

EFFECT OF SOME IMPORTANT BEE MANAGEMENT OPERATIONS ON PROTECTION OF HONEYBEE COLONIES AND CONTROLLING CHALKBROOD DISEASE

By

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ABSTRACT

The Experiment and observation indicated that, the colonies having old queens (more than 3 years old) were infected with chalkbrood disease more than the colonies that having the newly matted young queens with the mean of 28.7% infested the highest percent of infestation were 40,35 and 30% infestion occurred in case of old queens

The result indicated that replacement of old queen by a newly matted queen stopped the disease and the colonies became stronger.

The results indicated that introduction of a young newly matted queen to the colonies enhanced there breeding activity and reared more brood than the colonies with old queen.

The effect of artificial leading on stimulating protecting colonies from chalkbrood disease and increasing the honeybee

It was obvious from the obtained results that colonies fed on sugar syrup using Moshtoher Boardman feeder give the lowest infection percentage, increased the bee population, strengthen and protected the colonies from infection by chalkbrood disease .

Strong colonies that contain 10 combs and covered with bees have healthy bees there were no infection by chalkbrood disease

The comparison of three treatment showed that the colonies kept in sunny places has less infection and infection percentage was 1.3% the colonies kept in semi shaded area should an infection percentage of 10.3% while the infection percentage of colonies which kept in complete shade was 18.3% it was obvious from the about results that

colonies kept in open and sunny places were more tolerant and less susceptible to chalkbrood disease than the colonies kept in semi- shaded or shaded places.

INTRODUCTION

Chalkbrood a Fungal disease of honeybee colonies . chalkbrood rarely kills colonies it often weakens then so much that they are not able to produce surplus honey for beekeeper or sufficient food for this disease

Do - Jong demonstrated that larvae different in their resistance to infection . and the strains of bees vary the efficiency with which they remove larval mummies, the uncapping of the cells and the removal of the larvae appear to depend on separate genes there seams no reason to suppose that the behavioral inheritance affecting the honeybee dealing with dead A.F.B Larvae is in any way different from that which controls . it when dealing with cholkbrood mummies



4-MATERIALS AND METHODS

Effect of some important bee management operations on protection of honeybee colonies and controlling chalkbrood disease during the nectar flow seasons of 1997 and 1998.

A- The effect of Queen age on the rate of infection of honeybee colonies by chalkbrood :-

This experiment was carried out during the two years of the study (1997 and 1998) Forty honeybee colonies (F Carniolan bees) were divided into two groups, 20 colonies each. The colonies were prepared in early December 1996 the first group contain old queens (more than three years old). While the second group contain young queen (less than one year old). The colonies were housed in Langstroth hives, and were kept in the apiary of the faculty of Agriculture at Moshtohor. The experiment and observations were carried out from February to September 1997 and 1998. The infestation percent with chalkbrood disease was listed and calculated.

B-The study of the effect of introducing newly mated queen into chalkbrood infected colonies

To study the effect of introducing new queen on chalkbrood infected colonies, 6 colonies (F Carniolan hybride) were used in this experiment. The 6 colonies were divided into two groups 3 colonies each. The first group was headed by young mated queens (less than one year old), while the other group was headed by old queens (more than 3 years old). The mummies which dropped on bottom board of the hives were counted and recorded at 12 days intervals, from February to September during the two years of study (1997 and 1998).

C-Effect of re-queening of honeybee colonies with young queens on brood rearing activities, protection and controlling of colonies from infection by chalkbrood disease:-

To estimate the effect of re-queening of honeybee colonies with young mated queen, sealed brood areas were measured at 12 days intervals. These measurements were taken from the previous colonies that headed by young mated and old queens during the same period, 1997 and 1998.

D-Effect of artificial feeding and pollen supplement of honeybee colonies on the infection percentage by chalkbrood disease:-

Fifty colonies were used in this experiment (F Carniolan Bees), these colonies were divided into two groups 25 each. These colonies were housed in Langstroth hive and contain young queens at the same age. The first group was provided with pollen supplement and sugar syrup. While the second group were supplied only with sugar syrup. The artificial feeding were started early at December first before the beginning of the experiment and continued during the period of studies.

To prepare the pollen supplement, medicine or brewers yeast, honey and powder sugar were used at the following rate (1 yeast: 1 honey : 1 Powder sugar). The mixture were stirred thoroughly and softened to form cake. About 50-100 grams of cake was introduced weekly. The cake was placed at the top of the brood combs, covered with waxed paper to prevent cake dryness. The sugar syrup was prepared by mixing sugar with water at the rate of (1 Sugar : 1 Water W/V). the sugar syrup were provided to the colonies at the rate of 1/2kg at weekly intervals. Data are listed and calculated monthly from January to September during 1997 and 1998.

E-Effect of the types of bee feeders used in feeding honeybee colonies on the infection percentage by chalkbrood disease :-



Three apiaries containing 100 colonies each were used in this experiment, during the two years of the study 1997 and 1998. Three types of feeders were used, combs, Dummy and Boardman feeders. The numbers of infected colonies with chalkbrood disease and infection percentage were estimated monthly from January to December.

F-The effect of bee population on the infection percentage of chalkbrood disease :-

To study the effect of bee population on the percentage of chalkbrood disease infection, three groups of colonies were used. Each group contains 30 colonies, the first group was the strong group that contains 10 combs or more and covered with about 30,000 workers. The second group or the medium group contains 6-7 combs and covered with about 15,000 workers, while the weakest group contains about 3-5 combs and covered with about 10,000 workers. The infection percentages were calculated during the period of study 1997 and 1998.

G-Effect of hive shading on chalkbrood infection percentage:-

Three groups of thirty colonies that housed in Langstroth hives (F Carniolan bees) were prepared in early December and used in this experiment. The first group was placed in completely shaded area, the second group was placed in semi-shaded area and the last group was placed in open sun. The data were estimated from January to September 1997 and 1998.

RESULTS AND DISCUSSION

Effect of some important bee management operations on protection of honeybee colonies and controlling chalkbrood disease during the nectar flow seasons of 1997 and 1998.

A-The effect of Queen age on the rate of infection of honeybee colonies by chalkbrood :-

The effect of queens age on the percentage of chalkbrood infestation are listed in (table 1). The results showed that colonies having old queens were highly infected with chalkbrood disease (*A. apis*) during the experimental period of February to September 1997 and 1998. The percentages of infestation were ranged from 20 To 40% with the mean of 28.7%. the highest percent of infestation 40,35 and 30% occurred in March, September and April, respectively.

The colonies that having the young mated Queens (less than 1 year old) were healthy and the chalkbrood infestation were very low. Only one colony showed a 5% infestation during March, with a total mean infestation of 0.01% .

The experiment and observation indicated that, the colonies having old queens (more than 3 years old) were infected with chalkbrood disease more than the colonies that having the newly mated young queens. It could be concluded that introducing a newly young-mated queen to colonies enhanced the colony activities during honey flow, and it's a common practice to remove the old queens from infected colonies .



Months	No . of colonies examined	Colonies headed with old queens (more than 3 years old)			Colonies headed with young queens (less than 1 years old)		
		infected	Healthy	% infest	Infected	Healthy	% infest
February	20	5	15	25	0.0	20	0.0
March	20	8	12	40	1	19	5
April	20	6	14	30	0.0	20	0.0
May	20	4	16	20	0.0	20	0.0
June	20	5	15	25	0.0	20	0.0
July	20	5	15	25	0.0	20	0.0
August	20	6	14	30	0.0	20	0.0
September	20	7	13	35	0.0	20	0.0
Mean	20	5.7	14.2	28.7	0.12	19.9	0.01

Table (1) : Effect of Queens's age on the rate of infection of honeybee colonies by chalkbrood (*Ascosphaera apis*) during the nectar flow seasons of 1997 and 1998.

B-The study of the effect of introducing newly mated queen into chalkbrood infected colonies:-

The effect of introducing new mated queen into colonies infected with chalkbrood disease are shown in (table 2). The mean number of chalkbrood infested larvae dropped and removed by bees on the bottom board "mummies" in colonies headed by a new queen were 141.7, 81.3 and 11 in February and March. The disease disappeared from March 15 and the colonies regained its strength and became healthy and strong in rearing activity. However The mean number of chalkbrood infested larvae dropped and removed by bees on the bottom board "mummies" per colony in colonies headed by old queens (more than 3 years old) were 169 and 170.7 in February, 221.3, 200.3 and 132.3 in March, 234.6 and 275.6 in April. However the rate of infestation decreased during May and showed a mean number of 56.3 and 40.3 mummies. The trend of infestation increased again in June to reach 28.6, 55 and 106.3 mummies in June, 181.3 in July and 116 in August, while the lowest rate of infestation was detected during September and sowed a mean of 28.6 mummies.

These results indicated that replacement of old queen by a newly mated queen stopped the disease and the colonies became stronger. This method was a cheap method to use to protect honeybee colonies from infestation and control chalkbrood disease, (Heath, 1982 and 1985, and Herbert, et al, 1997 and 1986) .



Table (2) : Effect of introducing newly mated queen into chalkbrood infected colonies during the nectar flow seasons of 1997 and 1998 on mummy number on the bottom board .

Dates	Nucleus colonies infested with chalkbrood disease							
	Colonies supplied with new mated queen (mummies No.)				Colonies with old queens (mummies No.)			
	Colonies No.			Average	Colonies No.			Average
	1	2	3		1	2	3	
February								
5	127	122	146	141.7	166	175	160	169
19	111	78	55	81.3	190	134	188	170.7
March								
2	6	17	10	11	217	186	261	221.3
15	0.0	0.0	0.0	0.0	152	233	216	200.3
28	0.0	0.0	0.0	0.0	98	115	184	132.3
April								
10	0.0	0.0	0.0	0.0	123	310	271	234.6
23	0.0	0.0	0.0	0.0	289	218	325	275.6
May								
6	0.0	0.0	0.0	0.0	58	66	45	56.3
19	0.0	0.0	0.0	0.0	80	24	17	40.3
June								
2	0.0	0.0	0.0	0.0	15	48	23	28.6
15	0.0	0.0	0.0	0.0	30	65	77	55
28	0.0	0.0	0.0	0.0	99	132	88	106.3
July, 24	0.0	0.0	0.0	0.0	149	234	161	181.3
August, 19	0.0	0.0	0.0	0.0	150	124	74	116
September								
14	0.0	0.0	0.0	0.0	32	42	12	28.6

C-Effect of re-queening of honeybee colonies with young queens on brood rearing activities, protection and controlling of colonies from infection by chalkbrood disease :-

The new mated queens were introduced to the colonies before the experiment. The observation and results were recorded soon after. The effects of queen's age on the activity of honeybee colonies in brood rearing are listed in (table 3). The area of honeybee sealed brood was measured at 12 days interval. The results indicated that the averages sealed brood area in colonies headed by old mother queen more than three year old during the periods from February to the end of September were 431.3, 505, 512.7, 518, 570, 694.3, 438 and 345 in / colony. The area of the sealed brood in colonies that had young mated queens were 693, 1505.7, 2644.3, 2750, 3135.3, 2591.3, 1807 and 1241.6 in /colony during the periods from



February to the end of September respectively. The mean areas of sealed brood reared in colonies headed with young mother queen were 2020.6, 1944.1 and 2166.2 in / colony.

However the mean sealed brood reared in colonies headed with mother queen more than three years old were 463.4, 480.5 and 561.5 in /colony.

The above mentioned results indicated that good laying queens are important for beekeeping and increasing productivity. However, in fact the queen bee may live for several years, it is to the beekeeper advantage that they replaced the old queen by a good younger queen to increase productivity and maintain their colonies, (Baily; 1981, Heath, 1985 and Shimanuki & Knox, 1990). The experiment and observation indicated that, the colonies having old queens (more than 3 years old) were infected with chalkbrood disease more than the colonies that having the newly mated young queens.

Table (3) Effect of re-queening of honeybee colonies with young queens on brood rearing activities during the nectar flow seasons of 1997 and 1998.

Months and Dates	Sealed brood areas measured at 13 days intervals in / colony							
	Brood rearing activities in colonies headed with old queens (more than three years old)				Brood rearing activities in colonies headed with young queens (less than one year old)			
	Colonies No.			Average	Colonies No.			Average
	1	2	3		1	2	3	
February 5, 19	350	432	512	431.3	595	609	875	693
March 2, 15, 28	425	514	576	505	995	1350	2172	1505.7
April 10, 23	488	615	435	512.7	2124	2195	3614	2644.3
May 6, 19	604	435	515	518	2984	2502	2765	2750
June 2, 15, 28	508	490	712	570	3175	3281	2950	3135.3
July 11, 24	594	579	810	694.3	2672	2988	2114	2591.3
August 6, 19	340	462	512	438	2145	1556	1720	1807
September 1, 14, 27	298	317	420	345	1525	1072	1128	1241.6
Total	3707	3844	4492		16165	15553	17330	
Mean	463.4	480.5	561.5		2020.5	1944.1	2166.2	



D-Effect of artificial feeding and pollen supplement of honeybee colonies on the infection percentage by chalkbrood disease :-

The effect of artificial feeding on stimulating, protecting colonies from chalkbrood disease and increasing honeybee activities during dearth seasons of 1997 and 1998 are presented in table (4). The obtained data indicated that Colonies fed on sugar syrup and provided with pollen supplement (brewer's yeast), had only 1.0, 1.0, 2.0 and 1.0 infected colonies out of 25 colonies in February, March, April and May, respectively. However colonies fed with sugar syrup only had 3, 4, 3, 5, 5, 4, 4, 5, and 5 infected colonies out of the 25 observed colonies during January, February, March, April, May, June, July, August and September, respectively. The mean of infected colonies was 4.2 colonies. The infestation percentage by chalkbrood disease in colonies fed with sugar syrup only 16.9%. however the infection percentage in colonies fed with sugar syrup and provided wit brewer's yeast was 1.3% only. This result shows significant differences between treatments.

Considerable interest has been given to the feeding of pollen supplement, as a means of stimulating brood rearing, especially during periods of pollen shortage, or to increase colony strength for protection from chalkbrood disease. It is obvious from the above results that colonies fed with brewer's yeast produced and reared bees and give a stronger colonies more than colonies fed with sugar syrup only. Supplying colonies with brewer's yeast increased the resistance of bee colonies to chalkbrood disease and strengthens the bee colonies, (Baily, 1981; Heath, 1985 and Shimanuki & Knox, 1990). Feeding of honeybee colonies with pollen supplement and sugar syrup was the best, easy and cheap methods to protect the honeybee colonies from chalkbrood disease.



Table (4): Effect of artificial feeding and pollen supplement of honeybee colonies on the infection percentage by calkbrood (*Ascosphaera apis*) during the nectar flow seasons of 1997 and 1998.

Months of activity	No. of colonies/treatment	Colonies fed with brower's yeast mixtures+ sugar syrup			Colonies fed with sugar syrup only (contol)		
		Infected Colonies	Healthy colonies	% infest	Infected colonies	Health y colonie s	% infest
January	25	0.0	25	0.0	3	22	12
February	25	1	24	4	4	21	16
March	25	1	24	4	3	22	12
April	25	2	23	8	5	20	20
May	25	1	24	4	5	20	20
June	25	0.0	25	0.0	4	21	16
July	25	0.0	25	0.0	4	21	16
August	25	0.0	25	0.0	5	20	20
September	25	0.0	25	0.0	5	20	20
Mean	25	0.55	24.4	1.3	4.2	20.8	16.9

E-Effect of the types of bee feeders used in feeding honeybee colonies on the infection percentage by chalkboard disease:-

The effect of feeders types and methods of sugar syrup feeding on the number of infected colonies with chalkbrood disease during the years of 1997 and 1998 are presented in (table 5). The drop in combs feeder increased the infection of honeybee colonies by chalkbrood disease. The infection percentages ranged from 9% in June to reach its maximum level of 35% in April with the mean average of 18.5% during the two years of study. The highest infection percentage were 35, 26, 23 and 21% in April December, September and March, respectively. The high infection percentage using this method of feeding may due to increasing the humidity percentage in beehives. The Dummy division-board feeder gave infection percentages ranged from 4% in June to 16% in April with the mean of 7.6%. the highest infection percentage was 16% during the month of April while the lowest percentage of 4% were in during the months of June and July. However Boardman entrance feeder gave infection percentage ranged from 0.0% in July, September, October, November and December to 3% in April with a mean average of 1.1%

It was obvious that colonies fed on sugar syrup using Boardman feeder fixed in hive entrance or fixed into one end at bottom board, increases the bee populations and strengthen the colonies. The low infection rate and strong colonies resulted from using this feeder may due to the lowest humidity percentages in the hive, in addition to that this method of feeding



protected the bees from the cold weather and decreases robbing between colonies. (Baily, 1981 : Heath, 1985 and Shimanuki & Knox, 1990) .

Table (5) : Effect of the types of bee feeders used in feeding honeybee colonies on the infection percentage by chalkbrood disease (*Ascospaera apis*) during the dearth seasons of 1997 and 1998 .

Months of activity	No . of colonies examine d/feeder	Types of feeder					
		Drops in comps		Dummy feeder		Boardman feeder	
		Infected colonies	Healthy colonies	Infected colonies	Healthy colonies	Infected colonies	Healthy colonies
January	100	17	83	6	94	2	98
February	100	18	82	9	91	2	98
March	100	21	79	11	89	2	98
April	100	35	65	16	84	3	97
May	100	10	90	3	97	1	99
June	100	9	91	4	96	1	99
July	100	13	87	4	96	0.0	100
August	100	12	88	5	95	2	98
September	100	23	77	9	91	0.0	100
October	100	19	81	7	93	0.0	100
November	100	19	81	7	93	0.0	100
December	100	26	74	10	90	0.0	100
Mean	100	18.5	81.5	7.6	92.4	1.1	98.9

F-The effect of bee population on the infection percentage of chalkbrood disease :-

The effect of honeybee colony population on the infection percentage by chalkbrood disease are listed in (table (6)) . Strong colonies that contain 10 combs have healthy bees and there were no infections by chalkbrood disease during the experiment periods of 1997 – 1998. The percentage of infection in Moderate colonies which contains 6 – 7 combs were ranged from 6.6% in January, February, March, May and July to 13.3% in April and September, while the infection percentage were 10% in the months of March, June and July. The total means infection of the moderate colonies was 9% . However, a weaker colony that contains 3–5 combs was highly infected with chalkbrood disease more than strong and moderate colonies. The infection percentages ranged from 13.3% in January to 33.3% in April. The infection percentages were 16.6 in February and July, 26.6% in March and June 7% in May and 30% in August and September. The mean percentage of infection during the two seasons of study 1997-1998 was 24.1% .

The above mentioned results indicated that stronger colonies could be more tolerant to the infection by chalkbrood disease than any other weaker colonies (Baily, 1981; Heath, 1985



and Shimanuki & Knox, 1990). Maintaining strong colonies in the apiaries will increase the bees tolerance to the infection by chalkbrood disease.

Table (6) : The Effect of the colony populations (strength) on the infection percentage of chalkbrood disease (*Ascospaera apis*) during the months of study seasons of 1997 and 1998 .

Month	No . of colonies examined/treatment	Colonies					
		Strong colonies (10 combs or more)		Moderate colonies (6-7 combs)		Weak colonies (3-5 combs)	
		Infected colonies	% infest	Infected colonies	% infest	Infected colonies	% infest
January	30	0.0	0.0	2	6.6	4	13.3
February	30	0.0	0.0	2	6.6	5	16.6
March	30	0.0	0.0	3	10	8	26.6
April	30	0.0	0.0	4	13.3	10	33.3
May	30	0.0	0.0	2	6.6	7	33.3
June	30	0.0	0.0	3	10	8	26.6
July	30	0.0	0.0	2	6.6	5	16.6
August	30	0.0	0.0	3	10	9	30
September	30	0.0	0.0	4	13.3	9	30
Mean	30	0.0	0.0	2.7	9	7.2	24.1

G-Effect of hive shading on chalkbrood infection percentage:-

The effect of shading on honeybee colony susceptibility to the infection by chalkbrood disease are recorded in (table 7). The 30 colonies located in completely shaded place was highly infected with chalkbrood disease. The infection percentage ranged from 10% in January to 23.3% in April and May, while the infection percentage were 13.3% in February. 20% in June, July, August and September. The colonies kept in semi shaded area showed a moderate infection by chalkbrood disease. The infection percentage ranged from 6.6% in January, February and March to 13.3% in April, May, June and July and were 10% in August and September. However colonies that kept in open sun showed a little infection percentage. The percent of infection were ranged from 0.0% in January, February, July, August and September, to 6.6% in April, 3.3% in March and May.

The comparison of tree treatment showed that the colonies kept sunny places had less infection and the infection percentage was 1.3%, the colonies kept in semi -shaded area showed an infection percentage of 10.3%, while the infection percentage of colonies that kept in complete shade was 18.3%.



It was obvious from the above results that colonies kept in open and sunny places were more tolerant and less susceptible to chalkbrood disease than the colonies kept in shaded place. It could be recommended that Egyptian beekeepers should practice keeping their hives in open and sunny places especially in winter and spring. However during hot summer months protection of bee colonies especially in July and August could be done by keeping the colonies in semi - shaded area .

Table (7) : Effect of Keeping honeybee colonies in hives placed at shading or open sunny places on infection percentage of chalkbrood disease (*Ascosphaera apis*) during the months of study seasons of 1997 and 1998 .

Month	No . of colonies /treatment	Shading					
		Completely shade		Semi - shade		Open place (sunny)	
		Infected colonies	% infest	Infected colonies	% infest	Infected colonies	% infest
January	30	3	10	2	6.6	0.0	0.0
February	30	4	13.3	2	6.6	0.0	0.0
March	30	5	16.6	2	6.6	1	3.3
April	30	7	23.3	4	13.3	2	6.6
May	30	7	23.3	4	13.3	1	3.3
June	30	6	20	4	13.3	0.0	0.0
July	30	6	20	4	13.3	0.0	0.0
August	30	6	20	3	10	0.0	0.0
September	30	6	20	3	10	0.0	0.0
Mean	30	5.5	18.3	3.1	10.3	0.4	1.3



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الملخص العربي

*تم دراسة استخدام بعض العمليات النحلية على حماية المناحل من الإصابة بمرض تحجر الحضنة الطباشيري والأمراض الفطرية الأخرى بصفة عامة :

تم دراسة تأثير استبدال الملكات الكبيرة السن (أكثر من ٣ سنوات) بملكات ملقحة صغيرة السن (عمرها أقل من عام) إلى الطوائف المصابة بمرض تحجر الحضنة الطباشيري ، وقد أوحى النتائج أن الطوائف المزودة بملكات صغيرة السن أقل إصابة بهذا المرض حيث أن نسبة الإصابة في موسمي الدراسة (٩٧ ، ١٩٩٨) لا تتعدى المتوسط ٠,٠١% ، وهذه النسبة أقل بدرجة كبيرة عند مقارنتها بالطوائف التي توجد بها ملكات كبيرة السن إذ تصل الإصابة بهذا المرض بتلك الطوائف إلى ٢٨% خلال موسمي الدراسة كما درس تأثير إدخال ملكات ملقحة صغيرة السن على الوقاية من الإصابة بمرض تحجر الحضنة الطباشيري حيث أوضحت النتائج أن اليرقات المتحجرة (الموميات) في الطوائف المصابة التي استبدلت ملكاتها القديمة بملكات حديثة تختفي منها اليرقات المتحجرة في خلال شهران من تاريخ إدخال تلك الملكات الصغيرة السن ، بينما في الطوائف الأخرى التي يوجد على رأسها ملكات كبيرة السن ترتفع بها نسبة الإصابة بالمرض ويزداد بها أعداد الموميات المتحجرة التي تتساقط على طليبة الخلية ، وكان متوسط عدد اليرقات المتحجرة في حالة الطوائف ذات الملكات الصغيرة السن التي تم عدها كل ١٢ يوم على التوالي من فبراير إلى سبتمبر (٩٧،٩٨) حوالي (١٥,٦ يرقة متحجرة / طائفة) ، بينما في حالة الطوائف ذات الملكات الكبيرة السن في نفس الفترة حوالي (١٣٤,٣ يرقة متحجرة / طائفة) .

كما شملت الدراسة تأثير إدخال الملكات الملقحة صغيرة السن إلى الطوائف المصابة بمرض تحجر الحضنة الطباشيري على قدرة تلك الطوائف في تربية الحضنة مقارنة بالطوائف التي يوجد على رأسها ملكات كبيرة السن خلال عامي الدراسة (٩٧،٩٨) وبينت النتائج تفوق الطوائف ذات الملكات الصغيرة السن في تربية الحضنة حيث أعطت متوسط مساحة حضنة مقفولة كل ١٢ يوم على التوالي مقداره ٢٠٢٠,٥ ، ١٩٤٤,١ ، ٢١٦٦,٢ بوصة مربعة / طائفة ، بينما مساحة الحضنة في حالة الطوائف ذات الملكات الكبيرة السن حوالي ٤٦٣,٤ ، ٤٨٠,٥ ، ٥٦١,٥ بوصة مربعة / طائفة على التوالي وذلك خلال فترات النشاط من فبراير إلى سبتمبر ٩٧ ، ٩٨ .

كما تم دراسة تأثير قوة الطائفة واحتوائها على أعداد كبيرة من النحل وخاصة النحل الحاضن صغير السن على قدرة الطائفة على تحمل ومكافحة مرض تحجر الحضنة الطباشيري ، وأوضحت النتائج أن الطوائف القوية (التي تحتوي على ١٠ أقراص أو أكثر مغطاة بالنحل وبها عسل وحبوب لقاح) كانت نسبة الإصابة منعدمة بتلك الطوائف حيث أن نسبة الإصابة (صفر%) ، بينما كانت نسبة الإصابة بالمرض (٩%) في حالة الطوائف متوسطة القوة التي تحتوي خلاياها (على ٦ - ٧ أقراص مغطاة بالنحل) ، أما نسبة الإصابة العالية (٢٤,١%) فكانت واضحة في الطوائف الضعيفة (خلاياها تحتوي على خمس أقراص أو أقل وبها عدد قليل من النحل الحاضن صغير السن) وذلك خلال الفترة من يناير حتى سبتمبر في عامي الدراسة (٩٧ - ٩٨) .

ج- ويدراسة تأثير تغذية طوائف نحل العسل وتنشيطها بالتغذية بالبدائل خلال مواسم ندرة حبوب اللقاح وعدم توفر مصادر الرحيق على إصابة الطوائف بمرض تحجر الحنة الطباشيري ، وقد أظهرت النتائج المتحصل عليها قدرة الطوائف التي غذيت على (الخميرة الطبية الجافة المخلوطة بالعسل والسكر البودرة) كبديل لحبوب اللقاح ، استطاعت تلك الطوائف على خفض نسبة الإصابة بتلك المرض (١,٣%) ، بينما الطوائف التي غذيت على المحلول السكري فقط إرتفعت بها نسبة الإصابة بتحجر الحنة الطباشيري إلى (١٦,٩%) وذلك خلال عامي الدراسة من يناير حتى سبتمبر (٩٧ - ٩٨) .

وأيضاً درس تأثير استخدام نوع التغذية التي تستخدم في تغذية الطوائف بالمحلول السكري على الإصابة بمرض تحجر الحضنة الطباشيري بينت النتائج أن أفضل غذائية يمكن استخدامها هي غذائية بوردمان الخارجية التي تتركب على الخلايا من الخارج حيث أعطت أقل نسبة إصابة بالمرض ١,١% يليها في ذلك غذائية دومي التي توضع بجوار الأقراص داخل الخلية حيث أن نسبة إصابة الطوائف المستخدم فيها هذه الغذائية ٧,٩% أما أكثر طرق التغذية سبباً في ارتفاع نسبة الإصابة بالمرض هو التغذية بالأقراص القديمة بطريقة الصب بالمحلول السكري فوق هذه الأقراص وملئها بالمحلول حيث كانت نسبة الإصابة ١٨,٥% خلال عامي الدراسة من يناير حتى ديسمبر ١٩٩٧ - ١٩٩٨ .

د- أوضحت الدراسة أن استخدام التظليل الكامل للخلايا بالمنحل يرفع نسبة الإصابة بمرض تحجر الحضنة الطباشيري إلى (١٨,٣%) يليها في ذلك المكان النصف مظلل حيث وصلت نسبة الإصابة إلى ١٠,٣% أما أفضل أماكن وضع خلايا بالمنحل هي الأماكن المشمسة وخاصة في المواسم الشتاء والربيع والخريف حيث انخفضت نسبة الإصابة في الطوائف الموضوعة بهذا المكان إلى ١,٣% وذلك خلال عامي الدراسة من يناير حتى سبتمبر ١٩٩٧ - ١٩٩٨ .

