

FIELD TRIAL FOR CONTROLLING THE FOULBROOD DISEASES IN HONEYBEE COLONIES

**KHATTABY, A. M.¹, M. M. KHATTAB², R. E. OMER²,
I. A. GAABOUB² and M. E. HASHISH¹**

1 *Honeybee Research Department, Plant Protection Research Institute, ARC,
Dokki, Giza*

2 *Department of Plant Protection, Faculty of Agriculture, Moshtohor, Benha
University*

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Abstract

Honeybees (*Apis mellifera* L.) exposed and still to many diseases in Egypt during the last years, and the most danger is that honeybee colonies were attacked by two very ravenous bacterial diseases, which are named American foulbrood (AFB) and European foulbrood (EFB). In this field work trial was performed from October 2006 to April 2007, a beneficial and good results had been obtained in controlling and treating the two diseases by application a number of the beekeeping operations and by using some natural materials (Cinnamon & Clove) and which were superior as treatment when compared with the veterinary antibiotic, Tylosin that used also.

INTRODUCTION

American foul brood (AFB) and European foulbrood (EFB) are two bacterial diseases attack the honeybee brood and minimize its benefits at many countries (Morse, 1980; Bailey, 1981 and Sanford, 1987). Egypt was from little countries which free of those diseases for a few years as a result of application of quarantine laws. But Mattar, 2001 found AFB spores in honey samples at some Egyptian governorates, after that he was followed by extention leaflet of Khattab, 2004 represented a brief on AFB disease, then Khattaby found AFB symptoms in an apiary at Giza governorate, followed by booklet to Khattaby, 2006, whereas he pointed to danger of the AFB and EFB diseases, then followed that appearance to a number of papers which its researchers stated on presence and diffusion of AFB disease in Giza, Fayoum and Alexandria governorates respectively (Zakaria, 2007; Owayss, 2007 and Mostafa *et al.*, 2008), then presence of AFB and EFB diseases had been reported officially in the Egyptian apiaries by isolation and identification of the pathogenic causatives of both of them (Hashish *et al.*, 2008).

The present investigation aims to carry out a field experiment during a period extended from October 2006 to April 2007 for controlling the foulbrood diseases.

MATERIALS AND METHODS

In ordinary cases, when checkup of a honeybee colony which is healthy, that colony's status and the general outlook of the bee brood combs (the larval stages and pupal stage) according to Morse (1980) are as following (Fig. 1):

- 1- Smell to lovely scent emitted from the bee wax, the honey and from pheromones of the bee population.
- 2- The bee adults density in the colony and on the brood combs is reasonable.
- 3- The brood comb consisted from waxy pattern of hexagonal cells either are opened (uncapped) or are closed (capped) by waxy caps, and the bee brood are inner those cells.
- 4- If the brood cells were uncapped, then the bee larvae are white ivory of the color, fresh and presence horizontally in the cells.
- 5- The brood cells which capped are containing the prepupae and pupae stages, and in that case the caps of the cells are convex, intact and with yellow or light brown color.

So any strange appearance unlike the previous description is considered a disease or an upnormal position in that bee colony as well as in this present study, whereas we worked certain control trials on the two bacterial diseases were named AFB and EFB which attack the honeybee brood and exhibit the following symptoms:

In case of AFB disease: The diseased symptoms (Figs. 2 and 3) are a patchy appearance of brood combs, sunken, cappings with a greasy look and partially open cells, the dark brown larval remains stretched to a thin thread longer than 20 mm., in advanced stages of infection, scales adhere firmly to the lower side of the cells and in some cases tongues of dead pupae protrude from the scales across the cells and combs contain diseased larvae have a characteristic glue-pot odor (Morse, 1980; Shimanuki & Knox, 1991; Alippi, 1997 and Hansen & Brodsgaard, 1999).

In case of EFB disease: The diseased symptoms (Fig. 4) are that bee larvae die in the coiled stage, turn yellowish to dark brown or black in color and develop a watery to granular consistency, the resultant dried scales appear twisted or contorted in their cells and are easiest to remove and combs contain diseased larvae produce an intense

sour odor (Cantwell, 1974; Morse, 1980; Bailey, 1981; Farmnote, 1984; Sanford, 1987 and Shimanuki & Knox, 1991).

The control tests were conducted in the field during the period from October 2006 to April 2007 on 53 carniolian honeybee colonies (*Apis mellifera* L.) situated in two apiaries or localities; Kafr-Tohormos district at Giza governorate including 35 colonies and Sheshae district at Menoufia governorate including 18 colonies. All 53 colonies were affected and exposed to the known symptoms of AFB disease, and intervened them some colonies included a few combs with EFB symptoms, the control experiments were as follows:

1. The beekeeping management procedures:

The combs with bees were removed from their hives to another hive boxes over successions and treated by Farozal powder (natural compound product in agriculture faculty at Moshtohor) dusting on the bees and combs accompanied with putting of pierced sacks containing in saturated cardboard by Formic acid 65% due to decrease the *Varroa* mite numbers which may be presence, then the starving colonies were fed with sugar syrup only.

The removed wooden hive boxes and covers were washed by detergent solution, then immersed in a water bath containing a formic acid 85% as a chemical disinfectant. During washing, the inner walls of boxes and covers were scraped and scrubbed by use of metal emery or hard brush; also the inner covers were washed by same of the disinfectants.

The boxes and covers were allowed to dry in the air and sun rays for 2-3 days. The dry wooden boxes and covers were whole scorched with a blowtorch but 30 cm. spaces allowed between surface of the wood and the blowtorch. The combs and bees were again returned to the disinfected hive boxes with excluding of any empty or surplus combs. The weak or old queens were changed (requeening). Sizes of all the colonies were decreased upon the combs and bees by putting of 46×24cm. inner partitions after the last combs, with the enlargement due to continued increase of the bees and combs numbers.

After completely of housing whole the colonies in disinfected hive boxes at the both two apiaries, the colonies equalized in respect to the brood and the honey combs. Then, the colonies were treated with the suffixed therapeutic materials.

The shaking procedure was carried whereas only in Sheshae apiary, 3 colonies with suitable adult bee abundance from total colonies were returned to 3 disinfected boxes but without the combs whereas their adult bees were shaken

over 2 wire frames without wax foundations after the queens confined inner introducing cages. The hives and their entrances were closed by compact for along of 2 days without any feeding. After that, the queens transferred and the bees were again shaken into another 3 disinfected boxes each containing on 2 wire frames with wax foundations and slowly feeder with sugar syrup containing on the selected therapeutic. Then, the queens were liberated from the cages after 1day. Then, remainders of the procedures were continued on those 3 colonies with remainder of the apiary.

2. Examination of the inhibitory effects of certain therapeutic materials on the two foulbrood diseases in the honeybee colonies (*in Vivo*):

From each therapeutic group shown table.1, the following materials were selected and applied in the field as follows:

At the first apiary at Giza governorate consisting of 35 colonies, 18 colonies were treated by all mentioned materials in table, 1 (except the Clove oil and powder) as far as 3 colonies (replicates) / materials, and 3 colonies (replicates) were left without therapeutic as untreated replicates for the control while 14 colonies perished completely whereas the wooden hive boxes theirs were disinfected and used for recycling of the apiary.

At the second apiary (Sheshae district / Menoufia governorate consisting of 18 colonies), 6 colonies were treated by the Clove oil and powder as far as 3 colonies (replicates) / materials, and 3 colonies (The shaking experiment which previously mentioned) treated by only the clove powder in feeding sugar syrup, while 9 colonies perished completely whereas their wooden hive boxes were disinfected and used for recycling of the apiary.

The therapeutic materials were added to the colonies 6 times / once a week.

After 13 days from last addition of the treatments, the all colonies were looked for presence of any foulbrood symptoms and areas of the healthy sealed brood were estimated by (inch²) replicates group / treatment each 13 days for along about 4 months from first December 2006 until end April 2007.

Table 1. Certain therapeutics selected for examination treating foulbroods.

Therapeutic group		added per	
		100gm. Pollen substitute	100ml. Sugar syrup (1sugar :1water)
Comparison material		Tylosin as 1.25ml.	–
Antibiotics		–	Primomycin (Humanly) as 0.75ml.
Natural materials	Volatile oils	Clove oil as 0.1ml.	–
		Cinnamon oil as 0.05ml.	–
	Plant powders	–	Clove flowers powder as 0.2gm.
		–	Cinnamon powder as 0.15gm.
	Plant extracts	–	Zanzan (Fruits extract) (1Fruits : 3Water) as 0.5ml.
	Compounds	–	Liquid Farozal as 1.5ml.

Notes: (1) Tylosin which used is a veterinary antibiotic as oil formulation; each 1ml. =
1.6 gm.

(2) Concentration of 0.2gm Tylosin / 20gm sugar is the recommended
concentration by Peng *et al.*, 1996 and Elzen *et al.*, 2002.

(3) (_) is a mark or abbreviation means that addition manner or way did not
used.

RESULTS AND DISCUSSION

1. Effect of the tested therapeutic materials on disappearance or recurrence of AFB and EFB diseases:

Table No. (2) shows this effect to ten therapeutic materials which are named in the same table, whereas all the honeybee colonies were exhibitors to symptoms of AFB disease and a few to EFB disease before the treatment except sure 3 colonies which belong to the shaking experiment, while after last therapeutic addition the following was:

The treated colonies with the third, fifth, sixth and seventh therapeutics [Clove oil, Clove «Shaking experiment», Cinnamon oil, and Cinnamon] did not exhibit any foulbrood symptoms until 117days.

The treated colonies with the second, fourth and eighth therapeutics [Primomycin, Clove and Zanzan extract] did not exhibit any foulbrood symptoms until 104 days, whereas at the day 117 in the treatments of Primomycin and Zanzan extract, two replicates exhibited AFB symptoms, while one replicate of Clove treatment exhibited EFB symptoms at the day 117.

The treated colonies with the first and ninth therapeutics [Tylosin and Farozal liquid compound] did not exhibit any foulbrood symptoms until 78 days, whereas in both of the two treatments, AFB and EFB symptoms began successively appear in most of the treated replicates (colonies) from the day 91 to last checkup day.

The untreated colonies (control replicates), AFB symptoms remained existence between the increase and decrease in strength of the disease dependency on adult bees verve and queens activity.

Table 2. Ability & Date of recurrence of AFB and EFB symptoms in the treated honeybee colonies.

Inspection period	Before treated			After last treatment by											
	0days			13days			26days			39days			52days		
Replicate Treatment	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Tylosin (pollen substitute)	A	A	AE	-	-	-	-	-	-	-	-	-	-	-	-
Primomycin (sugar syrup)	A	A	A	-	-	-	-	-	-	-	-	-	-	-	-
Clove oil (pollen substitute)	A	A	A	-	-	-	-	-	-	-	-	-	-	-	-
Clove (sugar syrup)	A	AE	A	-	-	-	-	-	-	-	-	-	-	-	-
Clove (sugar syrup) (Shaking)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cinnamon oil (pollen substitute)	A	A	AE	-	-	-	-	-	-	-	-	-	-	-	-
Cinnamon (sugar syrup)	A	AE	A	-	-	-	-	-	-	-	-	-	-	-	-
Zanzan extract (sugar syrup)	A	A	A	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Farozal (sugar syrup)	A	A	AE	-	-	-	-	-	-	-	-	-	-	-	-
un-treated (Control)	A	AE	A	A	A	-	A	A	-	A	-	A	A	A	A

Cont.

Table 2. Continued

Inspection period	After last treatment by														
	Days	65days			78days			91days			104days			117days	
Replicate Treatment	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Tylosin (pollen substitute)	-	-	-	-	-	-	-	-	A	E	-	A	A	A	A
Primomycin (sugar syrup)	-	-	-	-	-	-	-	-	-	-	-	-	A	A	-
Clove oil (pollen substitute)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clove (sugar syrup)	-	-	-	-	-	-	-	-	-	-	-	-	-	E	-
Clove (sugar syrup) (Shaking)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cinnamon oil (pollen substitute)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cinnamon (sugar syrup)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zanzan extract (sugar syrup)	-	-	-	-	-	-	-	-	-	-	-	-	A	-	A
Liquid Farozal (sugar syrup)	-	-	-	-	-	-	A	-	-	A	E	-	A	-	-
un-treated (Control)	A	A	A	-	A	A	A	A	-	A	A	A	A	A	A

Keys of Tables :

A ; American foulbrood disease (AFB).

E ; European foulbrood disease (EFB).

AE; American foulbrood disease (AFB) and a few combs with European foulbrood disease (EFB).

- ; Nothing or No diseased symptoms or Healthy.

From the previous results it became a clear that 3rd, 6th and 7th treatments are superior on the remainder treatments in lengthening to absence or disappearing period of the disease, and those results cleared that natural materials especially essential oils have a high inhibition qualification to the foulbrood symptoms.

Participation of the 5th treatment with the 3 previous treatments in the qualification on hiding the foulbrood symptoms for along 117days, rather its superiority on other antibiotics and natural treatments, is somewhat accordant with Hansen & Brodsgaard, 1999, whereas reported that shaking method to the diseased colonies accompanied with the other control manners and beekeeping management procedures succeed in treating the diseased colonies and hiding of the foulbrood symptoms by efficacy reaches to 99.99% or in the lower cases to 80%

On the other hand, the results of Cinnamon treatment approach from results of Al_Hojaymi, 2005, who examined the Cinnamon hexanean extract and found that it is superior on OTC because it led to disappearance of AFB disease through 6 days after the first sprinkling and all during of the experiment period which was 33 days.

2. Effect of the tested therapeutic materials on the brood rearing activity:

First: Table No. (3) shows the means and increase percentages of sealed brood area which estimated for evaluating efficiency of each treatment, and by used Co-statistics program for get the low significant difference (L.S.D. at 5%) to each measurement, the following was found:

- 1)** The untreated replicates were low significant for along the experiment periods until 78 days, whereas became non-significant at the day 91 by brood mean 36.5 (inch²) at L.S.D. equal 56.179 .
- 2)** All the treatment gave highly significances with varying degrees until the last measurement time which 91 days in comparison with each calculated L.S.D. value at significance at 5% .
- 3)** The brood rearing activity reached to its higher means at the day 91, whereas get in the lesser treatment (Clove – Shaked colonies) to triple of untreated replicates, and in the greater treatment (Cinnamon oil) to about 8.5 times of the untreated replicates.
- 4)** Overall, the averages of sealed brood area for all treatments were a good with existence of an intra-closed ranges or non-significant ranges between replicates of some treatments as well as showed in table No. (3) by the linked marks which placed on the average values whereas;

Clove oil, Cinnamon oil and Cinnamon treatments get closed significant and all had a highly significance, so they were given mark a .

Primomycin, Clove and Zanzan extract treatments get closed significant but all were far than the previous 3 treatments in the significance, so they took mark b .

Tylosin, Clove «Shaked colonies» and Farozal treatments get closed-significant but all are very far than the first 3 treatments and at the same time they somewhat approximate from the second 3 treatments in the significance, so they were marked with bc .

Finally, the untreated replicates get out non-significant, so this treatment was given mark c .

Second: Diagram No. (1) shows the different variations or the fluctuations in means of the sealed brood area to each treatment for along experiment period, and the distinctions between efficacies of all treatments during that period from December 2006 to March 2007, whereas:

- 1)** From the day 13 to 26, the untreated colonies dropped by a slight amount and continued in decreasing by the same rate for along experiment period, while all the different treatments 1-9 began suddenly in rising from different low levels by a large amount with the following arrangement; Cinnamon oil, Cinnamon, Clove oil, Zanzan extract, Clove, Primomycin, Farozal liquid compound, Tylosin, and Clove «Shaked colonies» to date 26 days and when this date Tylosin took the seventh rank and Farozal became in the eighth position by exchange of the places.
- 2)** From the day 26 to 39, the treatments continued in the rising but by amounts are less than the previous time except the Clove «Shaked colonies» treatment which raised by same the previous rate, and all 9 treatments remained to keep with the same previous arrangement.
- 3)** From the day 39 to 52, the 9 treatments decreased by a slight amount with keeping on the same previous arrangement.
- 4)** From the day 52 to 65, the treatments much dropped by the same previous rate and Farozal exchanged again the places with Tylosin, then the new arrangement of the treatments became as follows; Cinnamon oil, Cinnamon, Clove oil, Zanzan extract, Clove, Primomycin, Farozal liquid compound, Tylosin, and Clove «Shaked colonies» in the last.
- 5)** From the day 65 to 78, all the treatments returned to increase by a simple degree except Clove oil treatment which remained in decrease but by a very simple amount, with keeping of all 9 treatments on the previous new arrangement.
- 6)** Finally, from the day 78 to 91, all 9 treatments more increased and by faster rate with keeping on the previous arrangement.

Third: From the average values (7 times) which registered in table No. (3) and cleared on Diagram No. (2) it is showed that 10 treatments already occupied different ranks, whereas the L.S.D. at 5% = 52.240 as following:

Rank1; Cinnamon oil treatment (in pollen substitute) had a high significance with average of 271.9 (inch²) as sealed brood area / colony and by increase percentage equal to 538.6% from average of the untreated colonies which equal to 42.6 (inch²).

Rank2; Cinnamon treatment (in sugar syrup) had a high significance with average of 255.5 (inch²) as sealed brood area / colony and by increase percentage equal to 500.1% from average of the untreated colonies which equal to 42.6 (inch²).

Rank3; Clove oil treatment (in pollen substitute) had a high significance with average of 213.0 (inch²) as sealed brood area / colony and by increase percentage equal to 400.3% from average of the untreated colonies which equal to 42.6 (inch²).

Rank4; Zanzan fruits extract treatment (in sugar syrup) was significant with average of 146.5 (inch²) as sealed brood area / colony and by increase percentage equal to 244.2% from average of the untreated colonies which equal to 42.6 (inch²).

Rank5; Clove treatment (in sugar syrup) was significant with average of 126.5 (inch²) as sealed brood area / colony and by increase percentage equal to 197.2% from average of the untreated colonies which equal to 42.6 (inch²).

Rank6; Primomycin treatment (in sugar syrup) was significant with average of 116.0 (inch²) as sealed brood area / colony and by increase percentage equal to 172.5% from average of the untreated colonies which equal to 42.6 (inch²).

Rank7; Farozal liquid compound treatment (in sugar syrup) was significant with average of 110.7 (inch²) as sealed brood area / colony and by increase percentage equal to 160.0% from average of the untreated colonies which equal to 42.6 (inch²).

Rank8; Tylosin treatment (in pollen substitute) was significant with average of 108.5 (inch²) as sealed brood area / colony and by increase percentage equal to 154.9% from average of the untreated colonies which equal to 42.6 (inch²).

Rank9; Clove «Shaked colonies» treatment (in sugar syrup) was significant with average of 73.4 (inch²) as sealed brood area / colony and by increase percentage equal to 72.5% from average of the untreated colonies which equal to 42.6 (inch²).

Rank10; Untreated colonies were non significant with average of 42.6 (inch²) as sealed brood area / colony.

CONCLUSION

From the mentioned display, it be epitomized the following:

- 1) Cinnamon oil, Cinnamon and Clove oil are superior in hiding the foulbrood symptoms for a period reached to 117 days after last addition. Furthermore, the 3 colonies which shaken and treated with Clove in sugar syrup did not exhibit the foulbrood symptoms for longer period of about one year.
- 2) All the 8 treatments which were used and the shaken experiment are significant in affecting the brood rearing activity during the experiment period from December 2006 to April 2007, but Cinnamon oil, Cinnamon and Clove oil are superiors, indicating high significance and gave averages of 271.9, 255.5, and 213.0 (inch²) respectively as sealed brood area /colony by increase percentage equal to 538.6%, 500.1% and 400.3% respectively comparison with average of the Untreated colonies which equal to 42.6 (inch²).

Table 3. Effect of certain control agents of AFB & EFB disease on brood rearing activity (inch²) in the tested honeybee colonies during winter and spring 2006/2007 years.

Ranks	Measurements Treatments	Mean of sealed brood area (inch ²) after last treatment							
		13days		26days		39days		52days	
		Brood area	% Increase	Brood area	% Increase	Brood area	% Increase	Brood area	% Increase
8	Tylosin	53.0	8.9	113.7	146.2	115.0	161.4	102.0	134.5
6	Primomycin	55.3	13.7	117.0	153.4	117.3	166.7	104.8	141.0
3	Clove oil	103.2	112.0	235.3	409.7	237.3	439.4	221.0	408.1
5	Clove powder	60.3	24.0	121.0	162.1	123.0	179.6	117.0	169.0
9	Clove (Shaking)	16.3	-66.5	47.5	2.9	78.7	78.8	71.0	63.2
1	Cinnamon oil	134.7	176.7	283.3	513.7	288.7	556.1	286.0	557.5
2	Cinnamon	121.7	150.0	270.3	485.5	271.3	516.7	265.8	511.1
4	Zanzan extract	65.3	34.2	147.3	219.1	149.0	238.6	137.2	215.3
7	Liquid Farozal	53.5	9.9	108.0	133.9	110.0	150.0	100.6	131.3
10	Untreated	48.7	—	46.2	—	44.0	—	43.5	—
L.S.D at %5		8.251		22.122		31.916		27.668	

Cont.

Table 3. Continued

Ranks	Measurements Treatments	Mean of sealed brood area (inch ²) after last treatment						Total		
		65days		78days		91days		Brood area	Average	% Increase
		Brood area	% Increase	Brood area	% Increase	Brood area	% Increase			
8	Tylosin	84.0	116.3	104.3	158.7	187.5	413.7	759.5	108.5 bc	154.9
6	Primomycin	97.2	150.2	112.0	177.7	208.5	471.2	812.2	116.0 b	172.5
3	Clove oil	210.7	442.5	208.0	415.8	275.3	654.3	1490.8	213.0 a	400.3
5	Clove powder	104.2	168.3	127.0	214.9	233.0	538.4	885.5	126.5 b	197.2
9	Clove (Shaking)	63.7	64.0	89.0	120.7	147.8	305.0	514.0	73.4 bc	72.5
1	Cinnamon oil	271.5	599.2	294.3	629.8	344.5	843.8	1903.0	271.9 a	538.6
2	Cinnamon	253.7	553.3	284.3	605.0	321.0	779.5	1788.2	255.5 a	500.1
4	Zanzan extract	137.0	252.8	146.0	262.0	243.8	568.0	1025.7	146.5 b	244.2
7	Liquid Farozal	92.7	138.7	108.3	168.6	201.5	452.1	774.6	110.7 bc	160.0
10	Untreated	38.8	—	40.3	—	36.5	—	298.0	42.6 c	—
	L.S.D at %5	28.514		33.326		56.179			52.240	

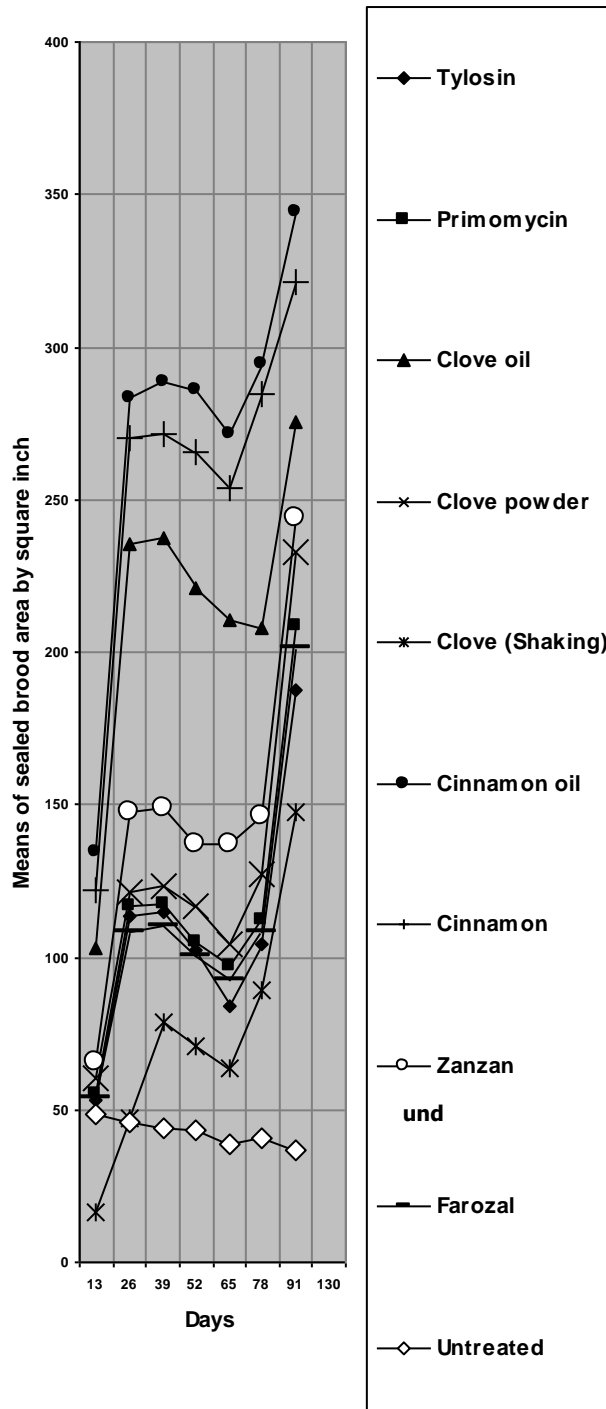


Diagram (1): Means of brood area by (inch²) after last treatment every 13 days show the efficacy differences among the different used therapeutics.

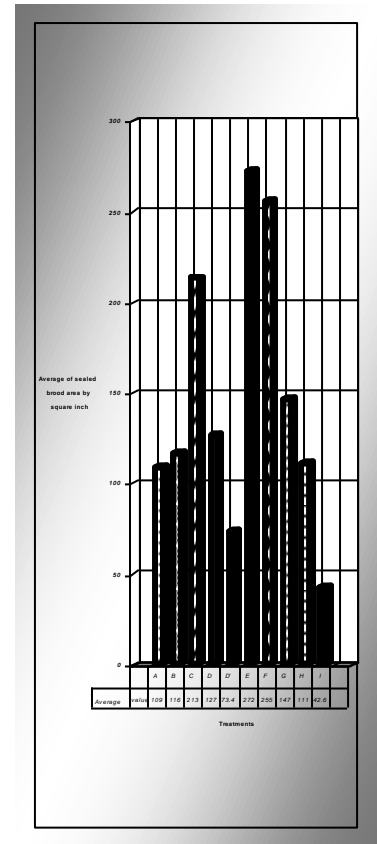


Diagram (2): Effect of certain control agents of AFB & EFB diseases in brood rearing activity (inch²) in the tested honeybee colonies during winter and spring 2006/2007 years.

- A --- Tylosin
- B --- Primomycin
- C --- Clove oil
- D --- Clove
- D' --- Clove (Shaked colonies)
- E --- Cinnamon oil
- F --- Cinnamon
- G --- Zanzan fruits extract
- H --- Farozal Liquid compo

Consequently, the following recommendations for the beekeepers can be set:-

- 1) Using oil or powder of Cinnamon or Clove for controlling AFB and EFB diseases by addition of them to the nutrient materials (sugar syrup or pollen substitute) at times of the honeybee feeding with the following dosages:

0.5ml. Cinnamon oil \ kgm. pollen substitute
or 1.5gm. Cinnamon powder \ Liter sugar syrup
1ml. Clove oil \ kgm. pollen substitute
or 2gm. Clove powder \ Liter sugar syrup.

- 2) Wholly avoidance of using artificial antibiotics especially the veterinary for therapeutics.

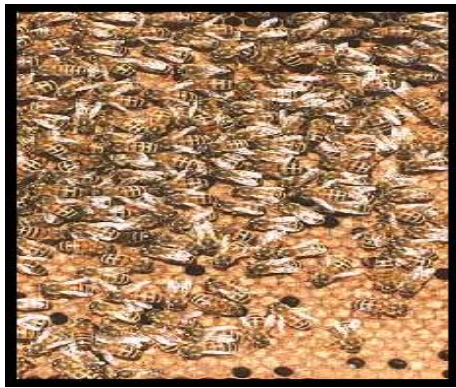


Fig. (1) A brood comb is healthy.

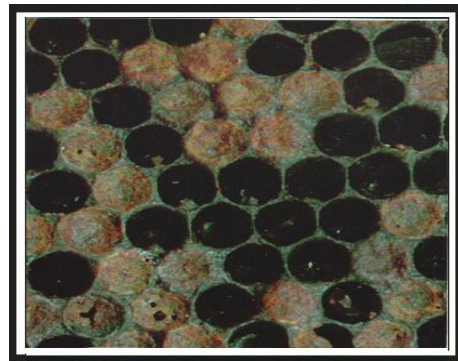


Fig. (2) AFB Symptoms.

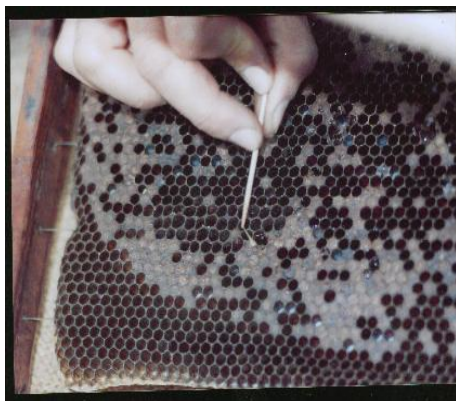


Fig. (3) A ropy threadlike material as character belong to AFB only.



Fig. (4) EFB Symptoms.

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محاولة حقليّة لمكافحة مرضي تعفن الحنّضة في طوائف نحل العسل

أحمد محمود خطّابي¹، متولى مصطفى خطّاب²، رضا السيد عمر²،
إبراهيم عبد الله جعبوب²، محمد السيد حشيش¹

١ - معهد بحوث وقاية النباتات - مركز البحوث الزراعيّة - الدقي - حيزة
٢ - قسم وقاية النبات - كلية الزراعة - بمشتهر - جامعة بنها

لوحظ في السنوات الأخيرة من خلال عدد من الدراسات والأبحاث العلمية المختلفة الوجود الفعلي في مصر لمرض تعفن الحنّضة البكتيريّين وهما تعفن الحنّضة الأمريكي AFB، وتعفن الحنّضة الأوروبي EFB، من خلال مظاهر الإصابة لبعض المناحل وبسبب أعراض مرضية ظاهرة ومعروفة لذوى التخصص وكذلك للنحالين لذا فقد أجريت هذه الدراسة بغرض إيجاد أفضل المواد لمكافحة المرضين؛ طبقت المعاملات في عدد 2 منحل مصابين و كانت بهما الأعراض الظاهرية للمرضين، المنحل الأول بمنطقة كفر طهرمس/الجيزة ويتكون من 35 طائفة نحل كرنيولى هجين، أما المنحل الثاني فكان بمنطقة شعشاع/المنوفية ويتكون من 18 طائفة نحل كرنيولى هجين. تم العمل في الفترة من أكتوبر 2006 حتى أبريل 2007، ثم الإستمرار في متابعة الحالة الصحية للمنحلين لمدة عام كامل، شملت تجارب مكافحة إجراء بعض العمليات الهامة المتعلقة بإدارة طوائف النحل وتطهير الخلايا أولاً ثم تلاها معاملة طوائف المنحلين ببعض المواد الطبيعية والمضادات الحيوية وذلك بتركيزات محسوبة في محاليل التغذية وبدائل حبوب اللقاح المقدمة لطوائف النحل والتي قسمت لمجاميع تكرارية (3مكررات/ مادة علاجية)، العلاجات المختبرة وتركيزاتها هي: 0.75مل بريمومايسين بشري، 0.2جم مسحوق قرنفل، 0.15جم مسحوق قرفة، 0.5مل مستخلص مائي لثمار الزنزلخت، 1.5مل مركب فاروزال/100مل محلول سكري على التوالي، 1.25مل تيلوزين مستحضر زيتي، 0.1مل زيت قرنفل، 0.05مل زيت قرفة / 100جم بديل حبوب على التوالي، أظهرت النتائج تفوقاً عالياً لعدد من المواد الطبيعية المختبرة في معالجة الطوائف من المرضين خاصة المعاملتين الأخيرتين وذلك مقارنة بالمضاد الحيوي البيطري تيلوزين Tylosin الموصى به مؤخراً كان هذا ملموساً في إخفاء الأعراض المرضية لفترة طويلة بلغت أقصاها 117 يوم بنهاية أبريل بإستخدام زيت القرفة، إضافة إلى زيادات واضحة في نشاط تربية الحنّضة بالحساب عند أقل فرق معنوي L.S.D. 5% (زيت القرفة 271,9 بوصة مربعة حنّضة مقفولة بنسبة زيادة 538,6%، زيت القرنفل 213,0 بوصة مربعة حنّضة مقفولة بنسبة زيادة 400,3% وذلك مقارنة بالطوائف غير المعاملة والتي كان معدل تربية الحنّضة بها يساوى 42,6 بوصة مربعة حنّضة مقفولة في نفس الفترة المذكورة. أما للتيلوزين فكانت 108.5 بوصة مربعة حنّضة مقفولة بنسبة زيادة 154.9%)، وعليه نوصي مرببي النحل عند مكافحة المرضين بإستخدام أى من زيت القرفة 0,5مل/كجم بديل حبوب أو مسحوق قرفة 1,5جم/ لتر محلول سكري، زيت القرنفل 1مل/كجم بديل حبوب أو مسحوق قرنفل 2جم/ لتر محلول سكري في فترة توقف نشاط النحل، ولا تستخدم المضادات الحيوية المتخصصة لمكافحة هذه الأمراض ومنها (التيلوزين) إلا عند إشتداد الإصابة وفي غير أوقات الفيض ويتبع ذلك مع جميع طرق مكافحة أمراض وأفات نحل العسل.