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SURVEY OF DIFFERENT POLLEN SOURCES GATHERING BY HONEY BEE AT QUNATIR AL-KHIRIA, QALUOBIA GOVERNORATE.

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ABSTRACT

The present work was conducted in the apiary of Plant Protection Institute at Qunatir, Qaluobia on pollen grains which collected by honeybees (*Apis mellifera* L.) during the year 2013. In Qunatir plantation was studied and indicated that about more than 60 flowering plants were sources for honeybee colonies in this area. The major pollen sources were Indian Corn (*Zea maize* L.), Egyptian Clover (*Trifolium alcxandarinum* L.), Citrus trees (*Citrus Spp*.), Broad bean (*Vicia faba* L.), Wild mustard (*Brassika Kaber* Koch), Orientals plants and weed grasses. For The amount of pollen trapped by each colony of bees examined determined the sources and identified of plant sources and the local of the cultivated trees, crops and plants in our area. Pollen traps used to obtain the economic amounts produced from honeybee colonies during different seasons. Pollen gathering activity during Citrus, Clover and Corn season. The results revealed that the honeybee colonies collected more amount of pollen during August month and summer season. While the low amounts of collected pollen were in December month and winter season. There were significant differences between all months and between all four seasons. The mean amounts of pollen trapped during Citrus season were 247.66 g/colony. The mean amount of pollen trapped was 355.00 and 1043.33 g/colony during the season of Clover and Corn seasons.

Keyword: Honeybee, pollen, year months, year seasons, pollen traps, Citrus season, Clover and Corn season.

INTRODUCTION

Bee's health depends on honey, but also pollen grains (Hydak, 1970). Pollen is the protein source in honeybee nutrition (Johnson, 1977 and Stace, 1996)Honeybees collect plant pollen from flowers and carry it in the pollen basket to the hives where it is stocked in cell combs in order to be utilized as a protein source for feeding (Marchini *et al.,* 2000 and Harter *et al*, 2002). Pollen trapping can be used to study pollination and pollen flow (Nabors, 1997). The bee pollen is created in the male sexual organ of the flower- anthers with the purpose of fertilizing the stigma. It is the main source of proteins for bee and fruits (Chlebo, 2009). The characterization of bee-collected pollen, colour, botanical origin (Lorenzo, 1989). The feeding pollen in the hive during the teaseling period of corn. Zea mays L. virtually eliminated pollen collection from this sources and greatly reduced the total collection of pollen by field honeybees. *Apis mellifera L* (Floyd, 1972). Pollen gathering by honeybees in

Minia on bean (Vicia faba), Egyptian clover (Trifolium alexandrinum), cotton (Gossypium), maize (Zea mays), Borage (Borago officinalis), Fennel (Foeniculum vulgare), dill (Anethum graveolens) and coriander (Coriandrum sativum). In terms of pollen production (kg/feddan/day), maize gave the highest yield, followed by bean, Egyptian clover, borage, coriander, cotton, fennel and dill. (Atallah et al., 1989). the distance across which bees transfer pollen is a factor in choosing the optimum combination of male- fertile and male- sterile lines, and a reduction of pollen loads on stigmas during afternoon hours may result from removal of previously deposited pollen by honey bees (Mohmood *et al.,* 1990). Vicia faba, Zea mays, Trifolium alexandrinum, Eucalyptus sp and Melilotus siculus are considere the main sources of collected pollen at Kafer El-sheikh region (SeragEl-Dein *et al*., 2004). Coating has a good apicultural potential as it is composed of a succession of plants which supply pollen and nectar all year (Freitas, 1994). Species are grouped into broad colour categories and arranged by family and genus within each category. The colours were recorded by removing pollen loads from honey bees (*Apis mellifera*) caught foraging at flowers and then matcing the colour of the fresh pollen loads by eye to the most similar colour in a reference colour chart. The colours were recorded as CMYK screen tint percentages as used by printers for the 4- colour printing process (for further details, see (Kirk 1994a,b). The honey bees were collecting mainly pollen, between 06.00 and 09.00 h. On average, a bee visited 12 flowers/min, and on each flower collected 80% of the pollen on each anther. On average, a fresh pollen load weighted 1.6 mg and contained 46 520 grains; in addition a bee carried 910 pollen grains on its body. This economically useful tree (seeds contain edible oil) is therefore also a good pollen source for bees and could be used in planting programmers (Rao *et al.,* 1995). The collections were held by installing pollen traps in the hive entrances for the period 7: 00 AM to 6: 00 PM, there was considerable overlap in the food source visited by different colonies. (Marchini *et al.,* 2000) The high collected amounts of pollen were during the summer season while the low amounts of collected pollen were in winter season. The high mean monthly amounts of collected pollen by the strains during August. There were significant differences between all months and all seasons (Farag *et al*., 2008).The attractiveness of three pollen types Bean pollen, Clover and Maize pollen to honeybees was studied in the light of their consumption rats and some chemical characteristics by (Emad *et al*., 2011), the highest value of total protein was registered in Bean pollen, while the Maize pollen was characterized by having the highest value of total lipids.

This work was conducted to study the important and the major pollen sources of pollen gathering activity by honey bee at Qunatir Khiria Governorate through the period of 1/1/2013 to 31/12/2013**.**

MATERIALS AND METHODS

The experiment was carried out in Apiary at the Institute of Plant Protection in Quantar, Qaluobia governorate during the period of 1/1 to 31/12/2013.

Experiment 1: Activity of pollen gathering :-

Three standard 8 frames colonies of honeybee *Apis mellefera* L. were used to fitted pollen traps for each honeybee Carniolan bees. These colonies were established hives of approximately equal strength . Trapped pollen was removed from 3 days (The pollen traps were fitted 3 days only and the bees enter free 3 days, respectively. The collected pollen was weighted. Trapping began on January first, until the end of sample on desember. Trapping continued until pollen collection was continuous during the seasons of study. From the loads of pollen was trapped sampling which used for the microscopic examination and classified were prepared to obtain the source of pollen grains collected from plants flowering in the location Quantar during the pollen flow seasons (citrus, clover, corn and others).

Experiment 2: Survey of plant flowers at Quantar region and others:-

Most pollens could have been obtained within several kilometers of the colonies, yet bees flew at least 3-6 km to obtain the pollen grains from the flowering plants (O Neal and Waller, 1984) .There were three major periods of pollen influx for colonies foraging within the cultivated trees and crops, (Citrus trees, Clover and Corn crops), the other plants were the minor sources of pollen in these area was observed and tabulated monthly during the year of study .The other observations was conducted for survey of all flowering plants in the farms, which bees may its visiting for pollen collection or nectar gathering activity.

Experiment 3: Evaluating pollen production from plants by removed its flowers:-

Knowing how much pollen a plant species produced would be useful in ranking plants . The amount of pollen grains produced in a male flower was used with removed of pollen from flower, the pollen grains was weight,(Traynor, 2001), for obtaining the amounts of pollen grains may be produced from the cultivated plants and compared with pollen trapped during this study.

Identification of pollen sources:-

All the permanent preparations on which our experiments are based have been made from pollen sources or gently removed from the newly opened anthers directly on to the glass slide as described by «Hyde and Adams,1958». After being defatted with absolute alcohol or ether and gently distributed with a needle the grains have been mounted glycerin jelly containing basic fuchsin as astain .It is necessary to use only just enough jelly to occupy the space beneath the cover slip without undue pressure being

applied, otherwise either the film is too thick and the grains do mot lie nearly in the same plane or it is too thin and they are liable to be flattened and so distorted, different kinds of pollen vary in their capacity to absorb stains, and the depth of colour attained by grains of any particular kind varies according to their density on the slide . In order to ensure acorrectly stained slide it is therefore necessary to make aeries using jellies of graded stain content. The optical system used in taking the majority of the photographs was a microscope fitted with camera. All the photographs have been taken at magnification of 450-1000 X diametres. When compiling the accompanying description and in particular when making the measurements (Khattab, 1976).

Statistical analysis:-

The statistical analysis was conducted according to (Snedecor and Cochran, 1973) and M-State computer analysis.

RESULTS AND DISSCATSSION

Data indicate that the honeybee workers collected pollen from different sources available in the areas of studies, while the pollen of Cotton was not collected according to (Loper, 1986). More than 60species of flowering plantats or trees were sources for pollen collecting by honeybee colonies in the area of study. More than ten major pollen types were gathered, among which, *Zea maize, Trifolium alexandarinum, Citrus spp, Vicia faba, Eucalyptus spp., Brassica spp., Acacia arabica, Rosa sp., Cucurbita spp., Prunus sp.* and *Helianthus annus.* The honeybees had to the visiting of flowering plants are recorded in (Table 1) only thirty pollen species were identification as in (Photo 1 to 30). The flowering of plants species which produced pollen was detected in the pollen trap samples. The honeybee workers did collect significant quantities of pollen from plants species, the main sources in the pollen-collection data, is the high proportion of pollen were (*Citrus spp., Trifolium alexandarinum, Zea maize*) (Table 1).The most important sources of nectar and pollen yielding crops were only five. The first source is Citrus trees which begins its blooming from 10 March to 18 of April, the second crop is Clover plants which begins its flowering from the start of May till the middle of June, the third of crop plants is Corn "*Zea maize*" which is usually the major source of pollen for the colonies of honeybees, this is start blooming at 1of July, till the end of August, the fourth sources of pollen are the Orientals and grasses plants which blooming during the different seasons of the year and some sources flowering plants are Leguminaceae plants, (*Vicia faba,Pisum sativum*) and Cruciferae, *Brassica spp, Eruca sativa, Raphanus sativas* and some vegetable flowering plants. Besides the above flowering plants the some sources for pollen.

Table (1): survey of pollen plant species and their classification throughout year of study.

No.	Months	Latine name	Family
1	January	*Brassica kaber* koch	Cruciferae
2		*Vicia faba* L.	Leguminasae
3		*Oreodoxa regia* L.	Palmaceae
4		*Eucalyptus spp.* Baker	Myrtaceae
5		*Prunus sp.*	Rosaceae
6		*Clarkia elegans*	Onagraceae
7		*Arctotis aurantiaca*	Compositae
8		*Acacia arabica*	Leguminasae
1	February	*Brassica kaber* koch	Cruciferae
2		*Vicia faba* L.	Leguminasae
3		*Trifolium alexandrimum* L.	Leguminasae
4		*Prunus sp.*	Rosaceae
5		*Pisum sativum*	Leguminasae
6		*Clarkia elegans*	Onagraceae
7		*Arctotis aurantiaca*	Compositae
8		*Calandula officinalis*	Compositae
9		*Ipomoea pinculata*	Convulvacea
10		*Acacia arabica*	Leguminasae
11		*Alyssum maritimum*	Cruciferae
1	March	*Citrus spp* L.	Rutaceae
2		*Eucalyptus spp.* Baker	Myrtaceae
3		*Brassica kaber* koch	*Cruciferae*
4		*Phoenix dactylifera* L.	Palmaceae
5		*Clarkia elegans*	Onagraceae
6		*Calandula officinalis*	Compositae
7		*Ipomoea pinculata*	Convulvacea
8		Acacia arabica	Leguminasae
1	April	*Citrus spp* L.	Rutaceae
2		*Trifolium alexandrimum* L.	Leguminasae
3		*Rosa spp*. L.	Rosaceae
4		*Eucalyptus spp.* Baker	Myrtaceae
5		*Coriandarum sativum* L.	Umbelliferae
6		*Clarkia elegans*	Onagraceae
7		*Calandula officinalis*	Compositae
8		*Ipomoea pinculata*	Convulvacea
9		*Acacia arabica*	Leguminasae
10		*Alyssum maritimum*	Cruciferae

Cont.,:

1 2 3 4 5 6	May	*Trifolium alexandrimum* L *Rosa spp*. L. *Eucalyptus spp.* Baker *Beta vulgaris* L. *Raphanas sativas* L. *Clarkia elegans*	Leguminasae Rosaceae Myrtaceae Chenopodiaceae Cruciferae Onagraceae
1 2 3 4 5	June	Trifolium alexandrimum L. Rosa spp. L. Eucalyptus spp. Baker Zea maize L. Arctotis aurantiaca	Leguminasae Rosaceae Myrtaceae Graminae Compositae
1 2 3 4	July	*Zea maize* L. *Rosa spp*. L. *Helianthus annus* L. *Cucumis sativus* L.	Graminae Rosaceae Compositae Cucurbitacea
1 2 3	August	*Zea maize* L. *Lufa cyledrica* L. *Cucurbita spp*.	Graminae Cucurbitaceae Cucurbitaceae
1 2 3	September	*Zea maize* L. *Lufa cyledrica* L. *Cucurbita spp.*	Graminae Cucurbitaceae Cucurbitaceae
1 2 3	October	*Zea maize* L. *Rosa spp*. L. *Lufa cyledrica* L.	Graminae Rosaceae Cucurbitaceae
1 2 3	November	*Rosa spp*. L. *Cucurbita spp.* *Helianthus annus* L.	Rosaceae Cucurbitaceae Compositae
1 2 3	December	*Brassica spp.* *Vicia faba* L. *Calandula officinalis*	Cruciferae Leguminosae Compositae

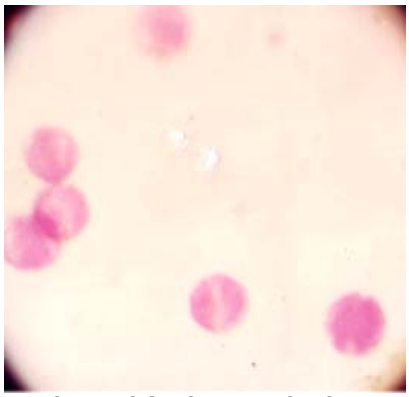

Photo. (1) *Citrus reticulata X* 400

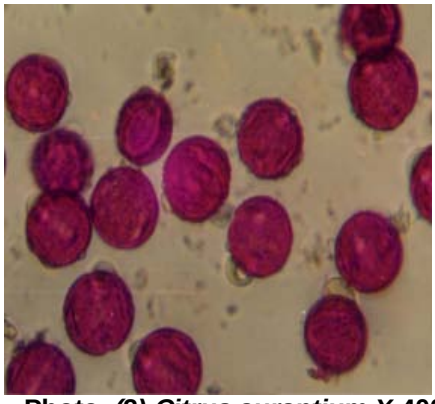

Photo. *(2) Citrus aurantium X* 400

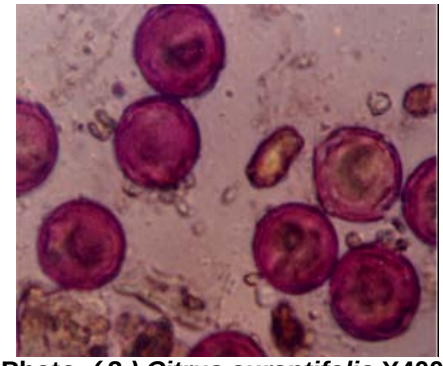

Photo. *(3) Citrus aurantifolia* X400

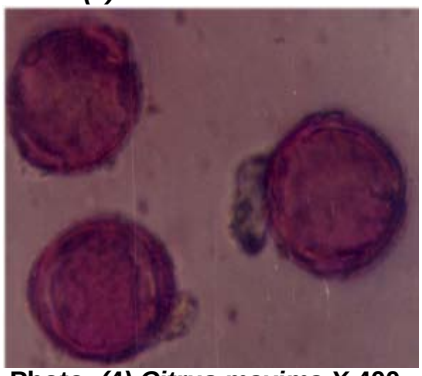

Photo. *(4) Citrus maxima X* 400

Photo. *(5) Brassica rapa* X320

Photo.(6) *Pyrus communis* X200

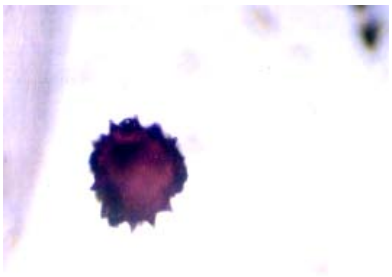

Photo.(7)*Prunus sp.*X 320

Photo.(8)*Hibiscus rosa sinensis* X 160

Photo. (9) *Calendula officinalis* X 320

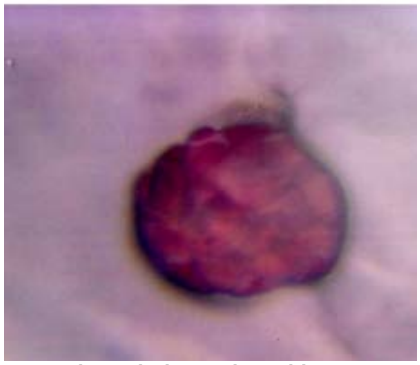

Photo. (10) *Acacia arabica* X 320

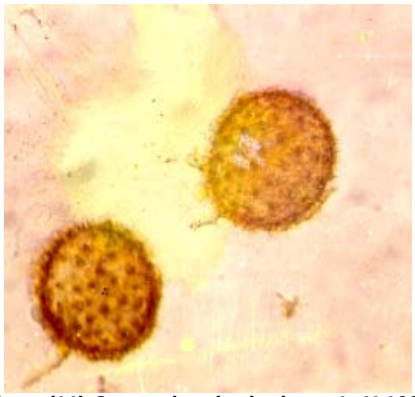

Photo.(11) *Gossypium barbadence* L. X 100

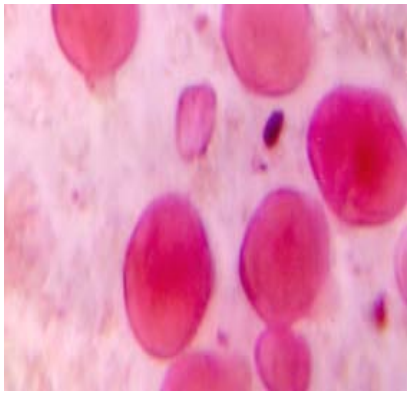

Photo. (12) *Trifolium alexandrinum* L. X 320

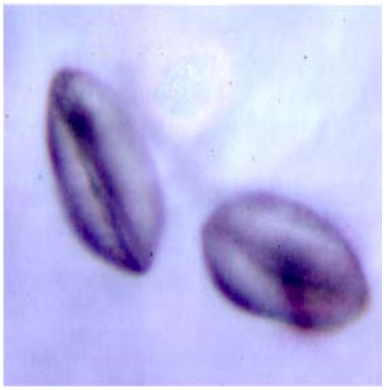

Photo. (13) *Phoenix dactylifera* X 320

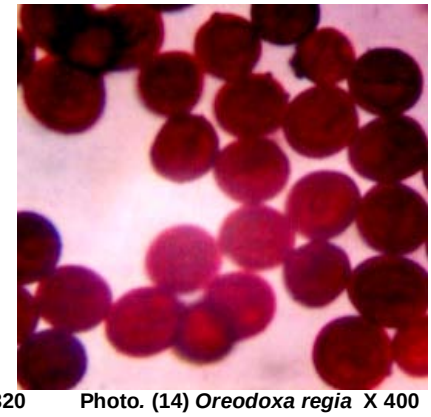

Photo. (14) *Oreodoxa regia* X 400

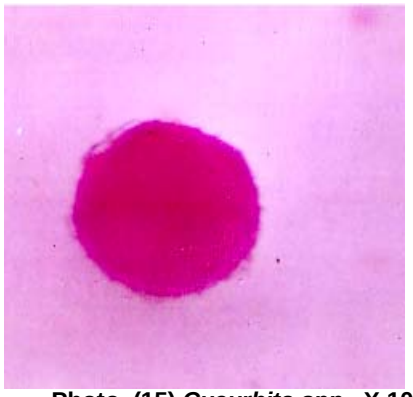

Photo. (15) *Cucurbita spp.* X 100

Photo. (16) *Rosa spp.* X 320

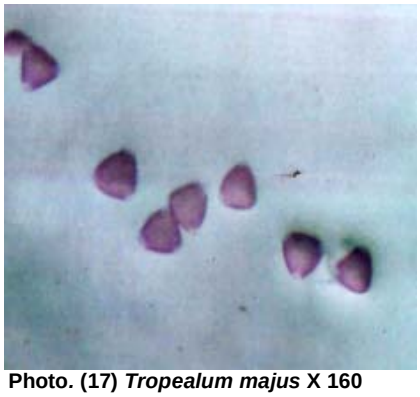

Photo. (17) *Tropealum majus* X 160

Photo. (18) *Alyssum maritimum* X 200

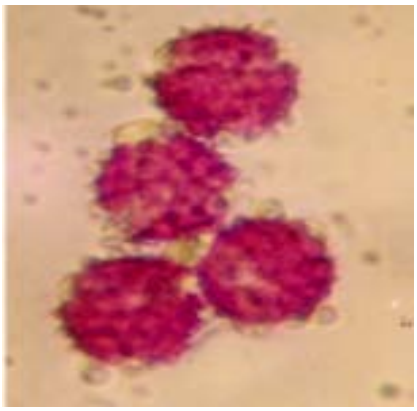

Photo. (19) *Lonicera japonica* X 200

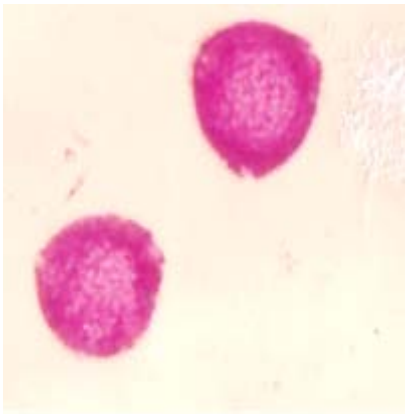

Photo. (20) *Arctotis grandis* X 200

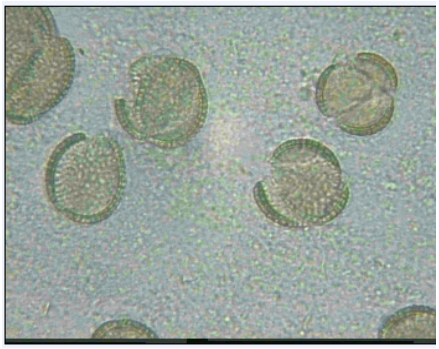

Photo. (21) *Malus domestica* X 200

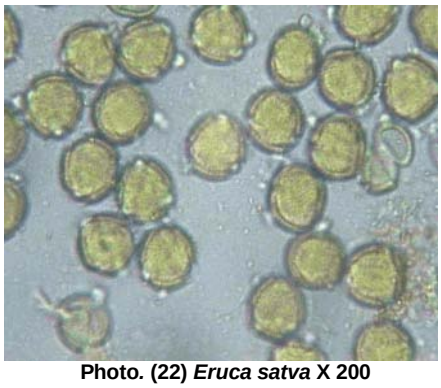

Photo. (22) *Eruca satva* X 200

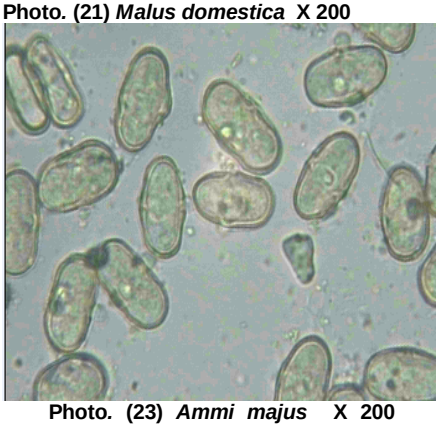

Photo. (23) *Ammi majus* X 200

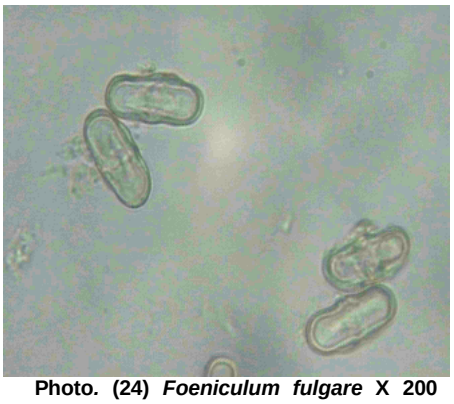

Photo. (24) *Foeniculum fulgare* X 200

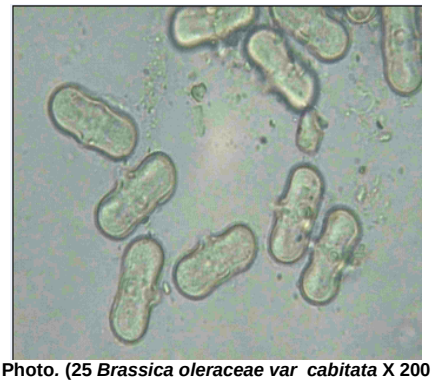

Photo. (25 *Brassica oleraceae var cabitata* X 200

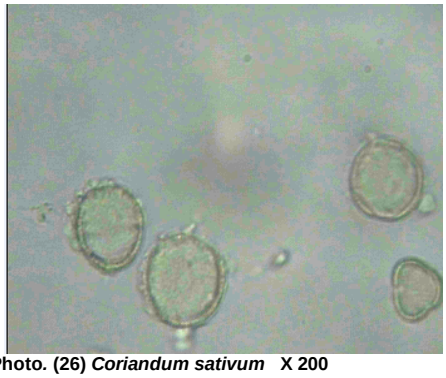

Photo. (26) *Coriandum sativum* X 200

Photo. (27) *Vicia faba* L. X 400

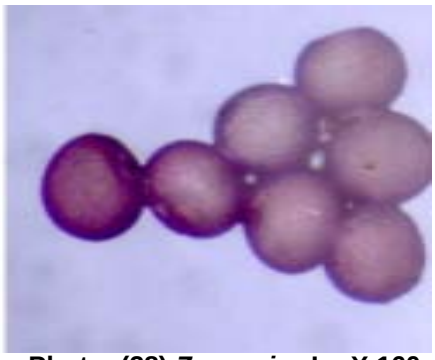

Photo. (28) *Zea maize* L. X 160

Photo. (29) *Clarkia elegans* X 200

Photo. (30) *Eucalyptus spp.* 320

The results in Table (2) revealed that the F1carniolan collected more amo1731.44unt of pollen during August month (761.33 g/colony) and summer season (1731.44g/ colony). While the low amounts of collected pollen were in December month (29.34 g/colony) and winter season (99.86 g/colony). There were significantly differences between months .

Table (2): Monthly average amount of pollen collecting (g./ colony) by Carniolan hybrid (F1) at Qanuter station, 2013 .

Months	F1
	Mean
January	32.72
February	37.80
March	265.95
April	324.50
May	402.33
June	233.37
July	736.74
August	761.33
September	157.45
October	81.97
November	35.79
December	29.34
Total	3099.29
L.S.D at 5 %	5.270

The data in Table (3) summarized the collection amount of pollen at the different seasons during 2013. The best collected amounts of pollen were during the summer season followed by spring, autumn and Winter seasons. The mean amount of collected pollen were 1731.44, 992.78, 275.21 and 99.86 g/colony for summer , Spring , Autumn and Winter respectively . The data showed that there were significant differences between all four seasons. The high collected amounts of pollen were during the summer season while the low amounts of collected pollen were in winter season.. There were significant differences between all seasons (Farag *et al.,* 2008)

Table (3): Seasonaly average amount of pollen collecting (g./ colony) by Carniolan hybrid (F1) at Qanuter station, 2013 .

Seasons	F1
	Mean
Winter	99.86
Spring	992.78
Summer	1731.44
Autumn	275.21
Total	3099.29
Mean	774.82
L.S.D at 5 %	60,27

Table (4) indicate that, the total amount of pollen trapped from 3 colonies during the Citrus period or flowering bloosoming (March, 10 to April, 18, 2013) was 743g. with an avarage of 247.66 g./colony From data presented in table 4 it could be concluded that the date 28,29,30 March was the best date for collecting Citrus pollen grains as it gained 47.00g/colony on the reverse the least mean value of gathering Citrus pollen was at 16,17,18 April as it gained 23.66g/colony. There were significantly in amounts pollen in dates.

Table (4): Average amounts of pollen trapped (g/colony) during flow of Citrus season 2013.

Date	Mean(g. /colony)
March 10,11,12	25
March 16,17,18	36.66
March 22,23 ,24	44.66
March 28,29 ,30	47.oo
April 3,4,5	42.66
April 9,10,11	28.oo
April 16,17,18	23.66
Total	247.66
L.S.D at 5 %	2.11

Table (5) indicate that, the total amounts of pollen trapped from 3 colonies during the clover flowering or bloosoming period (4 of May to 12 of June) was 1065g with an average of 355.00g/colony.The data analysis showed that the best date for gathering Clover pollen was 16,17,18 May as it was 83.33g/colony on the opposite the least mean value of pollen gathering was at 10,11,12 June as it gained 26.33 g/colony in the year 2013 .There were significantly in amounts pollen in dates.

Table (5): Average amounts of pollen trapped (g/colony) during flow of Clover season 2013.

Date of trapped	Mean
May 4,5,6	48.33
May10,11,12	67.66
May16,17 ,18	83.33
May22,23 ,24	56.66
May28,29 ,30	47.66
June 4,5,6	27.66
June10,11 ,12	26.33
T	335.00
L.S.D at 5 %	3.85

Table (6) shows three colonies were placed in the apiary for the activity on the field of Corn.Pollen traps were placed on colonies on June, 29and the first pollen samples were taken at three days from July1, 2, 3; until August 28, 29, 30 during the year of study (2013). The amounts of pollen trapped during the active season on corn was3130.00g with an average of 1043.33g / colony. Data analysis showed that the date of1,2,3 August was the highst date for Corn pollen gathering as it amounted166.00 g/colony . On the opposite the least date was 28,29,30 August as it was 50.00 g/colony.
The results are in agree with **Traynor, (2001)**and Nowar,(2006)

Table (6): Average amounts of pollen trapped (g/colony) during flow of Corn plant (Zea maiz L) season 2013.

Date of trapped	Mean
July 1,2,3	52.66
July 7,8 ,9	61.00
July 13,14 ,15	73.33
July 19,20,21	81.66
July 25,26,27	113.00
August 1,2,3	166.00
August 7,8 ,9	157.33
August 13,14 ,15	114.00
August 19,20 ,21	100.33
August 25,26 ,27	76.66
August 28,29 ,30	50
T	1043.33
L.S.D at 5 %	2.76

It can be concluded that from the present study the honeybee workers are development of managed for pollen collecting in the suitable seasons are doubtful that any economic program could be introduced to develop lineages of honeybees adapted to habitats, was evident. For virtually all pollen types there was an increase in the abundance of each over the study period, although some species were harvested much later than other. *Zea maize* was the first source of pollen collected by the bees in habitates (Khattab 1976) and Nowar, (2006) From the above results it could be concluded that , the main sources for pollen was during the Citrus, Clover and Corn. Pollen traps were used during these seasons for harvisting the more amounts of pollen per colony.

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حصرلمصادر حبوب اللقاح المختلفة و المجموعةبواسطة نحل العسل بالق ناطر الخيرية – محافظةالقليوبية.

نجلاء الاحمدي غزالة[1] والحسيني السيد نوار[2]

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أجرى هذا البحث فى منحل قسم بحوث النحل بالقناطر الخيرية – محافظة القليوبية التابع لمعهد بحوث وقاية النباتات بهدف دراسة نشاط طوائف نحل العسل فى جمع حبوب اللقاح وحصر الانواع الهامه والرئيسية التي يجمعها نحل العسل. و قد تم حصر أكثر من 60 نوع من حبوب لقاح النباتات والأشجار المزهرة في منطقة القناطر الخيرية وقد تم حساب ما تجمعه الطائفة من حبوب اللقاح على مدار سنة الدراسة 2013 وكانت أعلى كميات شهرية جمعت من حبوب اللقاح خلال شهر أغسطس وخلال موسم الصيف ويليه مواسم الربيع والخريف ثم الشتاء. وكانت أقل كميات مجموعة من حبوب اللقاح خلال شهر ديسمبر وخلال موسم الشتاء. وكانت هناك فروق معنوية بين الشهور وكذلك وجدت فروق معنوية بين الفصول الأربعة.وهناك بعض المصادر النباتية الرئيسية لحبوب اللقاح مثل نباتات الذرة ونباتات البرسيم المصري وأشجار الموالح والفول والكبر وكذلك النباتات الطبية والعطرية ونباتات الزينة وبعض الحشائش والأعشاب المتواجدة بمنطقة الدراسة .وقد تم تحضير هذه الحبوب للفحص الميكروسكوبي وتصنيفها وتصويرها ميكروسكوبيا للتعرف عليها وعلى مصدرها النباتيوقد وجد أن متوسط إنتاج طائفة النحل الكرنيولى29 ,3099 جم سنويا و تم دراسة نشاط النحل في تجميع حبوب اللقاح خلال موسم الموالح ،موسم البرسيم و موسم حبوب الذرة. ولقد وجد أن متوسط إنتاج موسم الموالح (2013) من حبوب اللقاح للطائفة الكرنيولى247.66 جم بينما كان متوسط إنتاج الطائفة هو 355 جم و 33 ,1043 جم خلال موسمى البرسيم و الذرة.