

EFFECT OF CERTAIN FACTORS ON NATURAL MATING OF HONEYBEE QUEENS IN ASSUIT region

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ABSTRACT

In the present investigation, some effective factors on natural mating successes of honeybee virgin queens were studied, such as: type of receiver colony race, introducing methods of virgin queen, presence of brood and their stages in receiver colonies for acceptance and mating of honeybee virgin queens.

Results showed that carniolan bee colonies accepted the highest percentage (96.67%) of the introduced virgin queens, followed by both the first carniolan hybrid colonies and Italian colonies (93.33%), the lowest significant percentage of the accepted queens was recorded for the Egyptian virgin queens (70.00%).

Concerning pre-mating periods of the introduced virgin queens, results revealed that there were no significant differences among periods of pre-mating required by the introduced virgin queens received by different bee colonies.

Results of mating ability of the introduced virgin queens, Italian bees encouraged the highest percentage (78.88%). However queens introduced carniolan and Egyptian bees colonies mated by the lowest percentage 65.92, 54.16% respectively.

Recording post-mating periods of the tested queens showed that queens introduced to carniolan bees recorded a shortest period (2.78 days), while the longest period (3.37 days) was recorded to the first Italian hybrid.

Results revealed that the highest percentage of acceptance (96.67%) was noticed with using half comb cage, while applying direct introducing method resulted in a lowest percentage (36.67%) of acceptance of the introduced queens.

Through two years revealed that introducing virgin queens to the colonies have mixed brood resulted in acceptance of the introduced virgin queens was the highest rate (86.67 and 90.00%, respectively). On the contrary introducing virgin queen to colonies having only sealed brood resulted in the lowest acceptance percentage (66.67 and 63.33). Pre-mating period of the introduced virgin queens showed that the shortest period with introducing to the colonies of the colonies of the mixed brood, it was 3.06 days while with queen introduced to colonies having no brood 3.73 days. Mating success percentage showed that although queens introduced to the colonies having mixed brood mated by the highest percentage (84.72%). Also, in this colonies (mixed brood) helped in shorting the post mating periods of the introduced queens.

The highest acceptance percentages through two years study (96.67 and 93.33% respectively) were recorded with introducing virgin queens to colonies 3 combs. However introducing virgin queens to colonies of 10 combs resulted in decreasing acceptance level of these queens (53.33 and 56.76% for two years study). Concerning pre-mating periods of introduced queen no significant difference were found among different treatment. Recording mating success of the introduced queens, showed that queens introduced to colonies of 5 combs mated by the highest rate 78.88%, while the lowest level mating success (62.22%) was associated with those queens introduced to colonies of 10 combs.

INTRODUCTION

The honeybee queen being the most important individual in the has attracted special attention of beekeepers and scientists, this is because her

function of laying eggs that helps to maintain and increase the population of the colony. The beekeepers are always in need to queens for compensation of the lost ones, for establishment of new colonies and / or the substitution of unproductive queens all over the year. The natural mating is considered one of the most economic products by using high quality queens we obtain good yield of honey and other hive products.

The aim of the present investigation was to study some of the factors affecting the mating of honeybee queens under the Assuit region. The factors taken in the consideration were effect of receiver bee colony race, introducing methods, presence and stage of brood receiver colonies and effect level of the receiver colonies strength on acceptance, pre-mating period, mating ability and post – mating period of honeybee virgin queens (F1 Carniolan). (Mortiz 1985, Scott and Kelly (1988), Szabo (1977), Liu and Jay (1975) and Medina and Goncalves (2001).

In this respects studied by several authors Guzman *et al.*,(1997). Found that the queens acceptance in European and Africanized colonies were 83.8 and 89.4%, respectively. Also, they found that the queens were introduced through using Benton mailing – cage and Acceptance was 89.4%. Also, Ormel (1983) Stated that introducing virgin queens and mated queens to colonies having little young brood was favorable conditions. It resulted in acceptance 93% for mated queens while 94% for virgin queens and Atella and Bover (1994) used small nucleus hives for queen mating found that average mating success ranged from 72% to 95%. Effect of certain factors on natural mating of honeybee queens in Assiut region

MATERIALS AND METHODS

This study was carried out in the apiary and laboratory of the Faculty of Agriculture, Al-Azhar University, Assiut branch during two seasons 2004 and 2005 by using virgin queens and bee colonies of three races of the honeybees and their hybrids were used in the present work as follows:-

- 1- Carniolan honeybees, *Apis mellifera carnica*.
- 2- Italian honeybees, *Apis mellifera ligustica* .
- 3- Egyptian honeybees, *Apis mellifera lamarckii*.
- 4- F1 Carniolan bees.
- 5- F1 Italian bees.

Four trials were conducted during the period of the study as follows:.

- 1- Effect of receiver bee colony race on acceptance, pre-mating period, mating ability and post-mating period of the introduced F1 Carniolan honeybee virgin queens.**

Fifty virgin queens of the F1 Carniolan honeybees having approximately the same age and weight were introduced individually to nucleus of five combs covered with bees.

The receiver colonies were three races of honeybees and two of their hybrids (Carniolan, Italian, Egyptian, the F1 Carniolan and the F1 Italian). The receiver colonies were in almost strength and divided into five groups, each race was represented by ten nuclei. Each nucleus was in a queenless state 24 hours before introducing the tested virgin queen. Acceptance, pre-mating period, mating success and pre-mating period were determined as mentioned

later in the first trial. This experiment was repeated twice through spring of two successive seasons (2004 and 2005).

2- Effect of introducing methods on acceptance of the virgin honeybee queens (F1 Carniolan) in colonies.

At the beginning of spring of two successive seasons (2004 and 2005) four methods of introducing (half ball cage, half comb cage, Benton cage and direct introduction) of honeybee virgin queens were tested. Three groups of the F1 Carniolan honeybee virgin queens, ten queens each were specified for each method of introducing. The receiver colonies of the introduced queens were dequeened 24 hours before introducing the tested virgin queens. The receiver colonies were almost in an equal strength (7 combs covered with bees) and housed in Langstroth hives. Introducing the virgin queens through cages were done according to method of (McCutcheon D, 2001) while direct introducing of the tested virgin queens were achieved through smoking on both receiver colony and the introduced virgin queens. The introducing queens and their receiver colonies were daily inspected to determine the acceptance percentage as mentioned above in the first trial.

3- Effect of presence and stage of brood in the receiver colonies on acceptance, pre-mating period, mating ability and post-mating period of the introduced virgin queens (F1 Carniolan).

Forty sisters of virgin queens in almost age and weight were introduced each to a colony of the F1 Carniolan honeybees having approximately the same strength and stored food (nuclei of 5combs covered with bees two of them have stored honey and pollen). The receiver colonies varied in presence and stage of their brood as follows:

- 3.1. Ten colonies have unsealed brood only.
- 3.2. Ten colonies have sealed brood only (the unsealed brood was removed manually)
- 3.3. Ten colonies possess mixed brood (sealed and unsealed brood).
- 3.4. Ten colonies have no brood (neither sealed nor unsealed one).

Introducing the virgin queens to different receiver colonies was achieved through using Benton cage method. Introducing of the virgin queen was done in summer of two successive seasons (2004 and 2005). Acceptance, pre-mating period, mating success and pre-mating period of the introduced queens were determined as mentioned in the first trial.

4- Effect of the receiver colonies strength on acceptance, pre-mating period, mating success and post-mating period of the introduced virgin queens (F1 Carniolan).

Forty sisters of virgin queens of the F1 Carniolan honeybees having the same characters were selected for this trial. The selected queens were divided into four groups, ten queens each. Each queens group was specialized to one group hive having different strength of bees as follows:

- 4.1. Ten colonies, each have 10 combs covered with bees and housed in Langstroth hive.
- 4.2. Ten colonies, each have 7 combs covered with bees and lived in Langstroth hive.
- 4.3. Ten colonies, each have 5 combs covered with bees and put in swarm box.

5. Ten colonies, each have 3 combs covered with bees and housed in wooden nuclei.

The receiver colonies were in queenless state 24 hours before introducing the virgin queens. Introducing of the tested virgin queens were achieved by using Benton cage method. Procedures of this trail were done on autumn of two successive years (2004 and 2005). Acceptance, pre-mating period, mating success and pre-mating period was recorded as mentioned previously in the first trail.

RESULTS AND DISCUSSION

1. Effect of receiver bee colony race on acceptance, pre-mating period, mating ability and post-mating period of the introduced honey bee virgin queens.

1.1. Acceptance

Introducing the F1 Carniolan honeybee virgin queens to different receiver colonies in spring season of year2004 resulted in acceptance of these queens by the highest rate (96.67 %) in case of using Carniolan bee colonies as receiver, followed by its first hybrid (93.33%) and Italian bee colonies (93.33%) with no significant difference among them (Table 1). The obtained results revealed also that the F1Italian bee colonies accepted the introduced virgin queens by moderate rate (83.33 %) which differed significantly than the last mentioned receiver races and also surpassed significantly the percentage of acceptance recorded with using Egyptian bee colonies as receiver (70.00%).

Table (1) - Effect of receiver bee colony race on acceptance, pre-mating period, mating ability and post-mating period of the introduced F1 Carniolan honeybee virgin queens, spring of 2004 season.

Bees race	Acceptance percentage		Pre-mating period (days)		Mating success %		Post-mating period (days)	
	2004	2005	2004	2005	2004	2005	2004	2005
Carniolan	96.67	93.33	6.50	5.443	65.92	65.92	2.78	2.78
F ₁ hybrid Carniolan bees	93.33	90.00	5.447	5.92	71.48	71.48	2.647	2.247
Italian	93.33	93.33	5.493	6.387	78.88	78.88	3.103	2.770
F ₁ hybrid Italian	83.33	86.67	5.653	5.880	75.92	68.05	3.370	3.370
Egyptian	70.00	76.67	5.777	5.830	66.86	54.16	3.100	2.933
F test	**	**	N. S	N. S	N. S	N. S	*	**
L.S.D 5%	6.42	8.83					0.43	0.362
L.S.D 1%	9.34	12.85					0.63	0.526

L. S. D (Least significant different)

n. s (Non significant)

* (Significant)

** (High significant)

The same trend almost was noticed with results of year2005 (Table 1), where the Carniolan and Italian bee colonies accepted more virgin queens. Each accepted (93.33%) of the introduced queens. At the same time the F1 Carniolan bees accepted 90% of the introduced queens, in comparison to 86.67% for the F1 Italian bees. Egyptian bees accepted the lowest percentage of the introduced virgin queen, they accepted only 76.67%. Although it was stated that queen honeybees proved genetic cues that can be used by workers to assess genetic relationship (Page and Erickson, 1986), but acceptance of the introduced queens F1 Carniolan) was

at the high rate with both Italian bees and Carniolan bees. According to this observations we can assume that acceptance of introduced queens may attributed to aggressiveness level of the receiver colonies since Carniolan bee well known as gentle race (Delaplane, 1996), While Egyptian bees have tendency of aggressiveness towards introducers (Graham, 1992)

This view may not coincides with the results obtained by Guzman *et al* (1997) who found that requeening Africanized colonies with European queen did not affect negatively the queen acceptance rate. On the other hand Ebadi (1988) found differences in the acceptance rates between 5 different queens genotypes, but he did not view the genetic relation ship between the introduced queens and bees in the host colonies.

1.2 pre-mating period.

Results of (Table 1) of year 2004 showed that there is no significant difference among, the periods of pre-mating of different introduced virgin queens received by different colonies belong to different races. The pre-mating periods were ranged between 5.44 days for queens received by the F1 Carniolan bees and 6.50 days for those received by Carniolan bees.

Results of year 2005 (Table 1) confirmed data obtained in previous season of year2004, hence the shortest pre-mating period of the introduced queens (5.44 days) was recorded for these queens received by Carniolan bees, while the longest period (6.38 days) was associated with those queens introduced to Italian bees.

1.3. Mating success

Results of (Table 1) of year 2004 Revealed that virgin queen introduced to Italian bees were successfully mated by a highest percentage 78.88%, followed by its F1 Italian (75.92%) and F1 Carniolan (71.48%). However percentages of the queens succeeded in mating were low in case of receiving by either Egyptian bees (66.86%) or Carniolan bees (65.92%). Difference among percentages of mating success of queens introduced to different bee races was not significant.

When this trial was repeated in year2005 the same trend of the year 2004 results was found (Table 1). Queens introduced to Italian bees succeeded greatly in mating (78.88%) while those queens that introduced to Egyptian bees succeeded by the lowest per cent (54.16%).

1.4. Post-mating period

The periods required after mating of the introduced queens to different receiver colonies were noticed. The shortest period of post-mating was recorded with those queens introduced to the F1 Carniolan bees (2.64 days), followed by those queens received by Carniolan bees (2.78 days), with no significant difference between them. At the same time, queens introduced to Egyptian bees showed requirement to significant more time (3.10 days) which was very close to the period needed by those queens received by Italian bees (3.103 days) and the F1Italian (3.37 days).

Data of year 2005 (Table 1) confirmed the same trend of the last season since, the shortest period (2.24 days) required for commence of egg laying after mating was recorded for the queens introduced to the F1 Carniolan bees, in comparison of 3.37 days for those queens received by the F1Italian bees relieved significant difference between them. The queens

introduced to other bee receivers showed a moderate need (2.77 to 2.93 days) of time to start oviposition.

2. Effect of introducing methods on acceptance of the virgin honeybee queens (first hybrids Carniolan)

Introducing the virgin queens of the F1 Carniolan by different methods in year 2004 showed that half comb cage method resulted in highest rate of acceptance (96.67%) of the introduced queens, followed by half ball cage method (86.67%) with no significant difference between them (Table 2).

On the other hand, introducing the virgin queens by using Benton cage caused significant reduction of acceptance, it was 73.33%. However the lowest rate of acceptance of the introduced queens was observed with following direct introducing (36.67%).

Table (2): Effect of Introducing methods of virgin queens of the F1 Carniolan honeybee on their Acceptance during spring season, 2004 and 2005.

Introducing method	Acceptance percentage	
	Mean 2004	Mean 2005
Benton cage	73.33	76.67
Half ball cage	86.67	86.67
Half comb cage	96.67	100.00
Direct introducing	36.67	43.33
F test	**	**
L. s. d 5%	11.52	11.04
L. s. d 1%	17.48	16.75

When procedures of the same trial were retested in year 2005, results of (Table 2), revealed that each tested introducing method have the same effect on acceptance of the introduced queens. Introducing through half comb cage showed the highest positive effect, it resulted in 100% acceptance, in comparison to 86.6, 76.67 and 43.33 % for half ball cage, Benton cage and direct introducing method, respectively.

The high acceptance of the introduced queens with using half comb cage may attributed to two factors, the first is related to the large exposure area of the cage screen which release the pheromone of the caged queens to the hive bees and the second one may attributed to the newly emerging bees which protect and company the caged queens during its release.

These conclusions coincides with Szabo and Townsend (1974) who stated that sure method of introducing queens was to release the queens with emerging brood. However, the present results disagree with those results obtained by Guzman *et al* (1998) who found that the highest rate of queens acceptance was noticed with using Benton mailing -cage method.

3. Effect of presence and stage of brood receiver colonies on acceptance, pre-mating period, mating success and post-mating period of the introduced honeybee virgin queens.

3.1. Acceptance:

Concerning the effect of different brood status the result of (Table 3) indicated that, presence of different brood stages (mixed brood) in the receiver colonies in trail of year 2004 effect positively on acceptance of the

introduced virgin queens. It contributed in high acceptance (86.67%) of the introduced queens. Introducing virgin queens to the colonies having only unsealed brood resulted in 76.67 % acceptance of the introduced queens in comparison to 70% for those virgin queens received by the colonies having no brood.

Table (3): - Effect of presence and stage of brood receiver colonies on the acceptance, pre-mating period, mating ability and post-mating period of honeybee virgin queens (F1 Carniolan), during summer season 2005.

Brood stage	Acceptance percentage		Pre-mating period (days)		Mating success %		Post-mating period (days)	
	2004	2005	2004	2005	2004	2005	2004	2005
Sealed brood	66.67	63.33	3.307	4.067	75.39	73.80	2.867	2.917
Unsealed brood	76.67	83.33	3.443	4.390	78.57	79.63	2.997	2.497
Mixed brood	86.67	90.00	3.067	4.163	84.72	96.67	2.810	2.293
Without brood	70.00	66.66	3.737	4.097	71.03	65.07	3.177	2.683
F test	N. S	**	*	N. S	N.S	**	N. S	N. S
L.S.D 5%		15.26	0.412			9.38		
L.S.D 1%		23.15	0.625			14.23		

Repeating procedures of the same trial in year 2005 (Table 3), resulted in confirmation of the same observations of the last season. Whereas introducing virgin queens to the colonies having sealed and unsealed brood (mixed brood), resulted in their acceptance of the highest rate (90.00%), followed by those virgin queens introduced to colonies of unsealed brood (83.33%).

These results are in agreement with Johansson and Johansson (1970) who found that presence of brood in the colonies receiving the introduced queens proved favorable conditions for their acceptance. Reid (1975) explained partially the effect of preserve brood of the receiver colonies as source of abundance of young workers for those colonies which reflect positively on increasing attention toward the introduced queens.

Also Stigen (1980) confirmed that introducing the queens into the brood nest of the receiver colonies contributed in a high acceptance of those queens.

3.2. Pre-mating period

Results of (Table 3) for year 2004 showed that introducing virgin queens to the colonies having mixed brood contributed in decreasing their pre-mating period significantly. They required only 3.06 days. Also, queens introduced to colonies of sealed brood came in the second class; they needed on an average 3.30 days. On the other hand virgin queens introduced to the colonies having unsealed brood or without brood showed requirement for more significant time to going to mating (pre-mating period). They required 3.44 and 3.73 days, respectively.

Data of the same parameters in the next year 2005 revealed that there were no significant differences among different treatments, (Table 3).

These results are close to those results obtained by Nasr (1977) who found that the pre-mating period of virgin queens introduced to brood right colonies lasted less time than those queens introduced to broodless colonies.

3.3. Mating success

As shown in results of (Table 3). Data of year 2004 revealed that introducing virgin queens to the colonies having mixed brood resulted in highest rate of mating success (84.72%), followed by those queens that introduced to the colonies of unsealed brood only (78.57%). At the same time mating success percentage of queens introduced to the colonies having sealed brood was in an average 75.39% in comparison to 71.03% for those queens introduced to broodless colonies. The difference among these treatment from statistical view point were non significant.

The same trend was obtained with repeating procedure, of those treatment in the next year 2005, (Table 3), but with appearance of significant difference among them.

Mating success percentage could be ranged in the following descending order; 96.67, 79.63, 73.80 and 65.07 for; queens introduced to colonies having, mixed brood, unsealed brood, sealed brood and no brood, respectively.

These results coincides with those results reported by Hellmich *et al.* (1986), El-Sarrag and Nag., (1988) and Hassan *et al.* (2004) who all stated that generally the mating success was better in colonies having brood than those without brood. However, Silva *et al.* (1995) found that presence of capped brood only in the receiver colonies resulted in highest percent of mating success of the introduced queens.

3.4. Post-mating period

Result, of (Table 3) for year 2004 indicated that presence of mixed brood in the receiver colonies showed better effect on post-mating period of the introduced queens. It lasted in an average 2.81 days Queens introduced into the colonies having sealed brood only required relatively more time to start egg laying, they need 2.86 day in an average.

The corresponding values for those queens, introduced to the colonies having unsealed brood or without brood were; 2.99 and 3.17 days, respectively. The differences among these values statistically not significant.

Also, in the next year 2005, as shown from results of (Table 3), there were no significant differences among different treatments, but it was still introducing queens to colonies having mixed brood contributing in shorting post-mating period of the introduced queens.

These findings are in very close to those findings obtained by Naser (1977) who stated that post-mating period of the queens introduced to the broodright colonies, was more short than their corresponding introduced to broodless colonies. Also, El-Sarrag and Nagi (1988) found that introducing queens to colonies containing brood contributed in starting egg laying more quickly.

4. Effect of receiver colonies strength on acceptance, pre-mating period, mating success and post-mating period of the introduced virgin queens.

4.1. Acceptance

Results of (Table 4) of year 2004, showed that there was a negative effect of strength level of the receiver colonies on acceptance of the

introduced virgin queens, whereas increasing of strength level of these colonies was associated with decrease in acceptance percentage of the introduced virgin queens. Acceptance percentages were; 69.67, 93.33, 73.33 and 53.33 % for queens introduced to colonies of 3, 5, 7 and 10 combs covering with bees, respectively. These Figure kept significant difference among each other.

Table (4): Effect level of the receiver colonies strength on acceptance, pre-mating period, mating ability and post-mating period of honeybee virgin queens (F1 Carniolan), during autumn 2005 season.

Colony strength	Acceptance percentage		Pre-mating period (days)		Mating success %		Post-mating period (days)	
	2004	2005	2004	2005	2004	2005	2004	2005
Colonies of 10 combs	53.33	56.67	5.653	5.60	62.22	59.05	2.330	2.58
Colonies of 7 combs	73.33	76.67	5.820	5.90	63.69	69.64	2.333	2.633
Colonies of 5 combs	93.33	86.67	5.413	5.76	78.88	80.55	2.687	2.847
Colonies of 3 combs	96.67	93.33	5.67	5.907	75.92	71.48	2.703	3.050
F test	**	**	N. S	N. S	N. S	*	N. S	N. S
L.S.D 5%	11.52	17.3				12.66		
L.S.D 1%	17.48	26.25				19.22		

On the next year 2005, results of (Table 4) indicated the same trend of the last season, whereas virgin queens introduced to colonies have small population (3 combs) accepted the highest number of the introduced virgin queens (93.33%), followed by those colonies having 5 combs (86.67%), and the colonies of a moderate population (7 combs), they accepted 76.67 % of the introduced virgin queens. Differences among these three treatments statistically not significant. However introducing virgin queens to the colonies of high population (10 combs) resulted in a significant decrease of acceptance of the introduced virgin queens, it was 56.67 %.

These result coincide with the results of Root *et al.* (1975) who reported a strong colony is more inclined to a attack a new queen, they added that introduction of a queen to nucleus is easier. Also, Kassem (2000) found that introducing virgin queens to swarm box having 4 combs covered with bees resulted in acceptance ranged between 73.5 and 78.1, however these introduced to colonies, having 8 combs, they were accepted by the rate extend between 70 and 75.2%.

4.2. Pre-mating period

Results of (Table 4) of year 2004 showed that although pre-mating period of the virgin queens introduced to colonies of 5 combs population lasted a shortest period (5.41 days), followed by those virgin queens introduced to colonies of 10 combs population (5.65 days), those virgin queens introduced into colonies of 3 combs (5.87 days), and 5.82 days for virgin queens introduced to 7 combs colonies. But differences among these Figures statistically not significant.

Also, non significant differences were obtained among treatments in the second year 2005, (Table 4). It was noticed that colonies having high populations (10 combs) affected pre-mating period of the introduced virgin

queens to be 5.60 days, however the longest period (5.907 days) was recorded for those virgin queens introduced to colonies 3 combs.

Results of Eickmeyer (1958) stated that the pre-mating period was longer for queens introduced to small nuclei than those present in large mating boxes. He attributed this behavior to the bees in large mating nuclei for encouraging the queen to leave early for mating flight, while bees in small mating nuclei were more affected by changes of weather conditions.

Also, Nasr (1977) found that pre-mating periods of the queens introduced to standard hive (10 combs) were shorter than smaller population hive.

4.3. Mating success.

As shown from results of (Table 4), of years 2004 and 2005, virgin queens introduced into moderated population colonies (5 combs) covered with bees recorded the highest rate mating success (78.88 and 80.55 %, respectively). However, the lowest percentages of mating success were noticed with introducing virgin queens to high population colonies (10 combs). They were 62.22 and 59.05 %, respectively.

It is obvious from the present results mating ability of the introduced queens increase with decrease the receiver colonies population, where the suitable population of the receiver colonies was 5 combs.

These findings are similar to early finding of Eickmeyer (1958) who found that the larger nuclei gave higher percentages of mating than smaller. These finding are also agree with finding of kassem (2000). Who found that queens introduced to swarm box (4 frams) resulted in 80.1% mating success, in comparison to 74.7 % for those queens introduced to colonies of 8 combs population. And results of Hassan (1990) confirmed the present results; the found that queen mating success was the best in normal nuclei and poorest in micro nuclei.

4.4. Post-mating period.

Data of (Table 4) of years 2004 and 2005 respectively, revealed that there were apparent negative correlation between population of the receiver colonies and post-mating periods of the introduced queens. The shortest period (2.33 to 2.58 days) was recorded for queens introduced to high population colonies (10 combs), however the longest period (2.7-3.05 days) was always associated to these queens introduced to small population colonies (3 combs). These findings may due to presence of more workers in large colonies which able to provide the queen with sufficient food necessary to accelerate sexual maturity and commence of egg laying. This view may are in line with both Eickmeyer (1958) and Hideseli (1968) who stated that larger population of receiver colonies encourage the mated queens to start oviposition early than smaller ones.

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تأثير بعض العوامل على التلقيح الطبيعي لمكبات نحل العسل في منطقة أسبوط

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تهدف هذه الدراسة إلى معرفة لثر بعض العوامل على نجاح التلقيح الطبيعي لعذارى نحل ملكات نحل العسل مثل تأثير نوعية سلالة الطوائف المستقبلة ، طرق إدخال الملكات العذارى ، تأثير وجود الحضنة وأطوارها المختلفة بالطوائف المستقبلة وكذلك قوة الطوائف المستقبلة على قبول وتلقيح الملكات العذارى ، أظهرت النتائج ما يلي :-

أولاً : تأثير نوعية سلالة الطوائف المستقبلة :

وجد أن أعلى نسبة القبول للمكبات عذارى هجين أول كرنبولي المنخلة على طوائف النحل الكرنبولي بنسبة ٩٦,٧٦% يليها الهجين الأول الكرنبولي والإيطالي بنسبة ٩٣,٣٣% ، في حين كانت نسبة القبول مع طوائف النحل المصري أقل نسبة ٧٠% ، وبخصوص فترة ما قبل التلقيح وجد أنه لا توجد فروق معنوية بين الفترات اللازمة لتلك العذارى المنخلة قبل توجهها للتلقيح بغض النظر عن سلالة الطوائف المستقبلة لتلك العذارى . وعند تقدير نسبة التلقيح للعذارى المنخلة وجد أن الملكات العذارى المنخلة إلى طوائف النحل الإيطالي بها أعلى نسبة تلقيح ٧٨,٨٨% بينما المنخلة على طوائف النحل الكرنبولي والمصري أقل نسبة تلقيح ٦٥,١٦% ، ٥٤,١٦% على الترتيب . أما بالنسبة لفترة ما بعد التلقيح فإن الملكات العذارى المنخلة إلى طوائف النحل الكرنبولي سجلت أقل فترة (٢,٨٧ يوم) ، بينما أطول فترة كانت مع الملكات المنخلة إلى طوائف النحل الإيطالي (٣,٣٧ يوم) .

ثانياً : تأثير طرق إدخال الملكات العذارى على نسبة قبولها :

أوضحت النتائج أن إدخال الملكات العذارى من خلال استخدام طريقة قفص نصف القرص قد أدى إلى أعلى نسبة قبول (٩٦,٦٧%) في حين أن استخدام طريقة الإخال المباشر إلى أقل نسبة قبول (٣٦,٦٧%) .

ثالثاً : تأثير وجود الحضنة وأطوارها المختلفة بالطوائف المستقبلة :

وجد أن أفضل نسبة قبول للمكبات العذارى المنخلة كانت مع الطوائف التي تحتوي على خليط من الحضنة حيث كانت بمعدل ٨٦,٦٧% ، ٩٠% خلال عامي الدراسة ، بينما كانت أقل قبول للمكبات العذارى المنخلة كانت مع تلك الطوائف المحتوية على حضنة مثقلة فقد بمعدل ٦٦,٦٧ ، ٦٣,٣٣% خلال عامي الدراسة . وبخصوص فترة ما قبل التلقيح فقد حققت العذارى المنخلة على خليط من الحضنة أقصر فترة بمعدل ٣,٠٦ يوم ، والملكات العذارى المنخلة على الطوائف عديمة الحضنة بمعدل ٣,٧٣ يوم . أظهرت النتائج أن نسبة التلقيح في العذارى المنخلة على الطوائف المحتوية على خليط من الحضنة كانت أعلى نسبة ٨٤,٧٢% ، وأيضاً أن هذه الملكات حققت أقصر فترة لما بعد التلقيح .

رابعاً : تأثير قوة الطوائف المستقبلة للمكبات العذارى :

سجلت العذارى المنخلة للطوائف المحتوية على ٣ أقراص أعلى نسبة قبول ٩٦,٦٧ ، ٩٣,٣٣% خلال عامي الدراسة ، بينما سجل القبول أقل معدلاته في الطوائف المحتوية على ١٠ أقراص (٥٣,٣٣ ، ٥٦,٦٧% خلال عامي الدراسة) . أما فيما يتعلق بفترة ما قبل التلقيح للمكبات العذارى عدم وجود فروق معنوية بين المعاملات .

وبخصوص نسبة التلقيح فإن الملكات التي أدخلت على الطوائف المحتوية على ٥ أقراص حققت أعلى نسبة نجاح في التلقيح ٧٨,٨٨% ، بينما حققت الملكات المنخلة على الطوائف التي تحتوي على ١٠ أقراص أقل نسبة تلقيح ١٢,٢٢% .