



Results and Discussion

RESULTS & DISCUSSION

Bee venom collection in Honeybees colonies:

(I) Types of bee venom electrical devise used for extraction of bee venom from honeybees workers

(1) Effect of using electrical transformer 220 V. to 3 V. at 0.4 A. on the mean of bee venom collection in bees races.

Table (1) and fig. (1) indicated that the means of bee venom collected during 30 min. were 0.31 , 0.32 and 0.31 g./colony with an average of 0.313 g. during the first run (31/8/1998). In the second run (10/9/1998) the means of bee venom collected by the same electrical device were 0.20 , 0.22 and 0.30 g./colony with an average of 0.24 g. In case of the 3rd run the means of bee venom collected in 30 min. by the same electrical device were 0.17 , 0.20 and 0.27 g./colony with an average of 0.21 g./colony. Clear from the result that, the highest amount of venom was that obtained in the first run in comparison with the other two runs. (0.313 , 0.24 and 0.21 g./colony. The above results are in agreement with authors who indicated that using the electrical device for bee venom collection is suitable in honey bees colonies (Dotmas & Hider, 1987 ; Omer et al, 1994 and Khattab, 1997). In addition the amount of venom obtained colony is higher than that obtained by Fakhim-Zadeh, 1998, of 0.21 g. venom.

Effect of bee venom recreation on the areas of brood neared and storage of pollen :

Results in table (1) indicated that, the mean area of scaled brood in 1st run was 208^{''}, while the areas of sealed brood in the 2nd bees run was 113^{''}, and in the 3rd treatment was 81.6^{''}. From the above results it is clear that, there was reductions in the brood rearing . This reduction could be due to the consumption of stored pollen and honey when compared with untreated colonies.

In control treatment the area of scaled brood in 1st run was 222, 265, and 279^{''} with an average 255.3^{''}, while in the 2nd run was 226, 267, and 275 with an average 256^{''}, and in the 3rd run was 229, 259, and 284 with an average 257.3^{''}.

In case of pollen stored in the hive during treatments with bee venom devices, the areas in inches of stored pollen are listed in table (1) indicated that, the mean area honey and pollen in 1st run was 263.33^{''}, while the areas of honey and pollen in the 2nd bees run was 220.33^{''}, and in the 3rd treatment was 203^{''}.

In control treatment the area of honey and pollen stored in 1st run was 232, 259, and 210^{''} with an average 233.6^{''}, while in the 2nd run was 230, 260 and 210 with an average 233.3^{''}, and in the 3rd run was 225, 265, and 215 with an average 235^{''}.

From the above results it is clear that, there was reductions in honey and pollen. This reduction could be due to the consumption of stored pollen and honey when compared with untreated colonies. This reductions could be attributed by that venom is a protein that require feeding on pollen and honey for its production (Omer 1994).

Table (1) Effect of using 3 V. at 0.4 A. on venom collection from three bees races per 30 min.

| Date of bee venom collection | No. of Combs in hive | Brood Combs Inch ² | Brood Combs Control Inch ² | honey and Pollen Combs inch ² | honey and Pollen Combs control inch ² | No. of dead Bees | Mean of bee venom collection (g/colony) |
|------------------------------|----------------------|-------------------------------|---------------------------------------|--|--|------------------|---|
| 31/8/98 | 10 | 228 | 222 | 240 | 232 | 5 | 0.31 |
| | 10 | 226 | 265 | 290 | 259 | 22 | 0.32 |
| | 8 | 170 | 279 | 260 | 210 | 15 | 0.31 |
| Mean | 9.33 | 208 | 255.3 | 263.3 | 233.6 | 15 | 0.313 |
| 10/9/98 | 6 | 97 | 226 | 194 | 230 | 31 | 0.2 |
| | 8 | 108 | 267 | 241 | 260 | 5 | 0.22 |
| | 8 | 144 | 275 | 226 | 210 | 15 | 0.3 |
| Mean | 7.33 | 113 | 256 | 220.3 | 233.3 | 17 | 0.24 |
| 21/9/98 | 6 | 70 | 229 | 150 | 225 | 10 | 0.17 |
| | 7 | 100 | 259 | 225 | 265 | 5 | 0.2 |
| | 6 | 75 | 284 | 235 | 215 | 25 | 0.27 |
| Mean | 7 | 81.6 | 257.3 | 203.3 | 235 | 16.6 | 0.213 |
| \bar{X} | | 135.3 | 256.2 | 229 | 234 | 14.6 | 0.25 |
| SE | | 57.21 | 22.77 | 37.22 | 20.75 | 9.003 | 0.054 |
| $\bar{X} + SE$ | | 192.51 | 278.97 | 266.22 | 254.75 | 23.603 | 0.304 |
| $\bar{X} - SE$ | | 78.09 | 233.43 | 191.78 | 213.25 | 5.597 | 0.196 |

* V. = Volt , A. = Amber

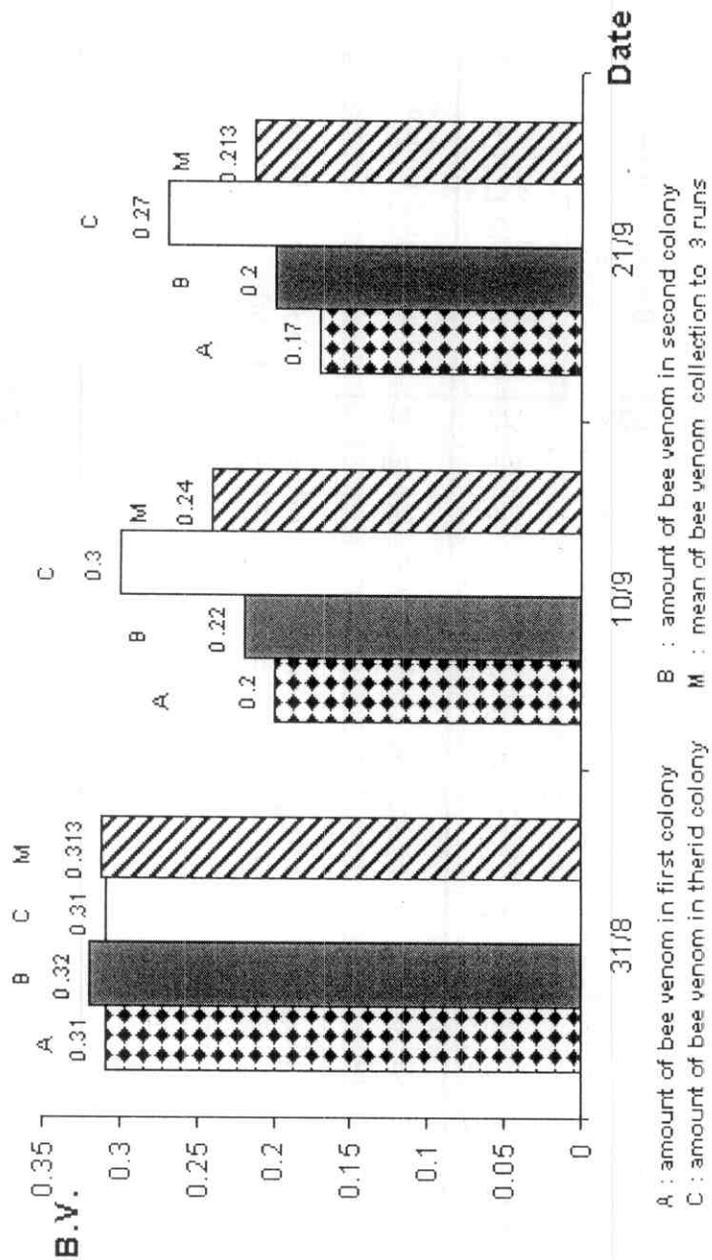


Fig. (1-a) Effect of using electrical transformer 220 V. to 3 V. at 0.4 A. on the mean of bee venom collection bees races, during 30 min.

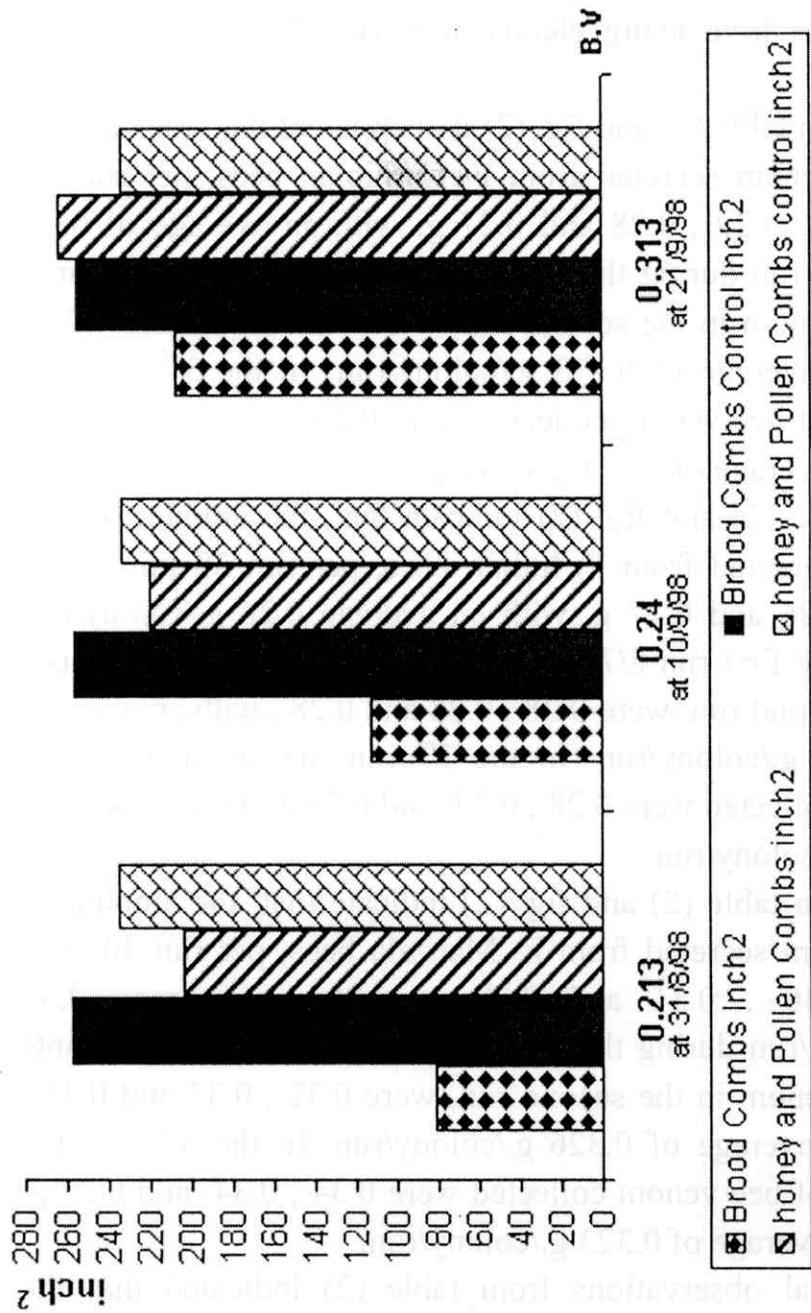


Fig. (1-b) B.V. & Brood combs
B.V. & honey and bollen

(2) The amount of bee venom collection from the honeybees hive using electrical device 220 to 6 V. with 1 A.:

From table (2) and fig. (2) it is apparent that, the amount of bee venom secreted from F₂ Carniolan bees, per run 30 min. were 0.29 , 0.28 and 0.27 g. with an average of 0.28 g./colony/run during the first run 8/7/98. While the amounts of bee venom in the second run, were 0.25 , 0.29 and 0.28 , with an average of 0.273 g./colony/run. In the 3rd run, the amount of bee venom collected were 0.28 , 0.25 and 0.29 g. with an average of 0.273 g./colony/run.

Table (2) and fig. (2) indicate that, the amount of bee venom secreted from F₂ Italian bees, per run 30 min. were 0.27 , 0.26 and 0.27 g. with an average 0.26 g./colony/run during the first run 8/7/98. While the amounts of bee venom in the second run, were 0.28 , 0.28 and 0.28 , with an average of 0.283 g./colony/run. In the 3rd run, the amount of bee venom collected were 0.28 , 0.27 and 0.25 g. with an average 0.266 g./colony/run.

From table (2) and fig. (2) indicate that, the amount of bee venom secreted from F₂ Manzala bees, per run 30 min. were 0.30 , 0.31 and 0.29 g. with an average 0.30 g./colony/run during the first run 8/7/98. While the amounts of bee venom in the second run, were 0.32 , 0.32 and 0.34 , with an average of 0.326 g./colony/run. In the 3rd run, the amount of bee venom collected were 0.34 , 0.34 and 0.29 g. with an average of 0.323 g./colony/run.

Initial observations from table (2) indicated that the amount of venom was different between races as well as between runs. Never the less deference between runs and

interval . The highest amount of venom (0.32 g.) was obtained from Manzala bees race, the second mean (0.275 g.) was obtained from Carniolan bees race , and the least mean (0.27 g.) was obtained from Italian bees race, when the transformer (12 V. at 1 A.) was used.

This result agreed with the recommendation by Brandenburg (1992) who in a similar study used transformer 10 V. to receives a shock. This induces the bees to sting through the sheet and deposit venom on the glass below.

Table (2) Effect of using electrical transformer 220 V to 6 V. at 1 A. on amount of B.V. collection from three F₂ bees races.

| Date of bee venom collection | Amount of B.V. collection (g/colony) | | |
|------------------------------|--------------------------------------|---------|---------|
| | Carniolan | Italian | Manzala |
| 8/7/98 | 0.29 | 0.27 | 0.30 |
| | 0.28 | 0.26 | 0.31 |
| | 0.27 | 0.27 | 0.29 |
| Mean | 0.28 | 0.26 | 0.30 |
| 11/7/98 | 0.25 | 0.28 | 0.32 |
| | 0.29 | 0.28 | 0.32 |
| | 0.28 | 0.29 | 0.34 |
| Mean | 0.273 | 0.283 | 0.326 |
| 14/7/98 | 0.28 | 0.28 | 0.34 |
| | 0.25 | 0.27 | 0.34 |
| | 0.29 | 0.25 | 0.29 |
| Mean | 0.273 | 0.266 | 0.323 |
| \bar{X} | 0.2753 | 0.2696 | 0.3163 |
| SE | 0.014 | 0.011 | 0.019 |
| $\bar{X} + SE$ | 0.2893 | 0.2806 | 0.3353 |
| $\bar{X} - SE$ | 0.2613 | 0.2586 | 0.2973 |

* V. = Volt , A. = Amber

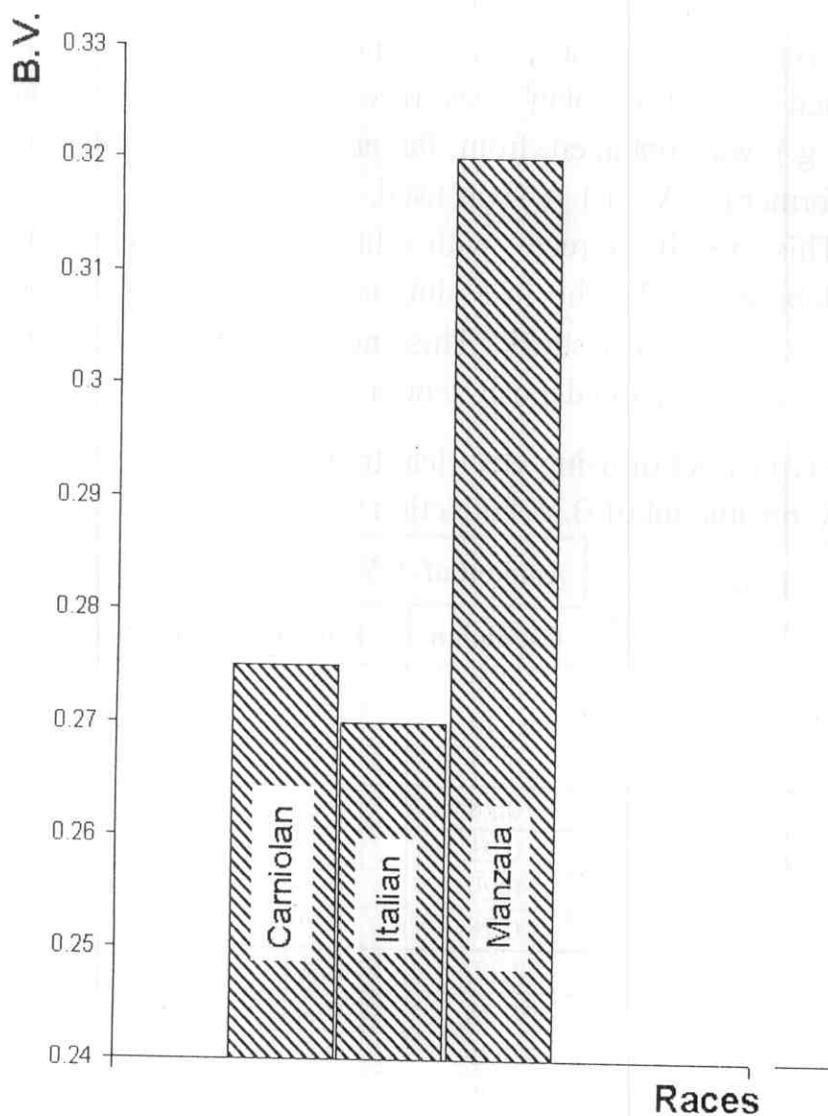


Fig. (2) Effect of using electrical transformer 220 V to 6 V. at 1 A. on amount of B.V. collection three bees races F_2 .

(3) Amount of B. V. collected from the three bees races of honeybees using electrical transformer 220 V. to 12 V. at 1 A. /30 min.

The amount of B. V. obtained from F₂ Carniolan bees race during 27/6/98 to 30/8/98 recorded every 3 days are shown in table (3) these were 0.35 , 0.35 , 0.34 , 0.34 , 0.3 , 0.3 , 0.3 , 0.28 , 0.28 , 0.26 , 0.25 , 0.25 , 0.25 , 0.23 , 0.2 , 0.2 , 0.2 , 0.2 , 0.17 , 0.15 , 0.15 and 0.15 g./colony, respectively with an average of 0.25 g./colony/30min.

As to the F₂ Italian races, these, the amount of are shown from table (3) these were 0.37 , 0.37 , 0.37 , 0.35 , 0.35 , 0.35 , 0.32 , 0.32 , 0.3 , 0.3 , 0.27 , 0.27 , 0.27 , 0.25 , 0.25 , 0.22 , 0.22 , 0.2 , 0.17 , 0.17 , 0.15 and 0.15 with an average of 0.272 g./ colony/30 min.

For F₂ Manzala bees race, the amount of B. V. secreted on the collector plate are shown from table (3) these were 0.38 , 0.37 , 0.37 , 0.37 , 0.37 , 0.35 , 0.35 , 0.35 , 0.32 , 0.32 , 0.32 , 0.32 , 0.30 , 0.30 , 0.27 , 0.27 , 0.25 , 0.25 , 0.23 , 0.23 , 0.20 and 0.17 with an average of 0.303g./ colony/30 min. The results obtained show reduction in the average of venom collected and this was true with the three races.

Initial observations, has indicated a fall in the amount of bee venom collected possibly due to learning effect. It was noticed that after this period some bees avoid contact with the wires through which the current is passed: as soon as the

device is set up, and even before electricity was turned on, the bees near the hive entrance back up appear to avoid touching the wires. A decrease in production also occurs after a certain time when the commonly used system for venom extraction is employed, and this may also be due to a learning effect. A good method for attracting bees to the extraction device is to shake a black leather ball inside the chamber; this intensifies the stinging response and increases the amount of venom extracted. (Brandeburgo, 1995).

Table (3) Amount of B. V. collected at three days interval from the three races of honeybees by using electrical transformer 220 V. to 12 V. at 1 A. on during 27/6/98 to 30/8/98.

| Date of B. V. collection | No. of Combs in hive | No. of Comb brood | No. of Comb honey and Pollen | Amount of B.V. collect (g/colony/3days) | | |
|--------------------------|----------------------|-------------------|------------------------------|---|-------------|-------------|
| | | | | Carniolan | Italian | Manzala |
| 27/6/98 | 10 | 7 | 3 | 0.35 | 0.37 | 0.38 |
| 30/6/98 | 10 | 7 | 3 | 0.35 | 0.37 | 0.37 |
| 3/7/98 | 10 | 7 | 3 | 0.34 | 0.37 | 0.37 |
| 6/7/98 | 10 | 7 | 3 | 0.34 | 0.35 | 0.37 |
| 9/7/98 | 10 | 6 | 4 | 0.30 | 0.35 | 0.37 |
| 12/7/98 | 10 | 6 | 4 | 0.30 | 0.35 | 0.35 |
| 15/7/98 | 10 | 6 | 4 | 0.30 | 0.32 | 0.35 |
| 18/7/98 | 10 | 6 | 4 | 0.28 | 0.32 | 0.35 |
| 21/7/98 | 10 | 6 | 4 | 0.28 | 0.3 | 0.32 |
| 24/7/98 | 10 | 6 | 4 | 0.26 | 0.3 | 0.32 |
| 27/7/98 | 10 | 6 | 4 | 0.25 | 0.27 | 0.32 |
| 30/7/98 | 10 | 6 | 4 | 0.25 | 0.27 | 0.32 |
| 2/8/98 | 10 | 6 | 4 | 0.25 | 0.27 | 0.30 |
| 5/8/98 | 10 | 6 | 3 | 0.23 | 0.25 | 0.30 |
| 8/8/98 | 10 | 6 | 3 | 0.20 | 0.25 | 0.27 |
| 11/8/98 | 10 | 6 | 3 | 0.20 | 0.22 | 0.27 |
| 14/8/98 | 10 | 6 | 3 | 0.20 | 0.22 | 0.25 |
| 17/8/98 | 10 | 6 | 3 | 0.20 | 0.2 | 0.25 |
| 20/8/98 | 10 | 6 | 3 | 0.17 | 0.17 | 0.23 |
| 23/8/98 | 10 | 8 | 2 | 0.15 | 0.17 | 0.23 |
| 26/8/98 | 10 | 8 | 2 | 0.15 | 0.15 | 0.20 |
| 30/8/98 | 10 | 8 | 2 | 0.15 | 0.15 | 0.17 |
| Total | 220 | 142 | 72 | 5.55 | 5.99 | 6.68 |
| \bar{X} | 10 | 6.45 | 3.27 | 0.25 | 0.272 | 0.303 |
| SE | - | 0.721 | 0.686 | 0.064 | 0.0724 | 0.05 |
| $\bar{X} + SE$ | 10 | 7.171 | 3.956 | 0.314 | 0.3444 | 0.353 |
| $\bar{X} - SE$ | 10 | 5.729 | 2.584 | 0.186 | 0.1996 | 0.253 |

* V. = Volt , A. = Amber

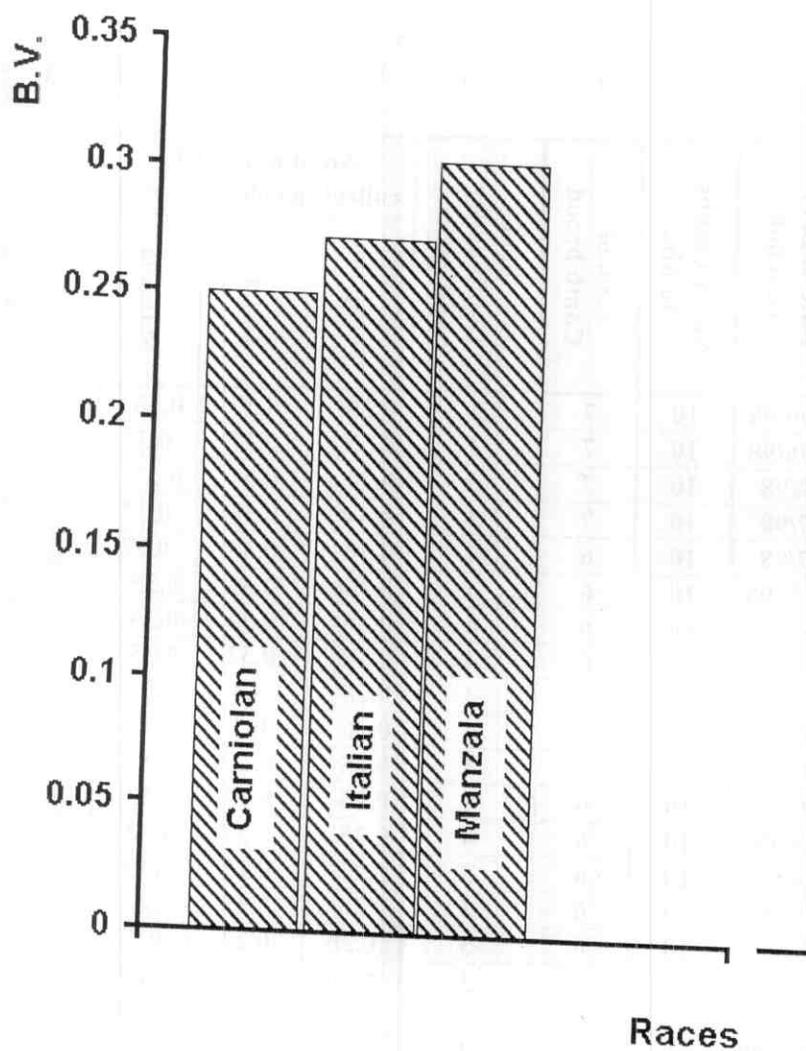


Fig.(3) Amount of B. V. 3 run collected from the three races of honeybees by using electrical transformer 220 V. to 12 V. at 1 A. on the amount of bee venom collection during 27/6/98 to 30/8/98 recorded at 3-run intervals.

(4) Amount of B. V. collected daily from the three bees races of honeybees using electrical transformer 220 V. to 12 V. at 1 A. during 30 min.

The amounts of daily B. V. collection by the above electrical device during 15 runs on F₂ Carniolan bees race are shown in table (4). These were 0.33 , 0.32 , 0.32 , 0.30 , 0.27 , 0.25 , 0.22 , 0.22 , 0.2 , 0.17 , 0.15 , 0.12 , 0.06 , 0.0 and 0.0 g./run/colony, respectively with an average of 0.195 g./run/colony.

With regard to the amounts of daily B. V. collection by the above electrical device during 15 runs from F₂ Italian bees race are shown in table (4). These were 0.35 , 0.33 , 0.30 , 0.30 , 0.30 , 0.30 , 0.27 , 0.27 , 0.25 , 0.25 , 0.22 , 0.20 , 0.15 , 0.10 and 0.10 g./run/colony, respectively with an average of 0.246 g./run/colony. The amounts of daily B. V. collection by the above electrical device during 15 runs from F₂ Manzala bees race are shown in table (4). These were 0.37 , 0.37 , 0.35 , 0.33 , 0.33 , 0.33 , 0.30 , 0.30 , 0.27 , 0.27 , 0.25 , 0.25 , 0.22 , 0.22 and 0.20 g./run/colony, respectively with an average of 0.290 g./run/colony.

From table (4) and fig.(4) it is indicated that Manzala bees race gave the highest amount of bee venom than other races. This result agreed with the recommendation by Omer et al (1993).

Initial observations, however, have indicated a fall in venom production after the 3rd run of collection, possibly due to a learning effect. It was noticed that after this period some bees avoid contact with the wires through which the current is passed: as soon as the device is set up, and even before electricity was turned on, the bees near the hive entrance back up appear to avoid touching the wires. A decrease in production also occurs after a certain time when the commonly used system for venom extraction is employed,

and this may also be due to a learning effect. A good method for attracting bees to the extraction device is to shake a black leather ball inside the chamber; this intensifies the stinging response and increases the amount of venom extracted. (Brandeburgo, 1995). It could be observed that reductions occurred in brood rearing activity and honey and pollen stored than what initially started with this reductions could be attributed by that venom is a protein that requires feeding on pollen and honey for its production (Omer 1994).

Table (4) Amount of B.V. from 15/8/99 to 29/8/99 collected daily from the three races of honeybees by using electrical transformer 220 V. to 12 V. at 1 A.

| Date of B.V. Collection | Comb brood Inch ² | Comb honey and Pollen Inch ² | Amount of B.V. collected g/colony) | | |
|-------------------------|------------------------------|---|------------------------------------|------------------------|------------------------|
| | | | Carniolan F ₂ | Italian F ₂ | Manzala F ₂ |
| 15/8/99 | 108 | 65 | 0.33 | 0.35 | 0.37 |
| 16/8/99 | 108 | 65 | 0.32 | 0.33 | 0.37 |
| 17/8/99 | 108 | 60 | 0.32 | 0.30 | 0.35 |
| 18/8/99 | 108 | 60 | 0.30 | 0.30 | 0.33 |
| 19/8/99 | 108 | 60 | 0.27 | 0.30 | 0.33 |
| 20/8/99 | 108 | 60 | 0.25 | 0.30 | 0.33 |
| 21/8/99 | 108 | 58 | 0.22 | 0.27 | 0.30 |
| 22/8/99 | 108 | 58 | 0.22 | 0.27 | 0.30 |
| 23/8/99 | 108 | 55 | 0.2 | 0.25 | 0.27 |
| 24/8/99 | 100 | 50 | 0.17 | 0.25 | 0.27 |
| 25/8/99 | 100 | 50 | 0.15 | 0.22 | 0.25 |
| 26/8/99 | 100 | 42 | 0.12 | 0.20 | 0.25 |
| 27/8/99 | 90 | 30 | 0.06 | 0.15 | 0.22 |
| 28/8/99 | 90 | 30 | 0.0 | 0.10 | 0.22 |
| 29/8/99 | 85 | 22 | 0.0 | 0.10 | 0.20 |
| Total | 2185 | 765 | 2.93 | 3.69 | 4.360 |
| \bar{X} | 145.66 | 51 | 0.195 | 0.246 | 0.290 |
| SE | 42.22 | 13.25 | 0.107 | 0.075 | 0.053 |
| $\bar{X} + SE$ | 187.88 | 64.25 | 0.302 | 0.321 | 0.343 |
| $\bar{X} - SE$ | 103.44 | 37.75 | 0.088 | 0.171 | 0.237 |

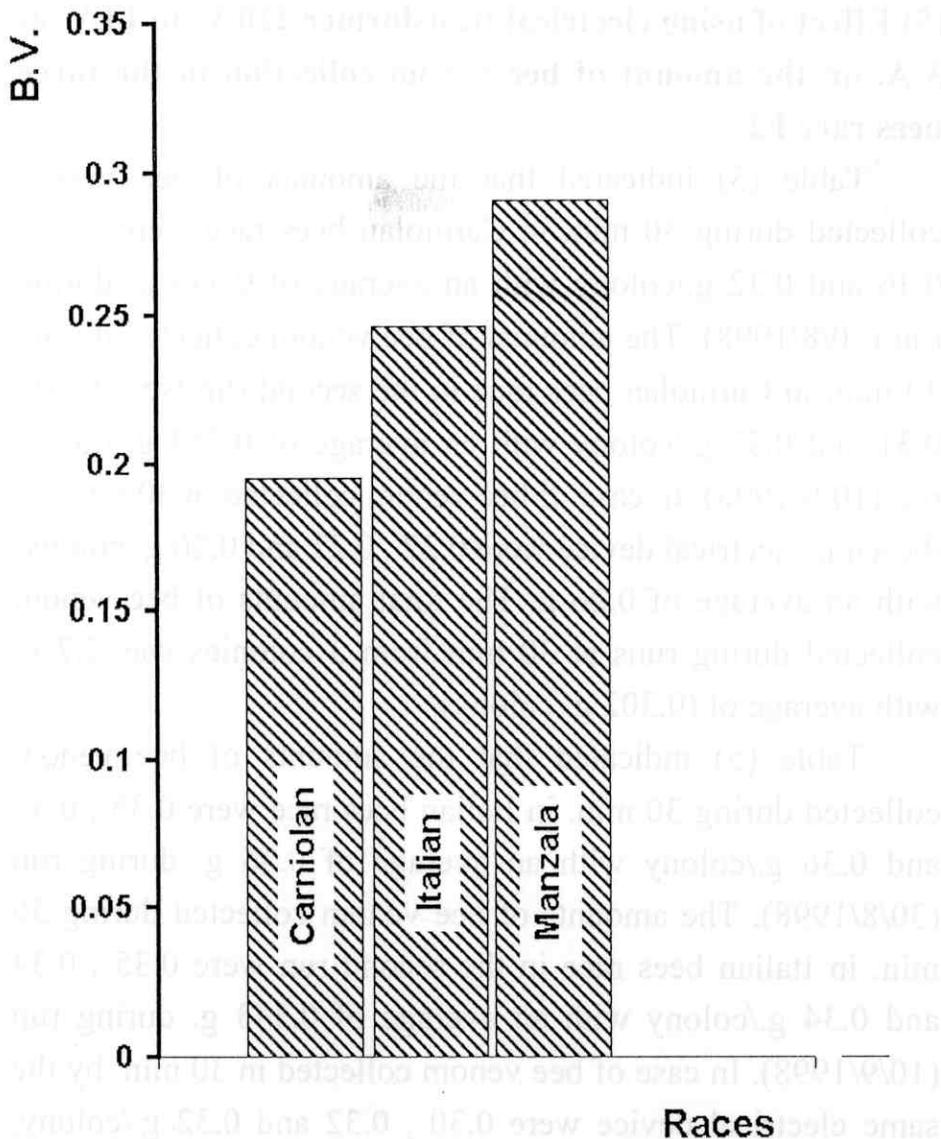


Fig.(4) Amount of B.V./run collected from the three races of honeybees by using electrical transformer 220 V. to 12 V. at 1 A. on the amount of bee venom collection during 15/8/98 to 28/8/98 recorded daily during 30 min.

(5) Effect of using electrical transformer 220 V. to 14 V. at 3 A. on the amount of bee venom collection in the three bees race F2.

Table (5) indicated that the amounts of bee venom collected during 30 min. in Carniolan bees race were 0.32 , 0.36 and 0.32 g./colony with an average of 0.333 g. during run (30/8/1998). The amounts of bee venom collected during 30 min. in Carniolan bees race in the second run were 0.30 , 0.31 and 0.33 g./colony with an average of 0.313 g. during run (10/9/1998). In case of bee venom collected in 30 min. by the same electrical device were 0.27 , 0.25 and 0.26 g./colony, with an average of 0.26 g. The total amounts of bee venom collected during runs at 30 min from 3 colonies was 2.7 g. with average of (0.302 g./colony).

Table (5) indicated that the amounts of bee venom collected during 30 min. in Italian bees race were 0.35 , 0.37 and 0.36 g./colony with an average of 0.36 g. during run (30/8/1998). The amounts of bee venom collected during 30 min. in Italian bees race in the second run were 0.35 , 0.34 and 0.34 g./colony with an average of 0.343 g. during run (10/9/1998). In case of bee venom collected in 30 min. by the same electrical device were 0.30 , 0.32 and 0.32 g./colony, with an average of 0.31 g. The total amounts of bee venom collected during runs at 30 min from 3 colonies was 3.05 g. with average of (0.338 g./colony).

Table (5) indicated that the amounts of bee venom collected during 30 min. in Manzala bees race were 0.37 , 0.39 and 0.36 g./colony with an average of 0.373 g. during

run (30/8/1998). The amounts of bee venom collected during 30 min. in Italian bees race in the second run were 0.39 , 0.38 and 0.37 g./colony with an average of 0.38 g. during run (10/9/1998). In case of bee venom collected in 30 min. by the same electrical device were 0.35 , 0.36 and 0.37 g./colony, with an average of 0.36 g. The total amounts of bee venom collected during runs at 30 min from 3 colonies was 3.32 g. with average of (0.368 g./colony).

Initial observations from table (5) it is obvious that the amount of venom was different. The highest amount of venom (0.368) was obtained in Manzala bees race, the second mean (0.338) was obtained in Italian Carniolan bees race , and the last mean (0.302) was obtained in Carniolan bees race, when the transformer (220 V. to 14 V. at 3 A.) was used in comparison.

This result agreed with the recommendation by Malaiu (1983) who in a similar study used transformer 16 V. to receives a shock. This induces the bees to sting through the sheet and deposit venom on the glass below. Results indicated that, the best amount of venom by transformer 220 V. to 14 V. at 3 A. and the highest amounts was that obtained with the wetbattery, 12 V. and 16 A. was in-between in the amount of venom obtained this results occurred wit the three bees races .

Table (5) Amount of bee venom from the three bees races F_2 using electrical transformer 220 V. to 14 V. at 3 A. during 30 min.

| Date of bee venom collection | No. of Combs in hive | Brood Combs inch ² | Comb honey inch ² | Comb pollen inch ² | Amount of B.V. collection(g/colony) | | |
|------------------------------|----------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------------|---------|---------|
| | | | | | Carniolan | Italian | Manzala |
| 30/8/98 | 8 | 90 | 20 | 15 | 0.32 | 0.35 | 0.37 |
| | 9 | 95 | 25 | 20 | 0.36 | 0.37 | 0.39 |
| | 9 | 85 | 25 | 20 | 0.32 | 0.36 | 0.36 |
| Mean | 8.66 | 90 | 23.3 | 18.33 | 0.33 | 0.36 | 0.373 |
| 10/9/98 | 8 | 80 | 12 | 10 | 0.3 | 0.35 | 0.39 |
| | 7 | 90 | 15 | 12 | .31 | 0.34 | 0.38 |
| | 8 | 95 | 25 | 15 | 0.33 | 0.34 | 0.37 |
| Mean | 8.3 | 88.33 | 17.3 | 12.3 | 0.313 | 0.343 | 0.38 |
| 20/9/98 | 7 | 60 | 26 | 14 | 0.27 | 0.30 | 0.35 |
| | 7 | 67 | 20 | 17 | 0.25 | 0.32 | 0.36 |
| | 8 | 75 | 20 | 16 | 0.26 | 0.32 | 0.37 |
| Mean | 7.3 | 67.3 | 22 | 15.66 | 0.26 | 0.47 | 0.36 |
| \bar{X} | | | | | 0.301 | 0.391 | 0.371 |
| SE | | | | | 0.033 | 0.0203 | 0.014 |
| $\bar{X} + SE$ | | | | | 0.334 | 0.4113 | 0.385 |
| $\bar{X} - SE$ | | | | | 0.268 | 0.3707 | 0.357 |

* V. = Volt , A. = Amber

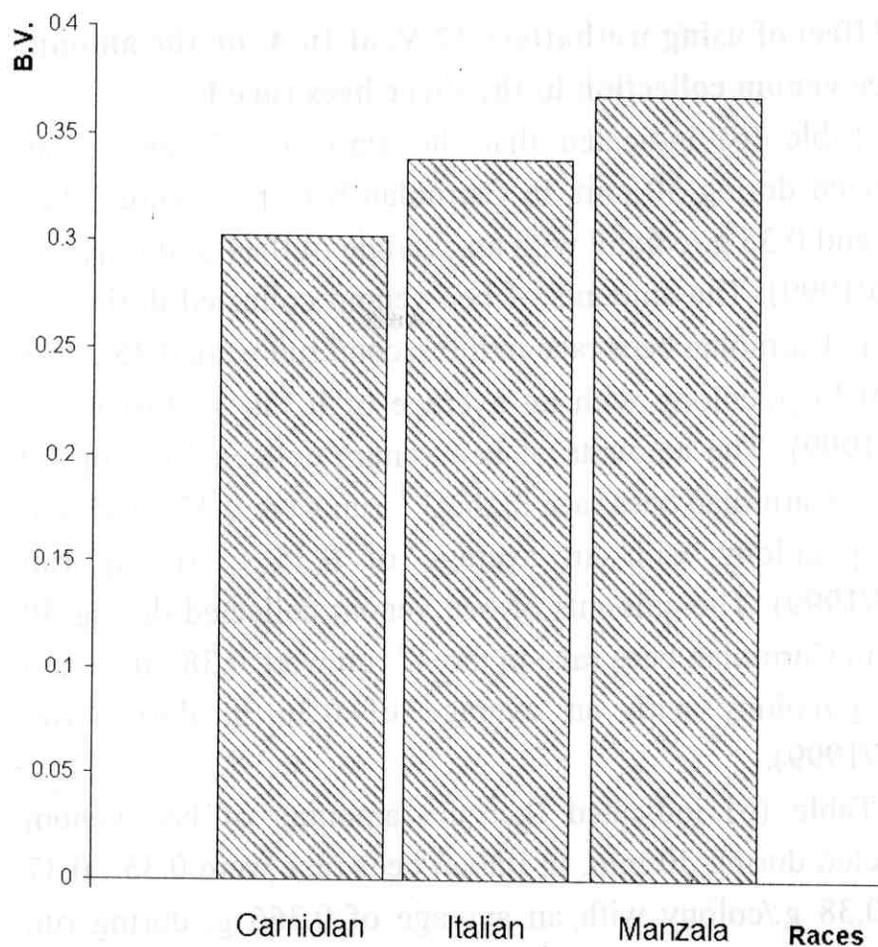


Fig (5) Amount of bee venom from the three bees races F_2 using electrical transformer 220 V. to 14 V. at 3 A. during 30 min.

(6) Effect of using wetbattery 12 V. at 16 A. on the amount of bee venom collection in the three bees race F₂.

Table (6) indicated that the amounts of bee venom collected during 30 min. in Carniolan bees race were 0.32 , 0.35 and 0.35 g./colony with an average of 0.34 g. during run (27/6/1999). The amounts of bee venom collected during 30 min. in Carniolan bees race in the second run were 0.35 , 0.33 and 0.33 g./colony with an average of 0.336 g. during run (7/7/1999). The amounts of bee venom collected during 30 min. in Carniolan bees race in the 3rd run were 0.37 , 0.35 and 0.33 g./colony with an average of 0.35 g. during run (17/7/1999). The amounts of bee venom collected during 30 min. in Carniolan bees race in the 4th run were 0.38 , 0.37 and 0.33 g./colony with an average of 0.36 g. during run (27/7/1999).

Table (6) indicated that the amounts of bee venom collected during 30 min. in Italian bees race were 0.35 , 0.37 and 0.38 g./colony with an average of 0.366 g. during run (27/6/1999). The amounts of bee venom collected during 30 min. in Italian bees race in the second run were 0.37 , 0.35 and 0.35 g./colony with an average of 0.356 g. during run (7/7/1999). The amounts of bee venom collected during 30 min. in Italian bees race in the 3rd run were 0.37 , 0.36 and 0.38 g./colony with an average of 0.37 g. during run (17/7/1999). The amounts of bee venom collected during 30 min. in Italian bees race in the 4th run were 0.39 , 0.39 and 0.37 g./colony with an average of 0.383 g. during run (27/7/1999).

Table (6) indicated that the amounts of bee venom collected during 30 min. in Manzala bees race were 0.40 , 0.40 and 0.43 g./colony with an average of 0.41 g. during run (27/6/1999). The amounts of bee venom collected during 30 min. in Manzala bees race in the second run were 0.39 , 0.39 and 0.45 g./colony with an average of 0.41 g. during run (7/7/1999). The amounts of bee venom collected during 30 min. in Manzala bees race in the 3rd run were 0.41 , 0.42 and 0.45 g./colony with an average of 0.426 g. during run (17/7/1999). The amounts of bee venom collected during 30 min. in Manzala bees race in the 4th run were 0.41 , 0.39 and 0.39 g./colony with an average of 0.396 g. during run (27/7/1999).

The above results indicated that the most common method of collecting honeybee venom by using electrical stimulation. The electric “milking” equipment usually consists of a nylon or latex sheet stretched over a glass plate and fitted within a wooden frame. Copper or steel wires, fixed to the wooden frame, run over the sheet surface at small intervals and are connected to an electrical source (usually a 12 V. battery). The frame is usually placed in front of the hive or under the brood chamber. When a bees contacts two adjacent wires on the device, it completes an electrical circuit and receives a shock. This induces the bees to sting through the sheet and deposit venom on the glass below. The stings from 10,000 bees will provide 1 gram of dried venom; therefore, venom collection is usually done on a very large scale. (Anne M. Robinson, and Gard 1996).

Table (6) Effect of using wetbattery 12 V with 16 A. on amount of B.V. collection in the three bees race F₂.

| Date of bee venom collection | No. of Combs in hive | Brood Combs inch ² | honey and Pollen Combs | Amount of B.V. collection(g/colony) | | |
|------------------------------|----------------------|-------------------------------|------------------------|-------------------------------------|---------|---------|
| | | | | Carniolan | Italian | Manzala |
| 27/6/99 | 7 | 3 | 2 | 0.32 | 0.35 | 0.40 |
| | 7 | 3 | 2 | 0.35 | 0.37 | 0.40 |
| | 7 | 3 | 2 | 0.35 | 0.38 | 0.43 |
| Mean | 7 | 3 | 2 | 0.34 | 0.366 | 0.41 |
| 7/7/99 | 7 | 3 | 2 | 0.35 | 0.37 | 0.39 |
| | 7 | 3 | 2 | 0.33 | 0.35 | 0.39 |
| | 7 | 3 | 2 | 0.33 | 0.35 | 0.45 |
| Mean | 7 | 3 | 2 | 0.336 | 0.356 | 0.41 |
| 17/7/99 | 9 | 5 | 3 | 0.37 | 0.37 | 0.41 |
| | 9 | 5 | 3 | 0.35 | 0.36 | 0.42 |
| | 9 | 5 | 3 | 0.33 | 0.38 | 0.45 |
| Mean | 9 | 5 | 3 | 0.35 | 0.37 | 0.426 |
| 27/7/99 | 9 | 5 | 4 | 0.38 | 0.39 | 0.41 |
| | 10 | 6 | 3 | 0.37 | 0.39 | 0.39 |
| | 10 | 7 | 3 | 0.33 | 0.37 | 0.39 |
| Mean | 9.67 | 6 | 3.33 | 0.36 | 0.383 | 0.396 |
| \bar{X} | | | | 0.346 | 0.368 | 0.415 |
| SE | | | | 0.018 | 0.014 | 0.021 |
| $\bar{X} + SE$ | | | | 0.364 | 0.382 | 0.435 |
| $\bar{X} - SE$ | | | | 0.328 | 0.354 | 0.385 |

* V. = Volt , A. = Amber

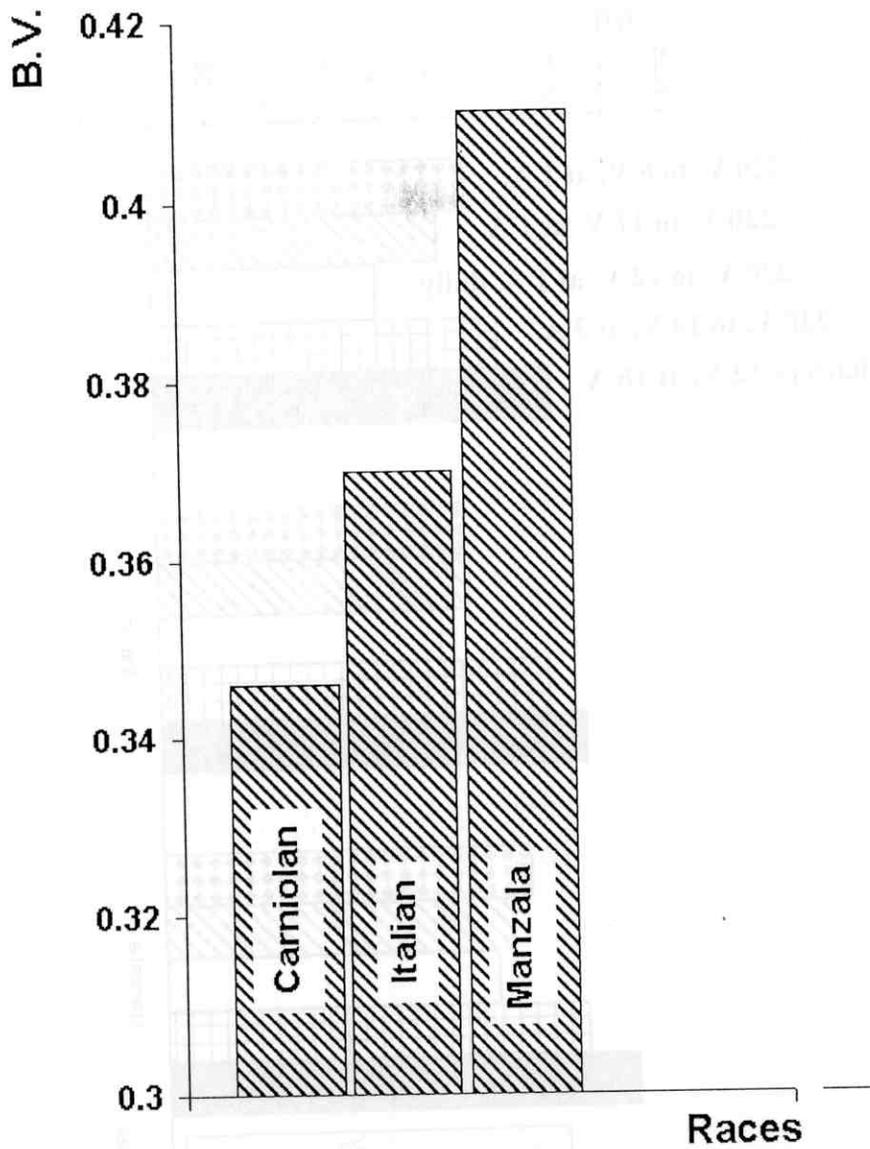
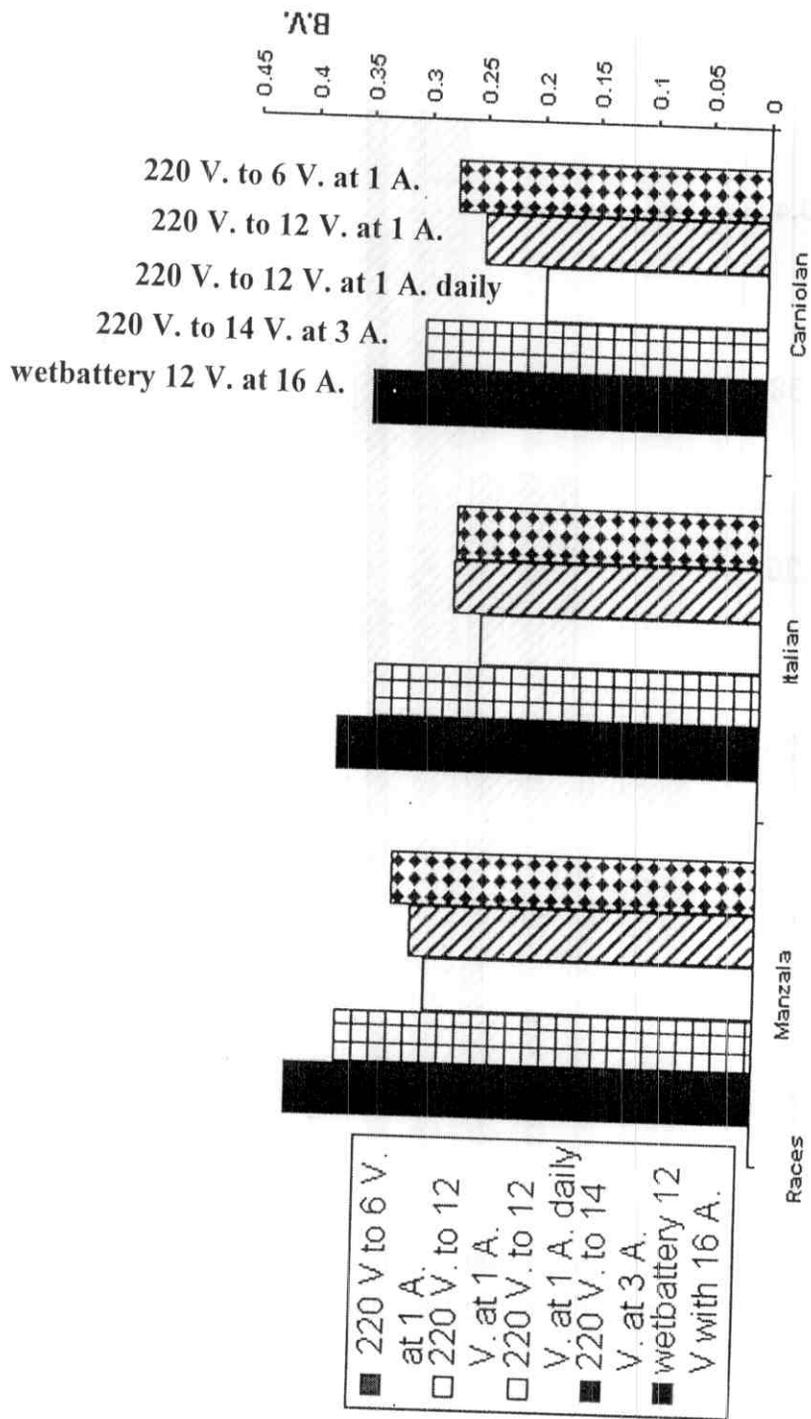


Fig.(6) Effect of using wetbattery 12 V with 16 A. on amount of B.V. collection in the three bees race F₂.



(II) Effect of different seasons on bee venom collection .

Results of the three runs (June , October and December) are tabulated in table(7) and Fig.(7). They show that the mean of bee venom obtained from bee races were 0.32 , 0.36 and 0.32 g. with an average of 0.33 in the first run (June run). As where in the second run the mean of bee venom obtained were 0.30 , 0.31 and 0.33g. with an average of 0.313g. in October run. In the 3rd run venom obtained were 0.27 , 0.21 and 0.25g. with an average of 0.243 in December run.

It could be observed that the mean of bee venom obtained in December run was lesser than those obtained in June and October runs.

The results agreed with Dotimas (1987) who in a similar study indicated that the venom quantity secreted by worker bees appeared to be highest during the summer months, when there is peak activity in the hive and relatively young bees are serving as hive guards and whilst they are supposedly having that largest poison sac.

Table (7) Effect of different seasons on bee venom collection.

| Date of bee venom collection | No. of Combs in hive | Brood Combs inch ² | honey and Pollen Combs inch ² | No. of dead Bees | No. of Varroa on the plate | Amount of bee venom collection (g/colony) |
|------------------------------|----------------------|-------------------------------|--|------------------|----------------------------|---|
| June run | 8 | 90 | 35 | 10 | 10 | 0.32 |
| | 9 | 95 | 45 | 15 | 15 | 0.36 |
| | 9 | 85 | 45 | 25 | 0 | 0.32 |
| Mean | 8.67 | 90 | 41.67 | 16.67 | 8.33 | 0.33 |
| October run | 7 | 80 | 45 | 35 | 25 | 0.3 |
| | 7 | 90 | 37 | 25 | 30 | 0.31 |
| | 8 | 95 | 35 | 20 | 15 | 0.33 |
| Mean | 7.33 | 88.33 | 39 | 26.67 | 23.33 | 0.313 |
| December run | 7 | 60 | 39 | 15 | 20 | 0.27 |
| | 7 | 65 | 32 | 15 | 25 | 0.21 |
| | 8 | 75 | 15 | 0 | 15 | 0.25 |
| Mean | 7.33 | 66.67 | 28.67 | 10 | 20 | 0.243 |
| \bar{X} | | | | 17.78 | 17.22 | 0.295 |
| SE | | | | 9.4 | 8.53 | 0.042 |
| $\bar{X} + SE$ | | | | 27.18 | 25.75 | 0.337 |
| $\bar{X} - SE$ | | | | 8.38 | 8.69 | 0.253 |

* V. = Volt , A. = Amber

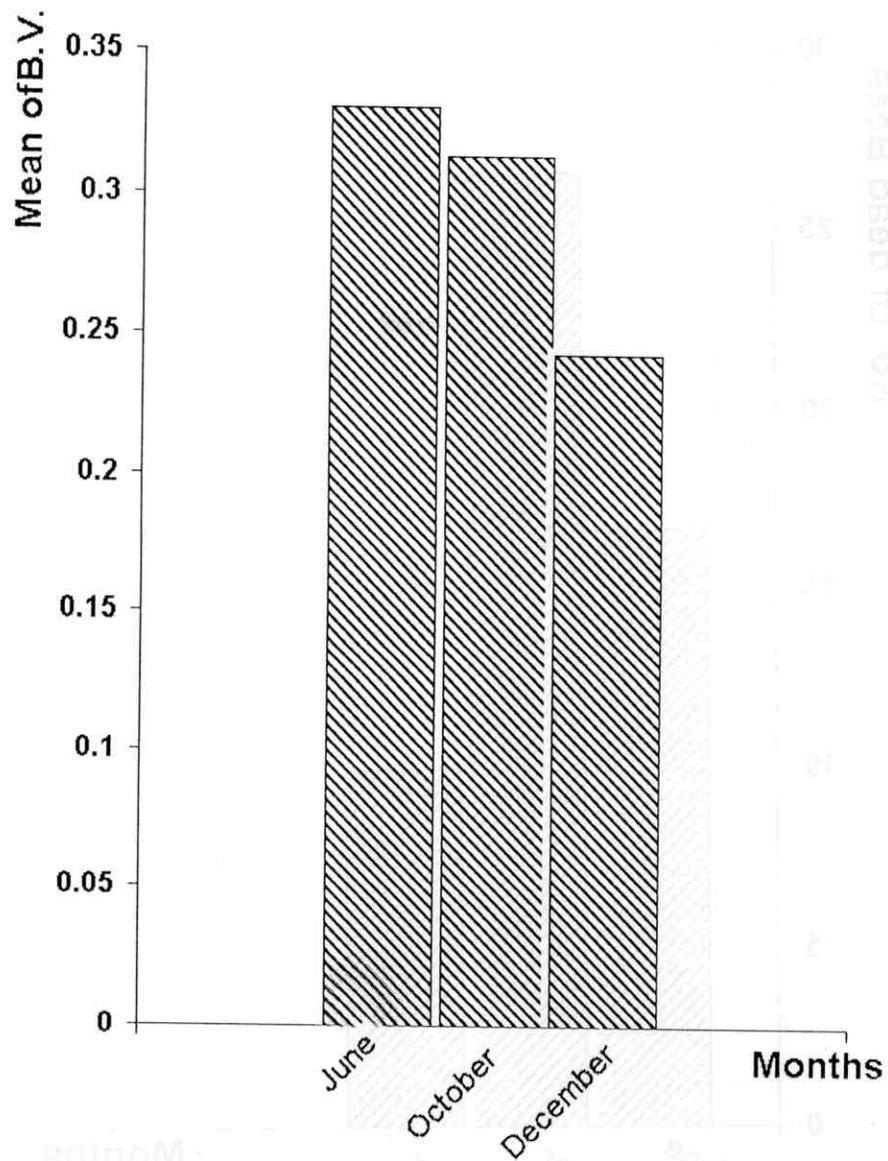


Fig. (7-a) Effect of different seasons on bee venom collection at the three runs.

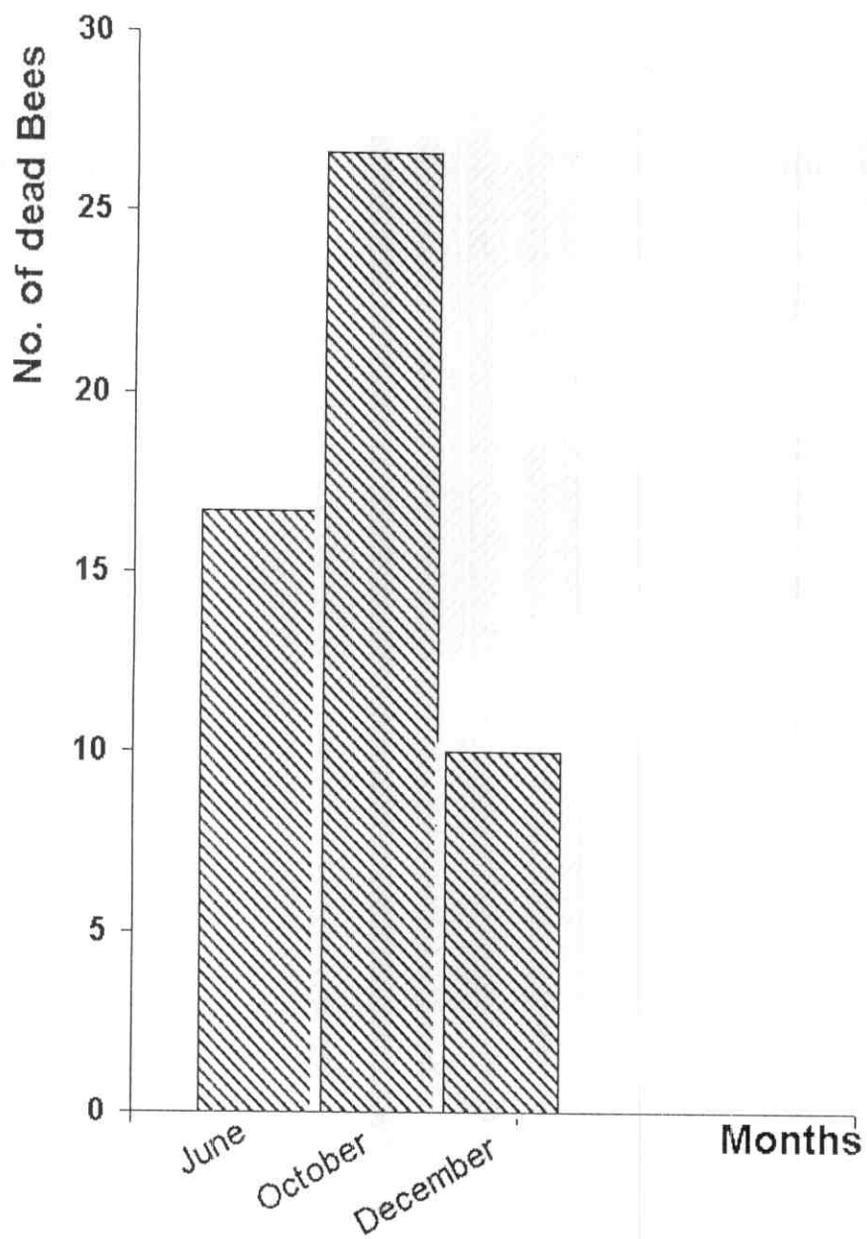


Fig.(7-b) Effect of collecting venom on the number of dead bees at the three runs.

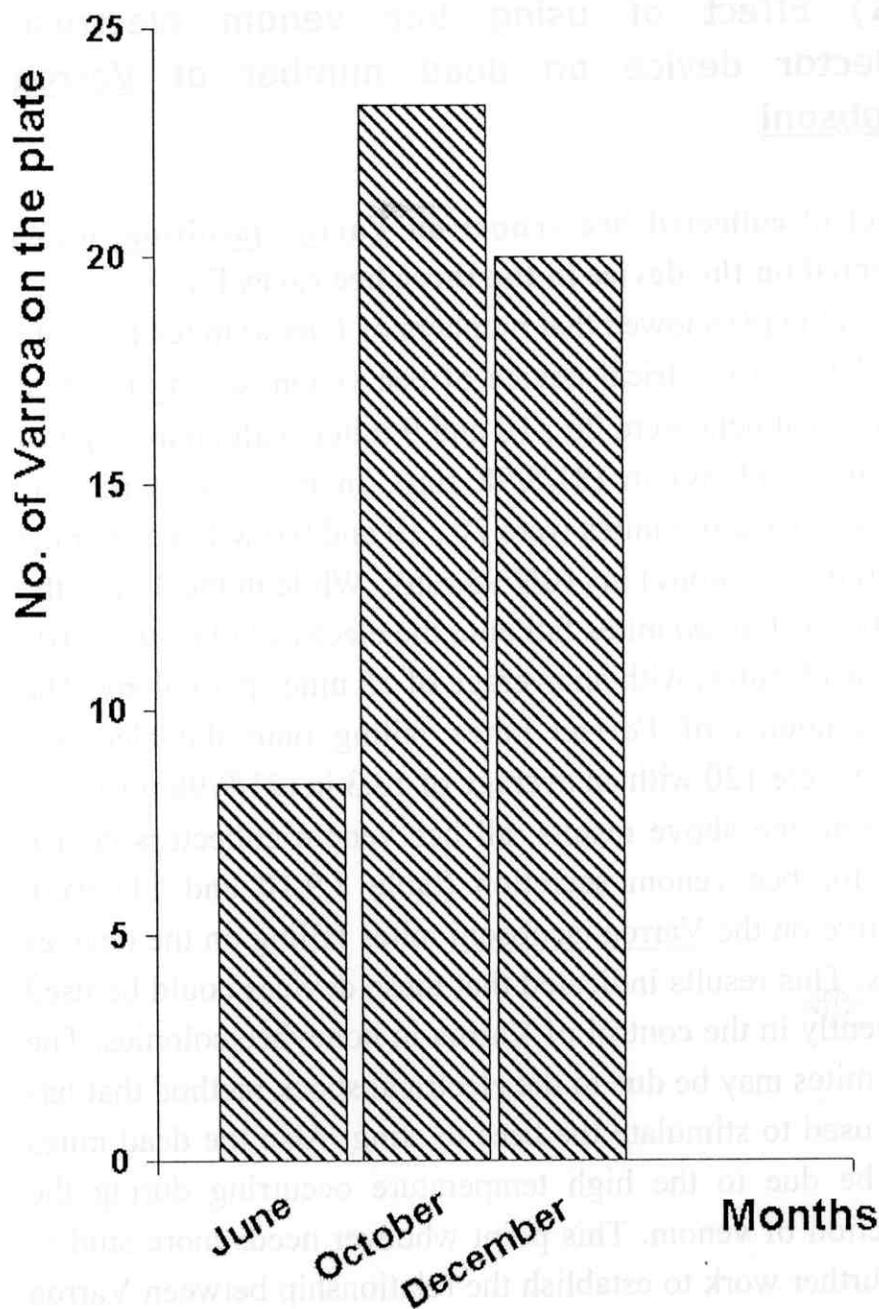


Fig (7-c) Effect of venom collection on the number of Varroa mites collected at the three runs.

(III) Effect of using bee venom electrical collector device on dead number of Varroa jacobsoni

Effect of collected bee venom on Varroa jacobsoni mites collected on the device in the three bee races F₁.

Table (8) showed that numbers of *Varroa* mites fall onto the plates of electrical device of bee venom during the first run of treatment were 26 , 10 and 9 mites with an average of (15 mites/colony) in (31/8/98 run). In the second run the number of *Varroa* mites were 20 , 10 and 0.0 with an average of (10 mites/colony) in (10/9/98 run). While in the 3rd run the number of *Varroa* mites fall onto the electrical plate were 10 , 20 and 15 mites, with an average of 15 mites per colony. The total amounts of *Varroa* mites falling onto the electrical device were 120 with an average of 13.3 in (21/9/98 run).

From the above results, all bee venom collectors device used for bee venom secretion (table 8,9,10 and 11) were effective on the Varroa jacobsoni mites falling on the devices plates. This results indicated that these devices could be used efficiently in the control of *Varroa* in honeybee colonies. The dead mites may be due to the electrical shock method that has been used to stimulate the bees to sting. Also the dead mites may be due to the high temperature occurring during the collection of venom. This point whoever needs more studies and further work to establish the relationship between *Varroa* deaths and the devices used in venom collection.

Table (8) The relationship between bee venom collection and Varroa mites caught by using electrical transformer 220 V. to 3 V. at 0.4 A. on the three bee races F₁. during 30 min.

| Date of bee venom collection run | No. of Combs hive | Brood Comb inch ² | No. of Varroa fall on the plate | Amount of bee venom collection (g/colony) |
|----------------------------------|-------------------|------------------------------|---------------------------------|---|
| 31/8/98 | 10 | 228 | 26 | 0.31 |
| | 10 | 226 | 10 | 0.32 |
| | 8 | 170 | 9 | 0.31 |
| Mean | 9.33 | 208 | 15 | 0.313 |
| 10/9/98 | 6 | 97 | 20 | 0.2 |
| | 8 | 108 | 10 | 0.22 |
| | 8 | 144 | 0.0 | 0.3 |
| Mean | 7.33 | 113 | 10 | 0.24 |
| 21/9/98 | 6 | 70 | 10 | 0.17 |
| | 7 | 100 | 20 | 0.2 |
| | 6 | 75 | 15 | 0.27 |
| Mean | 7 | 81.6 | 15 | 0.213 |
| \bar{X} | | | 13.333 | 0.255 |
| SE | | | 7.318 | 0.054 |
| $\bar{X} + SE$ | | | 20.651 | 0.309 |
| $\bar{X} - SE$ | | | 6.015 | 0.201 |

* V. = Volt , A. = Amber

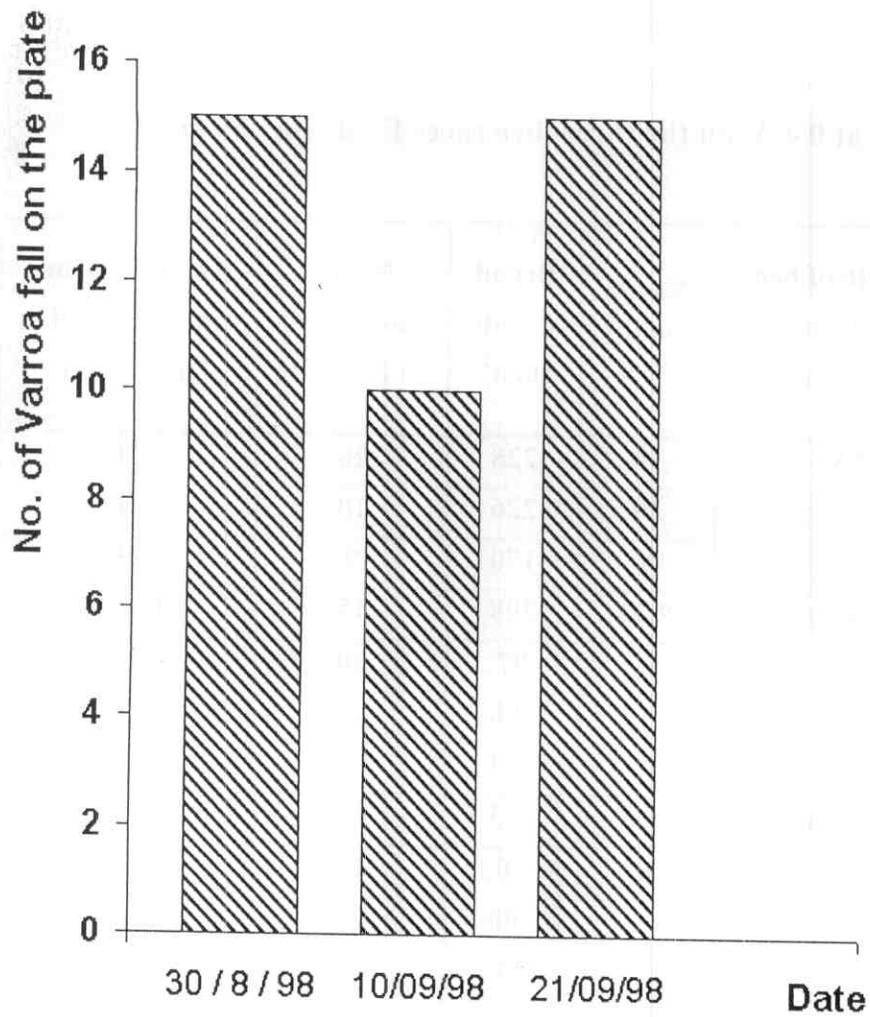


Fig.(8) Counts of Varroa mites caught as a result of using electrical transformer 220 V. to 3 V. at 0.4 A. on the three bee races F_1 . during 30 min.

(9) Counts of Varroa mites caught as a result of using electrical transformer 220 V. to 12 V. at 1 A. during 27/9/98 to 30/8/98 recorded at 3 day intervals on the three bee race during 30min.

The Counts of Varroa mites caught as a result of using electrical transformer 220 V. to 12 V. at 1 A. during 27/6/99 to 30/8/98 from Carniolan hives were 1 , 3 , 7 , 5 , 9 , 8 , 8 , 10 , 13 , 15 , 10 , 20 , 11 , 16 , 12 , 8 , 0 , 0 , 9 , 10 , 9 and 8 with an average of 8.31. The Counts of Varroa mites caught as a result of using electrical transformer 220 V. to 12 V. at 1 A. during 27/6/99 to 30/8/98 from Italian hives were 2 , 3 , 6 , 2 , 4 , 2 , 10 , 10 , 12 , 12 , 13 , 10 , 10 , 7 , 7 , 15 , 17 , 17 , 12 , 10 , 10 and 10 with an average of 9.13.

The Counts of Varroa mites caught as a result of using electrical transformer 20 V. to 12 V. at 1 A. during 27/6/99 to 30/8/98 from Manzala hives were 10 , 5 , 7 , 7 , 3 , 3 , 6 , 6 , 5 , 5 , 6 , 8 , 10 , 5 , 2 , 3 , 4 , 0 , 0 , 0 , 5 and 2 with an average of 4.63.

From the above results, device used for bee venom secretion (table 8,9,10 and 11) were effective on the Varroa jacobsoni mites fall on the devices plates, this results could be used for Varroa control in honeybee colonies, the dead mites may be due to the electrical shock method has been used to stimulate the bees to sting. Also the dead mites may be due to the high temperature. From the above results, it could be noticed that all three bee races harbored variable numbers of Varroa .mites. And the Italian race perhaps harbored greater numbers than the other two races as appeared from the dead mites collected on the device plate.

Table (9) The relationship between bee venom collection and Varroa mites caught using electrical transformer 220 V. to 12 V. at 1 A., during 27/6/98 to 30/8/98 recorded at the 3-day intervals in the three bee races F₂ during 30 min.

| Date of B.V. collection | Comb brood | No. of Varroa on the plate | | |
|-------------------------|------------|----------------------------|---------|---------|
| | | Carniolan | Italian | Manzala |
| 27/6/1998 | 7 | 1 | 2 | 10 |
| 30/6/1998 | 7 | 3 | 3 | 5 |
| 3/7/1998 | 7 | 7 | 6 | 7 |
| 7/7/1998 | 7 | 5 | 2 | 7 |
| 10/7/1998 | 6 | 9 | 4 | 3 |
| 13/7/1998 | 6 | 8 | 2 | 3 |
| 16/7/1998 | 6 | 8 | 10 | 6 |
| 19/7/1998 | 6 | 10 | 10 | 6 |
| 22/7/1998 | 6 | 13 | 12 | 5 |
| 25/7/1998 | 6 | 15 | 12 | 5 |
| 28/7/1998 | 6 | 10 | 13 | 6 |
| 31/7/1998 | 6 | 20 | 10 | 8 |
| 2/8/1998 | 6 | 11 | 10 | 10 |
| 5/8/1998 | 6 | 16 | 7 | 5 |
| 8/8/1998 | 6 | 12 | 7 | 2 |
| 11/8/1998 | 6 | 8 | 15 | 3 |
| 14/8/1998 | 6 | 0 | 17 | 4 |
| 17/8/1998 | 6 | 0 | 17 | 0 |
| 20/8/1998 | 6 | 9 | 12 | 0 |
| 23/8/1998 | 8 | 10 | 10 | 0 |
| 26/8/1998 | 8 | 9 | 10 | 5 |
| 30/8/1998 | 8 | 8 | 10 | 2 |
| ΣX | 142 | 183 | 201 | 102 |
| \bar{X} | 6.4 | 8.31 | 9.13 | 4.63 |
| SE | | 5.12 | 4.46 | 2.8 |
| $\bar{X} + SE$ | | 13.43 | 13.59 | 7.43 |
| $\bar{X} - SE$ | | 3.19 | 4.67 | 1.83 |

* V. = Volt , A. = Amber

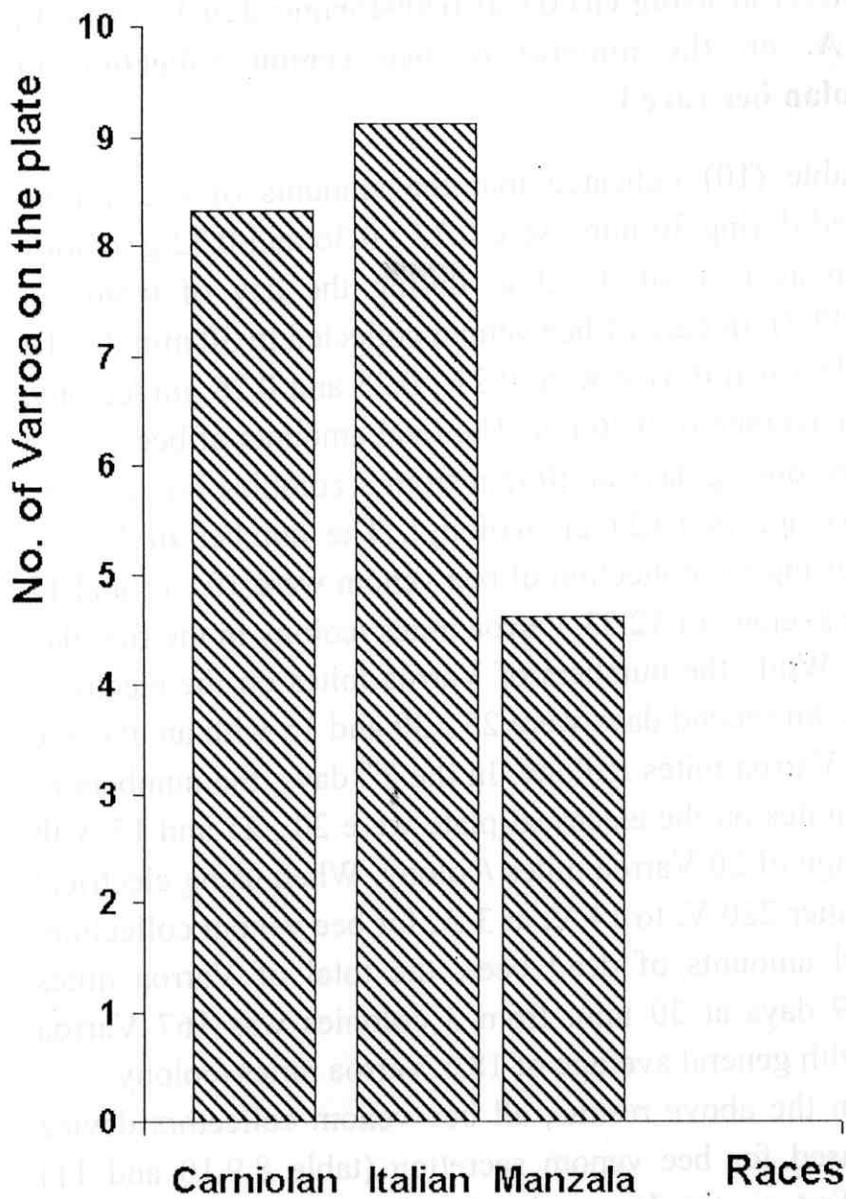


Fig.(9) The relationship between bee venom collection and Varroa mites caught using electrical transformer 220 V. to 12 V. at 1 A., during 27/6/98 to 30/8/98 recorded at 3-day intervals in the three bee races F_2 during 30 min.

(10) Effect of using electrical transformer 220 V. to 14 V. at 3 A. on the amount of bee venom collection in Carniolan bee race F₂.

Table (10) indicated that the amounts of bee venom collected during 30 min. were 0.32 , 0.36 and 0.32 g./colony with an average of 0.333 g. during the day of treatment (30/8/1998). In case of bee venom collected in 30 min. by the same electrical device were 0.27 , 0.25 and 0.26 gm./colony, with an average of 0.26 gm. The total amounts of bee venom collected during days at 30 min from 3 colonies was 2.2 gm. with average of (0.24 gm./colony). The number of Varroa mites during the collection of bee venom were 10 , 15 and 12 with an average of 12.33 Varroa mites /colony in the first day treated. While the numbers of Varroa mites on the electrical plate in the second days were 25 , 30 and 15 with an average of 23.3 Varroa mites /colony. In the 3rd days, the numbers of Varroa mites on the electrical plate were 20 , 25 and 15 with an average of 20 Varroa mites /colony. When using electrical transformer 220 V. to 14 V. at 3 A. for bee venom collection, the total amounts of dead bees, the total of Varroa mites during 9 days at 30 min. from 3 colonies was 167 Varroa mites, with general average of 18.5 Varroa mites /colony.

From the above results, all bee venom collectors device which used for bee venom secretion (table 8,9,10 and 11) were effect on the Varroa jacobsoni mites fall the devices plates, this results could be used for Varroa control in honeybee colonies, the dead mites may be due to the electrical shock method has been used to stimulate the bees to sting. Also the dead mites may be due to the high temperature,

because the illustrated of bee venom from honeybee colonies increase the hive temperature, during the application of the electrical device collector (30min. period and treatment), in hive of honeybee colonies. This point will be need more studies in the further worker for using this meyhod to Varroa control without chemicals.

Table (10) The relationship between bee venom collection and Varroa mites caught using electrical transformer 220 V. to 14 V. at 3 A. on bee race F₂ during 30 min.

| Date of bee venom collection run | No. of Combs in hive | Brood Combs inch ² | No. of Varroa on the plate | Amount of bee venom collection (g/colony) |
|----------------------------------|----------------------|-------------------------------|----------------------------|---|
| 30/8/98 | 8 | 90 | 10 | 0.32 |
| | 9 | 95 | 15 | 0.36 |
| | 9 | 85 | 12 | 0.32 |
| Mean | 8.66 | 90 | 12.33 | 0.33 |
| 10/9/98 | 8 | 80 | 25 | 0.3 |
| | 7 | 90 | 30 | .31 |
| | 8 | 95 | 15 | 0.33 |
| Mean | 8.3 | 88.33 | 23.3 | 0.313 |
| 20/9/98 | 7 | 60 | 20 | 0.27 |
| | 7 | 67 | 25 | 0.25 |
| | 8 | 75 | 15 | 0.26 |
| Mean | 7.3 | 67.3 | 20 | 0.26 |
| \bar{X} | 7.88 | 81.88 | 18.55 | 0.302 |
| SE | 0.73 | 11.72 | 6.413 | 0.0339 |
| $\bar{X} + SE$ | 8.61 | 93.6 | 24.963 | 0.3359 |
| $\bar{X} - SE$ | 7.15 | 70.16 | 12.137 | 0.2681 |

* V. = Volt , A. = Amber

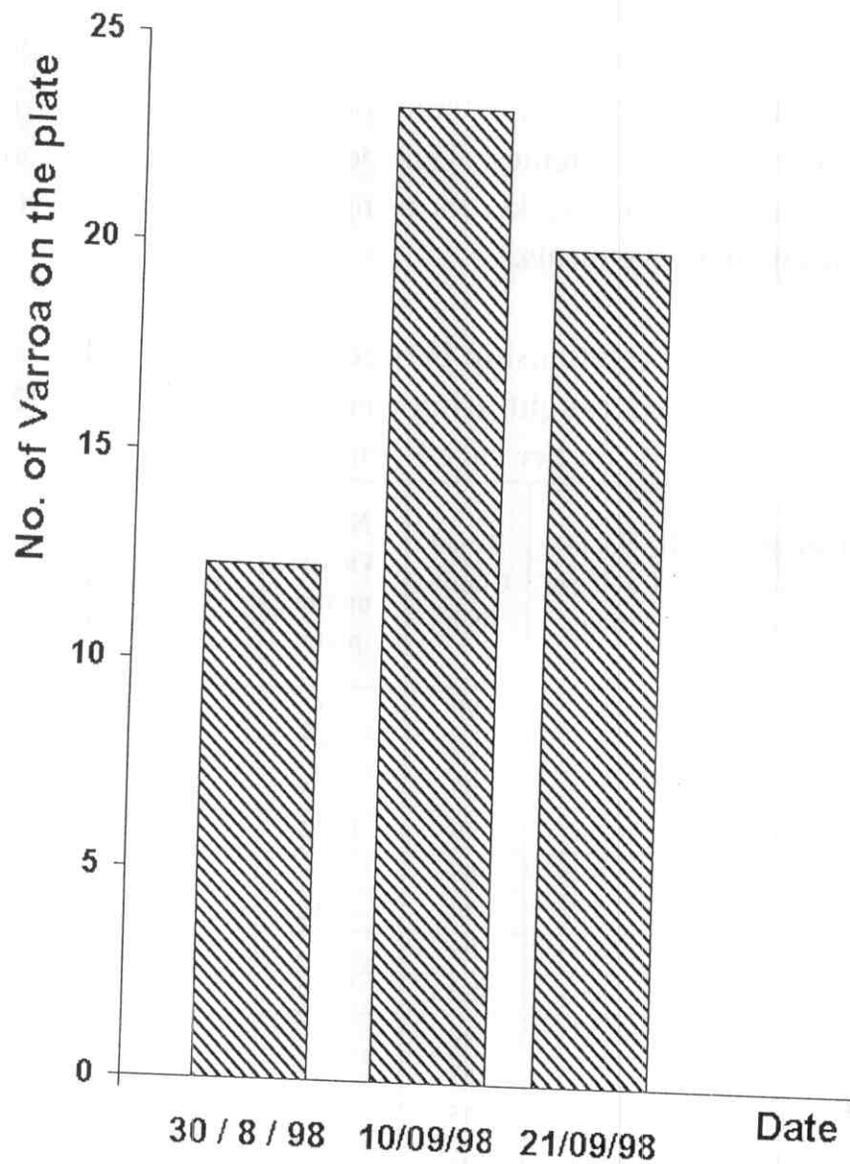


Fig.(10) The relationship between bee venom collection and Varroa mites caught using electrical transformer 220 V. to 14 V. at 3 A. on bee race F₂ during 30 min.

(IV) Effect of using bee venom device on the dead honeybee worker

(11) Amount of bee dead bees/3/day from 3 races of honeybee using electrical transformer 220 V. to 12 V. at 1 A. in bee venom collection during 30 min.

The amount of dead bee of F₂ Carniolan bee race during 27/6/98 to 30/8/98 recorded at 3 day respectively. The amounts of dead bees were 35 , 32 , 30 , 5 , 11 , 12 , 37 , 35 , 235 , 230 , 23 , 10 , 13 , 10 , 10 , 10 , 11 , 8 , 5 , 4 , 5 and 5 with an average of 35.27 killed bee. The amount of dead bee of F₂ Italian bee race during 27/6/98 to 30/8/98 recorded at 3 day respectively. The amount of dead bees were 13 , 10 , 10 , 15 , 5 , 6 , 9 , 29 , 125 , 134 , 140 , 13 , 12 , 10 , 9 , 9 , 7 , 5 , 5 , 2 , 2 and 2 with an average of 26 killed bee. The amount of dead bee of F₂ Manzala bee race during 27/6/98 to 30/8/98 recorded at 3 day respectively. The amount of dead bees were 12 , 10 , 11 , 8 , 5 , 25 , 20 , 100 , 70 , 150 , 100 , 75 , 50 , 20 , 10 , 7 , 7 , 0 , 0 , 0 , 0 and 0 with an average of 30.9 killed bee. It could be observed that the number of dead bees increased during the period from 19/7/98 at 31/7/98 the increase of that results according to springing of cotton by chemicals, insecticides at the area of experiment then fall down to numbers similar to these observed during the first period from 27/6/98 to 19/7/98 and from 31/7/ to 30/8/98 . The results agreed with Simics (1995) who in similar study indicated that the collection period showed that on average of 68 bees dead per colony.

Table (11) Effect of using electrical transformer 220 V. to 12 V. at 1 A. on the amount of bee venom collection during 27/6/98 to 30/8/98 recorded at 3-run intervals in the three bee race F₂ (A) during 30 min

| Date of B.V. collection | No. of Combs in hive | Comb brood | Comb honey and Pollen | No. of dead Bee | | | Mean of B.V. collection (g/colony) |
|-------------------------|----------------------|------------|-----------------------|-----------------|---------|---------|------------------------------------|
| | | | | Carniolan | Italian | Manzala | |
| 27/6/1998 | 10 | 7 | 3 | 35 | 13 | 12 | 0.363 |
| 30/6/1998 | 10 | 7 | 3 | 32 | 10 | 10 | 0.36 |
| 3/7/1998 | 10 | 7 | 3 | 30 | 10 | 11 | 0.36 |
| 7/7/1998 | 10 | 7 | 3 | 5 | 15 | 8 | 0.36 |
| 10/7/1998 | 10 | 6 | 4 | 11 | 5 | 5 | 0.34 |
| 13/7/1998 | 10 | 6 | 4 | 12 | 6 | 25 | 0.33 |
| 16/7/1998 | 10 | 6 | 4 | 37 | 9 | 20 | 0.323 |
| 19/7/1998 | 10 | 6 | 4 | 35* | 140* | 100* | 0.30 |
| 22/7/1998 | 10 | 6 | 4 | 235* | 125* | 100* | 0.30 |
| 25/7/1998 | 10 | 6 | 4 | 230* | 134* | 150* | 0.29 |
| 28/7/1998 | 10 | 6 | 4 | 23* | 29* | 70* | 0.28 |
| 31/7/1998 | 10 | 6 | 4 | 10 | 13 | 75 | 0.28 |
| 2/8/1998 | 10 | 6 | 4 | 13 | 12 | 50 | 0.27 |
| 5/8/1998 | 10 | 6 | 3 | 10 | 10 | 20 | 0.27 |
| 8/8/1998 | 10 | 6 | 3 | 10 | 9 | 10 | 0.24 |
| 11/8/1998 | 10 | 6 | 3 | 10 | 9 | 7 | 0.23 |
| 14/8/1998 | 10 | 6 | 3 | 11 | 7 | 7 | 0.22 |
| 17/8/1998 | 10 | 6 | 3 | 8 | 5 | 0 | 0.21 |
| 20/8/1998 | 10 | 6 | 3 | 5 | 5 | 0 | 0.18 |
| 23/8/1998 | 10 | 8 | 2 | 4 | 2 | 0 | 0.18 |
| 26/8/1998 | 10 | 8 | 2 | 5 | 2 | 0 | 0.16 |
| 30/8/1998 | 10 | 8 | 2 | 5 | 2 | 0 | 0.15 |
| ΣX | 220 | 142 | 72 | 776 | 572 | 680 | 5.996 |
| \bar{x} | 10 | 6.4 | 3.27 | 35.27 | 26 | 30.9 | 0.272 |
| SE | 0 | 0.721 | 0.686 | 62.41 | 42.9 | 40.7 | 0.066 |
| $\bar{x} + SE$ | 10 | 7.121 | 3.956 | 97.68 | 68.9 | 71.6 | 0.338 |
| $\bar{x} - SE$ | 10 | 5.679 | 2.584 | -27.14 | -16.9 | -9.8 | 0.206 |

* The dead are higher according to springing of cotton by chemicals insecticides at the area of experiment in shobra kubala Menofia.

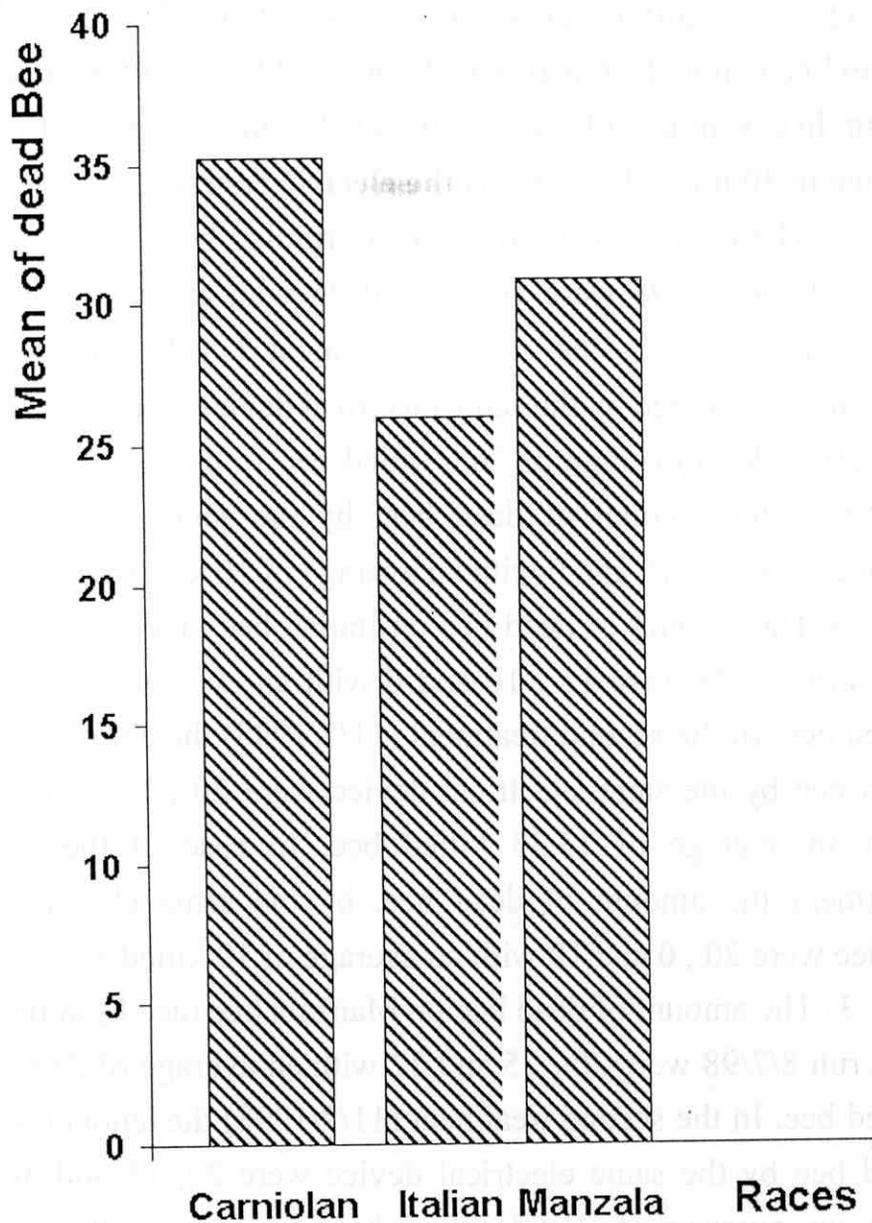


Fig.(11) Effect of using electrical transformer 220 V. to 12 V. at 1 A. on the amount of bee venom collection during 27/6/98 to 30/8/98 recorded at 3-day intervals in the three bee race F₂ (A) during 30 min.

(12) Amount of dead bees / 3day from 3 races of honeybee using electrical transformer 220 V. to 12 V. at 1 A. in bee venom collection during 30 min., leaving the device to 30 min. after cut off the electric current.

1- The amount of dead bee of Carniolan bee race F_2 in the first run 8/7/98 were 10, 15 and 25 with an average of 16.6 killed bee. In the second treatment (11/7/1998) the amount of dead bee by the same electrical device were 35 , 25 and 20 with an average of 26.6 killed bee In case of the 3rd treatment the amount of dead bee. by the same electrical device were 15 , 15 and 0 with an average of 10 killed bee.

2- The amount of dead bee on Italian bee race F_2 in the first run 8/7/98 were 15 , 10 and 0 with an average of 8.33 killed bee. In the second treatment (11/7/1998) the amount of dead bee by the same electrical device were 20 , 15 and 5 with an average of 13.33 killed bee. In case of the 3rd treatment the amount of dead bee. by the same electrical device were 20 , 0 and 10 with an average of 10 killed bee.

3- The amount of dead bee on Manzala bee race F_2 in the first run 8/7/98 were 20 , 25 and 32 with an average of 25.67 killed bee. In the second treatment (11/7/1998) the amount of dead bee by the same electrical device were 20, 15 and 30 with an average of 21.67 killed bee. In case of the 3rd treatment the amount of dead bee. by the same electrical device were 20 , 35 and 15 with an average of 23.33 killed bee.

It could be observed that the number of dead bees increased during the period from 19/7/98 to 31/7/98 that results according to springing of cotton by chemicals, insecticides at the area of experiment then fall down to numbers similar to these observed during the first period from 27/6/98 to 19/7/98 and from 31/7/ to 30/8/98 .

The results agreed with Simics (1995) who in similar study indicated that the collection period showed that on average of 68 bees dead per colony.

In the observation the treatments the left of electrical device in the same hive after application for 30min. without electrical (shut off) is more extraction of bee venom and less numbers in workers.

Table (12) Effect of using electrical transformer 220 V to 14 V. with 3 A. on amount of B.V. collection in the three bee races F₂ , leaving the device to 30 min. after cut off the electric current

| Date of bee venom collection | No. of Combs in hive | Brood Combs | honey and Pollen Combs | No. of dead Bees | | | Amount of bee venom collection (g/colony) |
|------------------------------|----------------------|-------------|------------------------|------------------|---------|---------|---|
| | | | | Carniolan | Italian | Manzala | |
| 8/7/98 | 7 | 4 | 2 | 10 | 15 | 20 | 0.39 |
| | 7 | 4 | 2 | 15 | 10 | 25 | 0.4 |
| | 8 | 5 | 2 | 25 | 0 | 32 | 0.42 |
| Mean | 7.33 | 4.33 | 2 | 16.6 | 8.33 | 25.67 | 0.403 |
| 11/7/98 | 7 | 4 | 2 | 35 | 20 | 20 | 0.4 |
| | 7 | 4 | 2 | 25 | 15 | 15 | 0.4 |
| | 8 | 5 | 2 | 20 | 5 | 30 | 0.41 |
| Mean | 7.33 | 4.33 | 2 | 26.6 | 13.33 | 21.67 | 0.403 |
| 14/7/98 | 7 | 4 | 2 | 15 | 20 | 20 | 0.39 |
| | 7 | 4 | 2 | 15 | 0 | 35 | 0.38 |
| | 7 | 4 | 2 | 0 | 10 | 15 | 0.35 |
| Mean | 7 | 4 | 2 | 10 | 10 | 23.33 | 0.373 |
| \bar{X} | 7.22 | 4.22 | | 17.77 | 10.55 | 23.5 | 0.393 |
| SE | 0.415 | 0.415 | | 9.46 | 7.24 | 6.91 | 0.018 |
| $\bar{X} + SE$ | 7.635 | 4.635 | | 27.23 | 17.79 | 30.41 | 0.411 |
| $\bar{X} - SE$ | 6.805 | 3.805 | | 8.31 | 3.31 | 16.59 | 0.375 |

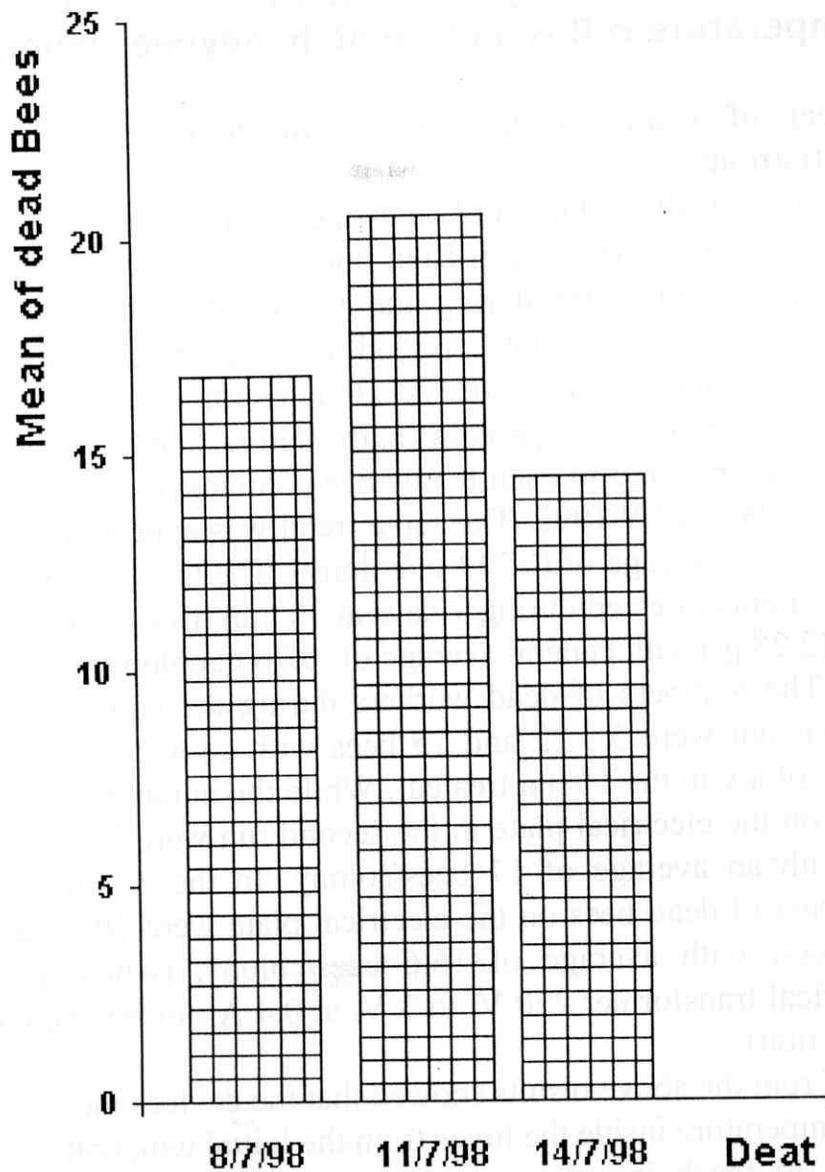


Fig.(12) Effect of using electrical transformer 220 V to 14 V. with 3 A. on amount of B.V. collection in the three bee races F2. , leaving the device to 30 min. after cut off the electric current .

(V) Effect of using bee venom device on the temperature & R.H. in hive of honeybee colonies

Effect of venom collection on the hive temperature fluctuation:

The results in table (13) indicated and illustrated in fig. (13-a , 13-b) of bee venom from honeybee colonies increase the hive temperature during the treatment with electrical device collector (30 min. period & treatment). Also the relative humidity was increased after treatment of colonies. These increase in temperature and relative humidity in the hive was appeared in each honey bee colonies treated during 31/8/1998 to 21/9/1998. The same trend was appeared in the fig.(13) an average of (0.213 g./colony). The total average of bee venom collected during 9 days at 30 min. from 3 colonies was (2.28 g.) with general average of (0.76 g./colony).

The numbers of dead workers during the collection of bee venom were 5 , 22 and 15 bees with an average of 15 bees/colony in the 1st run treated . While the numbers of bees dead on the electrical plate in the second run were 31 , 5 and 15 with an average of 17 bees/colony. In the 3rd run, the numbers of dead bees on the electrical plate were 10 , 5 and 25 bees, with average of 16.6 bees/colony, (when using electrical transformer 220 V. to 3 V. at 0.4 A. for bee venom collection).

From the above results showed that the devices increased the temperature inside the hives from the initial temperature at 32-34 to reach in our experiment about 40°C to in some experiment was found 48°C. These reason may be according to the pheromone secretion is considered to be one of the main stimuli for inducing an aggressive attitude amongst defending worker bees, which stimulating composition the

cluster of bees to make high temperature (Dotimas and Hider, 1987).

Table (13) Effects of temperature in honeybee hive and R.H. on the amount of bee venom collection using electrical transformer 220 V. to 3 V. at 0.4 A. in three bee races F₁.during 30 min.

| Date of bee venom collection | No. of Combs in hive | No. of dead Bees | Amount of bee venom collection (g/colony) | Temp. in hive C ^o | | R.H. in hive | |
|------------------------------|----------------------|------------------|---|------------------------------|--------------|--------------|-------------|
| | | | | Before | After | Before | After |
| 31/8/98 | 10 | 5 | 0.31 | 34 | 37 | 65 | 67 |
| | 10 | 22 | 0.32 | 35.5 | 38.5 | 70 | 82 |
| | 8 | 15 | 0.31 | 35.7 | 38.4 | 55 | 70 |
| Mean | 9.33 | 15 | 0.313 | 35.06 | 37.96 | 63.33 | 73 |
| 10/9/98 | 6 | 31 | 0.2 | 33.9 | 37.1 | 51.9 | 65 |
| | 8 | 5 | .22 | 35.52 | 36.4 | 70.3 | 72.4 |
| | 8 | 15 | 0.3 | 36.3 | 40.3 | 63.7 | 64.4 |
| Mean | 7.33 | 17 | 0.24 | 35.24 | 37.9 | 61.96 | 67.2 |
| 21/9/98 | 6 | 10 | 0.17 | 32.9 | 35.5 | 60 | 75 |
| | 7 | 5 | 0.2 | 35.9 | 36.5 | 76.2 | 79 |
| | 6 | 25 | 0.27 | 36.8 | 37.9 | 76.7 | 79 |
| Mean | 7 | 16.6 | 0.213 | 35.7 | 36.63 | 70.96 | 77.6 |
| \bar{X} | | | 0.255 | 33.18 | 37.5 | 65.4 | 72.6 |
| SE | | | 0.054 | 0.76 | 1.35 | 8.24 | 6.13 |
| $\bar{X} + SE$ | | | 0.309 | 33.94 | 38.85 | 73.64 | 78.73 |
| $\bar{X} - SE$ | | | 0.201 | 32.42 | 36.15 | 57.16 | 66.47 |

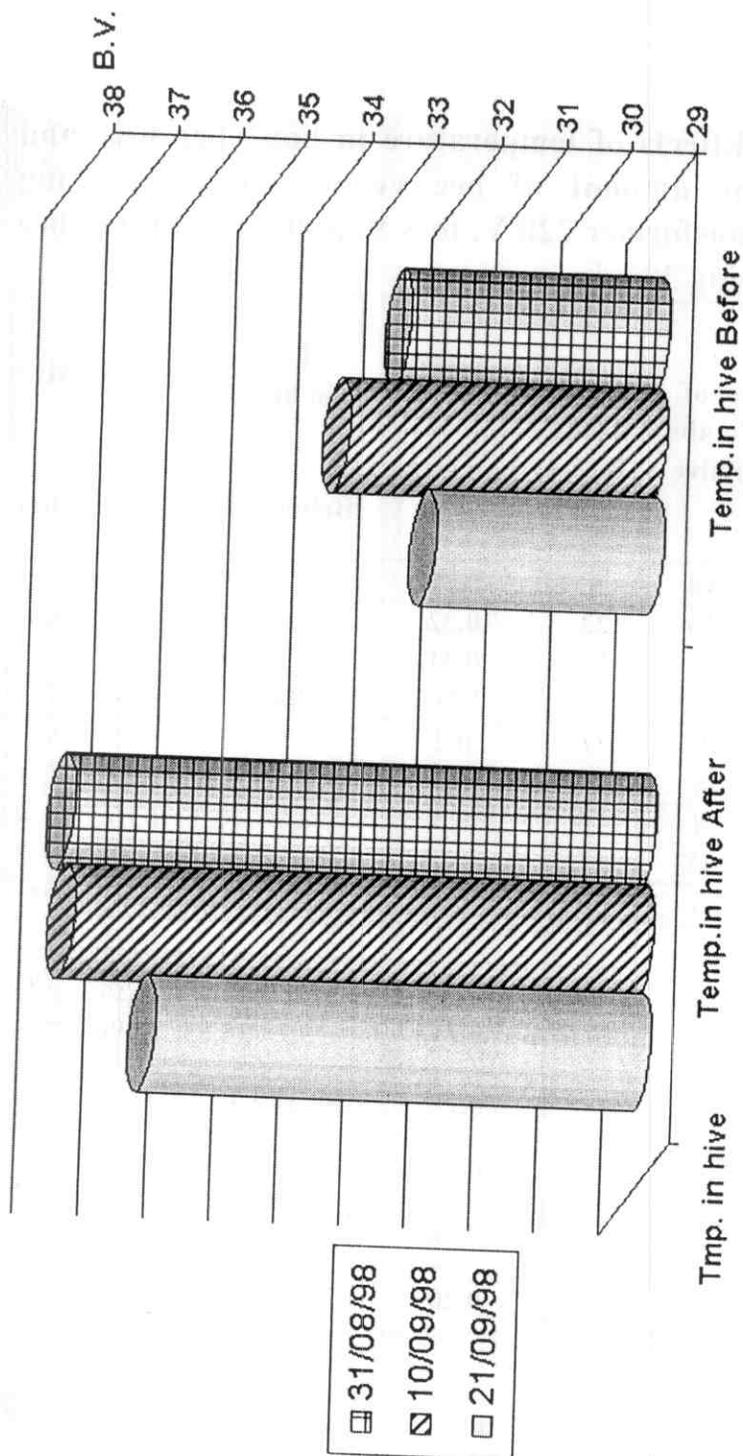


Fig. (13-a) Effects of temperature in honeybee hive and R.H. on the amount of bee venom collection using electrical transformer 220 V. to 3 V. at 0.4 A. in Italian bees race F₁. during 30 min.

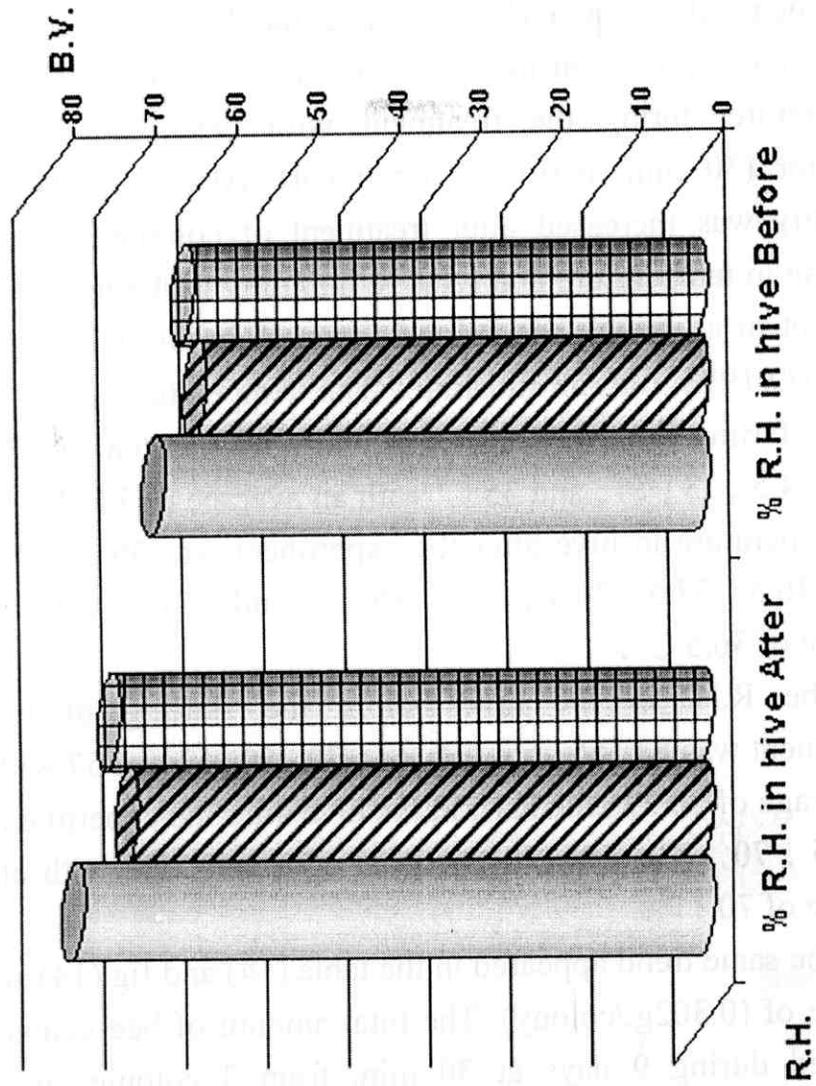


Fig.(13-b)

(14) Effect of venom collection on the hive temperature fluctuation:

The results in table (14) indicated that the process of bee venom collection from honeybee colonies increase the hive temperature during the treatment with electrical device collector (30 min. period & treatment). Also the relative humidity was increased after treatment of colonies. These increase in temperature and relative humidity in the hive was apparent in all honey bee colonies treated during 31/8/1998 and 21/9/1998 run to illustrate. The temperature in hive before starting the experiment was 34.9 , 34.7 , 36.8 , 35.2 , 35.1 , 34.5 , 33 , 34 , and 35 C° with an average of 34.68 C° , the temperature in hive after the experiment was 36 , 35.5 , 38.1 , 36.5 , 37.5 , 36.9 , 36.9 , 36 , 35 and 37 C° , with an average of 36.5 C° .

The R.H. in the hive before the starting of the experiment was 53 , 55 , 55 , 53 , 65 , 70 , 50 , 53 and 57 with an average of 56.77 , the R.H. in the hive after the experiment was 65 , 70 , 73 , 60 , 70 , 75 , 73 , 70 and 75% with an average of 70.11%.

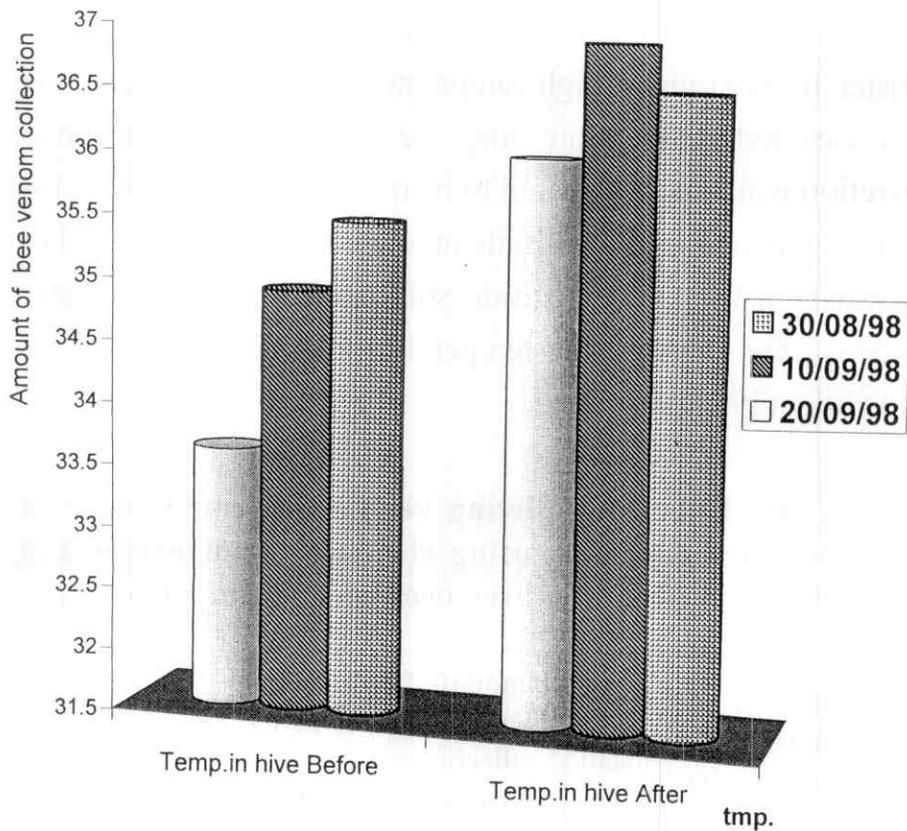
The same trend appeared in the table (14) and fig.(14) an average of (0.302g./colony). The total amount of bee venom collected during 9 days at 30 min. from 3 colonies was (2.72g.) with general average of (0.302g./colony).

The above results showed that using the device increased the temperature inside the hive over the initial temperature of 32-34 C° in our experiment to 38.1 C°., the may be according

to the pheromone secretion is considered to be one of the main stimuli for inducing an aggressive attitude amongst defending worker bees which stimulating composition. the cluster of bees make high temperature. The explanation of this elevated temperature may be due to the pheromone secretion which is considered to be one of the main stimuli for inducing an aggressive attitude amonged defending worker bees, which by its composition stimulates in turn the cluster of bees, thus increase the temperature of the hive, (Dotimas and Hider (1987)).

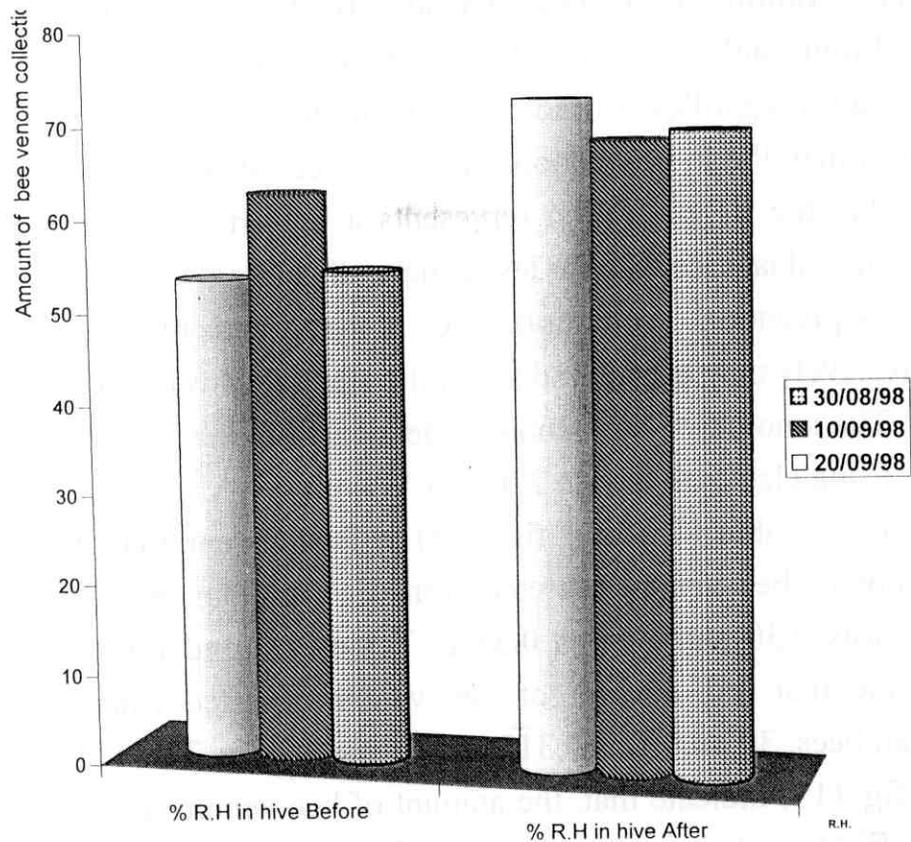
Table (14) Effect of colleting venom on temperature in honeybee hive and R.H. using electrical transformer 220 V. to 14 V. at 3 A. in the three bees race F₂ during 30 min.

| Date of bee venom collection | No. of Combs in hive | No. of dead Bees | Amount of bee venom collection (g/colony) | Temp. in hive C° | | R.H. in hive | |
|------------------------------------|----------------------------|---------------------------|--|---------------------|--------------|--------------|-------------|
| | | | | Before | After | Before | After |
| 30/8/98 | 8 | 10 | 0.32 | 34.9 | 36 | 53 | 65 |
| | 9 | 15 | 0.36 | 34.7 | 35.5 | 55 | 70 |
| | 9 | 25 | 0.32 | 36.8 | 38.1 | 55 | 73 |
| Mean | 8.66 | 16.6 | 0.33 | 35.46 | 36.53 | 54.3 | 69.3 |
| 10/9/98 | 8 | 35 | 0.3 | 35.2 | 36.5 | 53 | 60 |
| | 7 | 25 | 0.31 | 35.1 | 37.5 | 65 | 70 |
| | 8 | 20 | 0.33 | 34.5 | 36.9 | 70 | 75 |
| Mean | 8.3 | 26.6 | 0.313 | 34.9 | 36.9 | 62.6 | 68.3 |
| 20/9/98 | 7 | 15 | 0.27 | 33 | 36 | 50 | 73 |
| | 7 | 15 | 0.25 | 34 | 35 | 53 | 70 |
| | 8 | 0 | 0.26 | 35 | 37 | 57 | 75 |
| Mean | 7.3 | 10 | 0.26 | 33.6 | 36 | 53.3 | 72.6 |



Temp. in hive (Before , After) & B.V.

Fig.(14-a) Effects of temperature in honeybee hive and R.H. on the amount of bee venom collection using electrical transformer 220 V. to 14 V. at 3 A. in the three bees race F_2 during 30 min.



R.H in hive (Before , After) & B.V.

Fig.(14-B)

(15) Amount of bee venom as affected by generation.

From table (15) and fig(15) it is indicated that F_2 generation regardless of race gave the highest amount of bee venom than the F_1 generation. This result could be due to the fact that the F_1 generation represents a uniform population (i.e. individuals are more or less genetically alike), whereas F_2 is a segregating generation, (i.e. some genes related to aggressiveness may appear and affect the amount of venom).

The amount of bee venom collection from the honeybee hive using electrical device 220 to 3 V. with 0.4 A.:

From table (15) and fig. (15) it is apparent that, the amount of bee venom secreted from F_1 Carniolan bees, 30 min. was 0.30 and F_2 was 0.33 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F_1 Italian bees, 30 min. was 0.313 and F_2 was 0.35 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F_1 Manzala bees, 30 min. was 0.35 and F_2 was 0.37 g.

The amount of bee venom collection from the honeybee hive using electrical device 220 to 6 V. with 1 A.:

From table (15) and fig. (15) it is apparent that, the amount of bee venom secreted from F_1 Carniolan bees, 30 min. was 0.32 and F_2 was 0.33 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F_1 Italian bees, 30 min. was 0.34 and F_2 was 0.35 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F_1 Manzala bees, 30 min. was 0.32 and F_2 was 0.35 g..

The amount of bee venom collection from the honeybee hive using electrical device 220 to 12 V. with 1 A.:

From table (15) and fig. (15) it is apparent that, the amount of bee venom secreted from F₁ Carniolan bees, 30 min. was 0.32 and F₂ was 0.35 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F₁ Italian bees, 30 min. was 0.34 and F₂ was 0.36 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F₁ Manzala bees, 30 min. was 0.36 and F₂ was 0.39 g..

The amount of bee venom collection from the honeybee hive using electrical device 220 to 14 V. with 3 A.:

From table (15) and fig. (15) it is apparent that, the amount of bee venom secreted from F₁ Carniolan bees, 30 min. was 0.35 and F₂ was 0.37 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F₁ Italian bees, 30 min. was 0.35 and F₂ was 0.37 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F₁ Manzala bees, 30 min. was 0.40 and F₂ was 0.42 g.

The amount of bee venom collection from the honeybee hive using electrical device wetbattery 12 V. with 16 A.:

From table (15) and fig. (15) it is apparent that, the amount of bee venom secreted from F₁ Carniolan bees, 30 min. was 0.35 and F₂ was 0.38 g. Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F₁ Italian bees, 30 min. was 0.37 and F₂ was 0.39 g.

Table (15) and fig. (15) indicate that, the amount of bee venom secreted from F₁ Manzala bees, 30 min. was 0.42 and F₂ was 0.45 g..

This result is valid with all devices used however, the highest bee venom collected was obtained with the wet battery (0.435). It is apparent from table (15) and Fig (15) that the amount of bee venom differ from race to race. It is also apparent that race Manzala was the highest in the amount of collected bee venom than the other two counterparts.

The effect of device on the amount of venom obtained:

From table (15) it is obvious that the amount of venom was different among the devices used. The highest amount of venom (0.478) was obtained when the wetbattery (12 volt 16 A) was used in comparison with other devices and the least amount (0.42) was obtained when (6 volt and 1 A) device was used. So it is better to use the wetbattery (12 volt 16 A) provided that it well no do any harm to the colony or increase the mortality rate due to its application .

This result agreed with the recommendation by Alexandru (1983) Who in a similar study used a device of 12 volt battery. and also agreed with Anne and Gard (1996).

Table (15) amount of bee venom on affected by bees races and generation (F₁ and F₂)

| Transformer \ Generation | Italian | | Carniolan | | Manzala | | Total | Mean |
|--------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|--------|-------|
| | F ₁ | F ₂ | F ₁ | F ₂ | F ₁ | F ₂ | | |
| 3 V. at 0.4 A. | 0.313 | 0.35 | 0.3 | 0.33 | 0.35 | 0.37 | 2.013 | 0.426 |
| 6 V. at 1 A. | 0.34 | 0.35 | 0.32 | 0.33 | 0.32 | 0.35 | 2.1 | 0.42 |
| 12 V. at 1 A. | 0.34 | 0.36 | 0.32 | 0.35 | 0.36 | 0.39 | 2.17 | 0.439 |
| 14 V. at 3 A. | 0.35 | 0.37 | 0.35 | 0.37 | 0.4 | 0.42 | 2.23 | 0.446 |
| Wetbattery 12 V. with 16 A. | 0.37 | 0.39 | 0.35 | 0.38 | 0.42 | 0.45 | 2.39 | 0.478 |
| Total | 1.713 | 1.82 | 1.64 | 1.76 | 1.9 | 2.01 | 10.963 | 0.438 |
| Mean | 0.342 | 0.364 | 0.328 | 0.352 | 0.38 | 0.402 | 10.903 | 0.436 |

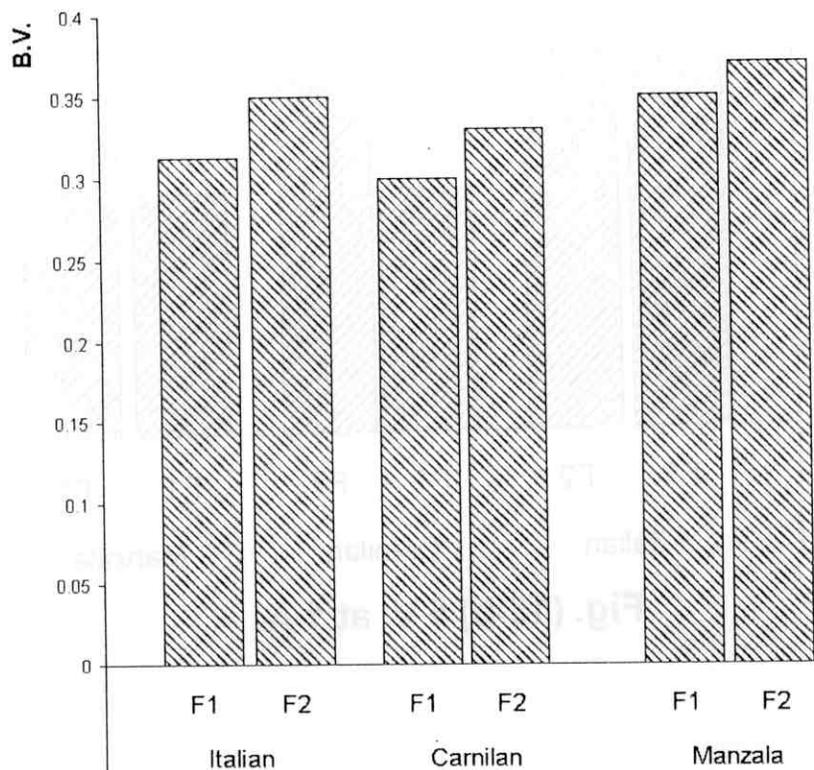


Fig. (15-a) 3 V. at 0.4 A.

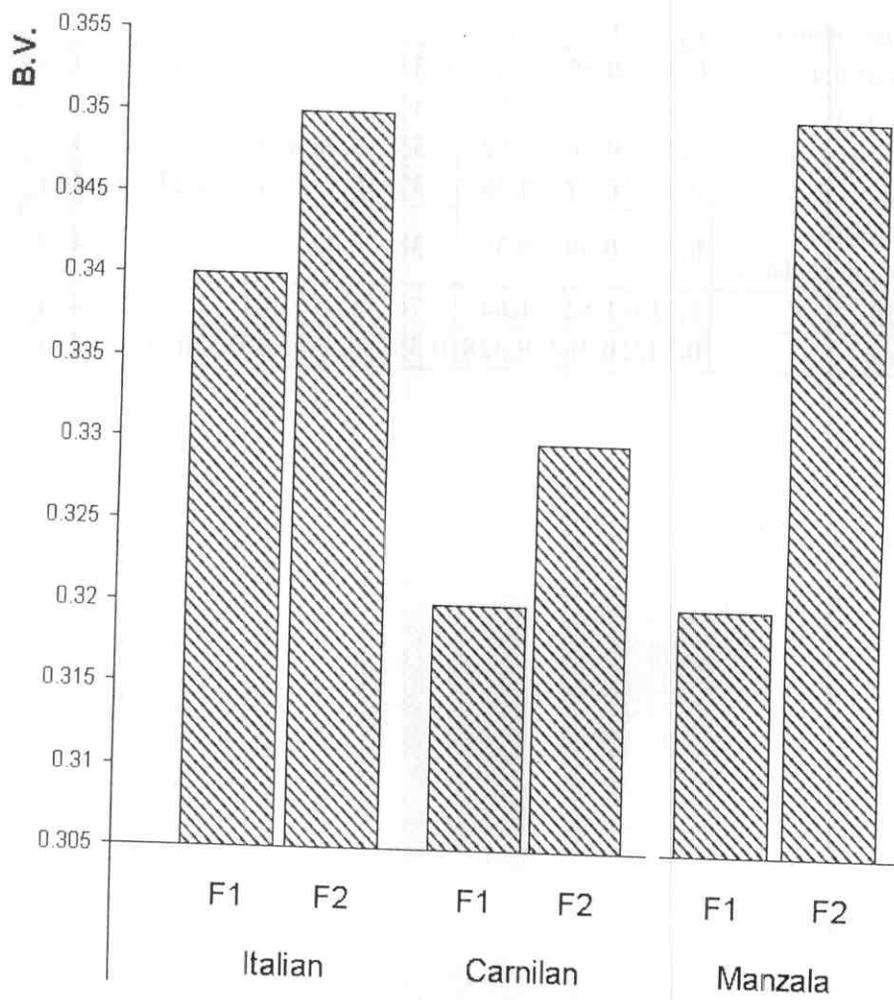


Fig. (15-b) 6 V. at 1 A.

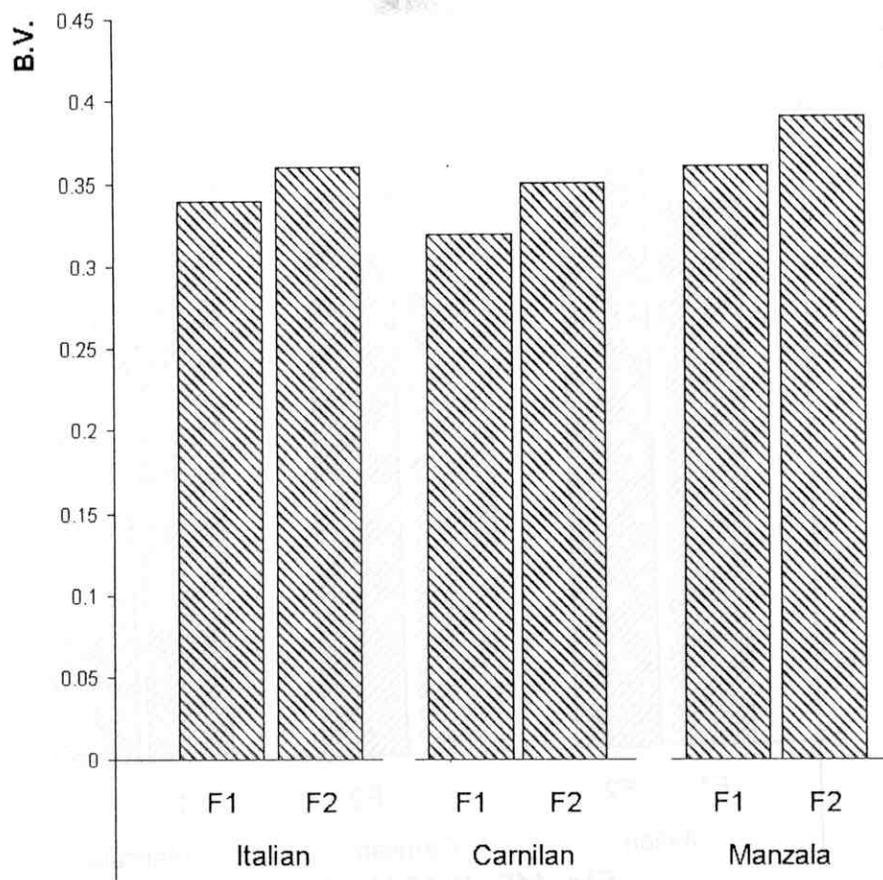


Fig (15-c) 12 V. at 1 A.

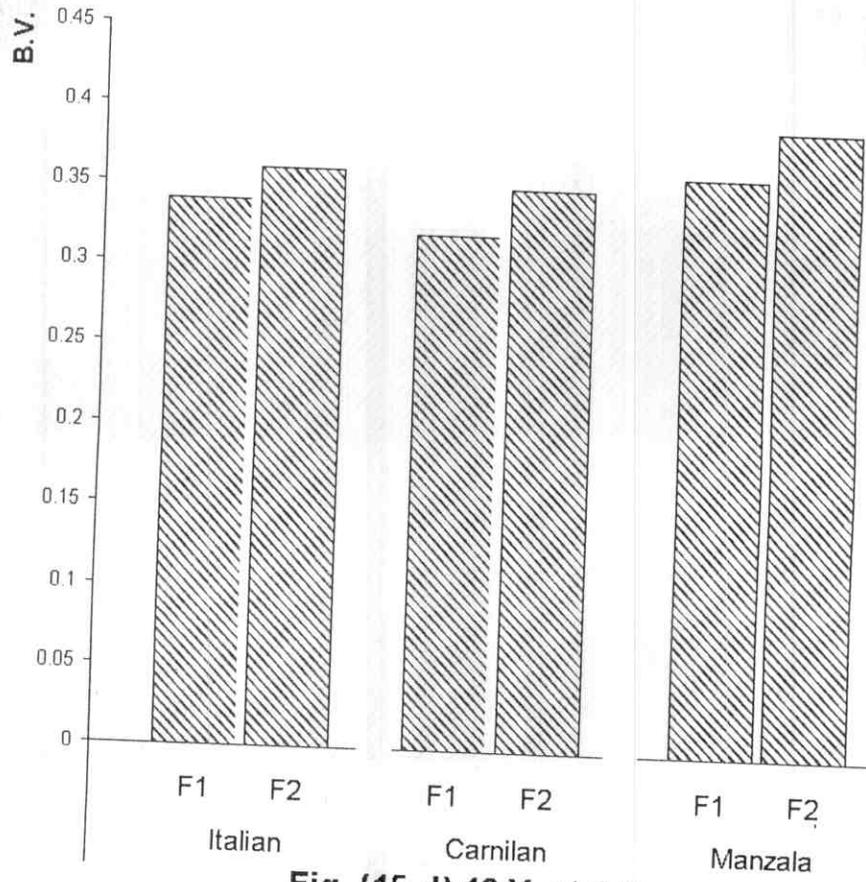


Fig. (15-d) 12 V. at 1 A.

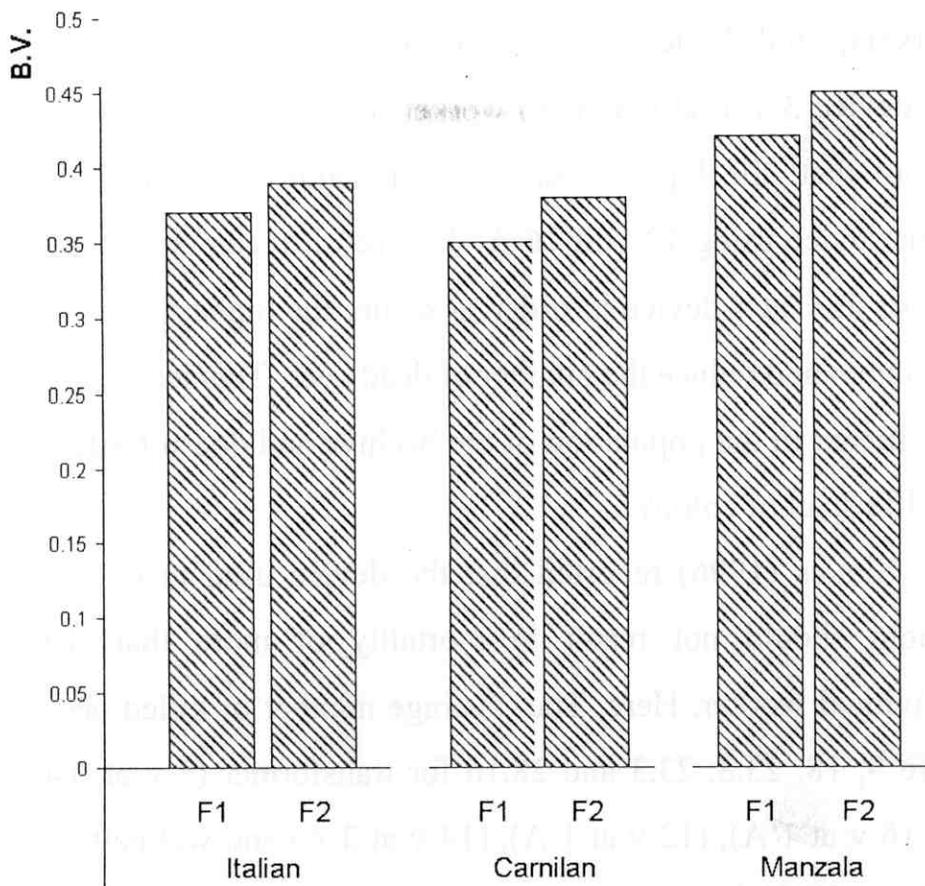


Fig. (15-e) Wetbattery 12 V. with 16 A.

Races and Generation

(16) It is obvious from the mean number of worker bees killed that, the highest mean number of dead bees was occurred with the device 12 volt at 16 A (28.16) individual workers, and the least number of killed bees occurred with the device 3 volt at 0.4 A (9) worker. It has been mentioned before that, the highest venom mean values was obtained from device using 12 volt 16 A. This result recommends the use of this later device in order to secure the highest amount of venom and reduce the number of dead bees. This loss is not significant to the population of the beehive and doesn't affect the life span of colony.

Simics (1996) reported that the device used to collect venom should not result in mortality of more than 10 individual worker. Here, The average number of killed bees were 9, 18, 23.8, 23.3 and 28.16 for transformer (3 v at 0.4 A), (6 v at 1 A), (12 v at 1 A), (14 v at 3 A) and wet battery (12 v at 16 A) respectively. It is apparent from the results that the best device is wet battery (12 v at 16 A), giving the highest amount of venom. And, it should be noticed that the amount of killed bees could be reduced to less than (20) killed bees should the device (prototype) undergo some refinement.

Table (16) Effect of bee venom collection device on different races on F₁ and F₂ on amount dead bees.

| Transformer \ Generation | Italian | | Carniolan | | Manzala | | \bar{X} | SE |
|--------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|------|
| | F ₁ | F ₂ | F ₁ | F ₂ | F ₁ | F ₂ | | |
| 3 V. at 0.4 A. | 15 | 10 | 11 | 7 | 7 | 5 | 9 | 3.28 |
| 6 V. at 1 A. | 21 | 18 | 22 | 20 | 17 | 10 | 18 | 3.95 |
| 12 V. at 1 A. | 22 | 18 | 23 | 25 | 27 | 23 | 23.8 | 3.07 |
| 14 V. at 3 A. | 23 | 19 | 25 | 23 | 27 | 23 | 23.3 | 2.42 |
| Wetbattery 12 V. with 16 A. | 33 | 25 | 30 | 26 | 30 | 25 | 28.16 | 3.02 |
| \bar{X} | 22 | 19 | 22.6 | 20.60 | 21.6 | 17.2 | | |
| SE | 6.13 | 5.17 | 6.34 | 7.22 | 8.52 | 8.10 | | |
| $\bar{X} + SE$ | 28.13 | 24.17 | 28.94 | 27.82 | 30.12 | 25.3 | | |
| $\bar{X} - SE$ | 15.87 | 13.83 | 16.26 | 13.38 | 13.08 | 9.1 | | |

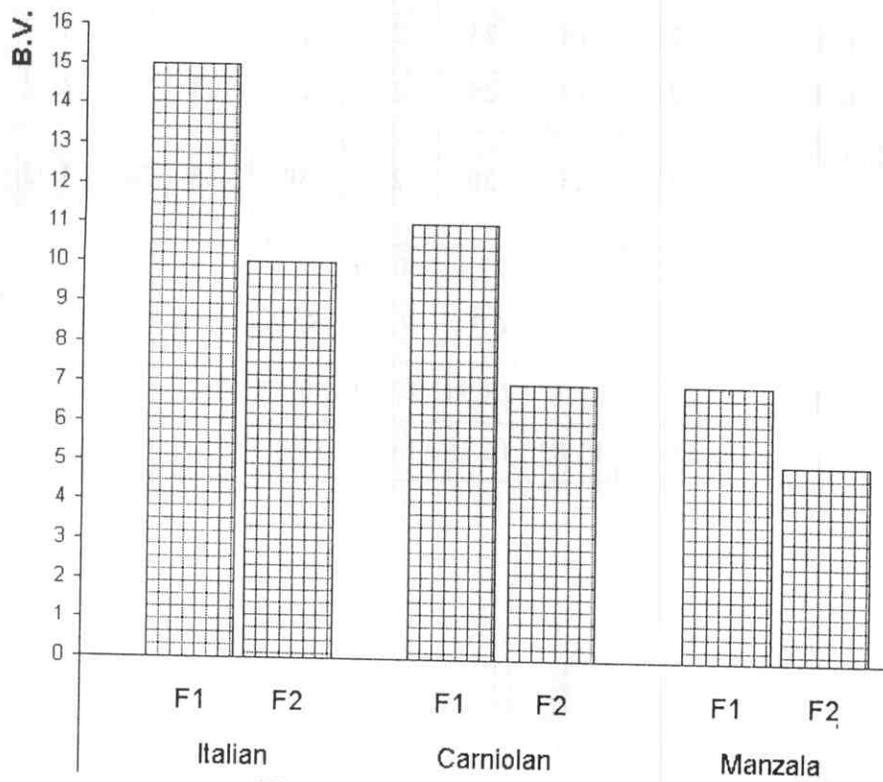


Fig. (16-a) 3 V. at 0.4 A.

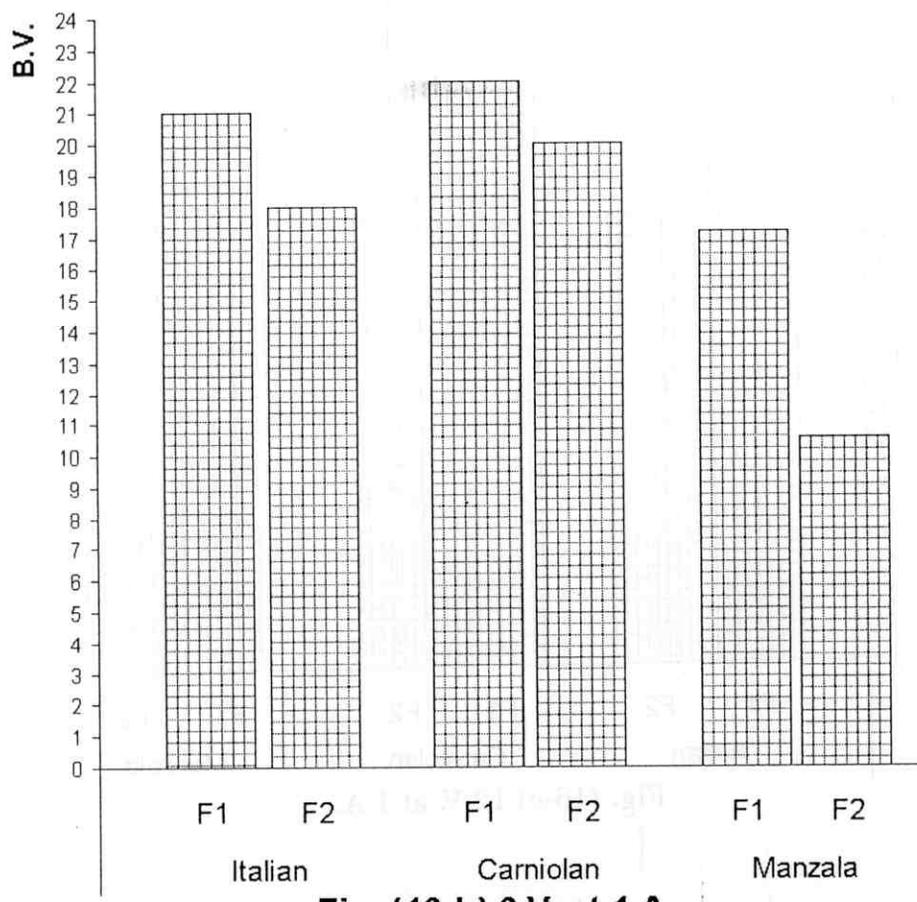


Fig. (16-b) 6 V. at 1 A.

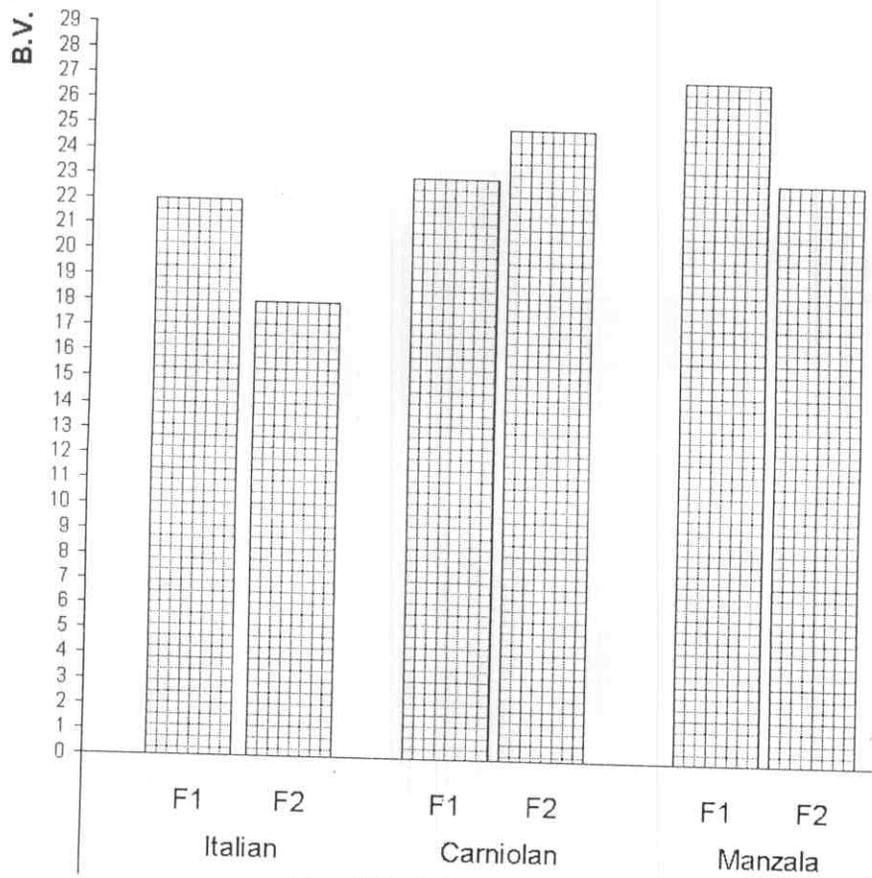


Fig. (16-c) 12 V. at 1 A.

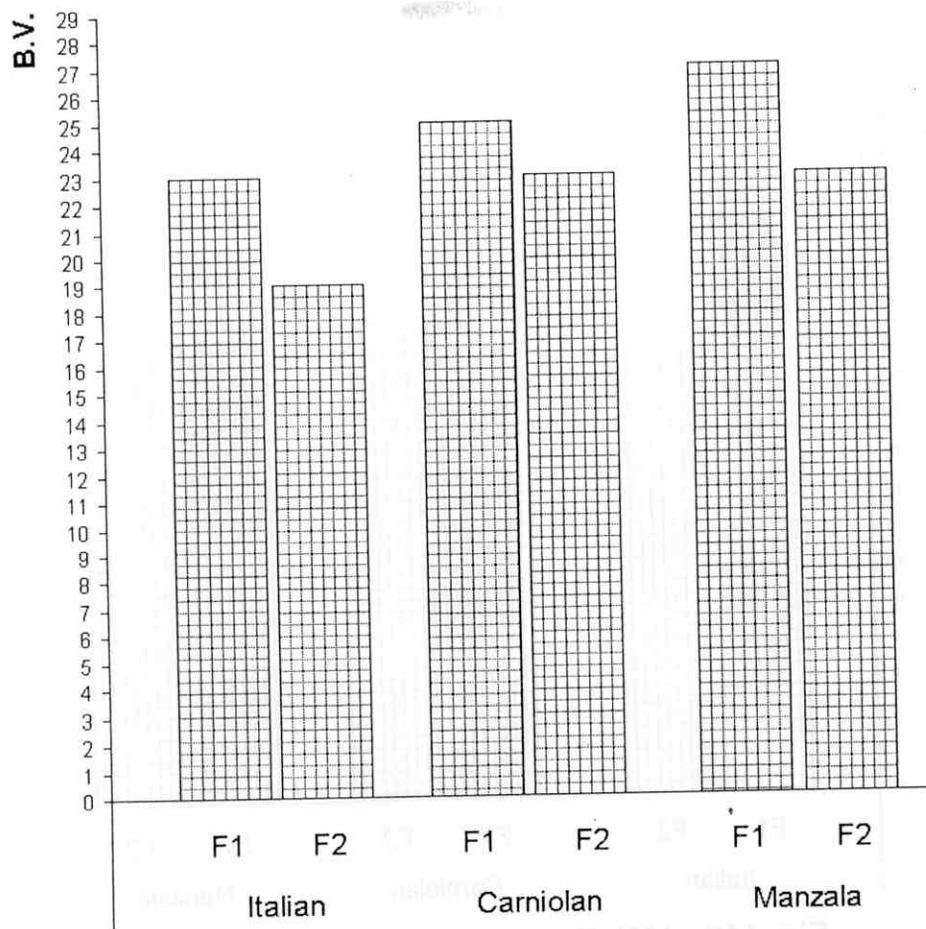


Fig. (16-d) 14 V. at 3 A.

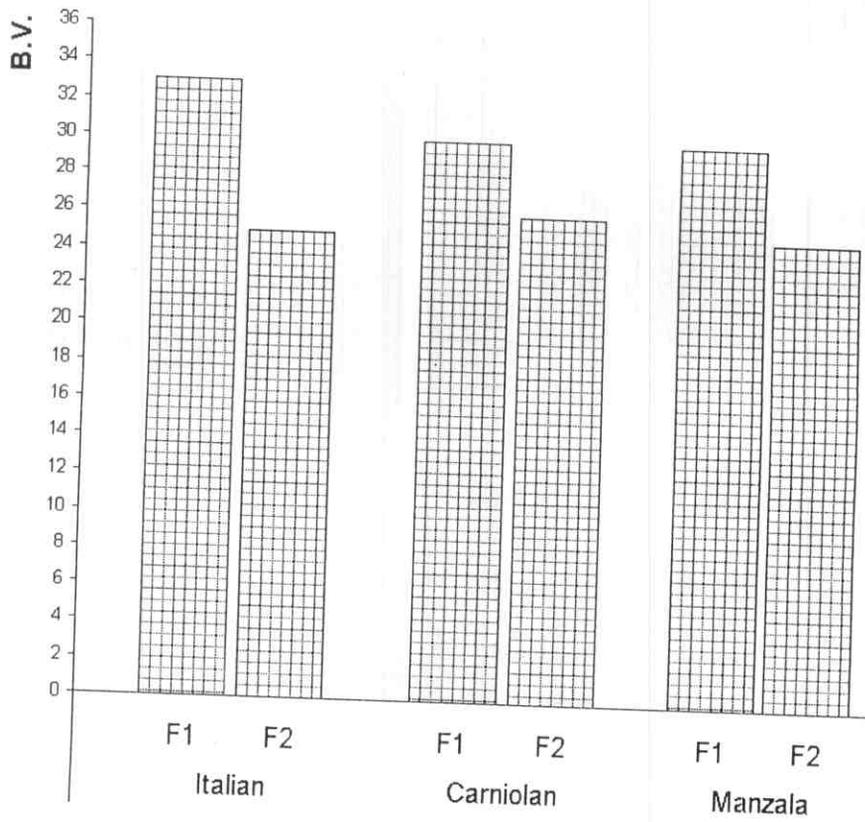


Fig. (16-e) Wetbattery 12 V. with 16 A.