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Some Modified Methods for Bee Propolis Production in Honeybee Colonies (Hymenoptera, *Apis mellifera* L.) under Egyptian Condition

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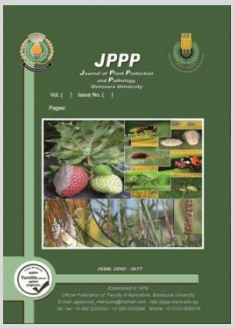

ABSTRACT

The current study was conducted to evaluate three different types of bee propolis-collection traps in propolis production in addition traditional method during the experimental period extended from July, 2017 until June, 2018. Two different locations were chosen for this study; New Valley governorate (El-Hindaw village, Dakhla region) and in Qalyubia governorate (Kalama village, Qalyub region). The results showed that, (Type2) trap "Hand-cut fiber screens with holes 1 mm." outperformed all other types of bee-collection traps in terms of the amount of bee propolis produced, followed by (Type 1) trap " Glass slides", then (Type 3) trap " Hand-cut plastic screens with holes 2 mm", while the lowest amount of bee propolis collected was in traditional method (hand collection). The results also revealed that, the highest amount of bee propolis collected was in July with an average of 11.19 and 5.96 gm/colony in the New Valley and Qalyubia governorates, respectively. Regarding the season**,** summer season significantly had the highest amounts of bee propolis produced with an average of 8.46 and 4.87 gm/colony, while the autumn season had the lowest amounts of bee propolis produced with an average of 1.61 and 0.83 gm/colony in the New Valley and Qalyubia governorates, respectively. It can be concluded that, the highest annual average of the collected bee propolis /colony was obtained with (Type, 2) trap 5.68 and 3.57 gm, while the lowest annual average was recorded in traditional method with an average of 3.75 and 1.93 gm/colony in the New Valley and Qalyubia governorates, respectively.

Keywords: Honeybee, *Apis mellifera*, bee propolis, bee glue, bee propolis-collection traps, Egypt.

INTRODUCTION

Bees have been on Earth for more than 125 million years, and to this day thanks in large part to chemistry and the application of the products that bees make: honey, beeswax, venom, pollen, royal jelly and propolis (aka bee glue), as the most important chemical weapon for bees against pathogenic microorganisms (Wollenweber *et al*., 1990).

Propolis is a term derived from the two Greek words: pro for " in front of " and polis for " community " or " city " and refer to material for the defense of the beehive against pathogens (Siheri et al, 2017). Honeybees workers make Propolis by gathered resin/gummy materials from different parts (branch, flowers, pollen and buds) of from several plant sources and modified in the bee hive by addition of salivate secretions, wax and pollen. (Eshbah *et al*., 2017). Due to the importance of propolis to the bee colony, bee work hard to collect raw resinous substance From the available sources, The collection process takes a long time during which the bee may need to visit the hive for feeding. A single bee can carry about 10 mg of propolis in pollen baskets on its hind legs (Ghisalberti, 1979; Konig, 1985)

Propolis has been used by Egyptian since early times where, Egyptians knew very well the antiputrefactive properties of propolis and used it to mummifying corpses and used as medicine. Egyptians, Greeks and Romans used propolis to treat some diseases (Sforcin and Bankova, 2011; Toreti *et al*., 2013). Propolis has been used in traditional medicines for thousands of years, until Today, propolis is a popular remedy in all over the world, and is available in either pure form or combined with other natural products in over-the-counter preparations, cosmetics, and as a constituent of health foods.(Oryan *et al*, 2018; Bankova *et al*., 2019).It is used in many applications especially as antimicrobial and antioxidant activities, propolis has important applications in the field of medicine as a raw material in drug formulation and in the food industry as a supplement (Choi *et al*., 2006; Souza *et al*, 2016).Recent certain years, researchers interested in the chemical components and biological activities of bee propolis because of its remedial properties (Bassani-Silva *et al*, 2007; Bankova et. al., 2014; Mountford *et at*, 2021). Propolis usually contains vegetation resin and balsam (50%), wax (30%), essential and aromatic oils (10%), pollen (5%) and other substances (5%) (Monti *et al*., 1983; Cirasino et *al*., 1987).

Multiple factors affecting of Propolis Yield quantity and quality. These variables such as the botanical source of resin, honey bee genetics, colonies strength, hive structure, food availability, environmental factors, and disease (Battagiini et al., 1987; Isidorov *et al*., 2014; Becerra *et al*., 2019; Mountford *et al* 2021) .

Traditional method of collected Propolis by scraping frames and boxes that is labor intensive and does not provide pure propolis and large amounts (Clay, 2002) Propolis was first produced on a commercial scale in the 1950s. It has been produced by a grid or grids, with holes about 2 mm. (Crane, 1997).

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The average production of propolis per colony per year has been described as 10 to 300g but the production depends on the bees, the forest resources, the climate and the trapping mechanism (Ochi, 1981). Under Egyptian condition, the average amount of bee propolis gathered in winter by honey bee was 2.92 g/colony, representing 18.68 %, In Spring was 4.56 g/colony, representing 29.15%, in summer is 6.71 g/colony, representing 42.9 % and in autumn is 1.45 g/colony representing 9.26 % of the propolis production per year (Fathy *et al*, 2017). The most commonly used collection methods employ special traps placed on top of a hive, below the covers or next to lateral walls inside the hives so that bees do not mix wax with the propolis and no contamination occurs during harvesting. Propolis traps work on the instinct of honey bees in bridging cracks where the Trap are screens with small holes which simulate cracks in the hive walls. Honey bee worker try to seal the holes and fill the trap with propolis (Clay, 2002). The aim of current study is evaluate different types of bee propolis collection traps in propolis production under Egypt condition in New Valley and Qalyubia governorates.

MATERIALS AND METHODS

1- Honey Bee Colonies:

Thirty two honeybee colonies of *Apis mellifera carnica* were used in this study during the experimental period which extended from July,2017 to June, 2018.The honeybee colonies were similar in colony strength, each colony had 4-5 brood combs, 2-3 honey and pollen combs and 7-8 combs of bees, they were divided into eight different groups, four groups in each location; New Valley and Qalyubia governorates, each group had four honeybee colonies (replicates). The amounts of bee propolis collected from each honeybee colony from each region were determined monthly and Tabled for all the experimental groups.

2-Bee propolis- collection traps:

Three different types of bee propolis- collection traps were evaluated in this study comparing with traditional method (hand collection), as follows:

1. **Glass slides trap (type, 1):** Bee propolis-collection trap (Breyer, 1995) by a modified method briefly, using transparent glass slides ,with 48 cm length and 6 cm width and 6 mm thickness, they were placed contiguously on the upper band of the combs inside the honeybee hive, with a space between slides of 2mm . So, seven glass slides were put in honeybee hive containing 10 combs
2. **Hand-cut fiber screens with circular holes in a diameter of 1 mm**. **trap (type, 2)**: fiber mesh sheets (45 X 35 cm) were sated into the top bar of the combs inside the honeybee hive.
3. **Hand-cut polypropylene plastic screens with round holes in diameter of 2 mm. trap (type, 3):** Plastic mesh sheets (45 X 35 cm) were sated into the top bar of the combs inside the honeybee hive.
4. **Traditional method (hand collection):** Propolis is collected at the hive entrance (where bees narrow the entrance to the hive in winter) and from the sides of the upper frames or from under the inner covering, because the honeybees hold the parts of the hive together. If the propolis is soft, collect it by fingers, if the propolis is hard, collect it by scraping with a putty knife (blade width is 2 inches) The propolis crop is placed in a dark glass bottle and then kept in the refrigerator until use. They were divided into eight different groups, each group with four traps.

3-Propolis Harvesting:

The bee Propolis collection traps were left in the experimental honeybee colonies in each group for bee propolis collection for one month, at then they were removed to collect bee propolis and replaced by another one for another month, respectively. The same technique was repeated for a year. The bee propolis produced from each honeybee colony for each group was weighted separately, stored\ in a bottle and transferred into a bottle deep freezer until used for further experiments.

4-Statistical analysis

The obtained results were subjected to statistical analysis according to factorial combination treatments in 4 randomized complete blocks design. Mean values will be tagged with alphabets, where any tow mean values sharing an alphabet are to be considered not significantly different. . Spreadsheet capabilities of SPSS statistical package will be the vehicle for the analysis of variance (ANOVA) for the abovementioned analyses**.**

RESULTS AND DISCUSSION

1- Bee propolis production in New valley governorate

Data presented in Table (1) indicated that, total and average amount of bee propolis produced by different types of bee propolis-collection traps during different months in New Valley governorate in 2017 and 2018. The results revealed that, the annual average amounts of bee propolis (gm) collected by bee propolis-collection traps and traditional method was 5.68, 4.61, 4.05 and 3.75 gm./colony for Type (2) trap (fiber screen with holes 1 mm), Type (1) trap (Glass slides), Type (3) trap (Plastic screen with holes 2 mm) and traditional method respectively .It can be obviously concluded that, the three bee propolis-collection traps could significantly differed from the traditional method as averaged across the months of the whole year. The four bee propolis- collection traps can be arranged in the following descending order of Type (2) > Type (1) > Type (3) > traditional method.

In conclusion, Type (2) trap could surpass types (1 and 3) traps and traditional method in accumulating the highest significant amount of honeybee propolis in all months of the 2017/2018 in the first location of the New Valley area and the highest month was July.

Data in Table (2) show, the seasonal performance of bee propolis production. It is obvious that the accumulation of propolis production was more active during the summer season, while it was the lowest during autumn. The average amounts of bee propolis collected (gm) was 8.46, 1.61, 3.2 and 4.52 (gm) during summer, autumn, winter and spring seasons, respectively.

The data summarized that, summer season significantly had the highest amounts of bee propolis produced, followed by spring season then winter season, meanwhile the autumn season had the lowest amount of propolis produced (Table, 2).

Table 1. Total and average amounts of bee propolis collected gm by different bee propolis-collection traps in El-Hindaw village, Dakhla region, New Valley governorate during different production month 2017/2018.

Month/year	Bee propolis-collection trap				Average amount of bee propolis produced gm
	Type 1	Type 2	Type 3	Traditional method	
July, 2017	(46.29) 11.57 ±0.21 b	(54.67) 13.67 ± 0.15 a	(41.99) 10.50 ±0.17 c	(36.1) 9.02 ±0.37 d	11.19 *a*
August, 2017	(37.68) 9.42 ±0.09 b	(46.74) 11.69 ± 0.11 a	(33.15) 8.29 ±0.31 c	(32.27) 8.07 ±0.18 c	9.37 *b*
September, 2017	(19.74) 4.93 ±0.14 ab	(22.26) 5.56 ± 0.26 a	(17.87) 4.47 ±.21 b	(17.22) 4.31 ±.2 b	4.82 *d*
October, 2017	(8.01) 2.00 ±0.1 ab	(11.39) 2.85 ± 0.16 a	(7.41) 1.85 ±0.09 b	(6.89) 1.72 ±0.2 b	2.11 h
November, 2017	(4.41) 1.10 ±0.07 ab	(6.69) 1.67 ±0.15 a	(3.01) 0.75 ±0.07 a	(2.63) 0.66 ±0.12 b	1.05 i
December, 2017	(6.07) 1.52 ±0.11 a	(8.2) 2.05 ±0.12 a	(6.73) 1.68 ±0.1 a	(6.03) 1.51 ±0.21 a	1.69 h
January, 2018	(6.81) 1.70 ±0.1 b	(12.07) 3.02 ±0.12 a	(6.65) 1.66 ±0.08 b	(5.57) 1.39 ±0.18 b	1.94 h
February, 2018	(16.48) 4.12 ±0.17 b	(20.52) 5.13 ±0.08 a	(15.2) 3.82 ±.2 b	(14.3) 3.57 ±0.21 b	4.16 *e*
March, 2018	(14.04) 3.51 ±0.23 b	(18.26) 4.57 ±0.23 a	(12.19) 3.05 ±0.32 b	(11.51) 2.88 ±0.25 b	3.50 f
April, 2018	(12.74) 3.19 ±0.15 ab	(15.74) 3.94 ±0.12 a	(8.85) 2.21 ±0.13 bc	(7.92) 1.98 ±0.27 c	2.83 *g*
May, 2018	(21.66) 5.41 ±0.17 a	(24.77) 6.19 ±0.19 a	(17.48) 4.37 ±0.18 b	(16.36) 4.09 ±0.22 b	5.02 *d*
June, 2018	(27.1) 6.78 ±0.12 b	(31.19) 7.80 ±0.28 a	(23.99) 6.00 ±0.38 b	(23.39) 5.85 ±0.3 b	6.61 *c*
Total amount of bee propolis produced gm	(221.03) 55.26	(272.51) 68.13	(194.62) 48.65	(180.18) 45.05	
Average amount of bee propolis produced gm	4.61 b	5.68 a	4.05 c	3.75 d	4.52
L.S.D	Treatments 0.26			Months 0.46	

Type (1) Glass slides
Type (2) Hand-cut fiber screens with circular holes in a diameter of 1 mm.
Type (3) Hand-cut polypropylene plastic screens with round holes in diameter of 2 mm.
Traditional method (hand collection).
Values between brackets are the total amounts of bee propolis produced.

Table 2. Total and average amounts of bee propolis collected gm by different bee propolis collection traps in in El-Hindaw village, Dakhla region, New Valley governorate during different production seasons 2017/2018

Bee propolis - collection trap	Season				Total amount of bee propolis produced gm	Average amount of bee propolis produced gm
	Summer	Autumn	Winter	Spring		
Type 1	(25.93) 8.64 ± 0.09 b	(4.62) 1.54 ± 0.07 b	(9.33) 3.11 ± 0.13 b	(15.37) 5.13 ± 0.13 b	(221.03) 55.26	4.61 b
Type 2	(30.92) 10.31 ± 0.1 a	(6.57) 2.19 ± 0.12 a	(12.71) 4.24 ± 0.11 a	(17.7) 5.98 ± 0.18 a	(272.51) 68.13	5.68 a
Type 3	(23.25) 7.75 ± 0.19 c	(4.29) 1.43 ±0.08 b	(8.53) 2.84 ± 0.07 b	(12.58) 4.19 ± 0.23 c	(194.62) 48.65	4.05 c
Traditional method	(21.4) 7.13 ± 0.22 d	(3.89) 1.3 ± 0.17 b	(7.85) 2.62 ± 0.41 b	(11.92) 3.97 ± 0.22 c	(180.18) 45.05	3.75 d
Average amount of bee produced propolis gm	8.46 a	1.61 d	3.20 c	4.82 b		4.52
LSD 5%			0.26			

Type (1) Glass slides
Type (2) Hand-cut fiber screens with circular holes in a diameter of 1 mm.
Type (3) Hand-cut polypropylene plastic screens with round holes in diameter of 2 mm.
Traditional method (hand collection)
Values between brackets are the total amounts of bee propolis produced

2- Bee propolis production in Qalyubia governorate

Data in Table (3) showed that, the total and average amounts of bee propolis produced (gm) by different types of bee propolis-collection traps during different months in Qalyubia governorate in 2017 and 2018.The results indicated that the annual average amounts of bee propolis (gm) collected by the bee propolis- collection traps and traditional method was 3.57, 2.81, 2.32 and 1.93 gm/colony for Type (2, 1 and 3) and traditional method respectively. Significant differences were recorded in bee propolis produced between the evaluated traps, where the type (2) trap significantly produced the highest amount of bee propolis, while the lowest amount was recorded in traditional method. The four propolis traps can be arranged in the following descending order of Type (2) > Type (1) > Type (3) > traditional method (Table, 3).In conclusion, Type (2) trap could surpass Type (1, 3) and traditional method and the highest amounts of bee propolis produced was during July month.

Table 3. Total and average amounts of bee propolis collected gm by different bee propolis- collection traps in Kalama village, Qalyub region, Qalyubia governorate during different production Month 2017/2018

Month/ year	Bee propolis-collection trap				Average amount of bee propolis produced gm.
	T1	T2	T3	Traditional method	
July, 2017	26.00 6.50 ±0.24 b	32.05 8.01 ±0.3 a	20.05 5.01 ±0.39 c	17.19 4.30 ±0.34 c	5.96 a
August, 2017	19.21 4.80 ±0.14 b	24.95 6.24 ±0.14 a	19.29 4.82 ±0.34 b	15.20 3.80 ±0.4 c	4.92 b
September, 2017	15.15 3.79 ±0.12 ab	17.44 4.36 ±0.27 a	14.05 3.51 ±0.28 b	13.28 3.32 ±0.52 b	3.74 d
October, 2017	4.14 1.04 ±0.09 ab	6.01 1.50 ±0.14 a	2.01 0.50 ±0.09 b	1.89 0.47 ±0.05 b	0.88 hi
November, 2017	2.52 0.63 ±0.09 a	4.01 1.00 ±0.09 a	1.57 0.39 ±0.06 a	1.31 0.33 ±0.05 a	0.59 j
December, 2017	4.40 1.10 ±0.11 ab	5.81 1.45 ±0.11 a	3.64 0.91 ±0.12 ab	2.41 0.60 ±0.12 b	1.02 h
January, 2018	6.31 1.58 ±0.15 b	9.68 2.42 ±0.17 a	5.57 1.39 ±0.18 b	3.66 0.92 ±0.07 b	1.58 g
February, 2018	8.95 2.24 ±0.17 ab	12.01 3.00 ±0.22 a	8.75 2.19 ±0.21 b	7.52 1.88 ±0.2 b	2.33 f
March, 2018	9.60 2.40 ±014 ab	12.60 3.15 ±0.16 a	7.36 1.84 ±0.14 bc	6.00 1.50 ±0.19 c	2.22 f
April, 2018	7.78 1.95 ±0.08 ab	9.99 2.50 ±0.17 a	6.08 1.52 ±0.21 b	5.30 1.32 ±0.08 b	1.82 g
May, 2018	12.57 3.14 ±0.13 b	16.18 4.04 ±0.07 a	8.76 2.19 c±0.2	7.64 1.91 ±0.19 c	2.82 e
June, 2018	18.40 4.60 ±0.18 a	20.55 5.14 ±0.18 a	14.12 3.53 b±0.29	11.22 2.81 ±0.19 b	4.02 c
Total amount of bee propolis produced gm	135.05 33.76	171.26 42.81	111.26 27.81	92.61 23.15	
Average amount of bee propolis produced gm	2.81 b	3.57 a	2.32 c	1.93 d	2.66
L.S.D		Treatments 0.21		Months 0.36	

Type (1) Glass slides
Type (2) Hand-cut fiber screens with circular holes in a diameter of 1 mm.
Type (3) Hand-cut polypropylene plastic screens with round holes in diameter of 2 mm.
Traditional method (hand collection)
Values between brackets are the total amounts of bee propolis produced

The results in Table (4) cleared that, the seasonal performance of bee propolis production in Qalyubia governorate. It is obvious that the accumulation of propolis production was more active during the summer season, while it was the lowest during autumn season. The average amounts of bee propolis collected (gm) was 4.78, 0.83, 2.04 and 2.89 (gm) during summer, autumn, winter and spring seasons, respectively.

The data indicated that Summer season significantly had the highest amount of bee propolis produced, followed by spring season, then winter season, meanwhile the autumn season had the lowest amount of propolis produced (Table ,4)

Table 4. Total and average amounts of bee propolis collected gm by different bee propolis- collection traps in Kalama village, Qalyub region ,Qalyubia governorate during different production Season 2017/2018

Bee propolis collection- trap	Season				Total amount of bee propolis produced (gm.)	Average amount of bee propolis produced (gm.)
	Summer	Autumn	Winter	Spring		
T1	15.09 5.03 ± 0.16 b	2.76 0.92 ±0.03 ab	6.22 2.07 ± 0.15 b	9.69 3.23 ± 0.12 a	135.05 33.76	2.81 b
T2	18.51 6.20 ± 0.19 a	3.96 1.32 ± 0.08 a	8.57 2.86 ± 0.14 a	11.68 3.89 ± 0.14 a	171.26 42.81	3.57 a
T3	13.35 4.45 ± 0.33 c	1.81 0.6 ±0.06 b	5.42 1.81 ± 0.16 bc	7.24 2.41 ± 0.23 b	111.26 27.81	2.32 c
Traditional method	11.42 3.81 ± 0.39 d	1.4 0.47 ± 0.07 b	4.29 1.43 ± 0.15 c	6.04 2.01 ± 0.13 b	92.61 23.15	1.93 d
Average amount of bee produced propolis (g)	4.87 a	0.83 d	2.04 c	2.89 b		2.66
LSD 5%			0.21			

Type (1) Glass slides
Type (2) Hand-cut fiber screens with circular holes in a diameter of 1 mm.
Type (3) Hand-cut polypropylene plastic screens with round holes in diameter of 2 mm.
Traditional method (hand collection)
Values between brackets are the total amounts of bee propolis produced

The four propolis traps can be arranged in the following descending order of Type 2 > 1 > 3 > traditional method. This finding was supported by those by Tsagkarakis *et al*., (2017) who evaluated the effect of the trap types on the quantity of propolis collected by honeybees, Results show that two hand-cut screens with smaller openings (1 × 1 mm and 2 × 2 mm) collected significantly more.

The obtained results shows that the highest significant moth for propolis accumulation was July month followed by August month and preceded by June month. Whereas the lowest month was November preceded by October and followed by December and January months. This finding coincides with that found by Ra'ed *et al*. (2008) who found that lateral side modification could give the highest propolis accumulation in both locations in August. In addition, Fathy *et al*. (2017) traced propolis collection at Sakha, Kafr Elsheikh governorate, Egypt during the period January to December 2014 in response to two hybrid bee races; Craniolan and Italian. They observed that the lowest accumulation of propolis was in November month , while the highest value was in July month . The latter finding agrees firmly with our finding which tells that the highest value of propolis collection was in July.

From Table (2 and 4) it can concluded that, the best season for propolis production was during Summer season, while the least production was during autumn season .The four seasons can be ranked in the following descending order of Summer > Spring > Winter > Autumn. This agrees with the finding by Fathy et al. (2017) who stated that propolis

collection at Sakha peaked high in Summer, but it was low in autumn season. but This disagrees

with the finding by Ayoub *et al* (1982) The four seasons can be ranked in the following descending order of Summer > Spring > Autumn > Winter .

Summary and conclusions

To sum up, results concluded that, three bee Propolis- collection traps (glass plates, fiber net, and plastic net) were evaluated in current study for bee propolis production in different locations in Egypt during the year 2017-2018. The locations were the New Valley and the Qalyubia governorate. The bee propolis- collection traps were arranged in factorial combinations in four randomized complete blocks. The major objective of the current study was to pinpoint which bee Propolis- collection traps is the best in this regard. The study that, the bee Propolis-collection traps could be ranked in the descending order of Fiber net > glass slides > plastic net > traditional method and the most appropriate month for bee propolis production was July and August , and the best season is the Summer.

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بعض الطرق المعدلة لإنتاج بروبوليس النحل في طوائف نحل العسل (Hymenoptera, *Apis mellifera* L) تحت الظروف المصرية

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اجريت الدراسة الحالية لتقييم ثلاثة أنواع مختلفة من مصائد جمع بروبوليس النحل في إنتاج البروبوليس بالإضافة إلى الطريقة التقليدية (الجمع باليد) تحت الظروف المصرية خلال الفترة التجريبية الممتدة من يوليو ٢٠١٧ حتى يونيو ٢٠١٨. تم اختيار موقعين مختلفين لهذه الدراسة ؛ محافظة الوادي الجديد (قرية الهنداو- مركز الداخلة) وفي محافظة القليوبية (قرية قلما - مركز قليوب). وأظهرت النتائج أن مصيدة البروبوليس من النوع (٢) (الشبك الفيبر : شاشات فبر بفتحات دائرية بقطر ١ مم مقطوعة يدويا بطول ٤٥ سم وعرض ٣٥ سم) تفوقت بمعنوية على جميع أنواع مصائد جمع بروبوليس النحل الأخرى من حيث كمية البروبوليس المنتجة ، تلاها المصيدة من النوع (١) (مصيدة الشرائح الزجاجية : شرائح زجاجية شفافة بطول ٤٨ سم وعرض ٦ سم وسماكة ٦مم) ، ثم المصيدة من النوع (٣) (مصيدة الشبك البلاستيكية : شاشات بلاستيكية بفتحات دائرية بقطر ٢ مم مقطوعة يدويا بطول ٤٥ سم وعرض ٣٥ سم)، بينما كانت أقل كمية من بروبوليس النحل التي جمعت بالطريقة التقليدية (الجمع اليدوي) . وكشفت النتائج أيضا أن أكبر كمية من بروبوليس النحل التي تم جمعها كانت في شهر يوليو بمتوسط ١١,١٩ و ٥,٩٦ جم/طائفة في محافظتي الوادي الجديد والقليوبية على التوالي. وفيما يتعلق بالموسم ، تفوق موسم الصيف بمعنوية حيث حقق أعلى كميات من بروبوليس النحل المنتج بمتوسط ٨,٤٦ و ٤,٨٧ جم/طائفة ، في حين حقق موسم الخريف أقل كميات من بروبوليس النحل المنتج بمتوسط ١,٦١ و ٠,٨٣ جم/طائفة في محافظتي الوادي الجديد والقليوبية على التوالي. ويمكن الإستنتاج أن أعلى متوسط إنتاج سنوي لبروبوليس النحل /الطائفة تم الحصول عليها مع استخدام المصيدة (نوع , الثاني) ٥,٦٨ و ٣,٥٧ جرام / طائفة ، في حين تم تسجيل أدنى متوسط سنوي لإنتاج البروبوليس في الطريقة التقليدية (الجمع اليدوي) بمتوسط ٣,٧٥ و ١,٩٣ جرام / طائفة في محافظتي الوادي الجديد والقليوبية على التوالي.