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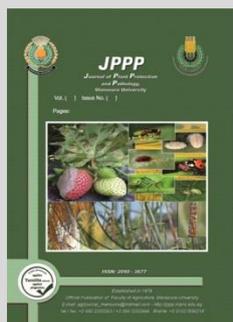
Comparative Study On The Use Of Three Pollen Grain Traps In Honeybee Colonies At Three Localities Of Elsharkia Governorate

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ABSTRACT

The monthly average weights of pollen grains collected at three trap types along (Mar. 2018 / Feb. 2020) were conducted at apiaries of Carniolan hybrids of Elsharkia Governorate: Diarb Nigm , Abokabeer and Kafr Sakar. Statistical analysis of the 1st year revealed that there were no significant differences in the weights of pollen grains by 1st and 2nd type of traps , where it was 365.8, 360.8 , 357.5 g /trap / colony, for 1st type of traps at Diarb Nigm , Abokabeer and Kafr Sakar, respectively, and it was 337.4, 336.2 , 335.4 g , for 2nd type of traps , respectively , while there were significant differences in the weights of pollen grains between 1st & 2nd and 3rd type, where it was 258.1, 256.0 , 255.0 g /trap / colony, for the 3rd type of traps , respectively. Statistical analysis the 2nd year revealed that there were no significant differences in the weights of pollen by 1st and 2nd type of traps , where it was 364.1, 360.0 , 355.0 g /trap / colony, for 1st type of traps at the three sites, respectively, and it was 337.9, 335.8 , 334.5 g, for 2nd traps, respectively , while there were significant differences in the weights of pollen grains between 1st & 2nd and 3rd type of traps , where it was 257.1, 256.2 , 254.2 g , for the 3rd type of traps , respectively.

Keywords: *Apis mellifera*, activity , traps , pollen grains

INTRODUCTION

Honeybee, *Apis mellifera* L produce different products mainly used in food and others in different purposes i.e., therapeutic or in the apitherapy science. Strains of honeybees differ in morphometrical and physiological characteristics, and these differences affect the production aspects of their products as pollen grains. The large needs of different honeybee products propolis , pollen grain , need further comparative studies on the technology needs of these products especially pollen grains . There are a few studies on the types of traps hanged in the honeybee colonies for collect pollens which used in many purposes.

In Kafr El Sheikh Shower (1987) revealed that the highest number of incoming workers carrying pollen/colony/minute and the largest stored pollen area throughout the blooming seasons of citrus, clover and cotton was observed in colonies moved to food sources- rich areas the highest number of incoming workers carrying pollen/colony/minute and the largest stored pollen area were found in May , followed by July and August.

In Assiut governorate , Hussein *et al.* (1992) mentioned that the maximum pollen collection recorded in August , May , September and February coincided with pollen sources and foraging activity of honeybee colonies , they reported that the distillation of pollen sources for years 1988-1990 was as follows: January (*Vicia faba*, *Brassica sinapis*). February (*Vicia*, *Helianthus*, *Simapis*, *Corindrum*, *Prunus*) March (*Trifolium*, *Sniapis*, *Salendula* , *Citrus*, *Phoenix* , *Prunus*, *Reseda*).

El sherif *et al.* (1994) mentioned that in El Kanater El Khyria , the honeybee colony collected about 3.095 kg pollen throughout the year , the ample pollen period extended from mid- March to mid- September (about 6 months) representing 76.48% of the annual harvested pollen by each trap , the pollen dearth period extended in the remaining period by each and represented about 23.52% of the annual harvested pollen/trapped colony.

Aboel Kassem (1997) at Kafr El sheikh region, the amount of stored pollen area was found during the clover season (143.2 inch² stored pollen/colony) and during cotton flow season 1989 was recorded (63.1 inch² stored pollen/colony)

In Assiut governorate, Abdel Rahman (1998) was found that the maximum area of stored pollen or bee bread (219.12 inch² /colony) in August 1997, while the minimum pollen area (41 inch² /colony) was noticed in April.

Ghoniemy and Abo Lila (1998) in Dokki , Egypt, found that the weight of trapped pollen per colony was 781.80 g collected from 22 plant sources in trees represented the most important source for pollen supplying more than 80%.

Abdalla (2001) in Sohag governorate, reported that there was a shortage in pollen storing during April and the maximum area of bee bread was recorded during August (the period of maize flowering).

Zeedan (2002) in Giza, revealed that gathering and storing pollen began slightly during January recording 2178.5 pollen cells/colony, representing 5.7% increased during February to 6.5% and reached its maximum rate of gathering pollen (12.8%) during August, then these amounts

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were declined gradually to its minimum value stored pollen during December 5.0% of the total stored pollen.

Mansour *et al.* (2003) in Kafr El Sheikh region , the highest amount of collected pollen (95.7&98.3 g/day) was obtained from colonies located in mixed fields (rice and maize) followed by Maize fields (80.2&73.1 g/day) while rice fields (63.3&58.5 g/day) was the least one in 2001 and 2002 seasons.

Taha (2006) in Mansoura, recorded that the amount of trapped pollen during the whole year with an average of 1697 g/colony/year.

Abd El Hady (2007) reported that the highest rate of stored pollen was during August , and lowest rate was during July , the highest seasonal amount of pollen storage was recorded in summer (44.39%), followed by Autumn, winter and spring recording 25.3, 17.48 and 12.83%.

Fathy (2008) in Dakahlia Governorate, recorded that spring season was the highest season in collecting pollen during whole year. The average was 316.68 gm/colony, representing (38.18%) in contrast, sinter was inferior season which was 88.97 gm/colony, representing (10.73%).

The aim of this study is to compare the efficacy of three types of pollen grain traps in collecting pollen grains of Carniolan hybrids at honey bee colonies at three localities of Elsharkia Governorate.

MATERIALS AND METHODS

The field experiments were carried out in a private apiaries located at Diarb Negm city , Abokabeer , and Kafar Sakar localities of Elsharkia Governorate.

1.Honeybee colonies:

All private apiaries of the honeybee colonies , *Apis mellifera* at El Elsharkia Governorate were chosen for this study was Carniolan hybrids. nine honeybee colonies from each locality were selected which were similar in its strength and population. Chosen colonies were arranged as completely randomized block design

2.Procedure of work :

Chosen colonies were observed and examined monthly during the period from March 2018 till February 2020.

3. Pollen grains :

Three pollen trap types were placed at three sites: Trap type 1 below the rearing box of colonies, Trap type 2 in front of the entrance of colonies, and Trap type 3 in front of the entrance of colonies. The traps were similar to the types used by Dimou and Thrasyvoulou (2007). The traps were emptied every 3 days and the contents were weighed and recorded.

4. Statistical analysis of the data:

Collected data were subjected to statistical analysis of variance (ANOVA) at 5 % probability, and the measurements were separated using Duncan's Multiple Range Test (DMRT) through CoStat software program (Version 6.400). CoStat version 6.400 Copyright © 1998-2008 Cohort Software. 798 Lighthouse Ave. PMB 320, Monterey, CA, 93940, USA.

RESULTS AND DISCUSSION

The obtained results in Table (1) show the monthly average weights of pollen grains collected by honey bee workers at three types of traps along one year months (March 2018 to February 2019) at three localities of Elsharkia governorate.

Statistical analysis of the obtained data revealed that there were no significant differences in the monthly average weights of collected pollen grains by first and second type of traps , where it was 365.8, 360.8 , 357.5 g /trap / colony, for first type of traps at Diarb Nigm , Abokabeer and Kafr Sakar localities, respectively, and it was 337.4, 336.2 , 335.4 g /trap / colony, for second type of traps at Diarb Nigm , Abokabeer and Kafr Sakar localities, respectively , while there were significant differences in the monthly average weights of collected pollen grains between first & second and third type of traps , where it was 258.1, 256.0 , 255.0 g /trap / colony, for the third type of traps at at Diarb Nigm , Abokabeer and Kafr Sakar localities, respectively (LSD 5% = 36.2) .

Table 1. Mean weights of pollen grains collected by honey bee workers at three types of traps along one year months (March 2018 / February 2019) at three localities

| Months | DN | | | Abo | | | KS | | |
|------------|--|---------|---------|---------|---------|---------|---------|---------|---------|
| | Trap 1 | Trap 2 | Trap 3 | Trap 1 | Trap 2 | Trap 3 | Trap 1 | Trap 2 | Trap 3 |
| | Average weights of pollen grains g /trap / colony | | | | | | | | |
| Mar. 2018 | 358.2 | 335.2 | 210.3 | 257.9 | 289.1 | 219.3 | 317.6 | 276.1 | 190.2 |
| Apr. 2018 | 361.3 | 338.7 | 240.7 | 346.7 | 293.4 | 230.3 | 340.3 | 410.3 | 212.2 |
| May 2018 | 462.3 | 426.6 | 331.6 | 370.5 | 419.6 | 305.7 | 441.7 | 431.7 | 349.6 |
| Jun. 2018 | 577.2 | 555.6 | 473.1 | 491.9 | 554.9 | 418.1 | 560.1 | 537.5 | 475.9 |
| July 2018 | 690.4 | 641.6 | 560.9 | 720.3 | 646.7 | 497.6 | 684.4 | 638.7 | 486.2 |
| Aug. 2018 | 721.2 | 697.3 | 614.2 | 770.2 | 687.2 | 529.4 | 703.8 | 694.5 | 519.8 |
| Sept. 2018 | 417.1 | 398.2 | 302.4 | 479.6 | 406.5 | 290.5 | 567.7 | 390.1 | 336.1 |
| Oct. 2018 | 186.6 | 160.4 | 114.7 | 253.7 | 179.1 | 198.3 | 188.6 | 150.4 | 130.3 |
| Nov. 2018 | 165.6 | 137.6 | 53.2 | 131.8 | 151.3 | 100.3 | 147.5 | 133.0 | 52.2 |
| Dec. 2018 | 135.2 | 101.3 | 45.8 | 109.1 | 120.7 | 88.9 | 94.6 | 104.2 | 46.6 |
| Jan. 2019 | 144.7 | 114.3 | 68.0 | 188.2 | 141.3 | 91.3 | 110.2 | 110.9 | 90.2 |
| Feb. 2019 | 170.2 | 142.2 | 83.1 | 210.1 | 145.2 | 108.5 | 133.5 | 147.6 | 170.7 |
| Total | 4391 | 4049 | 3098 | 4330 | 4035 | 3080 | 4290 | 4025 | 3060 |
| Mean | 365.8 a | 337.4 a | 258.1 b | 360.8 a | 336.2 a | 256.0 b | 357.5 a | 335.4 a | 255.0 b |
| L.S.D | 36.2 | | | | | | | | |

values in the row followed by the same letter are not significantly different at 5% level.

DN= Diarb Nigm Abo= Abokabeer KS= Kafr Sakar

The obtained results in Table (2) show the monthly average weights of pollen grains collected by honey bee workers at three types of traps along one year months (March 2019 / February 2020) at three localities.

Statistical analysis of the obtained data revealed that there were no significant differences in the monthly average weights of collected pollen grains by first and second type of traps , where it was 364.1, 360.0 , 355.0 g /trap / colony, for first type of traps at Diarb Nigm , Abokabeer and Kafr

Sakar localities, respectively, and it was 337.9, 335.8 , 334.5 gram /trap / colony, for second type of traps at Diarb Nigm , Abokabeer and Kafr Sakar localities, respectively , while there were significant differences in the monthly average weights of collected pollen grains between first & second and third type of traps , where it was 257.1, 256.2 , 254.2 g /trap / colony, for the third type of traps at at Diarb Nigm , Abokabeer and Kafr Sakar localities, respectively (LSD 5% = 39.7) .

Table 2. Mean weights of pollen grains collected by honey bee workers at three types of traps along one year months (March 2019/ February 2020) at three localities

| Months | DN | | | Abo | | | KS | | |
|------------|--|---------|---------|---------|---------|---------|---------|---------|---------|
| | Trap 1 | Trap 2 | Trap 3 | Trap 1 | Trap 2 | Trap 3 | Trap 1 | Trap 2 | Trap 3 |
| | Average weights of pollen grains g /trap / colony | | | | | | | | |
| Mar. 2019 | 374.8 | 324.4 | 230.7 | 330.2 | 238.2 | 146.1 | 320.6 | 267.5 | 168.2 |
| Apr. 2019 | 432.5 | 330.6 | 237.1 | 339.8 | 284.0 | 192.3 | 346.1 | 379.6 | 290.7 |
| May 2019 | 370.8 | 426.0 | 335.4 | 286.4 | 293.3 | 337.6 | 563.1 | 423.1 | 350.3 |
| Jun. 2019 | 544.4 | 557.1 | 470.3 | 483.2 | 556.1 | 480.8 | 570.7 | 530.3 | 397.6 |
| July 2019 | 603.6 | 664.8 | 569.1 | 712.1 | 647.2 | 567.5 | 689.4 | 632.2 | 459.3 |
| Aug. 2019 | 700.2 | 694.3 | 612.3 | 772.3 | 688.7 | 725.3 | 709.8 | 690.4 | 538.5 |
| Sept. 2019 | 468.3 | 392.2 | 307.5 | 470.7 | 400.3 | 204.5 | 449.7 | 400.7 | 351.5 |
| Oct. 2019 | 199.5 | 161.3 | 102.6 | 250.4 | 230.6 | 79.6 | 143.5 | 215.6 | 140.1 |
| Nov. 2019 | 156.9 | 137.8 | 49.7 | 128.6 | 156.3 | 75.7 | 107.2 | 91.3 | 82.6 |
| Dec. 2019 | 155.6 | 106.5 | 34.0 | 112.9 | 150.1 | 66.3 | 92.1 | 89.9 | 71.3 |
| Jan. 2020 | 182.8 | 115.7 | 46.9 | 190.3 | 179.3 | 78.8 | 128.2 | 117.2 | 89.8 |
| Feb. 2020 | 180.6 | 134.3 | 90.4 | 243.1 | 205.9 | 120.5 | 139.6 | 177.2 | 110.1 |
| Total | 4370 | 4045 | 3086 | 4320 | 4030 | 3075 | 4260 | 4015 | 3050 |
| Mean | 364.1 a | 337.9 a | 257.1 b | 360.0 a | 335.8 a | 256.2 b | 355.0 a | 334.5 a | 254.2 b |
| L.S.D | 39.7 | | | | | | | | |

values in the row followed by the same letter are not significantly different at 5% level.
DN= Diarb Nigm Abo= Abokabeer KS= Kafr Sakar

The obtained results of this article are in harmony with those conducted by Shawar (1987) at Kafr El-Sheikh , Aboel Kassem (1997) at Kafr El sheikh region and Abdel Rahman (1998) at Assiut governorate. Furthermore, Ghoniemy and Abo Lila (1998) in Dokki , Egypt, found that the weight of trapped pollen per colony was 781.80 g collected from 22 plant sources in trees represented the most important source for pollen supplying more than 80%. Abdalla (2001) in Sohag governorate, recorded a shortage in pollen storing during April and the maximum area of bee bread was recorded during August . Zeedan (2002) in Giza, revealed that gathering and storing pollen began slightly during January recording 2178.5 pollen cells/colony, representing 5.7% increased during February to 6.5% and reached its maximum rate of gathering pollen (12.8%) during August, then these amounts were declined gradually to its minimum value stored pollen during December 5.0% of the total stored pollen. Mansour *et al.* (2003) in Kafr El Sheikh region , the highest amount of collected pollen (95.7&98.3 gm/day) was obtained from colonies located in mixed fields (rice and maize) followed by Maize fields (80.2&73.1 gm/day) while rice fields (63.3&58.5 gm/day) was the least one in 2001 and 2002 seasons. Taha (2006) in Mansoura, recorded that the amount of trapped pollen during the whole year with an average of 1697 g/colony/year. Abd El Hady (2007) reported that the highest rate of stored pollen was during August , and lowest rate was during July , the highest seasonal amount of pollen storage was recorded in summer (44.39%), followed by Autumn, winter and spring recording 25.3, 17.48 and 12.83%. In addition , Fathy (2008) in Dakahlia Governorate, recorded

that spring season was the highest season in collecting pollen during whole year. The average was 316.68 gm/colony, representing (38.18%) in contrast, sinter was inferior season which was 88.97 gm/colony, representing (10.73%).

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**دراسة مقارنة علي إستخدام ثلاثة أنواع من مصائد حبوب اللقاح في طوائف نحل العسل بمحافظة الشرقية
عبيد جمال حسيني الباز¹ ، رضا عليوه سند² ، فتحى السعيد السنطيل¹ و حمزة السيد الشرقاوى¹
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² قسم بحوث النحل – معهد بحوث وقاية النباتات**

أجريت هذه الدراسة في ثلاث مراكز بمحافظة الشرقية بمناحل خاصة لدراسة مقارنة إستخدام ثلاثة أنواع من مصائد حبوب اللقاح في طوائف نحل العسل وذلك خلال عامين متتاليين في الفترة من مارس 2018 حتى فبراير 2020 و هي ديرب نجم و ابو كبير وكفر صقر وتم البحث لدراسة مقارنة لثلاثة أنواع من المصائد التي تستخدم في جمع حبوب اللقاح لمعرفة اكثرهم انتاجا حيث تم تعليق النوع الاول اسفل الخلية والنوع الثاني امام الخلية والنوع الثالث تم تركيبه امام الخلية ولكنه مصمم بتكنيك اخر. وتم اختبار تسعة طوائف نحل هجين اول كرنيولي متماتله القوه وتم تركيب ثلاثة مصائد من كل نوع علي ثلاثة طوائف في كل مركز من المراكز التي اجريت فيها الدراسة . علقت كل مصيده لمدته ثلاثة ايام ورفعت ثلاثة ايام من كل شهر وتم جمع حبوب اللقاح ووزنها وحفظها . أظهرت النتائج أن متوسط وزن حبوب اللقاح الشهري في مركز ديرب نجم من النوع الاول من المصائد بلغ (365.8 ، 364.1 جرام) ومن النوع الثاني من المصائد (337.4 ، 337.9 جرام) ومن النوع الثالث من المصائد (258.1 ، 257.1 جرام) وذلك للعام الاول والعام الثاني. واطهرت النتائج أن متوسط وزن حبوب اللقاح الشهري في مركز ابو كبير من النوع الاول من المصائد بلغ (360.8 ، 360 جرام) ومن النوع الثاني من المصائد (336.2 ، 335.8 جرام) ومن النوع الثالث من المصائد (256 ، 256.2 جرام) وذلك للعام الاول والعام الثاني. ووضحت النتائج أن متوسط وزن حبوب اللقاح الشهري في مركز كفر صقر من النوع الاول من المصائد بلغ (357.5 ، 355 جرام) ومن النوع الثاني من المصائد (335.4 ، 334.5 جرام) ومن النوع الثالث من المصائد (255 ، 254.2 جرام) وذلك للعام الاول والعام الثاني.