul	884.00	1496.00	204.00	2176.00	1564.00	340.00	340.00	272.00	680.00	204.00	408.00	408.00	170.00	544.00	544.00	136.00	68.00	408.00	340.00	136.00
10-Aug	680.00	952.00	136.00	952.00	816.00	272.00	340.00	272.00	306.00	340.00	1632.00	1904.00	1088.00	1632.00	1224.00	408.00	1292.00	1088.00	816.00	748.00
24-Aug	1428.00	1768.00	340.00	2312.00	1088.00	68.00	340.00	408.00	408.00	204.00	1360.00	2108.00	544.00	1632.00	1564.00	476.00	816.00	340.00	476.00	1768.00
7-Sep	2040.00	1904.00	2448.00	2176.00	1224.00	1224.00	1496.00	476.00	1904.00	816.00	1632.00	1904.00	1088.00	1632.00	1224.00	408.00	1292.00	1088.00	816.00	748.00
21-Sep	1360.00	2108.00	544.00	1632.00	1564.00	476.00	816.00	1632.00	748.00	1088.00	1428.00	1768.00	340.00	2312.00	1088.00	68.00	408.00	408.00	408.00	204.00
5-Oct	1292.00	2040.00	1904.00	2448.00	2176.00	1496.00	1224.00	1496.00	476.00	1904.00	1632.00	1632.00	1088.00	1496.00	1224.00	408.00	1292.00	952.00	816.00	748.00
Mean	952.00	1158.27	510.00	1400.80	1183.20	392.13	473.73	503.20	612.00	455.60	1051.73	1174.13	462.40	1328.27	1051.73	269.73	514.53	505.47	537.20	439.73
General mean	1040.85 a					487.33 b					1013.65 a					453.33 b				

LSD 0.05 = 149.045

Table (4): The measured Honey yield of the four races in the season of 2018

Date	Strains																			
	Hybrid camiola local					Hybrid Italian local					Egyptian (upper Egypt)					Egyptian (Alexandria)				
	1*	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
25-Mar	66.00	132.00	132.00	66.00	264.00	132.00	528.00	396.00	528.00	396.00	528.00	396.00	462.00	396.00	462.00	198.00	264.00	132.00	198.00	0.00
8-Apr	132.00	66.00	264.00	132.00	66.00	99.00	132.00	396.00	330.00	297.00	396.00	198.00	528.00	66.00	330.00	330.00	264.00	0.00	660.00	66.00
25-Apr	66.00	132.00	132.00	66.00	132.00	66.00	132.00	264.00	396.00	264.00	330.00	132.00	330.00	33.00	264.00	396.00	132.00	66.00	396.00	132.00
6-May	132.00	132.00	396.00	264.00	132.00	132.00	132.00	462.00	396.00	396.00	330.00	462.00	264.00	396.00	198.00	264.00	264.00	132.00	396.00	132.00
20-May	198.00	198.00	330.00	330.00	198.00	198.00	198.00	396.00	330.00	330.00	396.00	396.00	330.00	330.00	264.00	198.00	198.00	198.00	330.00	198.00
3-Jun	264.00	264.00	264.00	132.00	396.00	528.00	396.00	429.00	264.00	330.00	528.00	462.00	264.00	594.00	462.00	264.00	264.00	330.00	396.00	264.00
17-Jun	396.00	396.00	330.00	264.00	528.00	396.00	528.00	462.00	396.00	396.00	396.00	660.00	528.00	330.00	528.00	528.00	528.00	396.00	462.00	396.00
1-Jul	66.00	33.00	132.00	66.00	66.00	132.00	66.00	132.00	132.00	132.00	132.00	198.00	132.00	198.00	66.00	99.00	132.00	198.00	132.00	66.00
15-Jul	66.00	33.00	66.00	66.00	66.00	132.00	66.00	132.00	165.00	198.00	132.00	198.00	132.00	198.00	132.00	132.00	165.00	198.00	132.00	132.00
29-Jul	132.00	396.00	198.00	132.00	330.00	396.00	132.00	396.00	132.00	396.00	198.00	330.00	330.00	165.00	264.00	264.00	66.00	462.00	429.00	264.00
12-Aug	198.00	330.00	330.00	330.00	330.00	462.00	198.00	330.00	198.00	330.00	330.00	198.00	330.00	363.00	231.00	363.00	330.00	198.00	495.00	462.00
26-Aug	396.00	429.00	396.00	264.00	429.00	396.00	330.00	429.00	396.00	396.00	330.00	330.00	396.00	528.00	396.00	429.00	198.00	264.00	297.00	330.00
9-Sep	462.00	594.00	528.00	132.00	462.00	429.00	264.00	396.00	462.00	594.00	594.00	330.00	528.00	264.00	198.00	462.00	396.00	330.00	198.00	66.00
23-Sep	792.00	726.00	924.00	330.00	792.00	792.00	396.00	990.00	528.00	1056.00	660.00	1254.00	924.00	924.00	594.00	726.00	858.00	594.00	792.00	462.00
7-Oct	726.00	726.00	858.00	462.00	924.00	924.00	264.00	1056.00	726.00	1056.00	264.00	2112.00	1188.00	1452.00	924.00	132.00	462.00	660.00	792.00	198.00
Mean	272.80	305.80	352.00	202.40	341.00	347.60	250.80	444.40	358.60	437.80	369.60	510.40	444.40	415.80	354.20	319.00	301.40	277.20	407.00	211.20
General mean	294.80 c					367.84 b					418.88 a					303.16 c				

LSD 0.05 = 107.71

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المخلص العربي

دراسة مقارنة بين أربعة سلالات هجين محلية مختلفة لنحل العسل في بعض الأنشطة الحيوية

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١- قسم وقاية النبات-كلية الزراعة سا باباشا-جامعة الاسكندرية

٢-مركز البحوث الزراعية بالصبيحة-الاسكندرية

تمت هذه الدراسة بالمنحل التجريبي بمحطة بحوث الصباحية بالإسكندرية (٢٧.٢٨٣١ درجة شمالا و ٣٠.٧٦٣٢ شرقا) خلال موسمي ٢٠١٧ ، ٢٠١٨ باستخدام عشرين طائفة تحتوي على أربع مجموعات من سلالات هجين ، كل سلالة تحتوي على خمس مكررات. أجريت التجارب على أربعة طوائف من سلالات محلية هجين مختلفة وهم هجين إيطالي وهجين كارنيولي وهجين مصري من مصدرين مختلفين (صعيد مصر والإسكندرية). تم قياس العسل وحبوب اللقاح خلال موسمي ٢٠١٧ و ٢٠١٨. تم قياس العسل المخزن باستخدام إطار لانجستروث مقسم إلى بوصات مربعة بواسطة سلك لعشرين طائفة خلال موسمين ٢٠١٧ ، ٢٠١٨ والتي تشير إلى الكمية الإجمالية للعسل في الطوائف لكل موسم.

أظهرت البيانات المتحصل عليها أن أعلى متوسط محصول من العسل خلال موسم ٢٠١٧ كان الهجين كارنيولي المحلي ١٠٤٠.٨٥ (بوصة ٢) يليه الصعيد المصري ١٠١٣.٦٥ (بوصة ٢) ثم الهجين الإيطالي المحلي ٤٨٧.٣٣ (بوصة ٢) وأقل المتوسط كان الإسكندرية المصرية. بينما أظهرت البيانات في موسم ٢٠١٨ أن أعلى متوسط لإنتاج العسل كان في صعيد مصر ٤١٨.٨٨ (بوصة مربعة) يليه الهجين الإيطالي المحلي ٣٦٧.٨٤ (بوصة ٢) ثم الإسكندرية المصرية ٣٠٣.١٦ (بوصة مربعة) وأقل متوسط لإنتاج العسل سجلت خلال موسم ٢٠١٨ للهجين Carniolan المحلي ٢٩٤.٨٠ (بوصة مربعة) لكل طائفة.

تم حساب حبوب اللقاح المخزنة في الطوائف بواسطة إطار langstroth المقسم بالبوصة المربعة وتمت مقارنة مساحة حبوب اللقاح المخزنة في الطوائف العشرين.

أظهرت نتائج الدراسة الحالية أن حبوب اللقاح المجمع من السلالات المختارة خلال موسم ٢٠١٧ سجلت أعلى متوسط لحبوب اللقاح في الإسكندرية المصرية ١٤٢.٧٧ (بوصة ٢) تليها مصر العليا ١٠٩.٣١ (بوصة ٢) ثم الهجين كارنيولي المحلي ١٠٨.٠٧ (بوصة ٢) اطائفة وسجل أدنى متوسط لحبوب اللقاح في السلالة الهجين الإيطالية ٨٧.٨٢ (بوصة مربعة) اطائفة.

سجل أعلى متوسط عام لحبوب اللقاح خلال موسم ٢٠١٨ في الهجين الإيطالي المحلي ٢٠٢.٨٤ يليه صعيد مصر ٢٢١.٣٢ ثم الهجين محلي كارنيولي ١٩٠.٠٩ اطائفة وأدنى متوسط عام في الإسكندرية المصرية ١٨٣.٠٤ (بوصة مربعة) اطائفة .

ومن الملاحظ أن الهجين الكارنيولي تنتج كمية كبيرة من العسل المخزن والهجين المصري أعلى كمية من حبوب اللقاح المخزنة بصفة عامة.