

## EFFECT OF USING SOME DESIGNED FRAMES FOR COLLECTION BEE VENOM

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### ABSTRACT

In this work the effect of using some designed frames and its position in the hive, also the effect of wire gride for these designed frames on the production of bee venom throughout the period 2/4/2006 to 25/6/2006 were student . For this purpose sex types (A, B, C, D , E and F) of modern collector plates were designed. Modern collector frames A, and C (wire gride area were measuring 1125cm<sup>2</sup>), and the other 3 modern collector frames D, E and F (wire gride area were measuring 562 cm<sup>2</sup>). Modern collector frames (A and D) were placed on the top of the combs. B and E Frames were placed among of the hive combs frames (C and F) were placed under the combs. Eighteen honey bee colonies were processed for the work which divided into 2 groups of 9 colonies each. The 1<sup>st</sup> group were used for the collector frames A , B and C. while the 2<sup>nd</sup> group were used for the collector frames D, E and F. The bee venom device was applied during the work for collecting the material as mentioned by (Mc-nanny, 2005). The collected bee venom was regularly weighted a cording to each frame of the hive. Also the dead bees was experimented colony counted for each. The statistical analysis showed that the area (1125cm<sup>2</sup>) collected big amounts of bee venom than the area of wire grids measuring (562cm<sup>2</sup>). Other wands it could be mentioned that the biggest area collected big amounts of the material in experimented colonies. Type was observed to collect bee venom in big quantities more than the other types. On the other hand bees in this type was smaller in number than the other types.

**Keywords:** Honey bee - Bee venom – Designed frames – Area of wire grids

### INTRODUCTION

The various trap designs stimulate bees by applying a mild electric shock the most wires above the collecting tray. The most widely – used designs are modifications of the one first presented by (Benton, 1963). An area of 650 cm<sup>2</sup> is recommended. A 12 – V car battery (4.5 – V batteries) is used to provide current. A series of electric impulses of a complex pattern is supplied at a frequency of 58 Hz with a pause of 3 – 6s between them (Alexandra, 1983). The techniques used for honey bee venom collection are reviewed and studies on several types of device, carried out at, Poland, are described (Skubida, 1995). The final apparatus developed consists of an electrostimulator (Generator) which passes current through electrodes mounted every 5 mm in venom collecting frames fitted in one of the hive bodies. The frames include a glass screen on which the venom is deposited. The results showed that the optimal electrical parameters are: impulse frequency, 1 KHz; voltage, 25 V; impulse duration, 1 s; interval between impulses, 2 s. The best results were obtained when venom collection was carried out every 14 days, for 1 h (early morning , before bee flight) or 2 h (when foraging was occurring), with the collection frames in the upper body (Rybak, 1995). A modern collector frame is described, which is placed on top

of the frames in a hive. When collectors have been put in each hive, 20 – 40 are connected together and electric impulses are passed through for 30 min. The venom, which is scraped from the device in dried form, is claimed to be uncontaminated. Colonies are relatively unaffected by the procedure; an observation during the collection period showed that, on average, 68 bees died per colony. (Simics, M. 1995). In 1992 – 1994 different bee venom collection methods were compared for the amount of venom collected and for their effect on the status on honey bee colonies and their wintering as well as on their general productivity (honey, pollen, beeswax). Venom-collecting frames were inserted (1) in the lower hive body, or (2) in the upper hive body, or (3) in an empty body placed between the upper and lower bodies. A fourth technique involved a super with a fixed set of 6 venom-collecting frames (incorporating removable glass plates for scraping off the venom). Venom collection had no adverse effects on colony strength, brood rearing and productivity of honey, pollen and beeswax. However, it affected wintering performance, with colonies in group (3) most affected, and those in group (1) least affected. Overall, colonies in group (2) gave the best results for total colony productivity. (Skubida, 1995). There fore, this investigation has been outlined to study the effect of using some designed frams for collection bee venom.

## MATERIALS AND METHODS

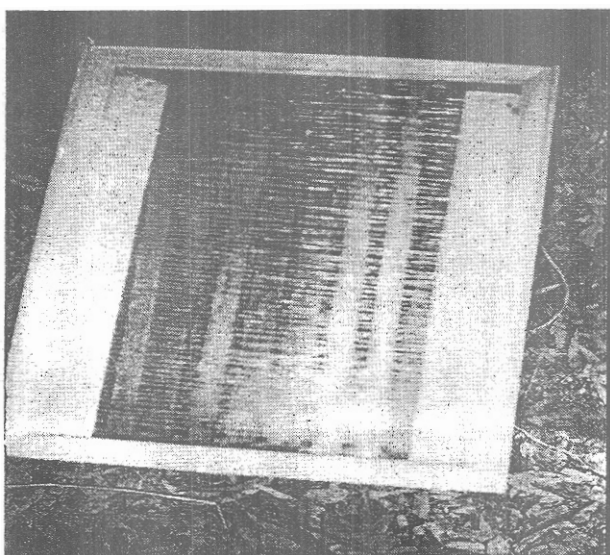
- I- The present work was conducted at the bee keeping Res. Dep. Plant protect. Rec. Inst., Dokki, Giza, during 2/4/2006 to 25/6/2006 to study the following points:
  - A. A comparison between sex types of modern collector plates on the production of bee venom in 18 colonies.
  - B. Position sex types of modern collector plates in the hive on thè bee venom production were achieved.
  - C. The effect area of wire gride to the collection frames on the production was processed.
- During this work sex different of modern collector frames were applied to collect bee venom as follows:

### **A modern collector frame (A)**

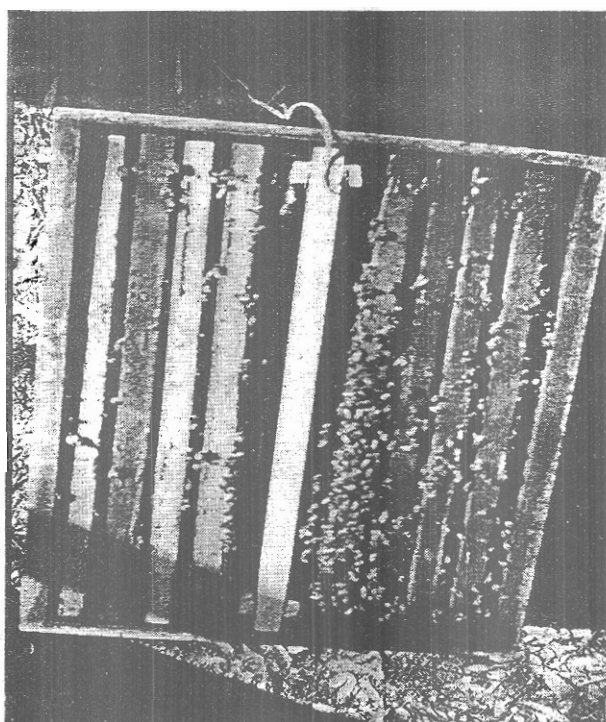
A wooden frame (52 cm length, 42 cm width and 1.5 cm thickness) supported with holding wire grides which consists of parallel copper wires spaced 0.5 cm in between. A glass plate was provided underneath the wire grid (45 cm Length x 25 cm width = 1125 cm) the collector frame was rested on upside down position on the top of the Combs of the hive. Like those operculum Fig (1).

### **A modern collector frame (B):**

A Lengstroth's frame measuring (45.5 cm Length, 23 cm width and 5 cm thickness) supported with wire grids in two faces, a glass plate was provided underneath the two faces of wire grides (33 cm length X 17 cm width X two faces = 1122 cm). The collector frame was placed among the hive combs as Lengstroth's frame Fig. (2 & 3),



**Fig. (1):** A modern collector frame (A) placed on the top of the combs of the hive.



**Fig. (2):** A modern collector frame (B) placed among the hive combs.

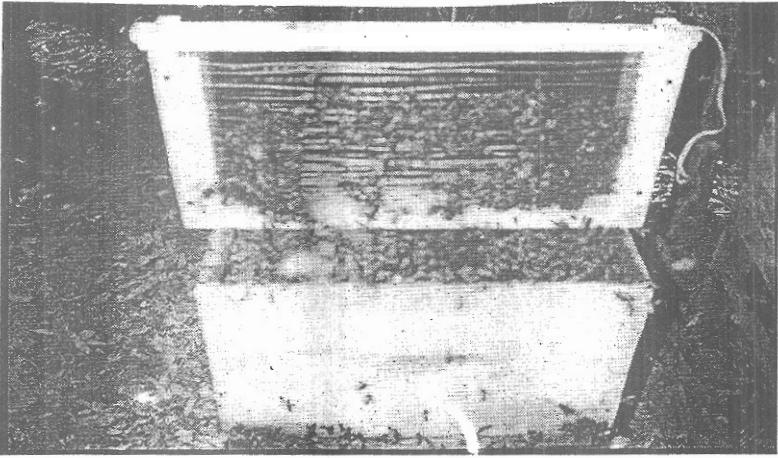


Fig. (3): A modern collector frames (B) which to take away from the hive after the process.

**A modern collector frame (C):**

A wooden frame (56 cm length, 36 cm width and 1.5 cm thickness) a glass plate was provided underneath the wire gride (45 cm length X 25 cm width = 1122 cm). The collector frame was placed under the combs of the hive Fig. (4)

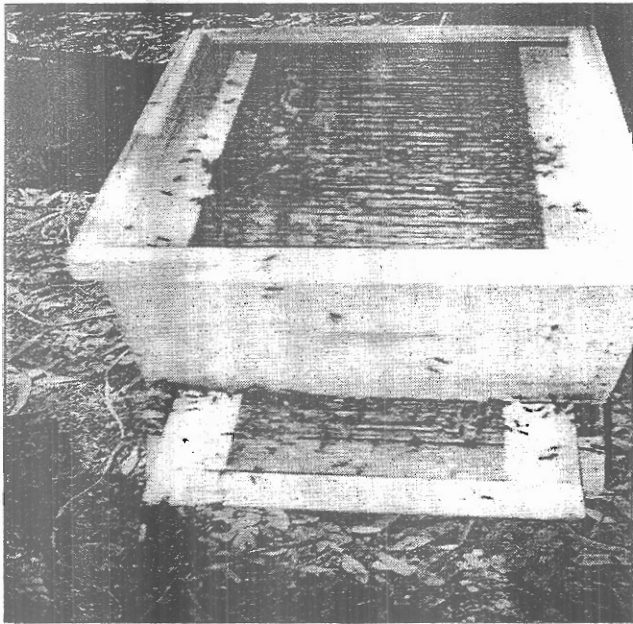
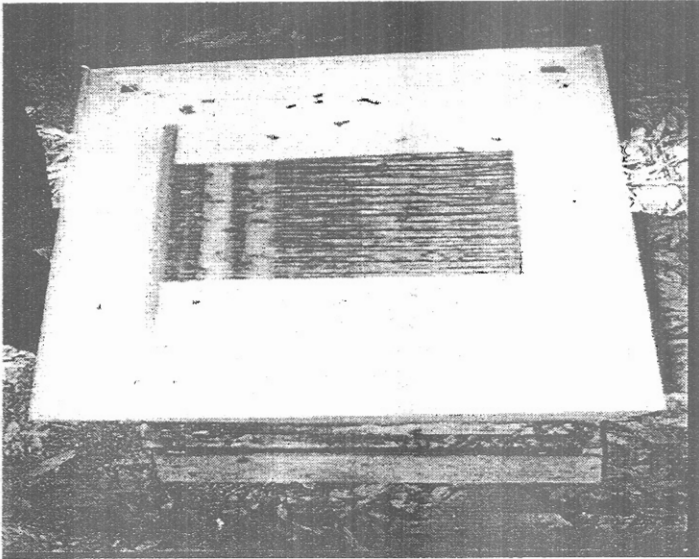


Fig. (4) : A modern collector frame (C) placed under the combs of the hive.

**A modern collector frame (D)**

The same collector frame (A) but covered the half area of the wire gride with plastic paper (22.5 cm length X 25 cm = 562.5cm) with pare area used for collecting of the bee venom Fig. (5).



**Fig. (5):A modern collector frame (D) after the covered half area of the wire gride.**

**A modern collector frame (E):**

The same collector frame (B) but covered the half area of the wire gride with paper (16.5 cm length X 17 cm width = 280.5 X two faces = 561 cm) which area used the collected of the bee venom.

**A modern collector frame (F):**

The same collector frame (C) but covered the half area of the wire grids with paper (22.5 cm length X 25 cm width = 562.5 cm) which area used the collected of the bee venom.

**II- Preparing of experimented colonies:**

Eighteen Honey bee colonies were related to *Apis mellifera carnica* colonies with equal strength, headed with queens of nearly the same age, were used for the work which divided into 2 groups of 9 colonies each. The 1<sup>st</sup> group were used the collector frames A, B and C (the area wire grides of these collector frames = 1125cm).

The 2<sup>nd</sup> group were used for the collector frames D, E and F (the area wire grides of these collector frames = 562 c.).

**III- Bee venom collection**

The bee venom collection was conducted by the device (Mohanny, 2005) the collector frame is connected with wires to the collector device, the collection time is 15 minutes at every seven days. During this time the device

works automatically and supplies preset impulses to the wire grids. When the bee touches two wires and completes the circuit, she will receive a mild electric shock, the effect of the shock results in her stinging onto the glass sheet which was used to collect the deposited venom after 15 minutes the collector frame was removed from the colony then the deposited bee venom on the glass plate was scrapped by means of a scraping knife. The collected bee venom was weighted a cording to each colony, also the dead bees was recorded after the process of each collection of the time.

## RESULTS AND DISCUSSION

Results in Table (1) and Figs. (6 & 7) indicated that the total amount of bee venom collected by collector frames A, B and C when using area wire grids ( $1125 \text{ cm}^2$ ) were 0.6175, 0.8924 and 0.7711 gm./ colony with an average of 0.7603 gm./ colony throughout 2/4/2006 to 25/6/2006.

According to the total number of dead bees when used a modern collector frames A, B and C were 548, 324 and 707 workers/ colony an average of 526 workers/ colony.

Figs. (6 & 7) cleared that the amount collected of bee venom fluctuated throughout the collector frame (B) from 0.8924 g./ colony in these eriod (the greatest) to 0.6175 g./ colony in collector frame A (the lowest) Also the number of dead bees fluctuated throughout the collector frame (B) from 324 workers/ colony in collector frame C (the greatest).

Table (2) and Figs. (6 & 7) indicated that collector frames the total amount of bee venom collected by a modern D, E and F when used area wire grids ( $562 \text{ cm}^2$ ) were 0.4773, 0.6244 and 0.5687 gm/ colony with an average of 0.5668 gm./ colony during 2/4/2006 to 25/ 6/2006.

According to the total number of dead bees when used a modern collector frames D, E and F were 1100, 803 and 1312 workers/ colony an average of 1072 workers/ colony.

Figs. (6 & 7) showed that the amount collected of bee venom fluctuated throughout the modern collector frame E from 0.6244 gm./ colony in these period (the greatest) to 0.4773 gm./colony in collector from D (the Lowest) Also the number of dead bees fluctuated throughout the collector frame (E) from 803 worker/ colony (the lowest) to 1312 workers/ colony in a modern collector frame F (the greatest).

These results indicated that there were significant differences between quantity of bee venom produced by the two area of wire grids, as well as between a modern collector frames. Also, the statistical analysis showed that there was no significant difference between the number of dead bees for a modern collector frames.

It was remarkable that the area. ( $1125\text{cm}^2$ ) collect more amounts of bee venom than area of wire grids ( $562 \text{ cm}^2$ ) as well as collected frame (B) collected more amounts than the collector frames A, C, D, E and F. Also these collector frame (B) was lowest the number of dead bees.

Table (1) The effect of a modern collected frames A, B and C (wire gride area measuring 1125 cm<sup>2</sup>) on bee venom collection throughout the 2/4/2006 To 25/6/2006

serial No. of record data	Date of bee venom collection	Difference among a modern collectors frames														Total production of bee venom for 3 collector frames	
		Collector frame (A)					Collector frame (B)					Collector frame (C)					
		Amount of bee venom collected (gm / colony)					Amount of bee venom collected (gm / colony)					Amount of bee venom collected (gm / colony)					
		Colony No.			mean of bee venom collected (gm / colony)	mean of dead bees per colony	Colony No.			mean of bee venom collected (gm / colony)	mean of dead bees per colony	Colony No.			mean of bee venom collected (gm / colony)		mean of dead bees per colony
1	2	3	4	5			6	7	8			9					
1	2/4/2006	0.0165	0.0153	0.0172	0.0163	30	0.0220	0.0237	0.0220	0.0226	20	0.0188	0.0193	0.0179	0.0187	40	
2	9/4/2006	0.0175	0.0182	0.0179	0.0179	35	0.0212	0.0212	0.0282	0.0262	23	0.0240	0.0264	0.0212	0.0239	43	
3	16/4/2006	0.0225	0.0235	0.0240	0.0233	38	0.0357	0.0368	0.0349	0.0358	25	0.0295	0.0300	0.0281	0.0292	48	
4	23/4/2006	0.0290	0.0281	0.0284	0.0285	30	0.0440	0.0453	0.0435	0.0443	20	0.0350	0.367	0.0383	0.0367	50	
5	30/4/2006	0.0355	0.0366	0.0348	0.0356	40	0.0485	0.0492	0.0480	0.0486	26	0.0395	0.0380	0.0405	0.0393	57	
6	7/5/2006	0.0378	0.0389	0.0365	0.0377	38	0.0510	0.0523	0.0490	0.0508	25	0.0428	0.0411	0.0450	0.0430	50	
7	14/5/2006	0.0405	0.0420	0.0419	0.0415	42	0.0557	0.0565	0.0547	0.0556	30	0.0459	0.0480	0.0462	0.0467	59	
8	21/5/2006	0.0420	0.0460	0.0430	0.0437	41	0.0610	0.0640	0.0581	0.0610	22	0.0520	0.0538	0.0510	0.0523	60	
9	28/5/2006	0.0442	0.0451	0.0433	0.0444	45	0.0680	0.0710	0.0610	0.0667	24	0.0580	0.0599	0.0598	0.0592	55	
10	4/6/2006	0.0520	0.0538	0.0510	0.0523	50	0.0990	0.1015	0.0930	0.0978	23	0.0790	0.0740	0.0787	0.0772	60	
11	11/6/2006	0.0735	0.0749	0.0720	0.0735	55	0.1140	0.1180	0.1111	0.1144	28	0.0995	0.0105	0.0973	0.1006	63	
12	18/6/2006	0.0950	0.0980	0.0910	0.0947	51	0.1250	0.1291	0.1230	0.1257	30	0.1112	0.1180	0.1100	0.1131	62	
13	15/6/2006	0.1090	0.1100	0.1050	0.1081	53	0.1430	0.1467	0.1390	0.1429	28	0.1333	0.1392	0.1211	0.1312	60	
Total production of bee venom and dead bees per collected frame					0.6175	548				0.8924	324				0.7711	707	0.2810
F ( 5 % )					1.684	2.301				2.6487	1.975				1.885	5.284	
LSD ( 5 % )					1.007	1.537				0.547	9100				0.7418	2.679	



Table (2) The effect of a modern collected frames D, E and F (wire gride area measuring 562 cm<sup>2</sup>) on bee venom collection throughout the 2/4/2006 to 25/6/2006

serial No. of record data	Date of bee venom collection	Difference among a modern collectors frames														Total production of bee venom for 3 collector frames	
		Collector frame (D)					Collector frame (E)					Collector frame (F)					
		Amount of bee venom collected (gm / colony)					Amount of bee venom collected (gm / colony)					Amount of bee venom collected (gm / colony)					
		Colony No.			mean of bee venom collected (gm/colony)	mean of dead bees per colony	Colony No.			mean of bee venom collected (gm / colony)	mean of dead bees per colony	Colony No.			mean of bee venom collected (gm / colony)		mean of dead bees per colony
1	2	3	4	5			6	7	8			9					
1	2/4/2006	0.0127	0.0135	0.0117	0.0126	70	0.0173	0.0181	0.0163	0.0172	50	0.0140	0.0133	0.0122	0.0132	81	
2	9/4/2006	0.0144	0.0150	0.0139	0.0144	73	0.0198	0.0210	0.0180	0.0196	52	0.0170	0.0179	0.0150	0.0168	78	
3	16/4/2006	0.0178	0.0189	0.0182	0.0183	78	0.0243	0.0230	0.0259	0.0244	58	0.0198	0.0202	0.0173	0.0191	90	
4	23/4/2006	0.0203	0.0226	0.280	0.0236	80	0.0299	0.0315	0.0280	0.0298	53	0.0250	0.0267	0.0211	0.0243	92	
5	30/4/2006	0.0230	0.0245	0.0249	0.0241	77	0.0343	0.0380	0.0320	0.0348	55	0.0280	0.0296	0.0221	0.0266	88	
6	7/5/2006	0.0263	0.0291	0.0275	0.0276	81	0.0375	0.0391	0.0355	0.374	61	0.0309	0.0325	0.0311	0.0315	90	
7	14/5/2006	0.0298	0.0300	0.0310	0.0303	85	0.0398	0.0410	0.0371	0.0393	60	0.0333	0.0343	0.0321	0.0332	105	
8	21/5/2006	0.0314	0.0370	0.0322	0.0335	89	0.0447	0.0472	0.0440	0.0453	63	0.0380	0.0392	0.0376	0.0383	100	
9	28/5/2006	0.0345	0.0371	0.0375	0.0364	90	0.0495	0.0518	0.0505	0.0506	65	0.0410	0.0450	0.0430	0.0430	120	
10	4/6/2006	0.0473	0.0470	0.0481	0.0468	93	0.0580	0.0599	0.0570	0.0583	68	0.0505	0.0533	0.0490	0.0509	123	
11	11/6/2006	0.0590	0.0611	0.0550	0.0584	95	0.0898	0.0933	0.0850	0.0894	70	0.0710	0.0780	0.0700	0.0730	120	
12	18/6/2006	0.0728	0.0748	0.0700	0.0725	92	0.0987	0.0914	0.0998	0.0600	75	0.0880	0.0899	0.0870	0.0883	115	
13	15/6/2006	0.0793	0.0791	0.0780	0.0788	97	0.1180	0.1220	0.1120	0.1173	73	0.1004	0.1110	0.1200	0.1105	110	
Total production of bee venom and dead bees per collected frame					0.4773	1100				0.6244	803				0.5687	1312	106704
F ( 5 % )					2.348	5.264				2.544	3.576				2.497	6.228	
LSD ( 5 % )					1.526	4.207				1.074	1.558				2.111	3.578	



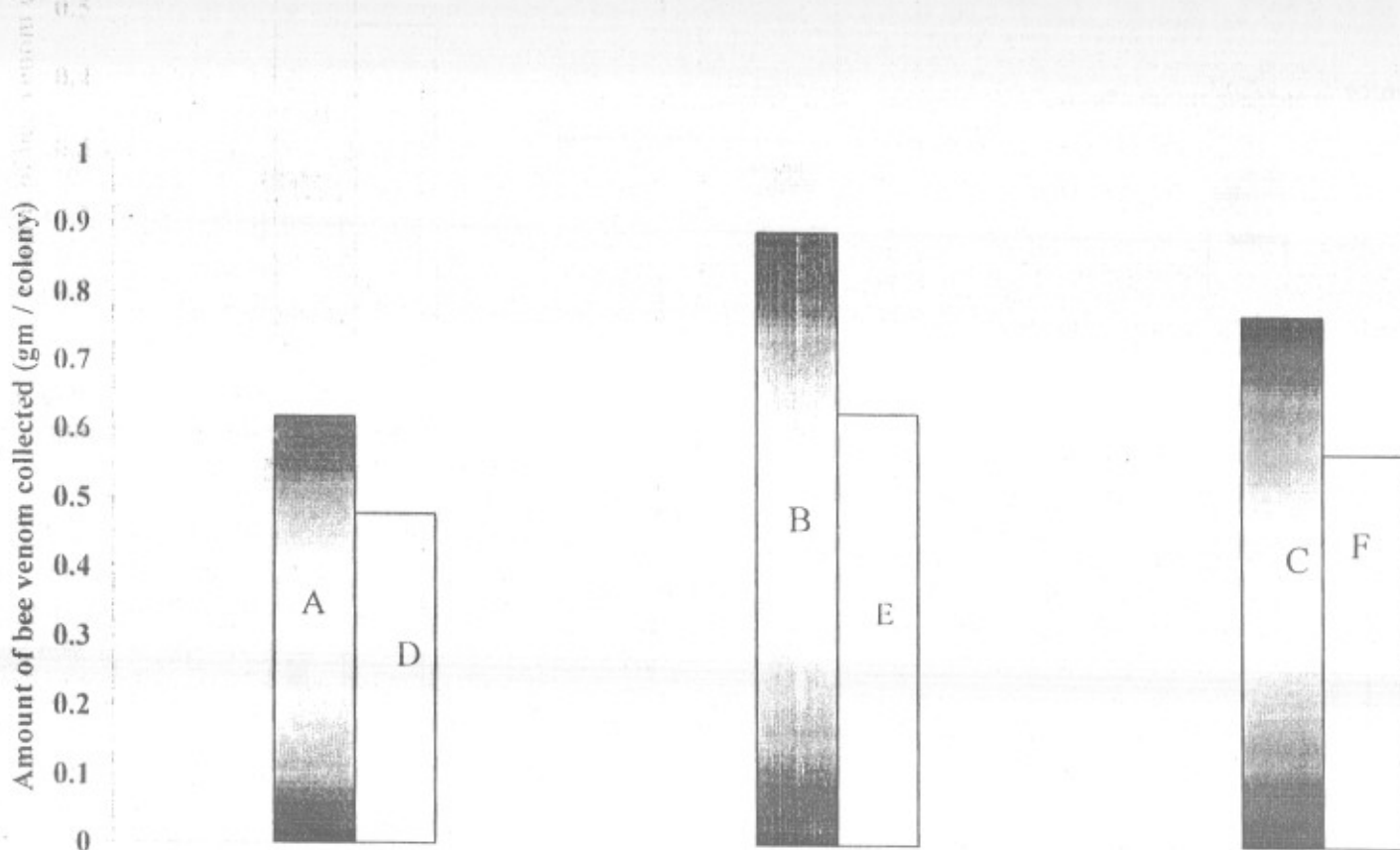


Fig. (6) The effect of a modern collected frames A, B and C (wire gride area measuring 1125 cm<sup>2</sup> ) and modern collected frames D, E and F (wire gride area measuring 562 cm<sup>2</sup> ) on bee venom collection throughout the 2/4/2006 to 25/6/2006

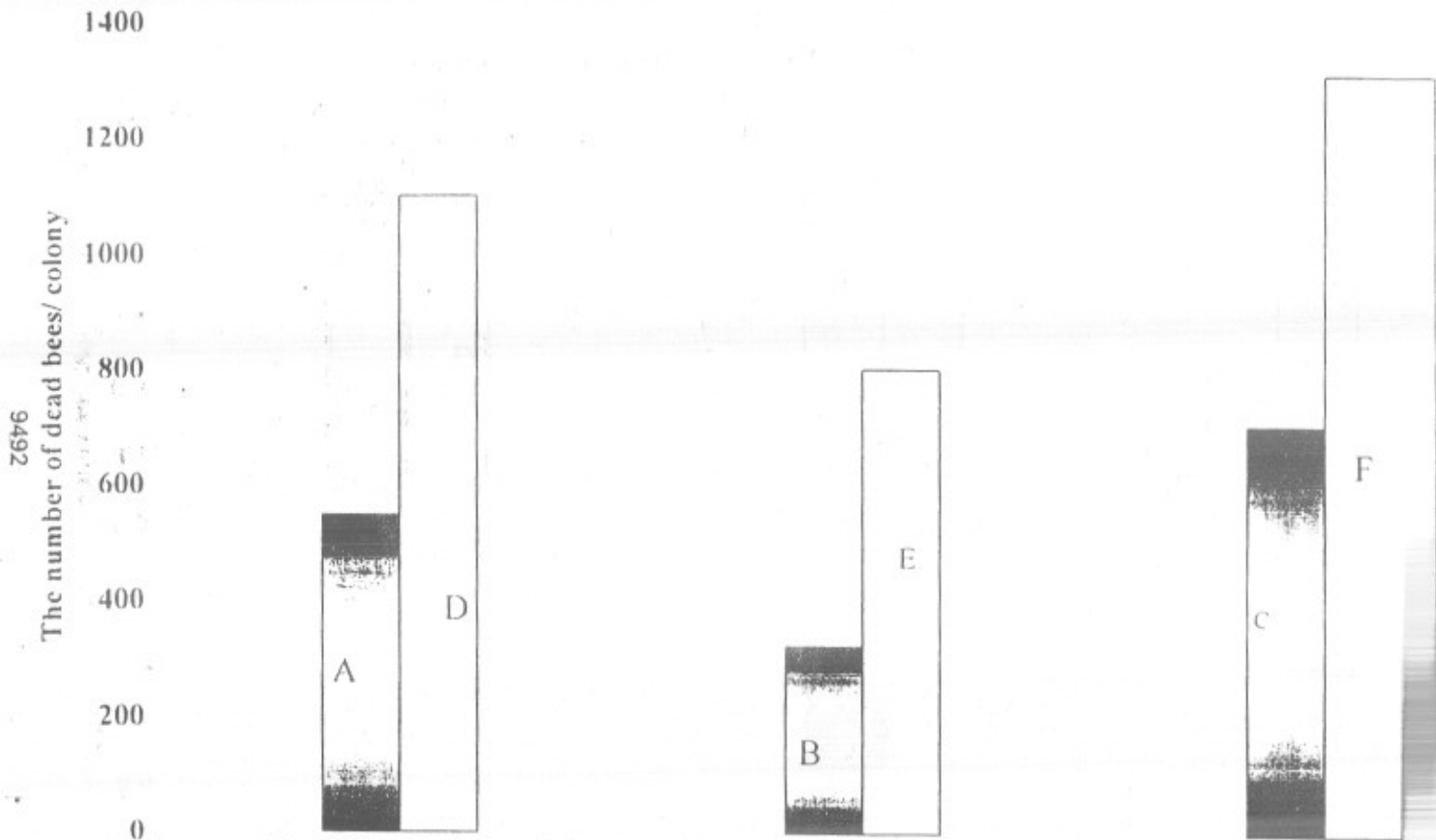


Fig. (7) The effect of a modern collected frames A, B and C (wire gride area measuring 1125 cm<sup>2</sup> ) and modern collected frames D, E and F (wire gride area measuring 562cm<sup>2</sup> ) on dead bees throughout the 2/4/2006 to 25/6/2006

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### تأثير استخدام بعض التصميمات لألواح جمع سم النحل على كمية الإنتاج

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اجري هذا البحث عام ٢٠٠٦ بقسم بحوث النحل بالدقي لبيان تأثير بعض التصميمات المختلفة لألواح جمع سم النحل وموضع هذه الألواح داخل الطائفة على إنتاج السم لشغالات نحل العسل، واستخدم مع هذه الألواح جهاز جمع السم المصمم برسالة الدكتوراه للباحث حيث تم تصميم ستة نماذج لألواح الجمع A ، B ، C ، D ، E ، و F في الثلاثة نماذج الأولى كانت مساحة شبكة الجمع لكل منهما ١١٢٢ سم<sup>٢</sup> والثلاثة نماذج الأخرى فكانت مساحة شبكة الجمع لكل منهما ٥٦٢ سم<sup>٢</sup> وقد صممت النماذج على كالتالي:

نموذج (A): على شكل إطار خشبي مساحته (٢١٨٤ سم<sup>٢</sup>) وبه شبكة الجمع من السلك النحاسي مساحتها (١١٢٢ سم<sup>٢</sup>) وأسفلها لوح زجاجي لجمع السم، على أن يوضع النموذج مسطحاً على قم أقراص الطائفة بدلاً من الغطاء.

نموذج (B): عبارة عن إطار لانجستروت مساحته (١٠٤٦,٥ سم<sup>٢</sup>) يستخدم من الناحيتين كشبكة لجمع السم مساحتها (١١٢٢ سم<sup>٢</sup>) ويوضع وسط أقراص الحضنة داخل الطائفة.

نموذج (C): على شكل إطار خشبي مساحته (٢٠١٦ سم<sup>٢</sup>) وبه شبكة الجمع مساحتها (١١٢٢ سم<sup>٢</sup>) ويوضع أسفل أقراص الحضنة.

نموذج (D): نفس نموذج A لكن شبكة الجمع (٥٦٢ سم<sup>٢</sup>).

نموذج (E): نفس نموذج B لكن شبكة الجمع مساحتها (٥٦٢ سم<sup>٢</sup>).

نموذج (F): نفس نموذج C لكن شبكة الجمع مساحتها (٥٦٢ سم<sup>٢</sup>).

وقد أظهرت النتائج وجود فروق معنوية بين كمية السم المنتجة وكذا عدد النحل الميت حيث تفوقت النماذج التي بها مساحة شبكة الجمع ١١٢٢ سم<sup>٢</sup> عن النماذج التي بها شبكة الجمع (٥٦٢ سم<sup>٢</sup>) وأن أفضل النماذج B ، C ، و A على التوالي وعليه نوصي باستخدام النموذج B لجمع أكبر كمية من السم مع أقل عدد نحل ميت.