Minia J. of Agric. Res. & Develop.
Vol. (37), No. 2, pp. 281-295, 2017

FFECT OF EXTERNAL FACTORS ON PROPOLIS COLLECTED BY HONEYBEE COLONIES *APIS MELLIFERA*L .IN LUXOR REGION, UPPER EGYPT

Eshbah H. M.; A. R. Hassan, and Abu El Hassan M. A. Ibrahim

Received: 12April (2017) Accepted: 15 June. (2017)

ABSTRACT

The present work was carried out in three private apiaries in Luxor governorate, Egypt. The conducted trials were extended over two successive years (July 2013-June 2015). In this study propolis was collected monthly and weighed. Collection process included scarping propolis by a sharp knife from the top of the frames .The obtained results showed that the highest collection months were May, June and July, while lowest months were October, November and December, respectively. The location of the apiary was an important factor as found Qurna district which the bees collected more propolis than Menshah and Bearaat districts, which the general means of districts were 2.85, 1.57 and 1.22 g/colony/year, respectively, in the first season 2013/2014, while in the second season 2014/2015 they were 3.57, 3.10 and 2.06 g/colony/year, for the Bearaat, Qurna and Menshah districts, respectively. Statistical analysis showed significant differences among all months in Bearaat district except November, they were significant differences among all months in Qurna district except August, March, May and June, also they were significant differences among all months in Menshah district except July, October and January.

The results of external factors effect in summer for first season 2013/2014 indicated that the highest total number of bees were 22, 20 and 19 bees at 8.00 am for Bearaa, Qurna and Menshah districts, respectively, it observed the bees were carrying propolis were 5 and 5 bees at 8.00 am for Qurna and Menshah districts, but they were 4 bees were carrying propolis at 2.00 pm for Bearaat district, when the temperature was 31.5 degree and relative humidity was 25.5 %.

In the second season 2014/2015 which showed that the highest total number of bees were 13, 14 and 10 bees at 8.00 am for Bearaat, Menshah and Qurna districts , respectively, it observed the bees were carrying propolis were 5, 2 and 1 bees at 8.00 am for Bearaat, Qurna and Menshah district. When the temperature was 32.57 degree and relative humidity was 23.87 %.

Key words: honeybee propolis collection, temperature, Relative humidity

INTRODUCTION

It is documented fact that propolis is another bee product that is useful for people consumption .The word itself originated from latin: "pro" meaning before, or "in front of "and "polis" meaning "city". This name comes from some early Greek study that discovered that honeybees use propolis to narrow the opening into their city –hives .This word stays similar in most world languages.

Propolis (bee glue) is a complex mixture, formed from resinous and balmy material collected from bees from parts of plants (branch, flowers, pollen and buds) and modified in the bee hive byaddition of salivate secretions and wax (Ghisalberti, 1979; Pereira *et al.,* 2003). Before it used in the hive, honey bee take this sap, combine it with nectar found in their own secretions and eventually end up with amixture consisting of wax, pollen and bee bread. For this reason, just chewing on awad of tree resin will not produce the same therapeutic results as propolis .Bees must transform the resin into propolis. (Rita Elkings, 1996).

MATERIALS AND METHODS

The present study was carried out in three private apiaries in Luxor governorate, Egypt. The trials of the study were conducted through two successive years from July 2013 to June 2015 as follows:

2.1. Propolis collection and sampling

For studying propolis gathering activity and antimicrobial activity, five honeybees colonies with equal strength for each apiary (*Apis mellifera* L.) were chosen, each was headed by a mated queen of similar age .Propolis was gathered monthly and weighed during 2013/2014 and 2014/2015 seasons. Collection process included scarping propolis by a sharp scraping knife from the end of the bars of the frames and the inner wall of the hives. For every treatment the collected Propolis samples were put in a small nylon bags and weighted then kept in refrigerator until analyzed as mentioned by Muszynska *et al*. (1985).

2.2. Effect of external factors:

By caging on bees after closing the hive entrance and counting the bees carring propolis, pollen and nectar (hand refractometer ranged from zero to hundred degree) to determine that the bees carrying nectar or water. This experiment was done four times annually (summer, autumn, winter and spring) in addition to recording the temperature and relative humidity from central laboratory for agriculture climate. (www.caaes.org)

3. Statistical analysis:

The obtained data was statistically analyzed through application of one-way analysis of variance. Differences among treatment means were compared through using the least significant difference (LSD) test according methods of Mead *et al*., (1993).

RESULTS AND DISCUSSION

2.1. Propolis collection and sampling

The obtained results in Table (1) that illustrated in Fig. (1) showed that the highest collection month was

June., 2014, while lowest month was October., 2013. In Qurna district the bees collected more propolis than Menshah district then Bearaat district, which the general means of showed were 2.85, 1.57 and 1.22 g/colony/year, respectively, in the first season 2013/2014. In the second season 2014/2015 the general means were 3.57, 3.10 and 2.06 g/colony/year, respectively, for Bearaat, Qurna and Menshah districts, respectively, with significant differences among all months in Bearaat district except November, while the differences were significant among all months in Qurna district except August, March, May and June, also they were significant differences among all the amounts of propolis collected in months of Menshah district except July, October and January. The highest monthly mean quantities of propolis were collected in June, July and August which showed 3.37, 3.55 and 3.48 g/colony/month, when the max temperature were 40.6, 39.5 and 40.2, respectively.

These results were came inagreement with Ashour, (1989) who cleared that the amount of propolis collected increase during warm and hot seasons (1.4-3.9g/hive/month) which could be obtained during the months from May to September, while lower amounts (0.185-0.582 g/hive/month) were obtained in cold weather through December to January.

2.2. Effect of external factors:

Data presented in table (3) and illustrated in fig. (3) indicated that the results of external factors effect in summer for first season 2013/2014 indicated that the highest total number of bees were 22, 20 and 19 bees at 8.00 am for Bearaat, Qurna and Menshah districts, respectively, it observed the bees were carrying propolis were 6.7 and 6.3 bees at 8.00 am for Qurna and Menshah districts, but they were 4.7 bees were carrying propolis at 2.00 pm for Bearaat district, when the temperature was 31.5 degree and relative humidity was 25.5 %.

In the second season 2014/2015 which showed that the highest total number of bees were 13, 14 and 10 bees at 8.00 am for Bearaat, Menshah and Qurna districts , respectively, it observed the bees were carrying propolis were 3.0, 2.0 and 1.0 bees at 8.00 am for Bearaat , Qurna and Menshah district. when the temperature was 32.57 degree and relative humidity was 23.87 % .

In autumn of the first season 2013/2014 table (4) and illustrated in fig. (4) showed that the highest total number of bees were 17 and 18 bees at 8.00 am for Bearaat and Menshah districts , respectively, it observed the bees were carrying propolis were 1.7 and 2.7 bees at 8.00 am for Bearaat and Menshah districts , when the temperature was 21.27 degree and relative humidity was 40.37 % .

Table (1): Quantity of propolis collected (g/colony/month) by honey bee colonies from different districts in 2013 / 2014season in Luxor Governorate.

Districts	2013						2014						General mean
	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	
Bearaat	1.99b	1.04b	0.63b	0.17b	0.31b	0.29b	0.38b	0.46b	0.46b	0.36b	1.07b	7.44a	1.22
Qurna	7.08a	6.50a	4.45a	3.85a	2.45a	0.52b	1.43a	1.28b	1.62a	0.57b	3.21b	1.27b	2.85
Menshah	1.57b	2.91b	1.25b	0.61b	0.44b	1.63a	0.30b	1.70a	1.32b	1.54a	4.17a	1.39b	1.57
Monthly mean quantity	3.55	3.48	2.11	1.54	1.07	0.81	0.70	1.15	1.13	0.82	2.81	3.37	
max temperature	39.5	40.2	38.7	33.0	30.1	23.5	24.7	26.2	30.1	35.9	38.6	40.6	
Mean temperature	32.1	31.1	31.3	25.4	22.7	15.7	16.2	18.0	22.4	27.8	30.1	32.3	
Mean Relative humidity (%)	24.7	24.0	27.8	33.2	41.9	46.0	39.9	35.9	32.6	20.0	18.0	19.4	
L.S.D at 5%	1.25	2.34	1.44	0.53	0.43	0.57	1.00	0.83	0.64	0.58	1.67	1.32	

Table (2): Quantity of propolis collected (g/colony/month) by honey bee colonies from different districts in 2014 / 2015 season in Luxor Governorate.

Districts	2014						2015						General mean
	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	
Bearaat	13.44a	4.05b	2.26b	1.53b	0.52b	2.37a	2.63a	3.25a	2.43b	1.88a	3.25b	5.17a	3.57
Qurna	3.50b	5.17a	3.26a	0.90b	0.40b	2.32b	5.17a	9.03a	1.86b	1.23a	2.26b	2.08b	3.10
Menshah	1.69b	0.89b	2.46b	1.07b	0.97a	0.31b	0.59a	0.60a	2.75a	3.15a	5.37a	4.86b	2.06
Monthly mean quantity	6.21	3.37	2.66	1.16	0.63	1.66	2.80	4.29	2.35	2.09	3.63	4.04	
Max temp.	41.2	41.2	37.4	33.8	28.4	25.5	22.1	25.3	30.3	32.4	38.3	39.9	
Mean temp.	33.6	33.2	30.9	26.6	20.7	18.2	14.2	17.5	22.4	24.0	30.0	32.0	
Mean Relative humidity	21.4	23.0	27.2	30.7	41.4	50.1	44.5	35.9	27.0	20.8	18.3	20.8	
L.S.D at 5%	2.37	1.53	1.41	0.64	0.19	0.77	1.08	1.24	0.84	0.54	1.38	1.49	
L.S.D (over 2 seasons)	1.38	1.61	1.096	0.49	0.26	0.60	0.85	0.82	0.55	0.4	1.14	1.45	

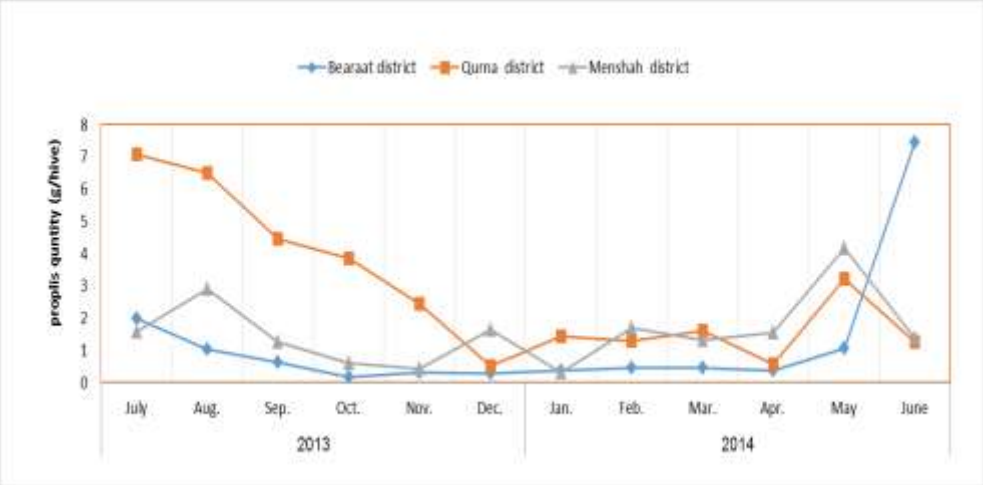

Fig. (1): Quantity of propolis collected (g/colony/month) by honey bee colonies from different districts of 2013/ 2014season in Luxor governorate

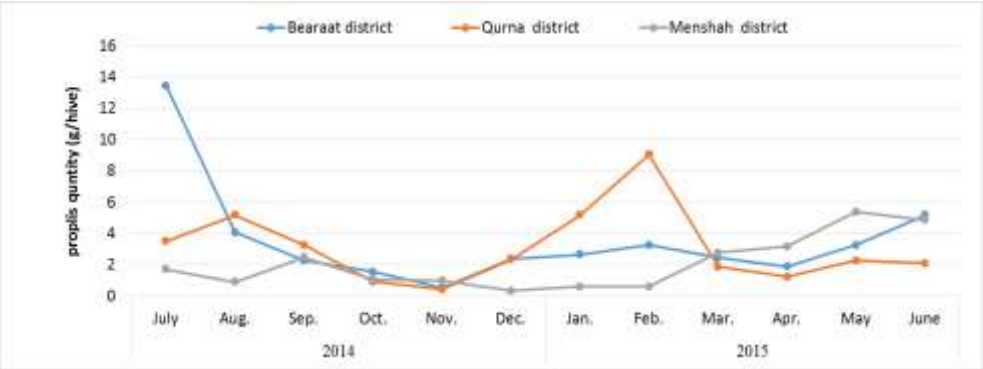

Fig. (2): Quantity of propolis collected (g/colony/month) by honey bee colonies from different districts in 2014 / 2015season in Luxor governorate

The same trend was observed in the second season 2014/2015, when the temperature was 21.77 degree and relative humidity was 43.60 %. These results were came in agreement with Jachimowicz, (1978) who mentioned that the bees collected propolis on warm days with temperature of more than 20 degree and only from 10 am to 3 pm especially in late summer and in autumn, and also with EL-Morsy, (2003) who stated that the amount of collected propolis was increased by increasing the temperature through spring and summer season. The collected amount every month was nearly 1.2-3.4 g/hive through summer season, while in winter the obtained amount was about 0.186-0656 g/hive.

Table (3): The effect of certain external factors on propolis collection in summer during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

Location actor (A)	Time factor (B)	Total no .of bees	No. of nectar forager	No. of pollen forager	No. of Propolis forager	Temp.	Relative humidity
First season 2013/2014							
Bearaat district	8.00 am	22.0	7.3	6.0	4.0	31.5	25.5
	2.00 pm	16.0	4.3	4.0	4.7	31.5	25.5
	4.00 pm	19.0	7.3	6.3	1.3	31.5	25.5
Qurna district	8.00 am	20.0	7.0	1.0	6.7	31.5	25.5
	2.00 pm	10.0	5.0	3.7	4.7	31.5	25.5
	4.00 pm	7.0	3.7	1.3	1.0	31.5	25.5
Menshah district	8.00 am	19.0	7.7	2.3	6.3	31.5	25.5
	2.00 pm	9.0	3.0	1.0	4.7	31.5	25.5
	4.00 pm	12.0	6.0	3.0	1.0	31.5	25.5
L.S.D (A)		2.0	-	2.1	-		
L.S.D (B)		3.8	2.5	2.5	2.6		
Second season 2014/2015							
Bearaat district	8.00 am	13.0	4.3	0.3	3.0	32.6	23.9
	2.00 pm	7.0	4.0	1.3	2.0	32.6	23.9
	4.00 pm	5.0	2.3	1.3	1.0	32.6	23.9
Qurna district	8.00 am	7.0	4.7	0.7	2.0	32.6	23.9
	2.00 pm	10.0	5.3	2.7	2.0	32.6	23.9
	4.00 pm	9.3	4.3	1.3	1.0	32.6	23.9
Menshah district	8.00 am	14.0	6.3	4.0	1.0	32.6	23.9
	2.00 pm	10.0	6.0	5.3	1.0	32.6	23.9
	4.00 pm	11.0	4.7	2.3	0.0	32.6	23.9
L.S.D (A)		4.6	3.1	1.1	-		
L.S.D (B)		3.4	1.9	2.4	2.5		

Data presented in table (5) and illustrated in Fig. (5) indicated that the results of external factors effect in winter for first season 2013/2014 indicated that the highest total number of bees were 5, 4 bees at 8.00 am for Bearaat and Menshah districts, respectively, it observed the bees were carrying propolis were 1.3 and 0 bees at 2.00 pm for Qurna and Menshah districts, when the temperature was 18.87 degree and relative humidity was 36.13 %. In the second season 2014/2015 which showed that the highest total number of bees were 4, 3 bees at 4.00 pm for Bearaat and Menshah districts, respectively, it observed the bees were carrying propolis were 1, 1 bee for Bearaat and Menshah districts, when the temperature was 17.83 degree and relative humidity was 44.63 %.

Table (4): The effect of certain external factors on propolis collection in autumn during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

Location factor (A)	Time factor (B)	total no .of bees	No. of nectar forager	No. of pollen forager	No. of Propolis forager	Temp.	Relative humidity
First season 2013/2014							
Bearaat district	8.00 am	17.0	9.7	3.0	1.7	21.3	40.4
	2.00 pm	11.0	5.0	1.3	1.3	21.3	40.4
	4.00 pm	12.0	6.7	1.3	1.3	21.3	40.4
Qurna district	8.00 am	14.0	6.7	1.3	2.3	21.3	40.4
	2.00 pm	12.0	7.0	4.0	4.0	21.3	40.4
	4.00 pm	15.0	7.7	1.7	1.3	21.3	40.4
Menshah district	8.00 am	18.0	13.3	1.7	2.7	21.3	40.4
	2.00 pm	17.0	8.3	1.3	1.7	21.3	40.4
	4.00 pm	11.0	7.0	0.7	1.3	21.3	40.4
L.S.D (A)		-	3.5	-	1.1		
L.S.D (B)		1.7	2.7	2.4	1.8		
Second season 2014/2015							
Bearaat district	8.00 am	11.0	3.7	1.3	1.7	21.8	43.6
	2.00 pm	5.0	4.0	1.0	1.0	21.8	43.6
	4.00 pm	7.0	5.0	1.0	1.3	21.8	43.6
Qurna district	8.00 am	9.0	4.3	1.3	1.0	21.8	43.6
	2.00 pm	6.0	4.0	0.0	1.7	21.8	43.6
	4.00 pm	5.0	2.0	1.0	2.0	21.8	43.6
Menshah district	8.00 am	12.0	5.3	1.7	1.0	21.8	43.6
	2.00 pm	10.0	5.3	1.3	1.0	21.8	43.6
	4.00 pm	5.0	3.0	0.0	1.3	21.8	43.6
L.S.D (A)		-	2.0	0.7	0.8		
L.S.D (B)		3.2	2.2	1.3	1.7		

In spring for first season 2013/2014 table (6) and illustrated in fig. (6) showed that the highest total number of bees were 15, 12and 9 bees at 8.00 am for Bearaat, Qurna and Menshah districts, respectively, it observed the bees were carrying propolis were 2, 2 and 3 bees at 8.00 am for Bearaat, Qurna and Menshah districts, when the temperature was 30.07 degree and relative humidity was 19.13 % .The same trend was observed in the second season 2014/2015, showed that the highest total number of bees were 13 at 8.00 am for Bearaat district, it observed the bees were carrying propolis were 2 bees at 8.00 am for Bearaat district, when the temperature was 23.90 degree and relative humidity was 20.77 % .These results were came in agreement with Ayoub, (1982) who indicated that the lowest amount of propolis was collected during winter season .The total amount of propolis gathered in winter average 6.3 g per colony representing 15.2 % of the total yields .In spring The total amount of propolis average 10.4 g per colony representing 26.3 % of the total yields, The total amount of propolis gathered in summer average 14.65 g per colony

representing 37.0 % of the total yields. Autumn season was 8.5 g per colony representing 21.0 % of the propolis production per year, and also with Donia, (1994) who found that the mean quantity of propolis during 1990, 1991 and 1992 in winter seasons were 5.63, 5.30 and 5.20 g /colony, respectively with mean 5.37 g/colony .In spring seasons the mean amount of propolis was 10.6, 11.4 and 11.5 g/colony, respectively with mean 11. 6 g/colony.

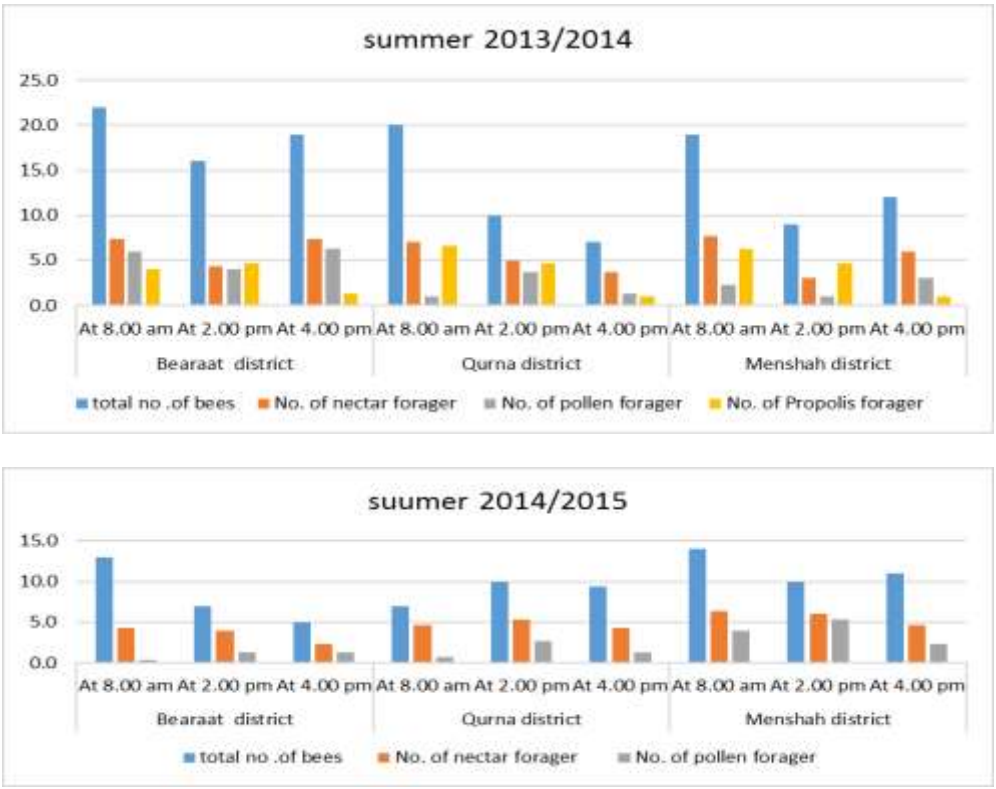

Fig. (3): The effect of certain external factors on propolis collection in summer during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

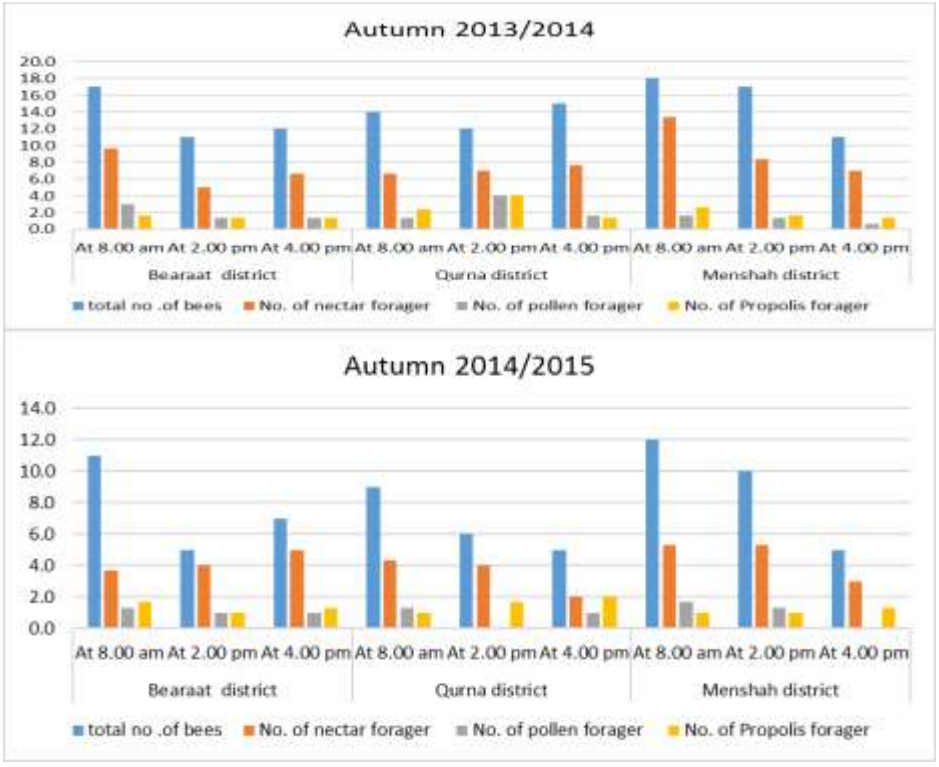

Fig. (4): The effect of certain external factors on propolis collection in autumn during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

Table (5): The effect of certain external factors on propolis collection in winter during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

Location factor (A)	Time factor (B)	total no .of bees	No. of nectar forager	No. of pollen forager	No. of Propolis forager	Temp.	Relative humidity
First season 2013/2014							
	8.00 am	5.0	1.3	1.3	0.0	18.9	36.1
Bearaat district	2.00 pm	3.0	1.0	1.3	0.0	18.9	36.1
	4.00 pm	4.0	1.3	1.0	0.0	18.9	36.1
	8.00 am	4.0	1.0	2.0	1.0	18.9	36.1
Qurna district	2.00 pm	3.0	0.0	0.3	1.3	18.9	36.1
	4.00 pm	5.0	1.3	2.0	1.0	18.9	36.1
	8.00 am	4.0	1.0	2.0	1.0	18.9	36.1
Menshah district	2.00 pm	4.0	2.7	1.0	0.0	18.9	36.1
	4.00 pm	3.0	1.0	1.0	1.0	18.9	36.1
L.S.D (A)		-	-	-	1.1		
L.S.D (B)		-	1.2	1.9	1.3		
Second season 2014/2015							
	8.00 am	3.0	0.0	2.0	1.0	17.8	44.6
Bearaat district	2.00 pm	2.0	0.0	1.0	1.0	17.8	44.6
	4.00 pm	4.0	2.7	1.0	1.0	17.8	44.6
	8.00 am	5.0	1.3	2.0	1.0	17.8	44.6
Qurna district	2.00 pm	3.0	0.0	2.0	1.0	17.8	44.6
	4.00 pm	4.0	1.3	1.0	1.0	17.8	44.6
	8.00 am	2.0	1.0	1.0	0.0	17.8	44.6
Menshah district	2.00 pm	1.0	0.0	1.0	0.0	17.8	44.6
	4.00 pm	3.0	0.0	1.0	1.0	17.8	44.6
L.S.D (A)		1.2	-	1.2	-		
L.S.D (B)		2.0	0.9	2.0	-		

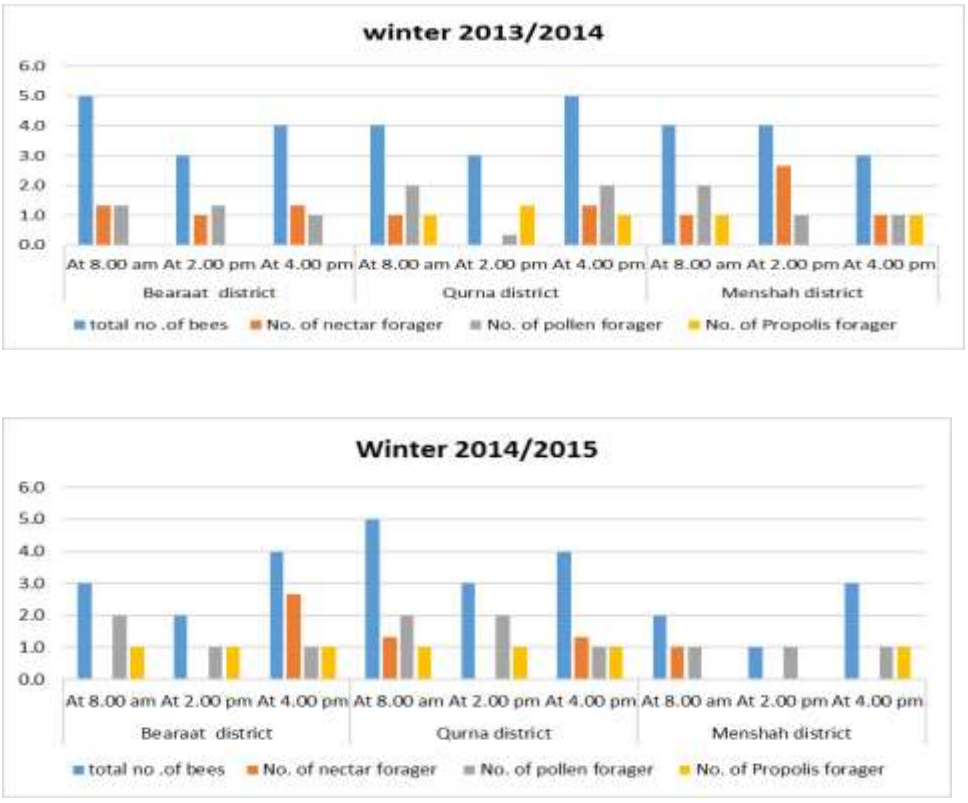

Fig. (5): The effect of certain external factors on propolis collection in winter during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

Table (6): The effect of certain external factors on propolis collection in spring during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

Location factor (A)	Time factor (B)	total no .of bees	No. of nectar forager	No. of pollen forager	No. of Propolis forager	Temp.	Relative humidity
First season 2013/2014							
Bearaat district	8.00 am	15.0	4.7	1.3	1.3	30.1	19.1
	2.00 pm	5.0	4.0	1.3	0.0	30.1	19.1
	4.00 pm	11.0	5.7	2.3	0.0	30.1	19.1
Qurna district	8.00 am	12.0	8.0	1.7	1.3	30.1	19.1
	2.00 pm	8.0	3.7	2.0	1.0	30.1	19.1
	4.00 pm	6.0	1.3	0.7	1.0	30.1	19.1
Menshah district	8.00 am	9.0	2.3	2.0	1.3	30.1	19.1
	2.00 pm	4.0	1.3	0.0	1.0	30.1	19.1
	4.00 pm	6.0	4.3	0.0	1.0	30.1	19.1
L.S.D (A)		2	2.4	1.1	1.1		
L.S.D (B)		1.7	2.3	1.8	2.0		
Second season 2014/2015							
Bearaat district	8.00 am	13.0	5.0	1.7	1.3	23.9	20.8
	2.00 pm	5.0	2.0	2.0	1.0	23.9	20.8
	4.00 pm	6.0	4.0	0.0	1.0	23.9	20.8
Qurna district	8.00 am	7.0	4.3	0.0	2.0	23.9	20.8
	2.00 pm	8.0	5.0	1.0	2.0	23.9	20.8
	4.00 pm	6.0	2.0	2.0	2.0	23.9	20.8
Menshah district	8.00 am	6.0	3.0	2.0	0.0	23.9	20.8
	2.00 pm	5.0	3.0	0.0	2.0	23.9	20.8
	4.00 pm	8.0	2.3	1.3	1.3	23.9	20.8
L.S.D (A)		2.3	0.7	-	-		
L.S.D (B)		2.3	2.4	2.1	1.5		

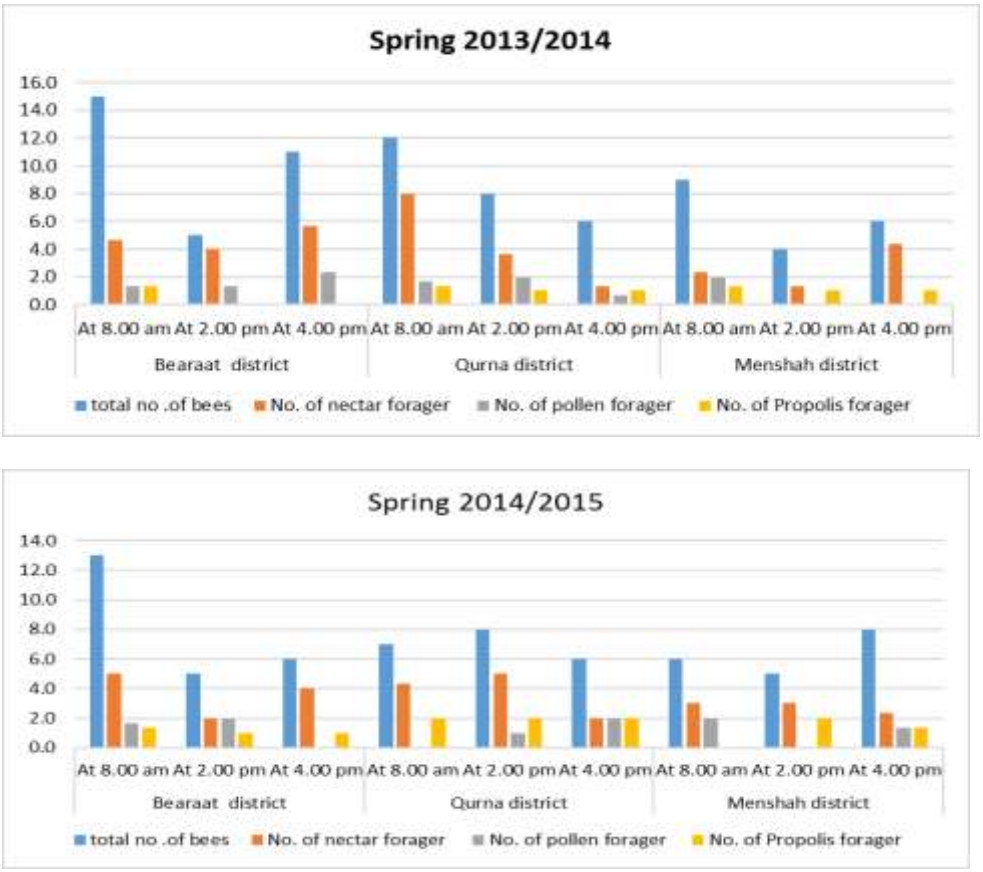

Fig. (6): The effect of certain external factors on propolis collection in spring during two seasons (2013/2014 and 2014/2015) in Luxor Governorate.

REFERENCES

Ashour, A. T(1989). Studies on propolis gathering with special reference to its antimicrobial properties. Thesis, Ph. D. Fac. Agri. Cairo Univ.

Ayoub, A. A. (1982) .Studies on propolis gathering by honeybees, *apis mellifera.l.* MSc.thesis. Alex. Univ. Alexandria. Egypt.

Doni, M. N. M. (1994) .in vitro and in vivo comparative studies on the role of propolis with or without mixing other hive products (Honey, Royal jelly) in the treatment of some dermatological disease. Ph. D. Thesis in medicine .fac.of medicine. Shiben El-kom, Monofya, Uni.pp: 169 with 22pp.

El-Morsy, H. A. (2003). Studies on propolisgathering in Dakahlia province ant its protective effect against liver toxicity induced in male rates. MSc.thesis. Fac. of Science, Zoology Department, Mansoura, Univ.

Ghisalberti, E.L. (1979). Propolis: A review. Bee Wld., 60, 59-84.

Jachimowicz, T. (1978). Should we recommend the bee keepers to harvest propolis. Apimondia, Bucharest.

Mead, R.; Curnow, R.N. and Harted, A. M. (1993).Statistical methods in Agric. and Exp. Biol. (2nd Ed).Chapman and Holl, London.

Muszynska, J; Konopacka, Z. and Rybak, H. (1985). Studies on propolis .An attempt to define condition favouringpropolis collection .Apic.Abst, 1393.

Pereira, A. S; Bicalho, B. and De Aquino Neto, F. R. (2003) Comparison of propolis from *Apismellifera* and *Tetragoniscaangustula*, Apidologie 34, 291–298.

Rita Elkings, M. A.(1996). Bee pollen, Royal Jelly, propolis and honey on extraordinary energy and health promoting ensemble. Canada, Woodland publishing, 32.

تاثير العوامل الخارجية على البروبوليس الذي تجمعه طوائف نحل العسل *Apis mellifera L* في منطقة الأقصر – مصر العليا

تناولت الدراسة العديد من العوامل التي تؤثر على إنتاجية البروبوليس خلال موسمي (2014/2013 و2015/2014) وذلك في ثلاث مناحل خاصة فى مناطق البعيرات والقرنة والمنشاة بمحافظة الأقصر. وقد استهدفت الدراسة مقارنة كميات البروبوليس التي جمعتها طوائف نحل العسل على مدار العام فى مناطق الدراسة وكذلك دراسة تاثير العوامل الخارجية من حرارة ورطوبة على كمية جمع البروبوليس.

وقد أوضحت النتائج ما يلي:

- بالنسبة للكميات المجمعة من البروبوليس في الموسم الأول 2014/2013 فقد أظهرت النتائج أن أكبر متوسط لكمية البروبوليس جمعت في شهر يونيو حيث كانت 44.7جم/طائفة فى منطقة البعيرات .اما الموسم الثاني 2015/2014 ان أكبر متوسط لكمية البروبوليس هو ما تم جمعه خلال شهر يوليو (13، 78 جم/طائفة) فى منطقة البعيرات ايضا.
- اما بالنسبة لتاثير العوامل الخارجية على كمية جمع البروبوليس فقد تم سد مدخل الخلية ثم التقفيص على النحل العائد من السروح ثم عد النحل تحت قفص نصف الكرة وتحديد كلا من الشغالات الحاملة للبروبوليس، الشغالات الحاملة لحبوب اللقاح والشغالات الحاملة للرحيق (وتم استخدام الريفراكتوميتر اليدوى لمعرفة الشغالات الحاملة للرحيق من الشغالات الحاملة للماء. وتم اجراء هذه التجربة اربع مرات فى السنة للاربعة

فصول (الصيف، الخريف، الشتاء، الربيع) .كما تم الحصول على درجات الحرارة والرطوبة من المعمل المركزى للمناخ الزراعى .

- فى فصل الصيف حيث درجة الحرارة حوالى 31.5 درجة، الرطوبة النسبية 25.5 %، كانت النسبة المئوية للشغالات الحاملة للبروبوليس حوالى 18.18% بالنسبة الى العدد الكلى للشغالات تحت قفص نصف الكرة وذلك للموسم الاول، 23.07% للموسم الثانى حيث كانت درجة الحرارة حوالى 23.9 درجة، الرطوبة النسبية % 20.8
- فى فصل الخريف حيث درجة الحرارة حوالى 21.3 درجة، الرطوبة النسبية 40.4 %، كانت النسبة المئوية للشغالات الحاملة للبروبوليس حوالى 10.00% بالنسبة الى العدد الكلى للشغالات تحت قفص نصف الكرة وذلك للموسم الاول، 15.45% للموسم الثانى حيث كانت درجة الحرارة حوالى 32.6 درجة، الرطوبة النسبية % 23.9
- فى فصل الشتاء حيث درجة الحرارة حوالى 18.9 درجة، الرطوبة النسبية 36.1 %، كانت النسبة المئوية للشغالات الحاملة للبروبوليس حوالى 0.00% بالنسبة الى العدد الكلى للشغالات تحت قفص نصف الكرة وذلك للموسم الاول، 33.33% للموسم الثانى حيث كانت درجة الحرارة حوالى 17.8 درجة، الرطوبة النسبية % 44.6
- اما فى فصل الربيع حيث درجة الحرارة حوالى 30.1 درجة، الرطوبة النسبية 19.1 %، كانت النسبة المئوية للشغالات الحاملة للبروبوليس حوالى 8.66% بالنسبة الى العدد الكلى للشغالات تحت قفص نصف الكرة وذلك للموسم الاول، 10.00% للموسم الثانى حيث كانت درجة الحرارة حوالى 23.9 درجة، الرطوبة النسبية % 20.8

الكلمات الدالة: جمع البروبوليس، درجة الحرارة، الرطوبة النسبية