

**THE FACTORS AFFECTING ON THE COLLECTION OF PROPOLIS (BEE GLUE) BY HONEY BEE  
*APIS MELLIFERA* L. COLONIES.  
 BY**

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**ABSTRACT**

**This** study was carried out during the years (2003,2004 and 2005) in two regions (Shibin El-Kom and El-Qaunatr) to study the effect of some factors (Honey bee strains, year months, year seasons, Propolis traps and some places in the hive) on the propolis collection by honey bee colonies. The obtained results showed that the highest amount of propolis was collected by F<sub>1</sub> Italian honeybee colonies followed by F<sub>1</sub> Carniolan honeybee colonies, while the lowest amount of propolis was collected by F<sub>2</sub> Carniolan honeybee colonies during the years of study. There were significant differences between F<sub>1</sub> Italian and (F<sub>1</sub>, F<sub>2</sub>) Carniolan hybrids and Also, between F<sub>1</sub> Carniolan and F<sub>2</sub> Carniolan. The monthly differences between the collecting amounts of propolis by honeybee colonies revealed that the highest amount of propolis was collected during September and the lowest amount of collected propolis was in December and January for F<sub>1</sub> Italian, F<sub>1</sub> Carniolan and F<sub>2</sub> Carniolan, respectively. There were significant differences between months during the year. The seasonal variations in the collected amounts of propolis by honeybee colonies showed that the highest amount of propolis was collected during the autumn season followed by summer season then spring season and the lowest amount during winter season for F<sub>1</sub> Italian, F<sub>1</sub> Carniolan and F<sub>2</sub> Carniolan, respectively. There were significant differences between the four seasons. Three kinds of propolis traps were used for collecting propolis; the high amount of propolis was collected by the glass board trap followed by the silk board trap, while the low amount of propolis was collected by propolis trap. There were significant differences between the glass board trap and each of silk board trap and propolis trap as well as between silk board trap and propolis trap. The propolis was collected from three places in the hive (the bottom, the entrance and the frames). The high amount of propolis was collected from the hive bottom followed with the hive entrance, then the low amount was collected from the hive frames. There were significant differences between the three places.

**Key words:** Honey bee, propolis, honeybee strains, year months, year seasons, propolis traps, hive bottom, hive entrance, hive frames.

**INTRODUCTION**

Honeybee *Apis mellifera* L. is considered one of the most important beneficial insects for the people (Sharaf El-Din, *et al.*, 2000). The name of propolis is the result of combining two terms, from Latin and Greek Language: Pro. Which means "in front of" or "before" and polis which means "fortress" or defense of the city shows that for the hive "the bee city" (Caillas, 1978). Propolis or Bee Glue

is an aromatic resinous substance collected by bees from the buds of trees and plants (El-Shaarawy, 1989). Bee propolis is a sticky amalgamation of plant resins collected by honeybees and used in the hive for filling cracks and repairing combs. Propolis contains a diversity of compounds reported as medicinal, antimicrobial, insecticidal and phototoxic properties (Johnson, *et al.*, 1994). Propolis is

the generic name for the resinous substance collected by honey bees from various plant sources and use in medicine in treatment of various diseases especially in dermatological diseases (Donia, 1994). Propolis is one of the major hive products of bees and rich in flavonoids, which are known for antioxidant activities (Sandeep, *et al.*, 1995). Propolis is a resinous material gathered by honeybees from the buds and bark of certain trees and plants and used inside their hives (Tadasu, *et al.*, 1996). Propolis is a glue substance, which honeybees prepare from plant material inclu-

ding their own secretion (Matsuno, *et al.*, 1997). Propolis is a resinous, rubbery and balsamic substance collected by bees from the buds of trees (Bevilacqua, *et al.*, 1997). Propolis is a series of gums, resins and balms of viscous consistency, which are gathered by honeybees from certain parts, mainly the buds and parks of plants. Bees modified propolis and mixed it with other substances including the bees own wax and salivary secretions (Chow, *et al.*, 1999). The present work aimed to study the factors affecting on the collection of propolis by honeybee colonies.

### MATERIAL AND METHODS

The experimentals of the present research were carried out during 2003, 2004 and 2005 years. In the educational apiary and laboratory of Economic Entomology and Agricultural Zoology Department, Faculty of Agriculture, Minofia University, Shibin El-Kom, Minofia and Apiary of agriculture research centre, Plant protection Institute, El-Qaunatir, Qalyoubia .

#### The tested honey bee strains:

The strength honey bee colonies from each of F<sub>1</sub> Italian, F<sub>1</sub> Carniolan and F<sub>2</sub> Carniolan in modern wooden (Langstrouth) hives. The most type of hives wide spread in Egypt were selected: The strength colony contains at least eight standard frames covering with bees. These colonies were headed with equal queen ages.

#### The tools and equipments:

The sensitive automatic balance (precisa-3500-D), knife to scrap the palls of

propolis and the traps (Glass board, silk board and propolis trap).

#### The propolis collection:

Nine honeybee strength colonies from each of F<sub>1</sub> Italian, F<sub>1</sub> Carniolan and F<sub>2</sub> Carniolan were divided into three groups. Each group was three colonies as replicates. The glass broad traps and the silk broad traps were put on the hives without covers, while propolis traps were put under the covers of the hives. The propolis was collected every 15 days (twice of each month) from the traps and from the entrance of the hive, the bottom of the hive and the top of frames. The knife was used to scrap the balls or small pieces of propolis. The collected amount of propolis from each tested colony was put in small nylon bag and weighed.

#### The statistical analysis:

The statistical analysis was conducted according to (Snedecor and Cochran, 1973) and M. state Computer analysis program.

### RESULTS AND DISCUSSION

Propolis "Bee glue" is an aromatic resinous substance collected by honeybee workers from the buds of trees and plants.

The results in Table (1) indicated that propolis amounts collected by F<sub>1</sub> Italian and the carniolan hybrids (F<sub>1</sub> and F<sub>2</sub>) during months of the 2003 year were; 152.46, 121.10 and 69.13 g. for the F<sub>1</sub> Italian F<sub>1</sub> carniolan and F<sub>2</sub> carniolan colonies, respectively. With

averages of 12.71, 10.09 and 5.76 g. /colony for three strains, respectively. The F<sub>1</sub> Italian colonies collected the high monthly amounts (12.71 g. /colony) followed by F<sub>1</sub> carniolan (10.09 g./colony) then F<sub>2</sub> carniolan (5.76 g. /colony). There were significant differences between the F<sub>1</sub> Italian and between F<sub>1</sub> carniolan and F<sub>2</sub> carniolan as well as there were significant differences between F<sub>1</sub> and F<sub>2</sub> carniolan. As regards, the results in Table (1)

showed that in general for all the experimental colonies the monthly mean amounts of collected propolis per colony ranged between 3.63 g. /colony in January and 14.38 g. /colony in September with general mean of 9.52 g. /colony. The colonies of the strains collected high amounts of propolis during September (18.05, 14.90 and 10.20 g./colony)

for F<sub>1</sub> Italian, F<sub>1</sub> carniolan and F<sub>2</sub> carniolan, respectively. While the low amounts of collected propolis were in January (4.30 and 3.90 g. /colony) for F<sub>1</sub> Italian and F<sub>1</sub> carniolan. However, the lowest amounts for F<sub>2</sub> Carniolan were in December (1.80 g. /colony). There were significant differences between all months during the year 2003.

**Table (1): Mean weights of collected propolis (g./colony) by three honeybee strains During the months of the year (2003).**

Months \ Strains	F <sub>1</sub> Italian bees	F <sub>1</sub> Carniolan bees	F <sub>2</sub> Carniolan bees	Total	Mean
January	4.30	3.90	2.70	10.90	3.63
February	7.20	6.20	3.00	16.40	5.47
March	16.20	11.30	5.30	32.80	10.93
April	9.10	8.70	4.90	22.70	7.57
May	11.40	10.60	5.90	27.90	9.30
June	15.40	12.10	6.70	34.20	11.40
July	15.01	11.40	6.00	32.41	10.80
August	16.60	12.40	6.90	35.90	11.97
September	18.05	14.90	10.20	43.15	14.38
October	17.40	13.20	8.40	39.00	13.00
November	16.90	12.10	7.33	36.33	12.11
December	4.90	4.30	1.80	11.00	3.67
<b>Total</b>	<b>152.46</b>	<b>121.10</b>	<b>69.13</b>	<b>342.69</b>	<b>114.23</b>
<b>Mean</b>	<b>12.71</b>	<b>10.09</b>	<b>5.76</b>	<b>28.56</b>	<b>9.52</b>

	0.05	0.01
L.S.D. for propolis	0.168	0.222
L.S.D. for months	0.335	0.445
L.S.D. for propolis x months	0.580	0.771

The results in Table (2) summarized the activity of F<sub>1</sub> Italian, F<sub>1</sub> carniolan and F<sub>2</sub> carniolan in the collection amounts of propolis at the different seasons during 2003. The best-collected amounts of propolis were during the autumn season followed by summer, spring and winter season. Where, the mean amounts of collected propolis were 39.50, 34.17, 27.80 and 12.77 g. /colony for autumn, summer, spring and winter, respectively. The statistical analysis of data in Table (2) cleared that significant differences were found between all four seasons during 2003. It was found also that the significant high seasonal amounts of propolis came from F<sub>1</sub> Italian (38.12 g. /colony) followed by F<sub>1</sub> carniolan (30.28 g./colony) then the low seasonal amounts were of F<sub>2</sub> carniolan (17.28 g. /colony). There

were significant differences between the strains in all the four seasons of the year.

The results in Table (3) indicated that propolis amounts collected by F<sub>1</sub> Italian and the carniolan hybrids (F<sub>1</sub> and F<sub>2</sub>) during months of the 2004 year were; 125.10, 98.91 and 57.93 g./colony for the F<sub>1</sub> Italian, F<sub>1</sub> carniolan and F<sub>2</sub> carniolan colonies, respectively. With averages of 10.43, 8.24 and 4.83 g. /colony for the three strains, respectively. The results indicated that F<sub>1</sub> Italian colonies collected the high monthly amounts (10.43 g. /colony) followed by F<sub>1</sub> carniolan (8.24 g. /colony) then F<sub>2</sub> carniolan (4.83 g. /colony). There were significant differences between the F<sub>1</sub> Italian, F<sub>1</sub> carniolan and F<sub>2</sub> carniolan bees as well as there were significant differences F<sub>1</sub> and F<sub>2</sub> carniolan. As regards, the results in

Table (3) showed that in general for all the experimental colonies the monthly mean amounts of collected propolis per colony ranged between 2.92 g./ colony in December and 12.13 g./ colony in September with general mean of 7.83 g./ colony. The colonies of the strains collected high amounts of propolis during September (16.30, 13.05 and 7.03 g./colony) for F<sub>1</sub> Italian, F<sub>1</sub> carniolan and F<sub>2</sub> carniolan bees, respectively. While the lowest amounts of collected propolis were in December (4.00, 3.05 and 1.70 g./colony.) for F<sub>1</sub> Italian, F<sub>1</sub> carniolan and F<sub>2</sub> carniolan bees, respectively.

Table (2): Mean weights of collected propolis (g./colony) by three honeybee strains during the seasons of the year (2003).

Seasons \ Strains	F <sub>1</sub> Italian	F <sub>1</sub> Carniolan	F <sub>2</sub> Carniolan	Total	Mean
Winter	16.40	14.40	7.50	38.30	12.77
Spring	36.70	30.60	16.10	83.40	27.80
Summer	47.01	35.90	19.60	102.51	34.17
Autumn	52.36	40.20	25.93	118.49	39.50
Total	152.47	121.10	69.13	342.70	114.23
Mean	38.12	30.28	17.28	85.68	28.56

	0.05	0.01
L.S.D. for seasons	0.216	0.294
L.S.D. for propolis	0.187	0.255
L.S.D. for seasons x propolis	0.375	0.510

Table (3): Mean weights of collected propolis (g./colony) by three honeybee strains during the months of the year (2004).

Months \ Strain	F <sub>1</sub> Italian bees	F <sub>1</sub> Carniolan bees	F <sub>2</sub> Carniolan bees	Total	Mean
January	4.01	3.10	2.10	9.21	3.07
February	6.90	5.60	3.50	16.00	5.33
March	10.20	8.01	5.20	23.41	7.80
April	8.80	5.60	4.40	18.80	6.27
May	9.90	7.90	5.00	22.80	7.60
June	12.20	9.90	5.50	27.60	9.20
July	10.60	8.00	4.80	23.40	7.80
August	13.02	10.20	5.90	29.12	9.71
September	16.30	13.05	7.03	36.38	12.13
October	15.10	13.00	6.50	34.60	11.53
November	14.07	11.50	6.30	31.87	10.62
December	4.00	3.05	1.70	8.75	2.92
Total	125.10	98.91	57.93	281.94	93.98
Mean	10.43	8.24	4.83	23.50	7.83

	0.05	0.01
L.S.D. for propolis	0.205	0.272
L.S.D. for months	0.410	0.544
L.S.D. for propolis x months	0.710	0.942

The results in Table (4) summarized the activity of F<sub>1</sub> Italian, F<sub>1</sub> carniolan and F<sub>2</sub> carniolan bees in the collection amounts of propolis at the different seasons during 2004. The best collected amounts of propolis were during the autumn season followed by summer, spring and winter season. Where, the mean amounts of collected propolis were

34.28, 26.37, 21.67 and 11.33 g./colony for autumn, summer, spring and winter, respectively. The statistical analysis of data in Table (4) cleared that significant differences were found between all four seasons during 2004. It was found also that the high seasonal amounts of propolis came from F<sub>1</sub> Italy (31.28 g./colony) followed by F<sub>1</sub> carniolan (24.49 g./colony) then the lowest seasonal amounts were of F<sub>2</sub> carniolan (14.48 g./colony) there were significant differences between the strains in all the four seasons of the year.

The results in Table (5) cleared that the effect of Glass board on collected amounts of propolis during the months of the year (2005) for F<sub>1</sub> carniolan. The results showed that the propolis amounts collected monthly from Entrance, Bottom, Frames and Glass board during the year were; 37.54, 46.11, 29.08 and 47.38 g./colony respectively. The mean monthly amounts of collected propolis for all places under experiments were 3.13, 3.84, 2.47 and 3.95 g... for Entrance, Bottom, Frames and Glass board. The more amounts of propolis were collected from Glass board (3.95 g.) during all the months of the year than each from Bottom (3.84 g.), Entrance (3.13 g.) and from Frames (2.42 g./colony). These results indicated that there were significant differences between the Glass board and each of Bottoms, Entrance and Frames places. As well as between each of Bottom, Entrance and Frames places. The high amounts of propolis were collected during the September month (5.60, 6.70, 4.20 and 6.79 g.) for Entrance, Bottom, Frames and Glass board, respectively. While the lowest amounts of collected propolis were in January month (1.10, 1.43, 0.88 and 1.69 g) for Entrance, Bottom, Frames and Glass board, respectively. There were significant differences among the months. As a general for all the experimental places the monthly amounts of collected propolis per place ranged between (1.69 and 6.79 g./colony.), (1.43 and 6.70 g.), (1.10 and 5.60) and (0.88 and 4.20 g./colony.) for Glass board, Bottom, Entrance and Frames, respectively. With general monthly amounts were 13.34 g. propolis per place.

The results in Table (6) showed that the effect of Silk board on collected amounts

of propolis during the months of the year (2005) for F<sub>1</sub> carniolan. The results cleared that the propolis amounts collected monthly from Entrance, Bottom, Frames and Silk board during the year were; 31.37, 39.92, 25.87 and 38.58 g./colony, respectively. The mean monthly amounts of collected propolis for all places under experiments were 2.61, 3.33, 2.16 and 3.22 g... for Entrance, Bottom, Frames and Silk board. The more amounts of propolis were collected from Bottom (3.33 g.) during all the months of the year than each from Silk board (3.22 g.), Entrance (2.61 g.) and from Frames (2.16 g./colony). These results indicated that there were significant differences between the Bottom and each of Silk board, Entrance and Frames places. As well as between each of Silk board, Entrance and Frames places. The high amounts of propolis were collected during the September month (5.20, 6.30, 4.40 and 5.90 g.) for Entrance, Bottom, Frames and Silk board, respectively. While the lowest amounts of collected propolis were in January month (0.93, 0.99, 0.80 and 1.00 g.) for Entrance, Bottom, Frames and Silk board, respectively. There were significant differences between all months. As a general for all the experimental places the monthly amounts of collected propolis per place ranged between (0.99 and 6.30 g.), (1.00 and 5.90 g.), (0.93 and 5.20) and (0.80 and 4.40 g.) for Bottom, Silk board, Entrance and Frames, respectively. With general monthly, mean 11.31 g./colony of propolis per place.

The results in Table (7) cleared that the effect of propolis Trap on collected amounts of propolis during the months of the year (2005) for F<sub>1</sub> carniolan. The results showed that the propolis amounts collected monthly from Entrance, Bottom, Frames and Trap were; 28.86, 39.92, 24.19 and 29.96 g./place, respectively. The mean monthly amounts of collected propolis for all places under experiments were 2.41, 3.33, 2.02 and 2.50 g... for Entrance, Bottom, Frames and Trap. The more amounts of propolis were collected from Bottom (3.33 g.) during all the months of the year than each from Trap (2.50 g.), Entrance (2.41 g.) and from Frames (2.02 g./colony). These results indicated that there were significant differences between the

Bottom and each of Traps, Entrance and Frames places. As well as between Trap and Entrance, Frames places. The high amounts of propolis were collected during the September month (4.90, 5.98, 4.03 and 4.99 g.) for Entrance, Bottom, Frames and Trap, respectively. While the lowest amounts of collected propolis were in January month (0.98, 0.90, 0.79 and 0.99 g.) for Entrance, Bottom, Frames and Trap, respectively. There were

significant differences among all months. As a general for all the experimental places the monthly mean amounts of collected propolis per place ranged between (0.90 and 5.98 g.), (0.99 and 4.99 g.), (0.98 and 4.90) and (0.79 and 4.03 g.) for Bottom, Trap, Entrance and Frames, respectively. With general monthly mean 10.24 g/colony of propolis per place.

Table (4): Mean weights of collected propolis (g. /colony) by three honeybee strains during the seasons of the year (2004).

Seasons \ Strains	F <sub>1</sub> Italian	F <sub>1</sub> Carniolan	F <sub>2</sub> Carniolan	Total	Mean
Winter	14.91	11.79	7.30	34.00	11.33
Spring	28.90	21.51	14.60	65.01	21.67
Summer	35.82	27.10	16.20	79.12	26.37
Autumn	45.47	37.55	19.83	102.85	34.28
Total	125.10	97.95	57.93	280.98	93.66
Mean	31.28	24.49	14.48	70.25	23.42

	0.05	0.01
L.S.D. for seasons	0.233	0.317
L.S.D. for propolis	0.202	0.275
L.S.D. for seasons x propolis	0.404	0.550

Table (5): Effect of glass board on collected amount of propolis (in g.) during the months of the years (2005)

Months \ Places	Entrance	Bottom	Frames	Glass	Total	Mean
January	1.10	1.43	0.88	1.69	5.10	1.28
February	1.63	2.05	1.00	1.80	6.48	1.62
march	2.80	3.20	2.50	3.28	11.78	2.95
April	3.00	3.98	2.00	3.99	12.97	3.24
May	3.93	4.10	2.90	4.60	15.53	3.88
June	4.08	5.00	3.70	5.30	18.08	4.52
July	1.25	1.60	0.98	1.70	5.53	1.38
August	3.40	4.50	2.10	4.55	14.55	3.64
September	5.60	6.70	4.20	6.79	23.29	5.82
October	4.93	5.98	3.87	5.99	20.77	5.19
November	4.55	5.67	3.80	5.69	19.71	4.93
December	1.27	1.90	1.15	2.00	6.32	1.58
Total	37.54	46.11	29.08	47.38	160.11	40.03
Mean	3.13	3.84	2.42	3.95	13.34	3.34

	0.05	0.01
L.S.D. for strains	0.104	0.137
L.S.D. for months	0.179	0.238
L.S.D. for strains x months	0.359	0.475

The results in Table (8) explained that the effect Glass board, Silk board and Trap propolis on collected amounts of propolis during the months of the year (2005) for F<sub>1</sub> carniolan. The data cleared that the propolis amounts collected monthly from Glass board, Silk board and Trap propolis were 159.71, 136.12 and 120.85 g. /colony, respectively. The mean monthly amounts of collected propolis for all traps under experiments were 13.31, 11.34, and 10.07 g... for Glass board, Silk board and Trap propolis, respectively. The more amounts of propolis were collected from Glass board (159.71 g.) during all the months of the year than each from Silk board (136.12 g.) and from Trap (120.85 g.). These results indicated that there were significant differences between the Glass board and each

of Silk board and Trap. As well, as between Silk board and Trap propolis. The high amounts of propolis were collected during the September month (23.29, 21.70 and 19.90 g.) for Glass board, Silk board and Trap propolis, respectively. While the lowest amounts of collected propolis were in January month (5.10, 3.72 and 3.66 g.) Glass board, Silk board and Trap propolis, respectively. There were significant differences between months. As the general for all the experimental traps, the monthly mean amounts of collected propolis per trap ranged between (5.10 and 23.29 g.), (3.72 and 21.70 g.) and (3.66 and 19.90 g.) for Glass board, Silk board and Trap propolis, respectively. With general monthly, mean 34.72 g/colony of propolis per trap.

**Table (6): Effect of silk board on collected amounts of propolis (in g.) during the months of the years (2005).**

Places Months	Entrance	Bottom	Frames	Silk broad	Total	Mean
January	0.93	0.99	0.80	1.00	3.72	0.93
February	0.99	1.00	0.95	1.05	3.99	1.00
march	1.80	2.59	1.60	2.60	8.59	2.15
April	2.70	3.00	2.10	2.90	10.70	2.68
May	2.90	3.49	2.50	3.50	12.39	3.10
June	3.10	4.75	2.60	4.60	15.05	3.76
July	1.20	1.22	0.89	1.60	4.91	1.23
August	3.10	4.08	2.07	3.70	12.95	3.24
September	5.20	6.30	4.40	5.90	21.80	5.45
October	4.30	5.50	3.80	5.03	18.63	4.66
November	3.90	5.00	3.10	4.90	16.90	4.23
December	1.25	2.00	1.06	1.80	6.11	1.53
TOTAL	31.37	39.92	25.87	38.58	135.74	33.94
Mean	2.61	3.33	2.16	3.22	11.31	2.83

	0.05	0.01
L.S.D. for strains	0.117	0.154
L.S.D. for months	0.202	0.267
L.S.D. for strains x months	0.404	0.435

Table (7): Effect of trap propolis on collected amounts of propolis (in g.) during the months of the years (2005).

Months \ Places	Entrance	Bottom	Frames	Trap of propolis	Total	Mean
January	0.98	0.90	0.79	0.99	3.66	0.92
February	0.95	0.99	0.93	1.00	3.87	0.97
march	1.50	2.00	1.30	1.80	6.60	1.65
April	2.10	2.90	1.99	2.20	9.19	2.30
May	2.80	3.80	2.40	2.50	11.50	2.88
June	3.00	4.06	2.44	2.90	12.40	3.10
July	1.00	1.70	0.79	1.08	4.57	1.14
August	2.98	3.80	2.00	2.70	11.48	2.87
September	4.90	5.98	4.03	4.99	19.90	4.98
October	4.00	5.01	3.50	4.30	16.81	4.20
November	3.60	4.90	3.00	3.90	15.40	3.85
December	1.05	1.80	1.02	1.60	5.47	1.37
Total	28.86	39.92	24.19	29.96	122.93	30.73
Mean	2.41	3.33	2.02	2.50	10.24	2.56

	0.05	0.01
L.S.D. for strains	0.277	0.366
L.S.D. for months	0.479	0.634
L.S.D. for strains x months	0.958	1.268

Table (8): Mean weights of propolis collected by F<sub>1</sub> carniolan honey bee using total of glass board and silk board and trap propolis collected amounts of propolis (In g/colony.) during the months of year (2005)

Months \ Places	Glass board	Silk board	Trap of propolis	Total	Mean
January	5.10	3.72	3.66	12.48	4.16
February	6.48	3.99	3.87	14.34	4.78
march	11.78	8.59	6.60	26.97	8.99
April	13.57	10.70	9.19	33.46	11.15
May	15.53	12.39	11.50	39.42	13.14
June	17.08	15.05	12.40	44.53	14.84
July	5.53	5.59	4.57	15.69	5.23
August	14.55	12.95	11.48	38.98	12.99
September	23.29	21.70	19.90	64.89	21.63
October	20.77	18.43	16.81	56.01	18.67
November	19.71	16.90	15.40	52.01	17.34
December	6.32	6.11	5.47	17.90	5.97
TOTAL	159.71	136.12	120.85	416.68	138.89
Mean	13.31	11.34	10.07	34.72	11.57

	0.05	0.01
L.S.D. for strains	0.134	0.176
L.S.D. for months	0.268	0.353
L.S.D. for strains x months	0.464	0.611



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العوامل المؤثرة على جمع البروبوليس (صمغ النحل) بواسطة طوائف نحل العسل  
*Apis mellifera* L.

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أجريت هذه الدراسة خلال أحوام ٢٠٠٣، ٢٠٠٤ و٢٠٠٥ في كل من منطقتي شبين الكوم والقناطر الخيرية لدراسة تأثير بعض العوامل (سلالة النحل، شهور السنة، فصول السنة، مصائد البروبوليس، بعض الأماكن داخل الخلية) على جمع البروبوليس بواسطة طوائف نحل العسل وأظهرت النتائج المتحصل عليها أن أعلى كمية بر وبوليس جمعت بواسطة طوائف النحل الهجين الأول الايطالى يليها طوائف النحل الهجين الأول الكرنبولي بينما أقل كمية بر وبوليس جمعت بواسطة طوائف النحل الهجين الثاني الكرنبولي وكانت الفروق معنوية بين النحل الهجين الأول الايطالى ونحل كل من الهجين الأول الكرنبولي والهجين الثاني الكرنبولي وبين نحل الهجين الأول الكرنبولي ونحل الهجين الثاني الكرنبولي. والاختلافات الشهرية بين كميات البروبوليس المجمعة بواسطة طوائف نحل العسل أوضحت أن أعلى كمية بر وبوليس جمعت خلال سبتمبر وأقل كمية جمعت خلال ديسمبر ويناير للهجين الأول ايطالى والهجين الأول الكرنبولي والهجين الثاني الكرنبولي على التوالي. وكانت الفروق معنوية بين شهور السنة. والتغيرات الموسمية في كميات البروبوليس المجموع بواسطة طوائف نحل العسل أظهرت أن أعلى كمية بر وبوليس جمعت أثناء موسم

الخريف وتبعه موسم الصيف ثم موسم الربيع وان اقل كمية بر وبوليس جمعت اثناء موسم الشتاء للهجين الأول ايطالي والهجين الأول الكرنبولي والهجين الثاني الكرنبولي على التوالي. وكانت هناك فروق معنوية بين المواسم الأربعة. وأوضحت النتائج أن أعلى كمية بر وبوليس جمعت بواسطة المصيدة الزجاجية تليها المصيدة السلكية بينما اقل كمية جمعت بواسطة مصيدة البروبوليس وكانت الفروق معنوية بين المصيدة الزجاجية وكل من المصيدة السلكية ومصيدة البروبوليس وكذلك بين المصيدة السلكية ومصيدة البروبوليس. وأظهرت النتائج أن أعلى كمية بر وبوليس جمعت من قاع الخلية يليها مدخل الخلية وأقل كمية جمعت من إطارات الخلية وتوجد فروق معنوية بين الأماكن الثلاثة سواء قاع الخلية أو مدخل الخلية أو إطارات الخلية.