Results and Discussion

I- QUEEN REARING

A - Effect of different seasons on queen rearing during of (1997& 1998).

I. Carniolan race.(Apis mellifera carnica)

The experiment was carried out during (1997&1998) in the three periods of nectarflow, Citrus (March–April), Clover (May–June) and Cotton (July–August) in order to study the relationship between the seasonal of nectar flow variation and the queen reared. The results of 1997 listed in **Table (1)** showed that the average number of grafted queen cups accepted in Citrus season was 36.8 queen cell/ colony, while the average number of queen cells succeeded to reach emergence was 81.7 %. The mean number of emerged queens from the queen cells was 29.8 virgin queens/ colony. The emerged virgin queens were introduced to the swarm boxes for natural matting was. Percent accepted queen was 60.6 %. The results of natural mating indicated that the mean number of mating in Citrus season was 62.9 %. While in case of Clover season the average number of queen cups accepted was 38.5 queen cells / colony, and the average number of queen cells succeeded to reach emergence was 85.6 % / the mean number of emerged queen from the queen cells reared was 30.5 colony. The virgin queens which emerged from these experiments were introduced to the swarm boxes was. Percent accepted queens was 76.3 % the results for natural mating indicated, the mean number of mating virgin queens in Clover season was 68.6 %.

While the average number of queen cups accepted in Cotton season was 41.3 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 91.7 %. The queen number of emerged queen from the queen cells tested was 36.5 virgin queen/colony. The emerged virgin queens were introduced to the swarm boxes was. Percent accepted queens was 79.6 %,

the results for natural mating indicated, the mean number of mating virgin queens in cotton season was 76.9 %.

While the results of 1998 listed in **Table (2)** showed that the average number of grafted queen cups accepted in Citrus seasons was 35.5 queen cells / colony. While the average number of queen cells succeeded to reach emergence was 81.7 %, the mean numbers of emerged queens from the queen cells was 29.8 virgin queens / colony. The emerged virgin queens were introduced to the swarm boxes for natural mating. Percent accepted a queen was 68.2 %. The results for natural mating that indicated the mean number of mating in Citrus season was 73.4 %. While in case of Clover season the average number of queen cups accepted in was 35.2 queen cells /colony, and the average number of queen cells succeeded to reach emergence was 80.8 %, the mean number of emerged queen from the queen cells reared was 29 virgin queen / colony, The emerged virgin queens were introduced to the swarm boxes was gave about 68.7 %, the results for natural mating indicated, the mean number of mating virgin queens in Clover season was 68.9%. While in Cotton season the average number of queen cups accepted was 37.8 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 83.9 % the queen number of emerged queen from the queen cells reared was 34.5 virgin queen / colony. The emerged virgin queens were introduced to the mated swarm boxes. Percent accepted queens was 84.6 %, the results for natural mating the mean number of mating virgin queens in Cotton season was 72.1 %

2 - *Italian race (Apis mellifera ligustica)*

In season of 1997 listed in **Table (3)** showed that average number of grafted queen cups accepted in Citrus seasons was 31.8 queen cells colony, while the average number of queen cells succeeded to reach emergence was 70.5 %, the mean numbers of emerged queen from the queen cells was 27.3 virgin queens / colony. The emerged virgin queens were introduced to the

swarm boxes for natural mating was 75.9 %, the results for natural mating that indicated that percent of natural of mating in Citrus season was 71.9 %

While in case of clover season the average number of queen cups accepted was 33 queen cells /colony, while the average number of queen cells succeeded to reach emergence was 73.3 %, the mean numbers of emerged queen from the queen cells reared was 29 virgin queen / colony, the emerged virgin queens were introduced to the swarm boxes gave about 81.2 %, the results for natural mating indicated, the mean number of mating virgin queens in Clover season was 74.6 %, while of Cotton season the average number of queen cups accepted was 31.5 queen cells / , while the average number of queen cells succeeded to reach emergence was 70%, the queen numbers of emerged queens from the queen calls reared was 25.8 virgin queen / colony, the emerged virgin queen were introduced to the mated swarm boxes was. Percent accepted queens was 75.5%, the results for natural mating the mean number of mating virgin queens in Cotton season was 68.1%.

While in season of 1998 the results of listed in **Table (4)** showed that the average number of grafted queen cups accepted in Citrus seasons was 31 queen calls / colony, while the average number of queen cells succeeded to reach emergence was 68.9 %, the mean numbers of emerged queen from the queens cells was 25.5 virgin queens /colony, the emerged virgin queens were introduced to the swarm boxes. Percent accepted queens was 79.6 % the results for natural mating that indicated the mean number of mating virgin queens in Citrus season was 59.9%

While in case of Clover season the average number of queen cups accepted was 32 queen cells \ colony, while the average number of queen cells succeeded to reach emergence was 71.1% the mean numbers of emerged queen from the queen cells reared was 27.5 virgin queen \ colony, the emerged virgin queens were introduced to the swarm boxes was gave about 74.4% the results for natural mating for indicated that the mean number of mating virgin queens

in Clover season was 79.5 %.

While the average number of queen cups accepted in Cotton season was 29 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 64.4%, the queen numbers of emerged queen / from the queen cells reared was 25.5 virgin queen / colony, the emerged virgin queens were introduced to the mated swarm boxes. Percent accepted queens was 78.3%, the results for natural mating the mean number of mating virgin queens in Cotton season was 70.9 %.

The statistical analysis of the data recorded in **Table (1-4)** showed that there was a highly significant difference between the number of accepted cells and emerged queen during the different seasons; also the deference's between two races of honeybee colonies was not significant.

From the above results it could be mentioned that the Carniolan race more active with using Cotton seasons in queen rearing than that the Italian race

The results are in agreement with experiment by **Jung (1981) and El-Sarrag (1993)**

Table (2) Effect of different seasons on queen rearing during of (1998) Carniolan race

Season	Rep.	No-patched accepted	Accepted %	Emerged queen	Introduced %	Mating %	temp. ^0C
Citrus	1	41	91.1	37	52.8	74.5	25.05
	2	27	60	21	63.7	66.0	
	3	39	86.7	32	73.2	84.3	
	4	35	88.7	29	82.9	68.7	
	T.	142		119			
	Avg.	35.5	81.7	29.8	68.2	73.4	
Clover	1	27	62.2	25	76.3	82.4	
	2	37	81.1	29	65.7	69.7	
	3	41	91.1	32	62.8	70.0	32.4
	4	35	88.9	30	69.7	53.4	
	T.	141		116			
	Avg.	35.2	80.8	29	68.7	68.9	
Cotton	1	40	88.9	36	75	85.3	34.7
	2	32	71.1	28	82.1	73.4	
	3	37	81.1	34	91.2	67.0	
	4	42	93.3	40	90	62.7	
	T.	151		138			
	Avg.	37.8	83.9	34.5	84.6	72.1	

L.S.D		Treat.	E .Q.
	5%	44.98	16.71
	1%	73.96	37.92

Table (3)Effect of different seasons on queen rearing during of(1997)

Italian race

Seasons	Rep.	No-patched accepted	Accepted %	Emerged queen	Introduced %	Mating %	temp. ^0C
Citrus	1	27	60.0	25	84.0	72.0	22.05
	2	33	73.3	29	75.8	69.2	
	3	29	64.4	24	79.2	63.4	
	4	28	84.4	31	64.5	82.4	
	T.	127		109			
	Avg.	31.8	70.5	27.3	75.9	71.9	
Clover	1	36	80	31	86.9	63.9	33.2
	2	40	88.9	38	82.7	81.1	
	3	32	71.1	29	73.8	74.7	
	4	27	53.3	18	81.9	78.6	
	T.	132		116			
	Avg.	33	73.3	29	81.2	74.6	
Cotton	1	26	57.8	21	76.7	61.7	33.35
	2	33	73.3	22	61.8	62.0	
	3	29	64.4	26	85.0	81.7	
	4	38	84.4	34	78.6	67.1	
	T.	126		103			
	Avg.	31.5	70.0	25.8	75.5	68.1	

		Treat.	E .Q.
L.S.D	5%	19.96	11.87
	1%	36.48	24.65

Table (4)Effect of different seasons on queen rearing during of(1998) Italian race

Seasons	Rep.	No-patched accepted	Accepted %	Emerged queen	Introduced %	Mating %	temp. °C
Citrus	1	36	80	27	77.3	81.7	25.05
	2	31	75.4	28	85.6	53.7	
	3	22	48.9	16	81.7	42.4	
	4	35	77.8	31	73.8	61.7	
	T.	124		102			
	Avg.	31	68.9	25.5	79.6	59.9	
Clover	1	34	75.6	29	60.8	72.3	
	2	27	60	21	71.7	85.3	
	3	39	86.7	35	84.0	81.0	
	4	28	62.2	25	80.9	79.2	32.4
	T.	128		110			
	Avg.	32	71.1	27.5	74.4	79.5	
Cotton	1	17	37.8	15	81.6	84.4	
	2	24	53.3	21	78.7	61.7	
	3	40	88.9	35	80.3	72.3	
	4	35	77.8	25	72.7	65.0	
	T.	116		102			34.7
	Avg.	29	64.4	25.5	78.3	70.9	

		Treat.	E .Q.
L.S.D	5%	25.96	17.57
	1%	44.83	32.98

B - Effect of different types of hives on queen rearing of honeybee races during (1997), (1998)

I- Carniolan race (Apis mellifera carnica)

The experiment was carried out during (1997 & 1998) in the three types

of hives swarm box, queenless hives normal and double queen hives, in order to study the relationship between hives variation in type of hives and the queen reared in these types. In 1997season the results listed in **Table (5)** showed that the average number of grafted queen cups accepted in swarm box was 39.5 queen cells/ colony, while the average number of queen cells succeeded to reach emergence was 87.8% , the mean number of emerged queen from the queen cells was 29.8 virgin queens / colony, the emerged virgin queen were introduced to the swarm boxes for natural mating was 73.5% the results for natural mating that indicated , the mean number of mating virgin queens in swarm box was 80.1 %.

While in case of queenless hives normal the average number of queen cups accepted was 37 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 82.2 % the mean numbers of emerged queen from the queen cells reared was 32.3 virgin queen/colony, the emerged virgin queens were introduced to the swarm boxes was gave about 70 %, natural mating indicated. The mean number of mating virgin queens in queenless hives normal was 74.7 %

While the average number of queen cells accepted in double queen hives was 30.5 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 67.8 % , the queen numbers of emerge queens from the queen cells reared was 28 virgin queen / colony, the emerged virgin queens were introduced to the mated swarm boxes was gave about 82.8 %, natural mating, the mean number of mating virgin queens in double queen hives was 75.9 %.

While the results of 1998 listed in **Table (6)** showed that the average number of grafted queen cups accepted in swarm box was 37.5 queen cells / colony, while the averaged number of queen cells succeeded to reach emergence was 83.4 % , the mean numbers of emerged queen from the queen cells was 29.5 virgin queen /colony, the emerged virgin queens were introduced

to the swarm boxes for natural mating was gave about 78.1 % natural mating that indicated the mean number of mating virgin was 68.9 %.

While in case of queenless hives normal the average number of queen cups accepted was 36.5 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 81.1%, the mean numbers of emerged queen from the queen cells reared was 30 virgin queens / colony, the emerged virgin queens were introduced to the swarm boxes gave about 75.2 %, natural mating that indicated the mean number of mating virgin in queenless hives normal 75.5 %.

While the average number of queen cups accepted in double queen hives was 29 queen cells / colony , while the average number of queen cells succeed to reach emergence was 64.5 %, the queen numbers of emerged queen from the queen cells reared was 23.5 virgin queen / colony , the emerged virgin queen were introduced to the mated swarm boxes was gave about 76.8 %, the results for natural mating the mean number of mating virgin queens in double queen hives was 71.8 %.

2- Italian race.

In results of 1997 listed in **Table (7)** showed that the average numbers of grafted queen cups accepted in swarm box was 36.8 queen cells / colony, while the average number of queen cells succeed to reach emergence was 81.7 %, the mean numbers of emerged queens from the queen cells was 32.5 virgin queens/colony, the emerged virgin queens were introduced to the swarm boxes for natural mating was gave about 74.8 %, natural mating that indicated the mean number of mating virgin queens in swarm box was 76.1 %.

While in case of queenless hives normal the average number of queen cups accepted was 29.8 queen cells / colony, while the average number of queen cells succeed to reach emergence was 70.6% , the mean numbers of emerged queen from the queen cells reared was 24.8 virgin queen / colony , the emerged virgin queens were introduced to the swarm boxes was gave about

70.8, natural mating for indicated in mated swarm boxes, the mean number of mating virgin queens in queenless hives normal was 75.4 %.While the average number of queen cups accepted in double queen hives was 27.3 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 60.6 %, the queen numbers of emerged queens from the queen cells reared was 21.3 virgin queen / colony , the emerged virgin queens were introduced to the mated swarm boxes was gave about 80.9 % , the results for natural mating, the mean number of mating virgin queens in double queen hives was 84.2%.

While in results (1998) listed in **Table (8)** showed that the average number of grafted queen cells accepted in swarm box was 34.8 queen cells / colony, while the average number of queen cells succeeded to reach was 77.3 %, the mean numbers of emerged queen from the queen cells was 32 virgin queens/colony, the emerged virgin queens were introduced to the swarm boxes was gave about 80.2 % , the results for natural mating that indicated the mean number of mating virgin queens in swarm box was 76.5 %, while in case the average number of queen cups accepted in queenless hives normal was 29.8 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 66.1 %, the mean numbers of emerged queen from the queen cells reared was 21.8 virgin queens / colony, the emerged virgin queens were introduced to the swarm boxes was gave about 79.7 %, the results for natural mating indicated in mated swarm boxes, the mean number of mating virgin queens in queenless hives normal was 79.8%.

While the average number of queen cups accepted in double queen hives was 29 queen cells / colony , while the average number of queen cells succeeded to reach emergence was 64.4 %, the queen numbers of emerge queen from the queen cells reared was 26 virgin queen / colony, the emerged virgin queens were introduced to the mated swarm boxes was gave about 83.1%, the results for natural mating the mean number of mating virgin queens in double queen hives was 83.6 %.

The statistical analysis of the data recorded in **Table (5-8)** showed that there was a highly significant difference between the number of accepted cells and emerged queen during the different hives, also the deference's between two races of honeybee colonies was not significant.

From the above results it could be mentioned that the Carniolan race more active in using Swarm box in queen rearing than the Italian race

The results are in agreement with results by **Robert, and Mackensen (1953)**

Table (5) Effect of type of hives on queen rearing by Carniolan race during (1997)

Type of hive	Rep.	No-patched accepted	Accepted %	Emerged queen	Introduced %	Mating %
Swarm box with queen less	1	39	86.7	31	80.6	84
	2	41	91.1	35	74.2	88
	3	35	77.8	22	68.1	66.7
	4	43	95.6	31	70.9	81.8
	T.	158		119		
	Avg.	39.5	87.8	29.8	73.5	80.1
Queenless hives normal	1	36	80	34	85.3	75.9
	2	35	86.7	31	80.6	84.0
	3	40	88.9	34	4401	53.3
	4	37	81.1	30	70	85.7
	T.	148		129		
	Avg.	37	82.2	32.3	70	74.7
Double queen hives	1	25	55.6	22	81.8	61.1
	2	32	71.1	30	86.7	92.3
	3	34	75.6	32	87.5	78.6
	4	31	68.9	28	75	71.4
	T.	122		112		
	Avg.	30.5	67.8	28	82.8	75.9

		Treat.	E .Q.
L.S.D	5%	10.33	16.20
	1%	56.09	30.98

Table (6) Effect of type of hives on queen rearing by Carniolan race during (1997)

Type of hive	Rep.	No-patched accepted	Accepted %	Emerged queens	Introduced %	Mating %
swarm box with queen-less	1	34	75.6	27	83.6	76.8
	2	41	91.1	31	67.5	81.9
	3	36	80	28	81.9	55.7
	4	39	86.7	32	79.3	61.4
	T.	150		118		
	Avg.	37.5	83.4	29.5	78.1	68.9
queen-less hives normal	1	38	62.2	32	61.4	70.0
	2	32	81.1	25	85.3	83.5
	3	34	91.1	31	72.5	86.7
	4	42	88.9	32	81.4	61.9
	T.	146		120		
	Avg.	36.5	81.1	30	75.2	75.5
Double queen hives	1	33	73.3	28	77.8	52.4
	2	21	46.7	19	82.6	78.7
	3	28	62.2	21	80.4	80.5
	4	34	75.6	26	66.4	75.4
	T.	116		94		
	Avg.	29	64.5	23.5	76.8	71.8

		Treat.	E .Q.
L.S.D	5%	18.05	31.68
	1%	61.37	92.11

C - Effect of different types of artificial feeding on queen rearing by honeybee races in (1997 & 1998)

1- Carniolan race

The experiment was carried out during (1997 & 1998) using the three types of artificial feeding ,1:1sugar syrup, Brewer yeast and sugar syrup and control without feeding, in order to study the relationship between the types of artificial feeding and the queen reared these types. The results of 1997 are listed in **Table (9)** showed that the average of grafted queen cups accepted in sugar syrup was 31.5 queen cells / colony, while the average of queen cells succeeded to reach emergence was 70 %, the mean numbers of emerged queen from the queen cells was 25.8 virgin queens / colony, the emerged virgin queens were introduced to the swarm boxes for natural mating was 76.5 %. The results for natural mating that indicated, the mean number of mating virgin queens in sugar syrup was 64.5 %.

While in case of brewer yeast and sugar syrup the average number of queen cups accepted was 40.5 queen cells / colony , while the average number of queen cells succeeded to reach emergence was 90%, the mean numbers of emerged queen from the queen cells reared was 38 virgin queen / colony, the emerged virgin queens were introduced to the swarm boxes was gave about 75.6 %, the results for natural mating introduced in mated swarm boxes, the mean number of mating virgin queens in Brewer yeast and sugar syrup was 78.5 %.

While in control the average number of queen cups accepted was 28 number of queen cells succeeded to reach emergence was 62.2 %, the queen numbers of emerged queen, from the queen cells reared was 22.5 virgin queens / colony, the emerged virgin queens were introduced to the mated swarm boxes was 56.4 %, the results for natural mating, the mean number of mating virgin queens in control was 60.9 %

While in (1998) listed in **Table (10)** showed that the average numbers of grafted queen cups accepted in sugar syrup 1 : 1 was 35.3 queen cells / colony out of 45 grafted queen cups, while the average number of queen cells succeeded to reach emergence was 78.3 %, the mean numbers of emerged queen from the queen cells was 27.3 virgin queens / colony, the emerged virgin queens which from these experiments were introduced to the swarm boxes for natural mating was 80.9 % , the results for natural mating that indicated the mean number of mating virgin queens in sugar syrup was 80.6 %.

While in case of brewer yeast and sugar syrup the average number of queen cups accepted was 40 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 88.9 %, the mean numbers of emerged queen from the queen cells reared was 36.5 virgin queens / colony, the emerged virgin queens were introduced to the swarm boxes was gave about 81.1 %, the results for natural mating indicated in mated swarm boxes, the mean number of mating virgin queens in brewer yeast and sugar syrup was 86.7 %

While the average number of queen cups accepted in control was 26.8 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 59.5 %, the queen numbers of emerged queen from the queen cells reared was 20.3 virgin queen / colony, the emerged virgin queens were introduced to the mated swarm boxes was 65.1%, the results for natural mating the mean number of mating virgin queens in control was 63.6%.

2 –Italian race

In results of (1997) listed in **Table (11)** showed that the average numbers of grafted queen cups accepted in sugar syrup 1:1 was 33.5 queen cells / colony, while the average number of queen cells succeeded to reach emergence was 74.5% , the mean numbers of emerged queen from the queen cells was 28.3 virgin queens/ colony, the emerged virgin queens were

introduced to the swarm boxes for natural mating was introduced to the swarm boxes for natural mating was 73.2%, the result for natural mating indicated that the mean number of mating virgin queens in sugar syrup was 76.6%.

While in case of Brewer yeast and sugar syrup the average number of queen was 38.3 queen cells / colony while the average number of queen cells succeed to reach emergence was 85%, the mean numbers of emerged queen from the queen cells reared was 34.3 virgin queen / colony, the emerged virgin queens were introduced to the swarm boxes was gave about 82.2% the results for natural mating in Brewer yeast and sugar syrup was 79.1%, while the average number of queen cups accepted in control (without feeding) was 25.3 queen cells/ colony, while the average number of queen cells succeeded to reach emergence was 56.1%, the queen cells reared was 19.3 virgin queen/ colony, the emerged virgin queens were introduced to the mated swarm boxes was 67.9%, the results for natural mating virgin queens in control (without feeding) was 74.1%.

Results in (1998) listed in **Table (12)** showed that the average numbers of grafted queen cups accepted in sugar syrup was 35.5 queen cells/ colony, while the average numbers of queen cells succeeded to reach emergence was 78.9% , the mean numbers of emerged queen from the queen cells was 32.9 virgin queen/ colony, the emerged virgin queens were introduced to the swarm boxes for natural mating was 75.4%, the results for natural mating that indicated number of mating virgin queens in sugar syrup 1:1 was 73.1%.

While in case of Brewer yeast and sugar syrup the average number of queen cups accepted was 36.5 queen cells/ colony , while the emerged was 81.1%, the mean numbers of emerged queen from the queen cells reared was 31.8 virgin queen / colony, the emerged virgin queens were introduced to the swarm boxes was gave about 79.9%, the results for natural mating indicated in

Table (9) Effect of different types of artificial feeding on queen rearing by honeybee races during (1997) Carnelian bees.

reatment	Rep	No. patched accepted	Accepted %	Emerged queens	Introduced %	Mating %
ugar yrup :1	1	31	68.9	24	81.2	72.6
	2	32	71.1	28	83.4	53.4
	3	38	84.4	31	78.5	60.0
	4	25	55.6	20	62.7	71.8
	Total	126		103		
	Avg.	31.5	70	25.8	76.5	64.5
Brewer eas + Sugar Syrup	1	41	91.1	39	71.8	77.7
	2	42	93.3	40	89.2	81.2
	3	38	84.4	37	67.8	85.4
	4	41	91.1	36	73.4	69.7
	Total	162		152		
	Avg.	40.5	90	38.4	75.6	78.5
Control Without Feeding	1	30	66.7	22	61.5	51.5
	2	32	71.1	26	53.6	62.8
	3	28	62.2	25	67.8	71.2
	4	22	48.9	17	42.6	58.3
	Total	112		90		
	Avg.	28	62.2	22.5	56.4	60.9

		Treat.	E. Q.
L.S.D	5%	4.30	12.76
	1%	9.93	63.65

Table (10) Effect of different types of artificial feeding on queen rearing b honeybee races during (1998) Carniolan bees

Treatment	Rep	No. patched accepted	Accepted %	Emerged queens	Introduced %	Matin %
Sugar Syrup 1:1	1	34	75.6	24	78.4	81.7
	2	38	84.4	30	82.5	86.5
	3	40	88.9	34	77.8	73.6
	4	29	64.4	21	84.7	80.5
	Total	141		109		
	Avg.	35.3	78.3	27.3	80.9	80.6
Brewer yeas + Sugar Syrup	1	39	86.7	35	88.7	91.0
	2	42	93.3	39	83.4	89.7
	3	38	84.4	34	79.8	82.5
	4	41	91.1	38	72.5	83.4
	Total	160		146		
	Avg.	40	88.9	36.5	81.1	86.7
Control Without Feeding	1	29	64.4	18	63.7	65.7
	2	23	51.1	17	54.4	51.5
	3	34	75.6	28	72.4	77.8
	4	21	46.7	14	69.8	59.4
	Total	107		81		
	Avg.	26.8	59.5	20.3	65.1	63.6

		Treat	E. Q.
L.S.D	5%	7.85	24.60
	1%	11.78	45.67

Table (11) Effect of different types of artificial feeding on queen rearing by honeybee races during (1997) Italian bees

Treatment	Rep	No. patched accepted	Accepted %	Emerged queens	Introduced %	Mating %
Sugar Syrup 1:1	1	26	57.8	21	73.6	81.6
	2	42	93.3	38	81.0	75.7
	3	35	77.8	29	75.6	82.3
	4	31	68.9	25	62.7	66.9
	Total	134		113		
	Avg.	33.5	74.5	28.3	73.2	76.6
Brewer yeas + Sugar Syrup	1	43	95.6	39	88.2	90.2
	2	34	75.6	30	84	75.6
	3	37	82.2	33	81.5	83.0
	4	39	86.7	35	75.0	67.7
	Total	153		137		
	Avg.	38.3	85	34.3	82.2	79.1
Control Without Feeding	1	18	40	12	52.6	68.7
	2	30	66.7	27	78.3	80.6
	3	24	53.3	18	61.5	77.5
	4	29	64.4	20	79.3	69.5
	Total	101		77		
	Avg.	25.3	56.1	19.3	67.9	74.1

		Treat	E. Q.
L.S.D	5%	48.59	24.03
	1%	118.8	45.9

Table (12) Effect of different types of artificial feeding on queen rearing by honeybee races during (1998) Italian bees

Treatment	Rep	No. patched accepted	Accepted %	Emerged queens	Introduced %	Mating %
Sugar Syrup 1:1	1	33	73.3	27	73.5	63.8
	2	31	68.9	29	81.6	80.7
	3	38	84.4	35	75.6	71.4
	4	40	88.9	38	70.8	76.5
	Total	142		129		
	Avg.	35.5	78.9	32.3	75.4	73.1
Brewer yeast + Sugar Syrup	1	36	80	35	85.7	88.5
	2	32	71.1	28	80.6	78.3
	3	44	97.8	39	74.0	81.9
	4	34	75.6	25	79.5	79.6
	Total	146		127		
	Avg.	36.5	81.1	31.8	79.9	82.1
Control Without Feeding	1	27	60	20	53.6	77.8
	2	31	68.9	22	67.8	60.0
	3	28	62.2	21	78.3	54.8
	4	20	44.4	13	61.5	75.7
	Total	106		76		
	Avg.	26.5	58.9	19	65.3	67.1

		Treat	E. Q.
L.S.D	5%	25.09	32.37
	1%	105.16	89.13

II. BROOD REARING ACTIVITY:

1 - Effect of honeybee races activities on sealed brood reared during 1997 year.

The brood rearing activity of honeybee races and their hybrids was measured at every 13- days intervals during 1997. The results were listed in **Table (13)** and illustrated in Figure (5). The Italian hybrid gave the highest mean of sealed brood /year with an average of 267.6 in2/colony. The Italian race came second with an average of 254.5 in2/colony. As for the F_1 Carniolan hybrid with an average of 244.8 in2/colony. The lowest average of sealed brood was found in the colonies of Carniolan race, it was 234.93 in2/colony .

2 - Average monthly sealed brood reared by different honeybee races during 1997.

Monthly brood rearing activities are recorded in **Table (14)** and illustrated in **fig. (6)**.Results indicated that the highest average of sealed brood were found during May for the Italian race (398.6 in2/colony) during August, Carniolan race (377.6 in2/colony), during May for Italian hybrid (382.6 in/ colony)and during August for Carniolan hybrid (396.0 in2 / colony).While the lowest average of sealed brood reared was observed during January for the four colonies from each Italian race, Carniolan race , F1 Italian hybrid and F1 Carniolan hybrid (66.4, 64.6, 96.0 and 68.6 in2/ colony), respectively. Regarding the interaction between honeybee races and the amount of sealed brood during different months of 1997 season .The same result proved that ,the highest amount of sealed brood reared was found during in April and August the (average was 384.7 in2 /colony) ,while the lowest amounts of sealed brood reared was found during January was(73.9 in2 /colony).

Statistical analysis indicated that, The differences between the races and hybrids were highly significant (P>0.01). L.S.D.0.05 and 0.01 were 105.03 and 192.79 in2, respectively in table (1)during 1997.

From the above data mentioned data it is clear that , the F1 Italian hybrid came the first in amount of reared brood in this region.

These result are in agreement with the finding of (**Bronek and Rosenthal (1984).**

3 – Average of sealed brood per one measurement in different nectarflow seasons during 1997.

Results of sealed brood reared in colonies during different nectarflow of (1997)were tabulated in **Table (15)** and illustrated **fig. (7),** It is clear that the highest amounts of brood reared were those occurring during Cotton season, F_1 Carniolan hybrid came the first (average was 352.9 in2 / colony), followed by F_1 Italian hybrid (average was 333.75 in2 / colony), followed by Italian race (average was 329.25 in2 / colony), and Carniolan race (average was 324.1 in2 / colony). In case Clover nectarflow Italian race came the first (average was 355.9 in2 / colony), followed by F_1 Italian hybrid (average was 354.5 in2 / colony), then followed by Carniolan race (average was326.4 in2/ colony), while the lowest amounts of sealed brood was found in the F_1 Carniolan hybrid (average was 314.5 in2/ colony). The Lowest amount of sealed brood found during Citrus nectarflow F_1 Italian hybrid (average was 194.5 in2 / colony), followed by Italian race (average was 187.4 in2 / colony), F_1 Carniolan hybrid (average was 164.5 in2 / colony), and the lowest amounts of sealed brood was found with Carniolan race (average was 154.8 in2 /colony) .

The differences between races and their hybrids in brood rearing activity during Cotton nectarflow were highly significant (P<0-1%) It could be mentioned that, the F_1 Italian hybrid came the first in this region .

These results are in agreement with the results of **Woyke (1984),Soszka (1996).**

4 - Effect of Temperature on brood rearing activity:

The relationship between brood rearing activities and daily temperature are listed in **Table (16)** and illustrated in Fig (8). The effect of daily temperature on brood rearing was positive during the months of May (32.1°c) the mean amounts of brood reared were 398.6 and 382.6 in^2/colony in Italian race and F_1 Italian colonies, respectively. In August (32.2°c) the mean amounts of brood reared were 377.6 and 396.0 in^2/colony in Carniolan race and F_1 Carniolan colonies, respectively. While the lowest amounts of brood reared in January (19.1°c) the mean amounts of brood reared were 66.4, 64.6, 96.0 and 68.6 in ^{2}/colony from Italian race , Carniolan race, F1 Italian hybrid and F1Carniolan hybrid, respectively.

The brood rearing activities increased gradually from March to November depending on the increase of daily temperature (March, 20.1°c , April, 24°c May 32.1°c , June 34.3°c ,July, 33.8°c , August 32.2°c , September 31.1°c , October 29.0°c and November 25°c, respectively. On the contrary , the brood rearing decreased gradually From December to February due to the Low temperature of day (December 20.3, January 19.1, February 19.4°c respectively.

Statistical analysis indicated that the relation between brood rearing and air temperature were highly significant at (P>0.1%) . From the above data it could be recorded that, the effect of temperature on brood rearing activities was positive that is the colonies reared more brood at warm climate and when the nectarflow is available as well, (March, April, May, June, July, August, September, October and November), than those at reared in lowest temperatures during the wintering months, (December, January and February).

Table (13) Effect of honey bee races activities on sealed brood reared during 1997

Date	Sealed brood areas in In^2 *																					
	Italian race colonies						Carniolan race colonies						F.1 Italian hybrid						F.1 carniolan hybrid					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
05/02/97	108	98	103	114	423	105.75	101	73	115	97	386	96.5	142	118	108	117	485	121.25	121	126	116	114	477	119.25
18/02/97	135	124	131	129	519	129.75	95	101	92	113	401	100.25	148	122	134	137	541	135.25	124	138	134	141	537	134.25
03/03/97	148	156	148	155	607	151.75	134	117	123	121	495	123.75	162	147	152	164	625	156.25	136	150	167	158	611	152.75
16/03/97	177	182	169	167	695	173.75	153	180	168	175	676	169	191	199	186	194	770	192.5	173	170	175	165	683	170.75
29/03/97	240	231	227	215	913	228.25	216	210	194	193	813	203.25	223	230	226	242	921	230.25	207	183	201	194	785	196.25
11/04/97	345	326	329	340	1340	335	291	298	268	263	1120	280	335	347	313	330	1325	331.25	226	211	217	201	855	213.75
24/04/97	351	334	338	356	1379	344.75	305	297	282	295	1179	294.75	353	356	341	342	1392	348	247	260	255	240	1002	250.5
07/05/97	386	375	372	390	1523	385.75	355	307	325	336	1323	330.75	381	371	377	351	1480	370	311	275	321	318	1225	306.25
20/05/97	400	423	421	422	1666	416.5	338	339	356	333	1366	341.5	407	387	387	400	1581	395.25	346	372	365	348	1431	357.75
02/06/97	371	415	406	400	1592	398	384	368	377	362	1491	372.75	391	380	407	406	1584	396	336	341	358	266	1301	325.25
15/02/97	314	316	342	307	1279	319.75	330	337	327	315	1309	327.25	316	312	343	320	1291	322.75	311	281	327	298	1217	304.25
28/06/97	302	252	263	286	1103	275.75	311	287	306	297	1201	300.25	286	271	308	315	1180	295	360	338	341	332	1371	342.75
11/07/97	316	295	290	310	1211	302.75	247	220	236	251	954	238.5	263	237	265	258	1023	255.75	349	356	352	350	1407	351.75
24/07/97	380	397	373	421	1571	392.75	345	362	387	356	1452	363	312	326	343	304	1285	321.25	386	393	367	315	1461	365.25
06/08/97	386	413	351	432	1582	395.5	350	365	410	376	1501	375.25	348	425	365	337	1475	368.75	415	396	398	358	1567	391.75
19/08/97	397	374	382	452	1505	376.75	364	413	398	345	1520	380	356	412	425	367	1560	390	451	354	423	373	1601	400.25

* Numbers of Colonies Replicates

Fig. (5) Effect of honeybee races activities on sealed brood reared during 1997

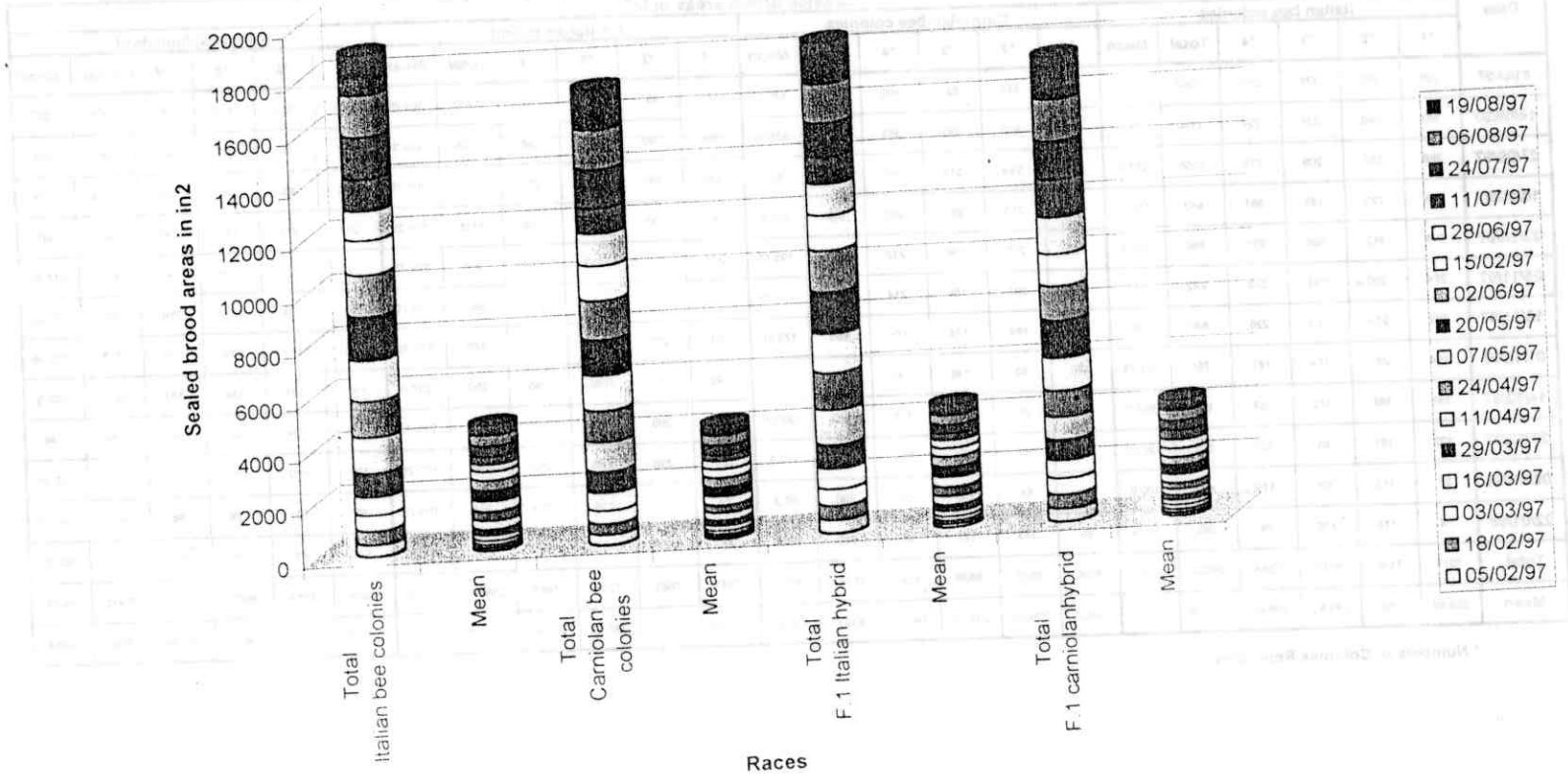


Table (13) contenue :

Date	Sealed brood areas in In^2																					
	Italian bee colonies						Carniolan bee colonies						F.1 Italian hybrid						F.1 carniolanhybrid					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
01/09/97	326	287	335	256	1204	301	286	293	327	405	1311	327.75	371	401	295	366	1433	358.25	283	374	410	361	1428	357
14/09/97	293	289	324	234	1140	285	220	315	387	363	1285	321.75	356	392	314	296	1358	339.5	287	345	367	305	1304	326
27/09/97	266	253	209	278	1006	251.5	213	234	216	287	1050	262.5	332	287	315	277	1211	302.75	282	303	241	286	1112	278
10/10/97	258	223	195	267	943	235.75	223	213	257	265	958	239.5	281	245	273	306	1105	276.25	266	278	191	253	988	247
23/10/97	241	212	200	237	890	222.5	182	215	158	232	787	196.75	261	183	213	274	931	232.75	212	237	174	248	871	217.75
05/11/97	274	200	183	235	892	223	166	207	156	214	743	178.25	247	207	200	229	883	220.75	221	175	213	256	865	216.25
18/11/97	237	214	163	226	840	210	182	164	176	171	693	173.25	227	237	184	217	865	216.25	203	153	129	228	713	178.25
01/12/97	194	201	174	182	751	187.75	156	83	146	143	528	132	243	251	188	268	950	237.5	187	121	139	163	610	152.5
14/12/97	143	168	112	187	610	152.5	161	67	152	115	495	123.75	189	269	150	243	851	212.75	150	194	93	147	584	146
27/12/97	122	157	85	157	521	130.25	131	84	151	104	470	117.5	121	230	148	210	709	177.25	133	152	170	128	583	145.75
09/01/98	87	112	93	110	402	100.5	86	51	138	115	390	97.5	74	213	110	224	621	155.25	69	101	128	88	413	103.25
22/01/98	74	113	109	99	395	98.75	65	113	111	96	385	96.25	77	128	135	191	531	132.75	103	87	135	85	410	102.25
Total	7271	7140	6827	7264	28502	7125.5	6390	6343	6839	6740	26312	6578	7393	7683	7205	7685	29966	7491.5	6924	6864	6907	6717	27412	6853
Mean	259.68	255	243.82	259.43	1017.9	254.5	228.21	226.53	244.25	240.71	939.7	234.93	264.03	274.39	257.32	274.46	1070.2	267.6	247.28	245.14	246.68	239.89	979	244.8

* Numbers of Colonies Replicates

Fig (5) Contenue

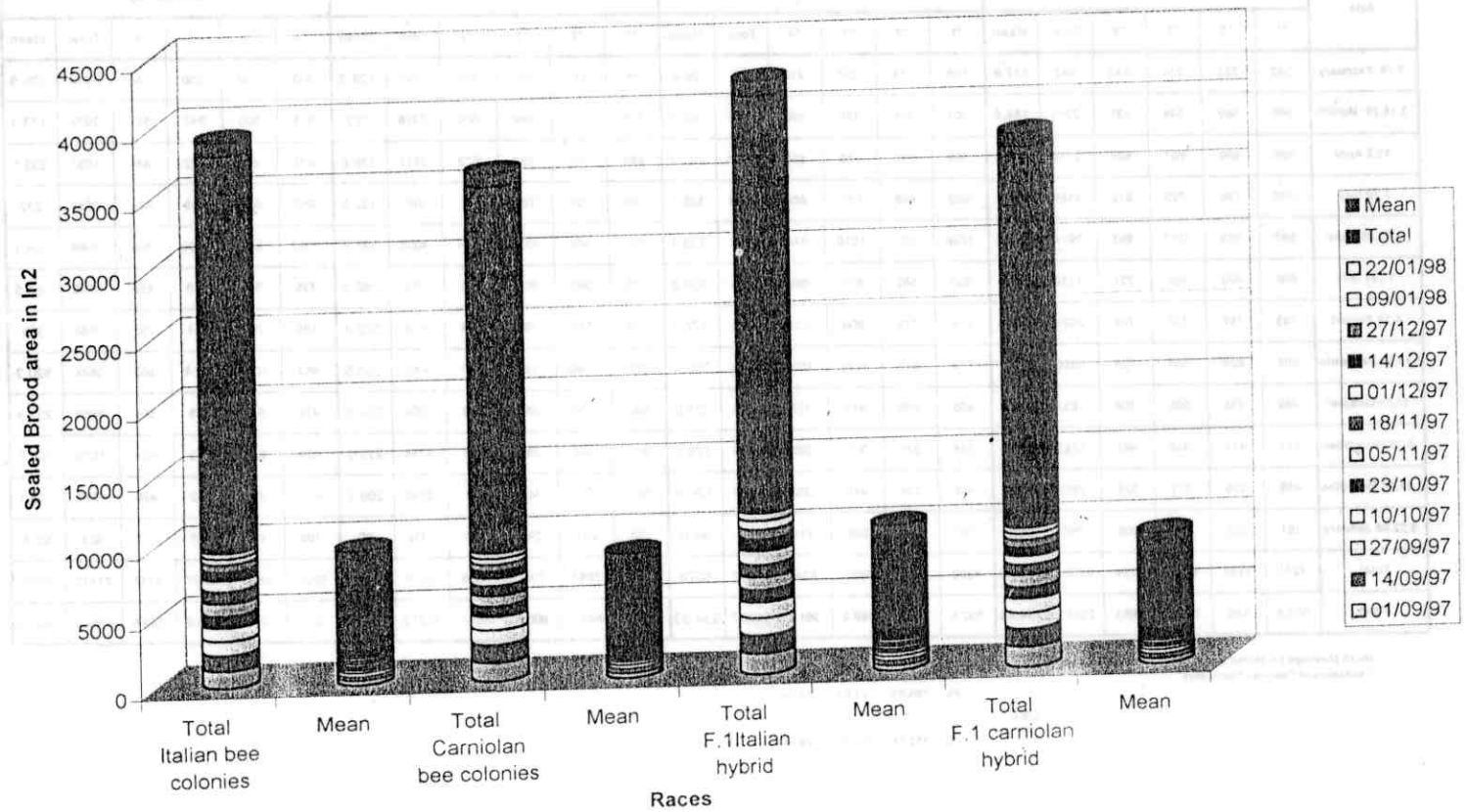


Table (14) Average monthly sealed brood reared by different honey bee races during 1997season

date	Sealed brood areas in In2																							
	Italian race colonies						Carniolan race colonies						F1 Italian Hybrid						F.1 Carniolan hybrid					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
5,18 February	243	222	234	243	942	**117.8**	196	174	207	210	787	98.4	290	240	242	254	1026	128.3	245	264	250	255	1014	126.8
3,16,29 March	565	569	544	537	2215	**184.9**	503	507	485	489	1984	165.3	576	576	564	600	2316	193	516	503	543	517	2079	173.3
11,2 April	696	660	667	696	2719	**339.9**	596	595	550	558	2299	287.4	688	703	654	672	2717	339.6	473	471	472	441	1857	232.1
7,20 May	786	798	793	812	3189	**398.6**	693	646	681	669	2689	336.1	788	758	764	751	3061	382.6	659	647	686	864	2856	232
2,15,28 June	987	983	1011	993	3974	**331.2**	1025	992	1010	974	4001	333.4	993	963	1058	1041	4055	337.9	1007	960	1026	896	3889	324.1
11,24 July	696	692	663	731	2782	**347.8**	592	582	623	609	2406	300.8	575	563	608	562	2308	288.5	735	749	719	665	2868	358.5
6,19 August	783	787	733	784	3087	**385.9**	714	778	808	721	3021	377.6	704	837	790	704	3035	379.4	866	750	821	731	3168	396
1,14,27 Septembe	885	829	886	768	3350	**279.2**	719	842	1030	1055	3646	303.8	1059	1080	924	939	4002	333.5	852	1022	1018	952	3844	320.3
10,23 October	499	435	395	504	1833	**229.1**	405	458	415	797	1775	221.9	542	428	486	580	2036	254.5	478	515	365	501	1859	232.4
5,18 November	511	414	346	461	1732	**216.5**	348	371	323	365	1436	179.5	474	444	384	446	1748	218.5	424	328	342	484	1578	197.3
1,14,27 Decembe	459	526	371	526	1882	**156.8**	448	234	449	362	1493	124.4	553	750	486	721	2510	209.2	470	467	402	438	1777	148.1
9,22,98 January	161	225	202	209	797	**66.4**	151	164	249	211	775	64.6	151	341	245	415	1152	96	199	188	263	173	823	68.6
Total	7271	7140	6827	7264	28502	**7125.5**	6390	6343	6839	6740	26312	6578	7393	7683	7205	7685	29966	7491.5	6924	6864	6907	6717	27412	6853
Mean	605.9	595	568.9	6053	2375.2	**254.48**	532.5	528.5	669.9	561.7	2192.7	234.93	616.1	640.2	600.4	640.4	2497.2	267.55	577	572	575.6	559.8	2284.3	244.75

Mean (Average) = sealed brood areas in In2 at days intere als.
* Numbers of Colonies Replicates

		Treat	Date	txd
L.S.D.	5%	105.03	41.94	19.34
	1%	192.79	59.19	25.96

Fig (6) Average monthly sealed brood reared by different honey bee races during 1997season

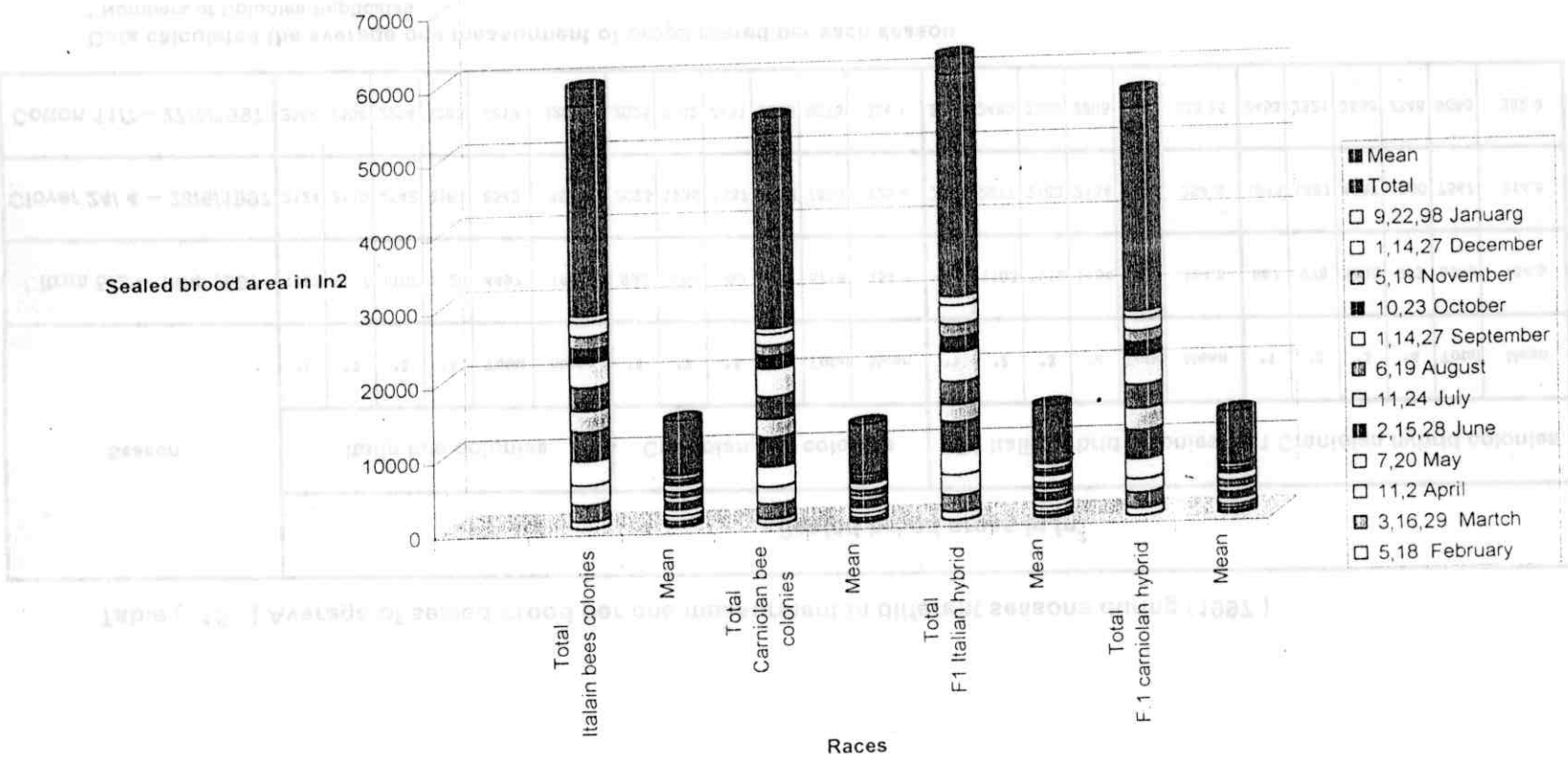


Table (15) Average of sealed brood per one measurment in different seasons during (1997)

Season	Sealed brood areas in In^2																					
	Italin bee colonies						Craniolan bee colonies						F1 Italin hybrid colonies						F1 Craniolan hybrid colonies					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
Citrus 5/2 -- 11/4/1997	1153	1117	1107	1120	4497	187.4	990	979	960	787	3716	154.8	1201	1163	1119	1184	4667	194.5	987	978	1010	973	3948	164.5
Clover 24/ 4 -- 28/6/1997	2124	2115	2142	2161	8542	355.9	2023	1935	1937	1938	7833	326.4	2134	2077	2163	2134	8508	354.5	1913	1867	1967	1800	7547	314.5
Cotton 11/7-- 27/9/1997	2364	2308	2264	2283	9219	329.25	2025	2202	2461	2385	9073	324.1	2338	2480	2322	2205	9345	333.75	2453	2521	2558	2348	9880	352.9

Data calculated the average one measurment of brood reared per each season

* Numbers of Colonies Replicates

Fig(7) Average of sealed brood per one measurment in different nectarflow seasons during 1998

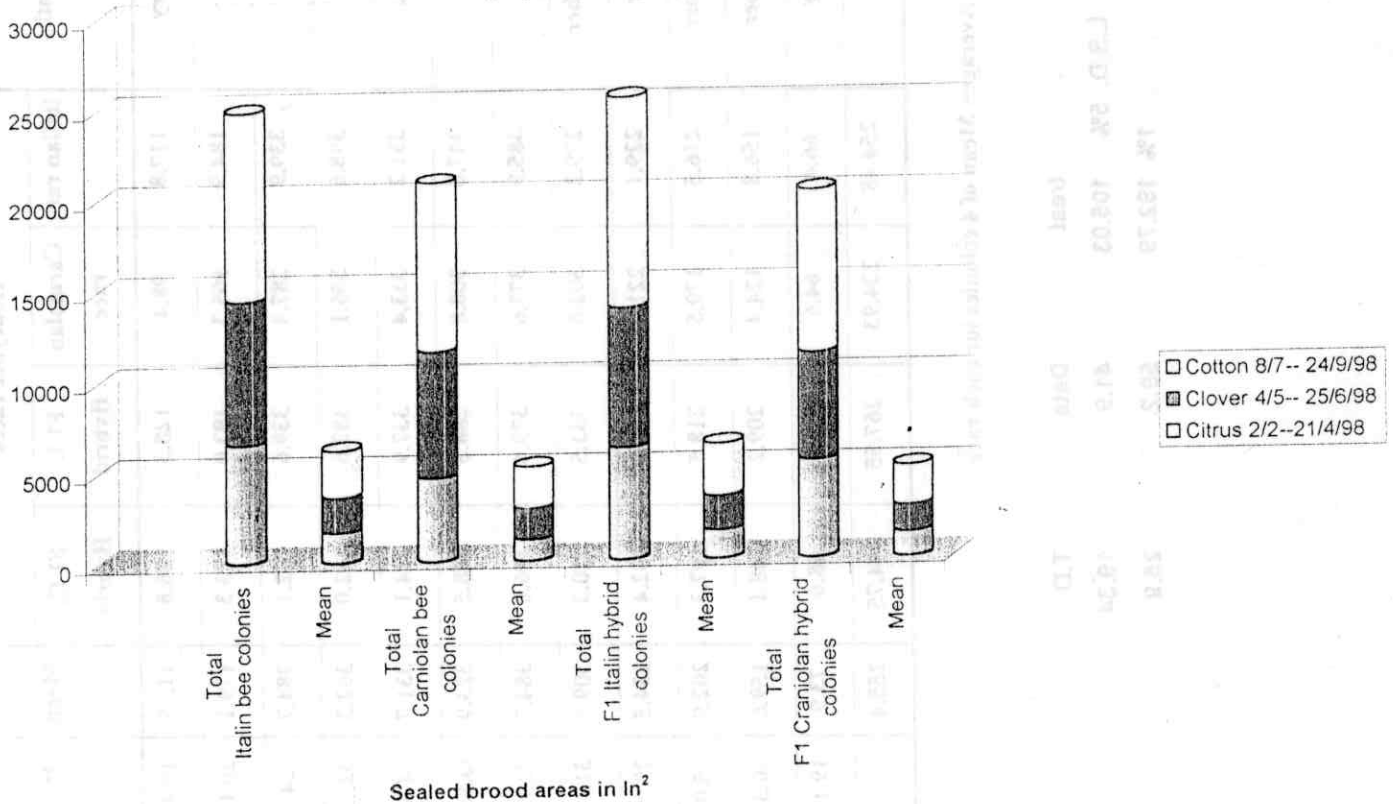


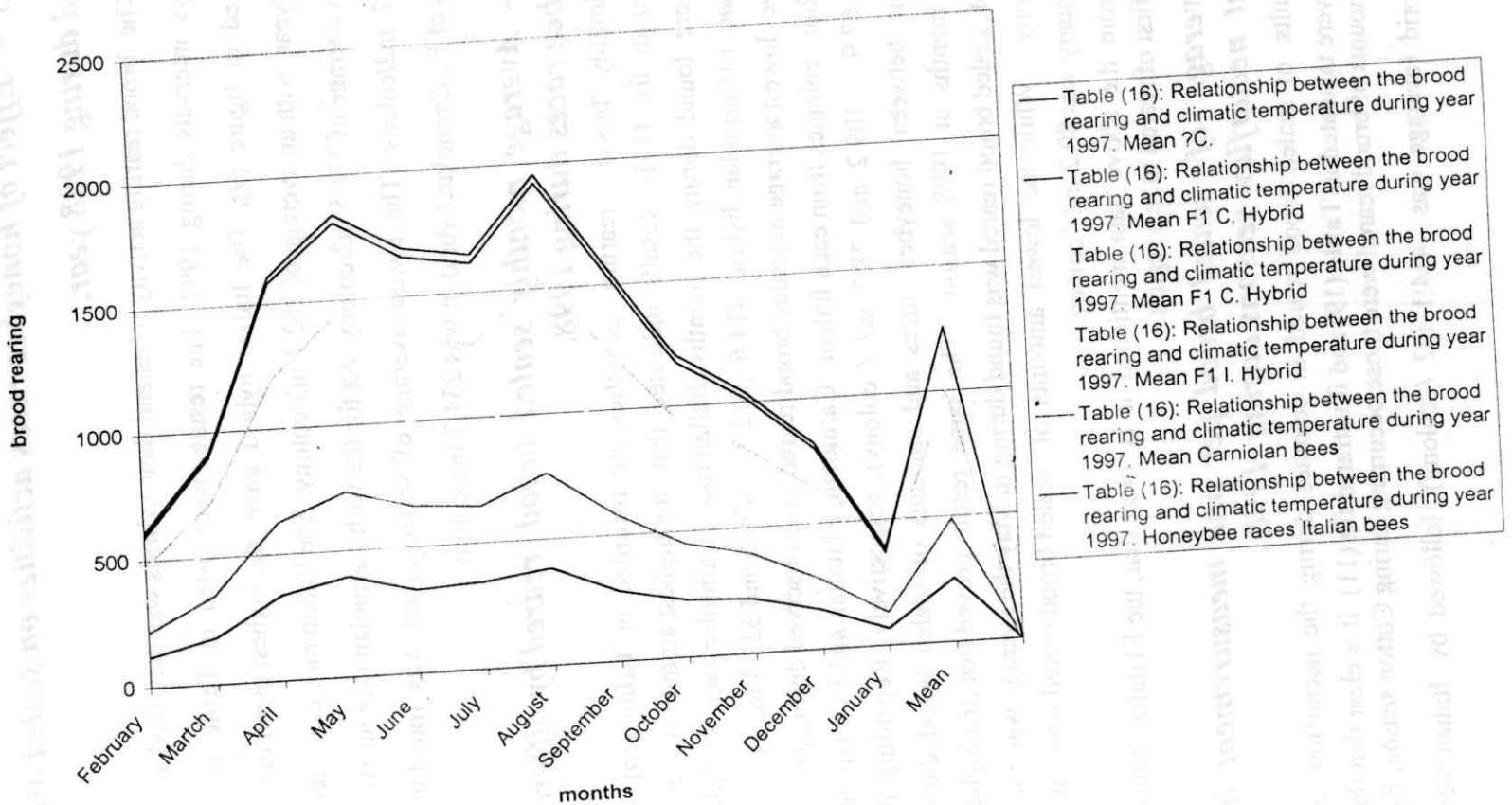
Table (16): Relationship between the brood rearing and climatic temperature during 1997 year.

Months	Honeybee races				Mean	°C.
	Italian race	Carniolan race	F1 I. Hybrid	F1 C. Hybrid		
February	117.8	98.4	128.3	126.8	117.8	19.4
March	184.9	165.3	193.0	173.3	179.1	20.1
April	339.9	287.4	339.6	232.1	384.7	24
May	398.6	336.1	382.6	332.0	362.3	32.1
June	331.2	333.4	337.9	324.1	331.7	34.3
July	347.8	300.8	288.5	358.5	323.9	33.86
August	385.9	377.6	379.4	396.0	384.7	32.2
September	279.2	303.8	333.5	320.3	309.2	31.1
October	229.1	221.9	254.5	232.4	234.5	29.0
November	216.5	179.5	218.5	197.3	202.9	25.0
December	156.8	124.4	209.2	148.1	159.6	20.3
January	66.4	64.6	96.0	68.6	73.9	19.1
Mean	254.48	234.93	267.55	244.75	255.4	

Average= Mean of 4 colonies for each race

		treat	Date	T.D
L.S.D.	5%	105.03	41.9	19.34
	1%	192.79	59.2	25.9

Fig.(8 Relationship between the brood rearing and climatic temp. during 1997



5 – Effect of honeybee races activities on sealed brood reared during 1998 year.

The brood rearing activity races and their hybrids was measured at every 13- days intervals during 1998. The results were listed in **Table (17)** and illustrated in figure (9). The Italian hybrid gave the highest mean of sealed brood /year with an average of 282.7 in2/colony. The Italian race came second with an average of 271.5 in2/colony. As for the with Carniolan race an average of 234.7 in2/colony. The lowest average of sealed brood was found in the colonies of F_1 Carniolan hybrid, it was 234.7 in2/colony .

6- Average monthly sealed brood reared by different honeybee races during 1998.

Monthly brood rearing activities are recorded in **Table (18)** and illustrated in fig. (10)> Results indicated that the highest amounts of sealed brood were found during the months Italian race , Carniolan race, F1 Italian hybrid and F1Carniolan hybrid 414.6 ,372.3 , 496.6 and 333.3 in2 / colony. While the lowest average of sealed brood reared was observed during January by the four colonies from each Italian , Carniolan, F1Italian and F1 Carniolan (65.1 , 67.9 , 109.2 and 78.7 in2 / colony), respectively. Regarding the interaction between honeybee races and amounts of sealed brood during different months of 1998 season . The same result proved that ,the highest amount of sealed brood reared was found during in May the average was 363.6 in2 / colony . While the lowest amounts of sealed brood reared was found during January was 80.2 in2 / colony.

From the above data mentioned it is clear that, the F1Italian hybrid came the first of reared in this region.

7 - Average of sealed brood per one measurement in different nectarflow seasons during 1998 .

Results of sealed brood reared in colonies during the nectarflow of (1998) were tabulated in **Table (19)** and illustrated fig (11). It is clear that the highest amounts of brood reared were those occurring during Cotton season, F_1 Italian hybrid (average was 414.1 in2 / colony), followed by Italian race

(average was 371.2 in2 / colony), then come the Carniolan race (average was 332.1 in2 / colony), and the lowest amounts of sealed brood was reared by the F_1 Carniolan hybrid (average was 320 in2 / colony). In case clover nectarflow the Italian race were came the first (average was 394.9 in2 / colony), followed by F_1Italian hybrid (average was 384.5 in2 / colony),then followed by Carniolan race (average was 348,2 in2 / colony), while the lowest amounts of sealed brood was found in the F_1 Carniolan hybrid (average was 295.3 in2 / colony). The lowest amount of sealed brood found during Citrus nectarflow Italian race (average was 233.8 in2 / colony), followed by F_1 Italian hybrid (average was 221.4 in2 / colony), F_1 Carniolan hybrid (average was 193.1 in2 / colony), and the lowest amounts of sealed brood was found with Carniolan race (average was 165.3 in2 / colony).

The differences between races and their hybrid in brood rearing activity during Cotton nectarflow were highly significant (P<0. 1%).

It could be mentioned that, the F1Italian hybrid came the first in this region.

These results are in agreement with the results of **Woyke (1977, 1984), Soszka 1996.**

8 - Effect of temperature on brood rearing activity.

The relationship between brood rearing activities and daily temperature were listed in **Table (20)** and illustrated in fig (12).The effect of daily temperature August (Avg.35.1°c) enhanced brood rearing during the average amounts of reared brood were 496.6,414.6,372.3 and 333.3 in2/colony for the F_1 Italian hybrid, Italian race, Carniolan race and F1 Carniolan hybrid, respectively . While the lowest amounts of reared brood were in January (19.1)° c the average amounts of reared brood were 80.2 in^2/colony, from each races.

The brood rearing activities started increasing gradually from (April to November) concomitantly with the increase in daily temperature (Avg. were 28.9, 31.0, 33.7, 34.2, 35.1, 34.2, 30.7 and 27.0°c,for April, May, June, July,August,September,October and November, respectively. While the brood rearing decreased gradually from December to March according following the daily drop of temperature Avg. 19.4, 19.1, 20.2 and 21.2°c for December, January, February and March, respectively.

Statistical analysis indicated that the relation between brood rearing and daily ambient temperature was highly significant (P>0.01).

From the above data it could be inferred that, the effect of temperature and brood rearing activities was positives correlation .That is the honeybee colonies reared more brood in warmest months and the abundant nectarflow season as well(April, May, June, July, August, September, October and November).

While less amounts of sealed brood was reared in lowest temperatures during the wintering months. (December, January and March).

Table (17) Effect of Honeybee races activities on sealed brood reared during 1998 season.

Date	Sealed brood areas in In^2																					
	Italian race						Carniolan race						F11. Hybrid						F1 C. Hybrid					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
02/02/98	86	142	153	121	502	125.5	100	43	80	92	315	78.75	122	117	187	136	562	140.5	116	93	71	137	417	104.25
15/02/98	107	165	187	154	613	153.25	86	63	104	152	405	101.25	153	112	190	144	599	149.75	181	186	128	190	685	171.25
28/02/98	167	183	237	208	795	198.75	105	87	105	184	481	120.25	188	157	212	85	642	160.5	210	193	92	188	683	170.75
13/03/98	191	137	283	260	871	217.75	143	110	117	213	583	145.75	207	198	243	139	787	196.75	213	227	98	163	701	175.25
26/03/98	237	191	294	289	1011	252.25	162	125	242	256	785	196.25	263	217	288	187	955	238.75	238	251	145	273	907	226.75
08/04/98	366	258	348	327	1297	324.25	209	137	276	321	943	235.75	318	283	335	334	1270	370.5	267	239	179	268	953	238.25
21/04/98	380	333	381	364	1458	364.5	273	191	309	347	1120	280	351	326	327	381	1385	346.25	263	245	183	184	875	218.75
04/05/98	451	406	433	423	1713	428.25	356	383	344	387	1370	342.5	378	382	357	413	1530	382.5	337	280	218	286	1121	280.25
17/05/98	472	368	448	397	1685	421.25	375	298	365	413	1451	362.25	407	441	311	425	1584	396	381	317	243	234	1175	293.75
30/05/98	516	327	413	349	1605	401.25	381	336	320	386	1423	355.75	418	343	376	428	1565	391.25	429	319	173	309	1230	307.5
12/06/98	498	395	443	210	1646	386.5	348	356	266	415	1385	346.25	420	273	295	435	1423	355.75	389	331	194	249	1163	290.75
25/06/98	450	387	351	162	1350	337.5	350	358	240	386	1304	326	495	281	365	446	1587	396.75	390	360	209	256	1215	303.75
08/07/98	421	338	293	205	1257	313.25	361	297	311	146	1115	278.75	408	128	367	412	1315	328.75	397	354	246	310	1307	326.75
21/07/98	463	351	384	296	1494	373.5	372	304	329	188	1223	305.75	438	307	341	399	1485	371.25	428	380	296	379	1484	371
03/08/98	478	418	391	334	1621	405.25	411	335	377	302	1425	356.25	516	286	387	431	1620	405	435	351	305	225	1317	329.25
16/08/98	512	444	420	367	1743	435.75	452	368	318	332	1570	392.5	516	338	421	457	1732	433	462	364	375	256	1457	364.25

* Numbers of Colonies Replicates

Fig (9) Effect of Honeybee races activities on sealed brood reared during 1998 season.

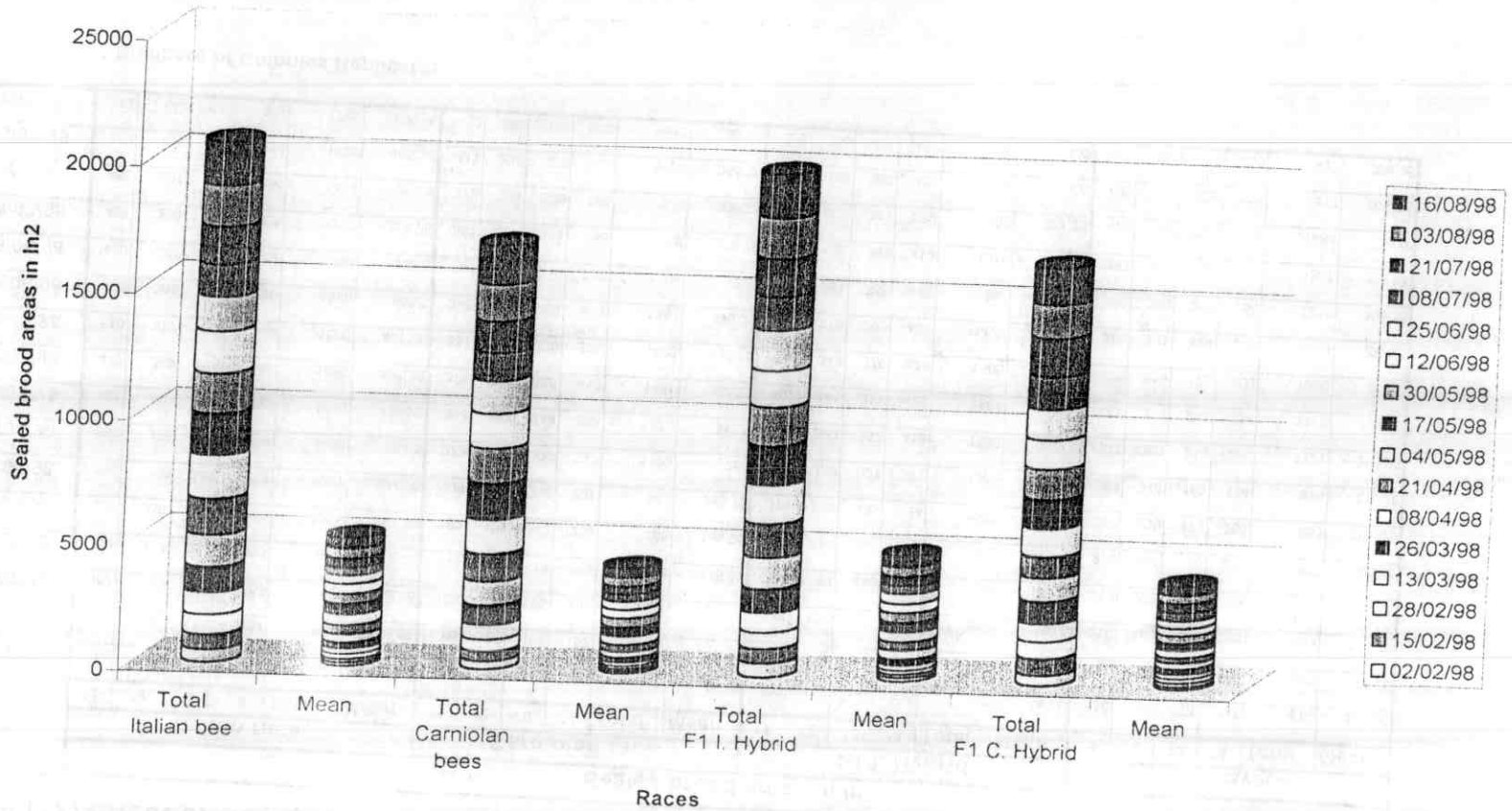


Table (17) contenue :

Date	Sealed brood areas in In^2																					
	Italian bee						Carniolan bees						F1 I. Hybrid						F1 C. Hybrid					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
29/08/98	469	426	328	388	1611	402.75	443	370	292	368	1473	368.25	500	370	326	415	1611	402.75	433	325	255	213	1226	306.5
11/09/98	411	393	285	362	1451	362.75	421	341	225	328	1315	328.75	423	381	271	449	1524	381	385	249	213	187	1114	253.5
24/09/98	372	340	201	304	1217	304.75	368	291	248	302	1209	302.25	400	355	173	378	1315	328.75	341	277	198	339	1155	288.75
07/10/98	312	233	188	260	973	243.25	311	173	252	274	1010	252.25	371	243	264	323	1201	300.25	283	211	239	244	977	244.25
20/10/98	266	213	123	231	853	213.25	315	200	234	218	967	241.75	300	150	243	281	974	243.5	215	183	220	225	843	210.75
20/11/98	203	183	137	178	701	175.25	273	177	102	191	743	185.75	268	114	283	230	915	228.75	186	147	109	76	518	129.5
15/11/98	193	180	122	168	663	165.75	267	148	82	142	619	154.75	251	116	242	232	841	210.25	124	128	78	113	443	115.75
28/11/98	151	200	126	34	511	127.75	167	121	52	73	413	103.25	224	110	188	231	753	188.25	105	83	122	137	447	111.75
11/12/98	121	166	189	95	573	143.25	133	118	93	131	475	118.75	162	93	145	219	619	154.75	78	51	70	122	321	80.25
24/12/98	100	126	93	99	417	104.25	92	102	72	85	351	87.75	147	81	107	218	553	138.25	113	87	101	174	475	118.75
06/01/99	91	85	81	117	354	88.5	104	100	112	97	413	103.25	161	123	221	192	697	174.25	115	98	75	133	421	105.25
19/01/99	121	86	93	127	427	106.75	81	115	103	103	402	100.5	186	142	185	100	613	153.25	127	109	96	191	523	130.75
Total	8625	7453	7405	6829	30312	7578	7459	5947	6050	6832	26288	6572	9011	6467	6644	8529	32653	8162.75	7623	6438	5014	6166	25241	6310.25
Mean	308.04	266.18	264.46	243.89	1082.57	271.5	266.39	212.39	216.07	244	938.9	234.7	321.82	230.96	308.71	304.6	1166.2	282.7	272.25	229.92	179.07	220.21	901.5	224.6

* Numbers of Colonies Replicates

Fig(9) Contenu

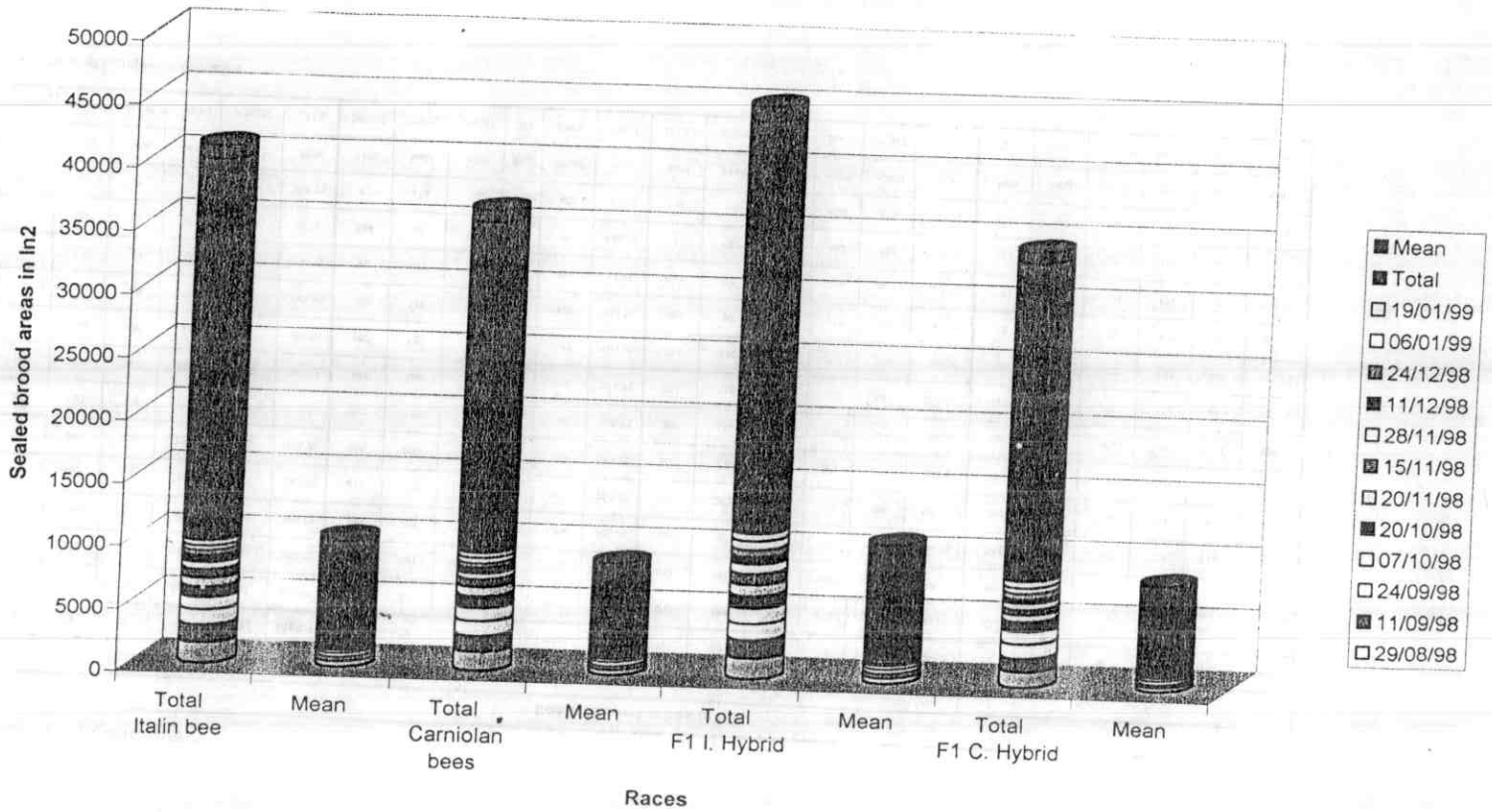


Table (18) Average monthly sealed brood rered by different honey bee races during1998.

Monthes	Sealed brood areas in In^2																							
	Italian race						Carniolan race						F1 I. Hybrid						F1 C. Hybrid					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
2,15,28 Fbruary	380	490	577	483	1910	159.2	291	193	289	428	1201	100.1	483	386	589	365	1803	150.3	507	472	291	515	1785	148.8
13,26 March	428	328	577	549	1882	156.8	305	235	359	469	1368	114	470	415	531	326	1742	145.2	451	478	324	541	1794	149.5
8,21 April	746	589	729	691	2755	229.6	482	326	585	686	2063	171.9	696	609	662	715	2655	221.3	530	484	362	452	1828	152.3
4,17,30 May	1439	1101	1294	1169	5003	416.9	1112	917	1029	1186	4244	353.7	1203	1166	1044	1266	4679	389.9	1149	916	634	829	3528	294
12,25 June	948	782	794	372	2896	241.3	698	714	506	801	2719	226.6	915	554	660	881	3010	250.8	779	691	403	505	2378	198.2
8,21 july	884	689	677	501	2751	229.3	733	601	640	334	2308	192.3	846	435	708	811	2800	233.3	825	734	543	689	2791	232.6
3,16,29 August	1459	1288	1139	1089	4975	414.6	1306	173	1087	1002	4468	372.3	1532	994	1134	1303	5959	496.6	1330	1040	936	694	4000	333.3
11,24 Septemper	783	733	489	663	2668	222.3	789	832	473	630	2524	210.3	823	736	444	836	2839	236.6	706	526	411	526	2169	180.8
7,20 October	598	446	291	491	1826	152.2	626	373	486	492	1977	164.8	671	393	507	604	2175	181.3	498	394	459	469	1820	151.7
2,15,28 November	547	583	385	380	1875	156.3	707	446	216	406	1775	147.9	763	340	713	693	2509	209.1	415	358	309	326	1408	117.3
11,24 December	221	293	282	194	990	82.5	225	220	165	216	826	68.8	309	174	252	437	1172	97.7	191	138	171	296	796	66.3
6,19,1999 January	212	151	174	244	781	65.1	185	215	215	200	815	67.9	347	285	408	292	1310	109.2	232	207	171	324	944	78.7
Total	8625	7453	7405	6829	30312	7578	7459	5947	6050	6832	26288	6572	9011	6467	8644	8529	32653	8162.75	7623	6438	5014	6186	25241	9310
Mean	718.8	621.1	617.1	569.1	2526	210.51	621.6	495.6	504.2	569.3	2190.6	182.55	750.9	538.9	720.3	710.80	2721.1	226.78	635.3	536.5	417.8	513.8	2103.4	175.3

Mean (Average) = sealed brood areas in In2 at days intere als.

* Numbers of Colonies Replicates

		Treat	Date	txd
L.S.D.	5%	252.27	100.74	46.45
	1%	463.08	142.17	62.34

Fig(10) Average monthly sealed brood rered by different honey bee races during1998.

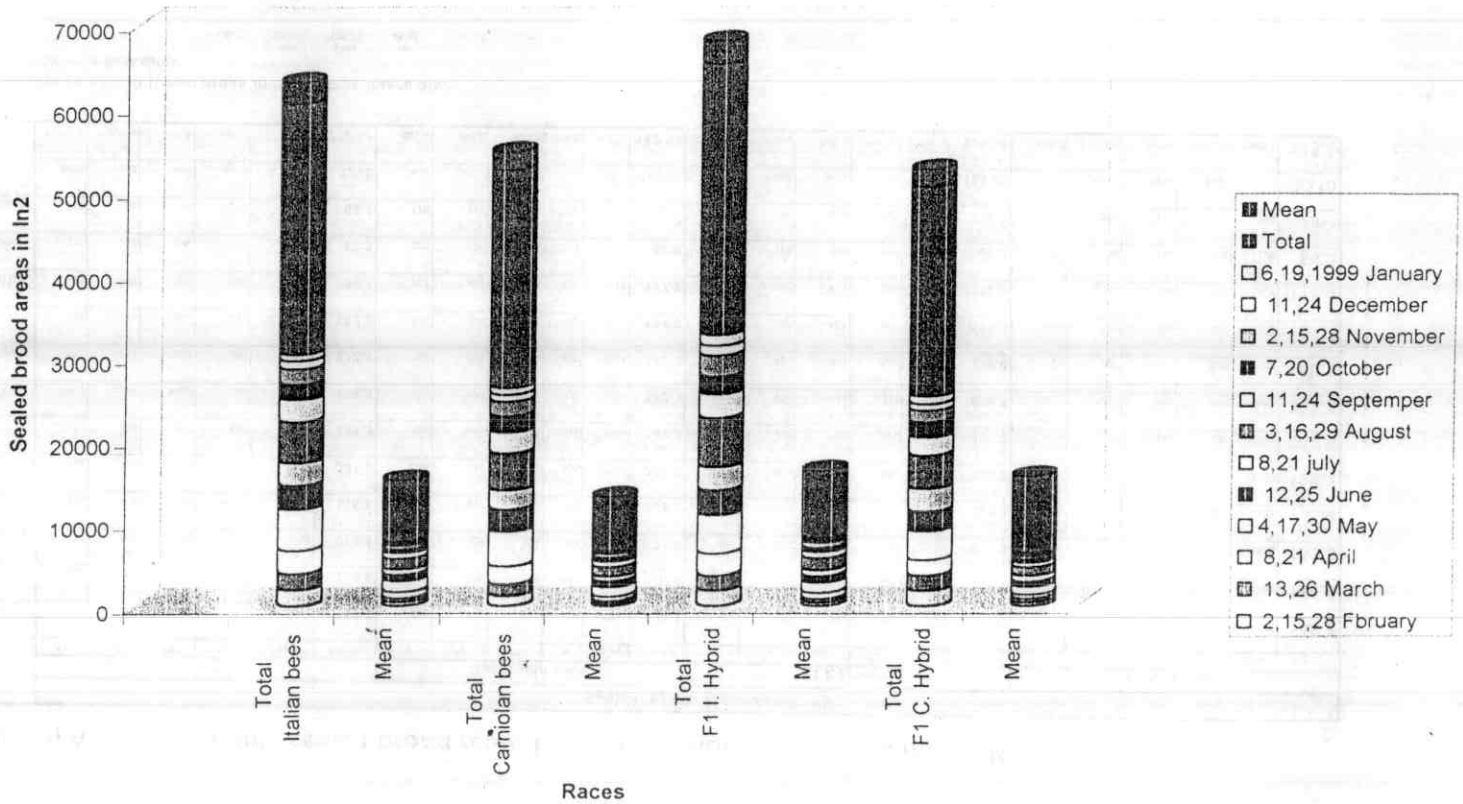


Table (19) Average of sealed brood per one measurment in different seasons during 1998

seasons	Seald brood areas in In.^{2}																					
	Italian race colonies						Craniolan race colonies						F1 Italian hybrid colonies						F1 Carniolan hybrid colonies					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
Citrus 2/2--21/4/98	1534	1407	1883	1723	6547	233.8	1078	756	1233	1560	4627	165.4	1602	1410	1782	1406	6200	221.4	1488	1434	977	1508	5407	193.1
Clover 4/5-- 25/6/98	2387	1883	2088	1541	7899	394.9	1810	1631	1535	1987	6963	348.2	2118	1720	1704	2147	7689	384.5	1928	1607	1037	1334	5906	295.3
Cotton 8/7-- 24/9/98	3126	2710	2302	2256	10394	371.2	2828	2306	2200	1968	9300	332.1	3201	2165	3280	2950	11596	414.1	2861	2300	1890	1909	8960	320

Data calculated the average one measurment of brood reared per each season

* Numbers of Colonies Replicates

Fig (11) Average of sealed brood per one measurment in different season1998

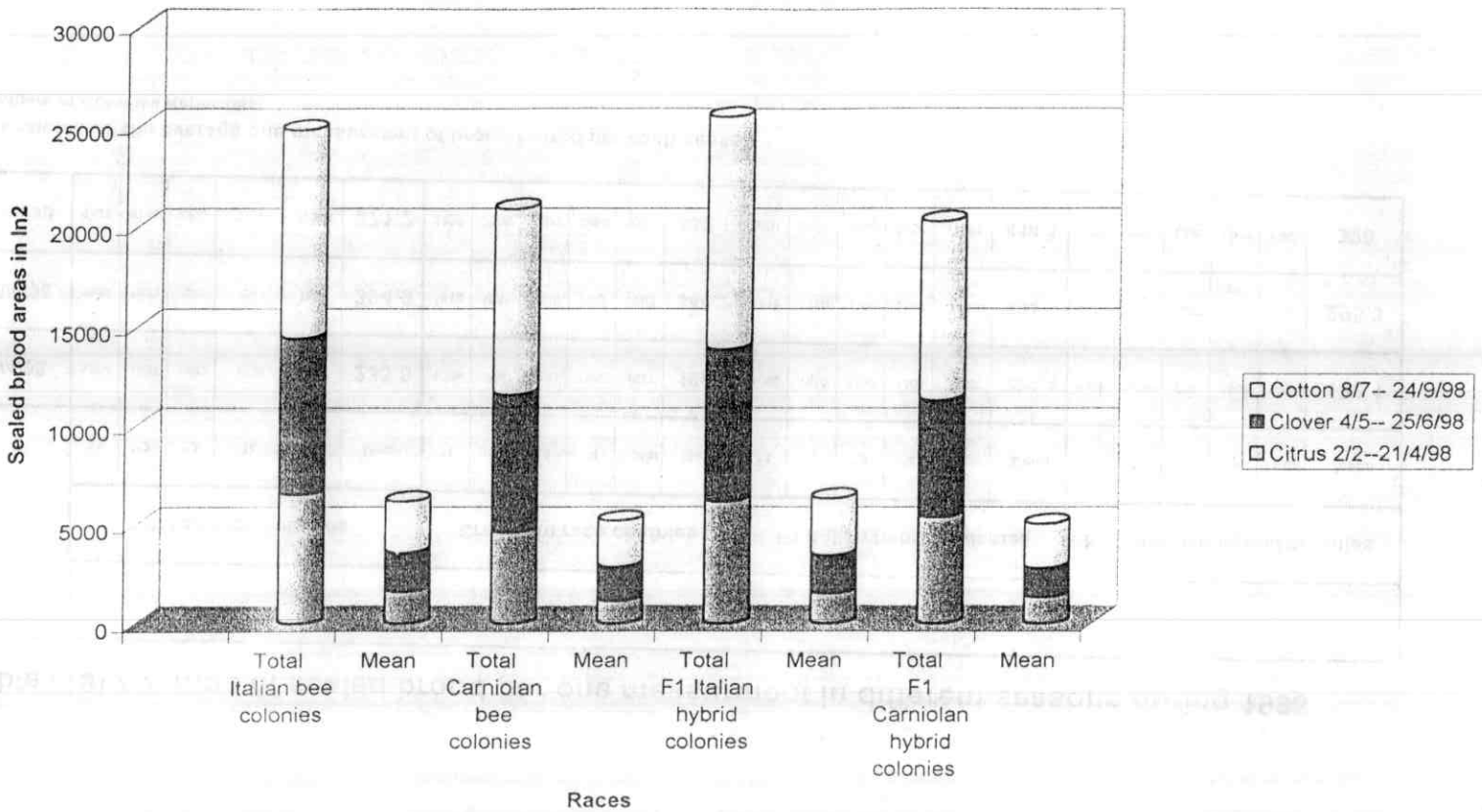
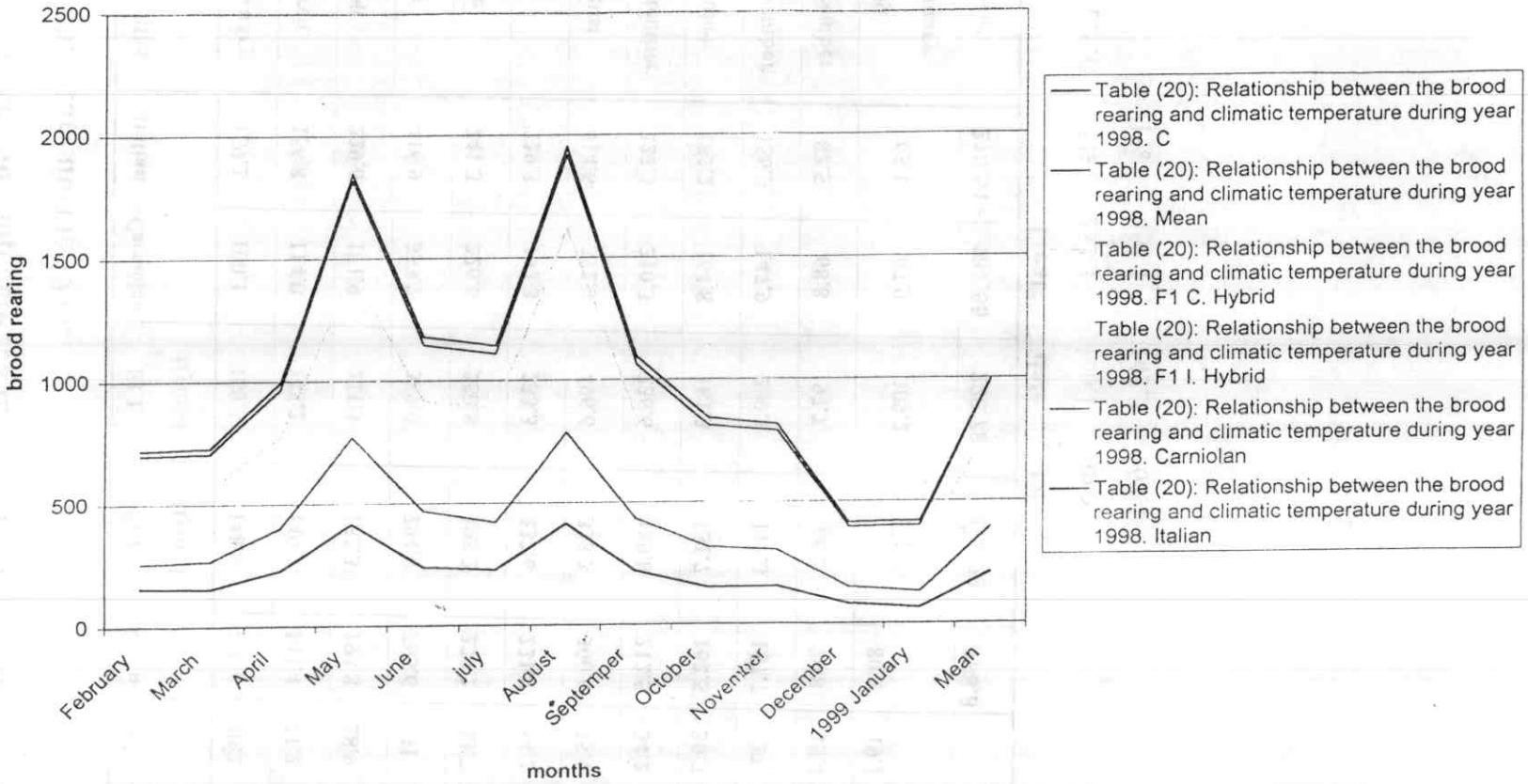


Table (20): **Relationship between the brood rearing and climatic temperature during 1998.**

Months	Italian	Carniolan	F1 I. Hybrid	F1 C. Hybrid	Mean	C
February	159.2	100.1	150.3	148.8	139.6	20.2
March	156.8	114.0	145.2	149.5	141.4	21.2
April	229.6	171.9	221.3	152.3	193.8	28.9
May	416.9	353.7	389.9	294.0	363.6	31
June	241.3	226.6	250.8	198.2	229.2	33.7
July	229.3	192.3	233.3	232.6	221.9	34.2
August	414.6	372.3	496.6	333.3	300.6	35.1
September	222.3	210.3	236.6	180.8	212.5	34.2
October	152.2	164.8	181.3	151.7	162.5	30.7
November	156.3	147.9	209.1	117.3	157.7	27
December	82.5	68.8	97.7	66.3	78.8	19.4
1999 January	65.1	67.9	109.2	78.7	80.2	19.1
Mean	210.51	182.55	226.78	175.29	198.8	

		Treat	date	t.d
L.S.D	5%	252.3	1oo.1	46.5
	1%	463.1	142.2	62.4

Fig. (12) relationship between the brood rearing and climatic temp. 1998



III-POLLEN GATHERING ACTIVITIES

1-Amounts of pollen grains collected by honeybee races during 1997

The activity of honeybee races and their hybrids in pollen collecting activity was investigated during 1997. Results were listed in **Table (21)** and illustrated in fig (13). The highest amounts of collected pollen grains occurred during Cotton nectarflow season (*Zea maize*).The F_1 Italian hybrid (average was 1657.75 g/colony), Italian race (average was 1557 g/colony), then followed by F_1 Carniolan hybrid (average was 1543.75 g/colony). The lowest amounts of pollen were than collected by Carniolan race (average was 1506.25 g/colony). In case of Clover nectarflow the Italian race came the first (average was 998.5 g/colony), F_1 Italian hybrid (average was 913.25 g/colony). Finally came the Carniolan race (average was 899.75 g/colony) .The lowest amounts of collected pollen were confronted in the F_1 Carniolan hybrid (average was 899.75 g/colony). The lowest amounts of collected pollen occurred during the Citrus nectarflow where F_1 Italian hybrid (average was 894 5 g/colony), F_1 Carniolan hybrid (average was 881.25 g/colony). Third came the Italian race (average was 881.25 g/ colony). The lowest amounts of collected pollen were those of Carniolan race (average was 768.25 g/ colony).

2- Amounts of pollen grains collected by honeybee races during 1998

The activity of honeybee races and their hybrids in pollen collecting activity was investigated during 1997. Results were listed in **Table (22)** and illustrated in fig (14). The highest amounts of collected pollen grains occurred during Cotton nectarflow season. The F_1 Italian hybrid came the first (average was 1610.5 g/colony), Italian race (average was 1562.75 g/colony), then

followed by F_1 Carniolan hybrid (average was 1540.5 g/colony). The lowest amounts of pollen were those collected by Carniolan race (average was 1529 g/colony). In case Clover nectarflow F_1 Italian hybrid (average was 893 g/colony), followed by Italian race (average was 879 g/colony), then followed by F_1 Carniolan hybrid (average was 800 g/colony). Finally came the Carniolan race (average was 796.75 g/colony). The lowest amounts of collected pollen occurred during the Citrus nectarflow Italian race (average was 747.75 g/colony), followed by Carniolan race (average was 745.25 g/colony), then by F_1 Italian hybrid (average was 721.75 g/colony). The lowest amounts of Collected pollen were those of F_1 Carniolan hybrid (average was 679.5 g/colony).

Statistical analysis showed that the difference between the races about the collected amounts of pollen were non significant in the two seasons of the study (1997 and 1998) and also the difference between various periods according to amounts of collected pollen were highly significant in the two seasons of the study ($P<0.1\%$).

From the above mentioned data it is clear that, the F_1 Italian hybrids came the first hybrid of honey bee reared in this region .

These results are in agreement with the finding of **Aly et. al (1989)**.

Table (21) Amounts of pollen grains collected by honeybee races during 1997

Seasons	Italian						carniolan						F1Italian						F1 carniolan					
	1	2	3	4	Total	Mean	1	2	3	4	Total	M	1	2	3	4	Total	M.	1	2	3	4	Total	M.
Citrus	760	884	821	850	3315	829	747	667	778	881	3073	768	758	963	1034	823	3578	895	948	922	1070	585	3525	881
Clover	1034	947	918	1095	3994	999	1080	805	892	822	3599	900	827	736	991	1099	3635	913	965	875	820	939	3599	900
Cotton	1729	1396	1904	1199	6228	1557	1294	1385	1451	1895	6025	1506	1663	1479	1841	1648	6631	1658	1820	1305	1439	1611	6175	1544
Tatal	3523	3227	3643	3144	13537	3384	3121	2857	3121	3598	12697	3174	3248	3178	3866	3570	13862	3466	3733	3102	3229	3135	13299	3325
Mean	207	190	214	185	796.2	199	184	168	184	212	746.9	187	191	187	227	210	815.4	204	220	183	196	184	782.3	196

L.S.D. Date

5% 597.13 G/colony

1% 1377.3 G/colony

Fig (13) Amounts of pollen grains collected by honeybee races during 1997

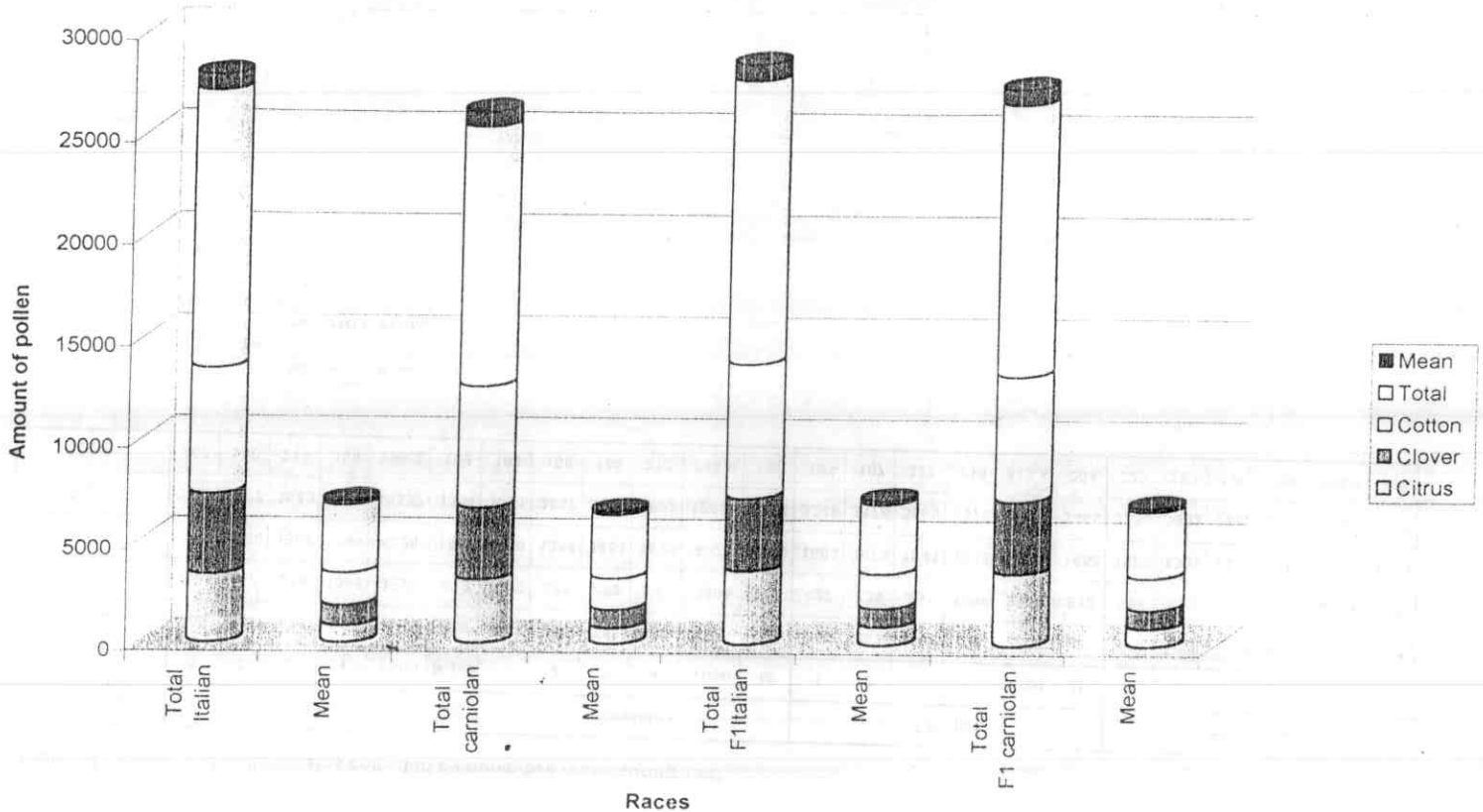


Table (22)Amounts of pollen grains collected by honeybee races during 1998

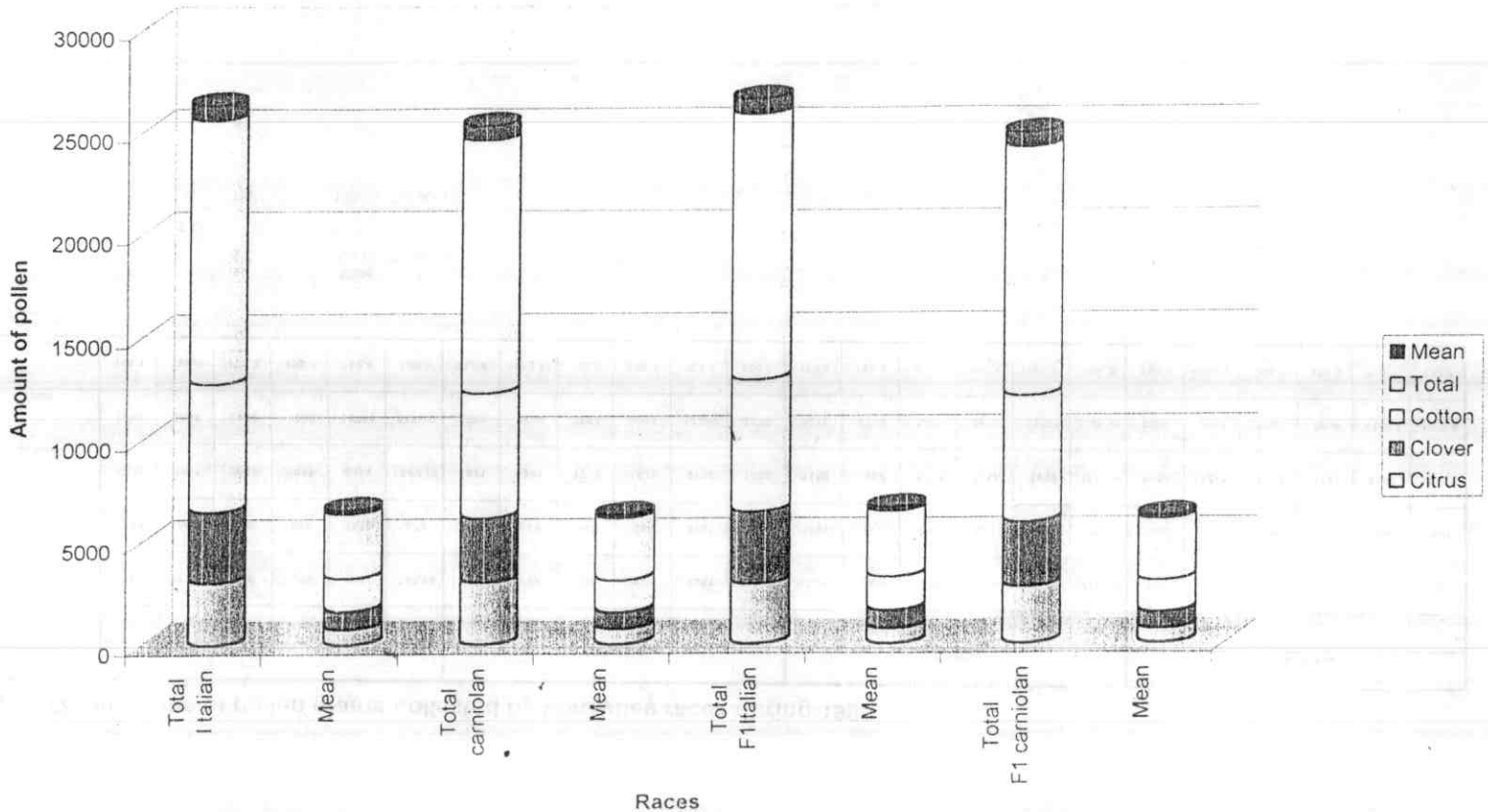
Seasons	Italian						carniolan						F_1Italian						F_1 carniolan					
	1	2	3	4	Total	Mean	1	2	3	4	T.	M.	1	2	3	4	T.	M.	1	2	3	4	T.	M.
Citrus	644	720	768	895	2991	747.75	961	729	617	674	2981	745.25	728	559	915	686	2887	721.75	804	577	864	483	2718	679.5
Clover	1179	863	600	910	3516	879	949	819	665	754	3187	796.75	1099	747	849	877	3572	893	1002	789	666	743	3200	800
Cotton	1375	1811	1568	1499	6251	1562.75	1821	1381	1272	1638	6116	1529	1188	1407	1731	2116	6442	1610.5	1490	1249	1712	1713	6162	1540.5
Total	3198	3394	2934	3268	12794	3198.5	3731	2929	2554	3066	12280	3070	3015	2713	3495	3678	12901	3225.25	3296	2615	3232	2939	12082	3020.5
Mean	188.1	199.6	172.2	192.2	752.6	188.1	219.5	172.3	150.2	180.4	722.4	180.6	177.6	159.6	206.6	216.4	758.9	189.7	193.9	153.8	190.1	172.9	710.7	177.7

L.S.D. Date

5% 721.65 G/colony

1% 1664.5 G/colony

Fig (14) Amounts of pollen grains collected by honeybee races during 1998



V. ROYALJELLYSECRETION ACTIVITIES

1- Effect of honeybee races and their hybrids on royal jelly production during1997

The activity of honeybee races and their hybrids on the royal jelly secretion activity during 1997. The results were listed in **Table (23)** and illustrated in fig (15). Results showed that F_1 Italian hybrid gave the highest secretion of royal jelly with an average of 322.9,g/colony, followed by F_1 Carniolan hybrid with an average of 315.6 g/colony, then followed by Italian race with an average of 304.9 g/colony, while the lowest amounts of royal jelly secretion was obtained from the Carniolan race with an average of 301.6 g/colony, during months (March to August).

The royal jelly secretion during the months (March to August) showed that the highest amount of royal jelly produced were for F_1Italian 233.9,Carniolan race 229.3,F_1 Carniolan 228.4 and Italian race 220.9 g/colony during months (May to August), respectively. While that lowest royal jelly secretion produced during month June were 187, 179.5, 169.7 and 159 g/colony for F_1 Italian, F_1 Carniolan ,Italian race and Carniolan race, respectively.

Statistical analysis indicated that no significant differences existed between races and hybrids of honeybee colonies as to the secretion of royal jelly.

2 -Effect of honeybee races and their hybrids on royal jelly production during 1998

The activity of honeybee races and their hybrids on the royal jelly secretion activity during 1998. The results listed in **Table (24)** and illustrated in fig (16). Results showed that F_1 Italian hybrid gave the highest secretion of royal jelly with an average of 287.7 g/colony, followed by F_1 Carniolan hybrid with an average of 282.3 g/colony, then followed by Carniolan race with an average of

267.3 g/colony, while the lowest amounts of royal jelly secreted was found in the colonies of Italian race with an average of 266.9 g/colony, during months (March to August), respectively. The royal jelly estimates indicated that highest averages of royal jelly were produced during August were F_1 Italian 287.7, F_1 Carniolan 282.3, Carniolan race 267.3 and Italian race 266.9 g/colony, during months (May to August) respectively, while that lowest royal jelly secretion produced during month June were F_1 Carniolan 169.3, F_1 Italian 167.9, Carniolan race 161.6 and Italian race 158.7 g/colony, respectively. Statistical analysis showed that no significant differences between the races and hybrids during the two season and also the difference between various races for royal jelly secretion in the different production periods was highly significant during the two seasons ($P<0.1\%$) .

From the above results it could be mentioned that, the F_1 Italian hybrid bees came the first place of honey bee reared in this region ,and the decrease in royal jelly production may be attributed especially for the dearth of nectar and pollen grains sources in this region at the end of the honeyflow season.

These results were in agreement with our work in **M.Sc .(kassem,1995).**

While these results were not in agreement with the experiment **of Krol (1985)** who indicated that the Carniolan bees was the best in royal jelly secretion.

Table(23) Effect of honeybee races and their hybrids on royal jelly production during 1997.

Races& Rep. / Months	Royal Jelly production in Grams																						Temp.		R.H.
	Italian race colonies						Carniolan race colonies						F1 Italian Hybrid Colonies						F1 Carniolan Hybrid colonis								
	*1	*2	*3	*4	Tatal	Mean	*1	*2	*3	*4	T.	M.	*1	*2	*3	*4	T.	M.	*1	*2	*3	*4	T.	M.	Max	Min	
March	65.0	48.6	40.3	37.0	190.9	47.7	36.7	43.8	55.0	45.9	181.4	45.4	50.2	43.0	56.4	60.4	209.8	52.5	32.7	66.6	58.9	41.3	199.5	49.9	20.1	7.0	68.0
April	71.3	35.2	51.7	53.2	211.4	52.9	58.2	52.0	56.8	36.4	203.4	50.9	56.3	55.4	61.0	48.9	221.6	55.4	43.5	62.4	53.8	50.7	210.4	52.6	24.0	9.1	66.0
May	68.0	54.5	38.4	56.6	217.5	54.4	52.7	60.0	58.3	41.9	212.9	53.2	60.7	49.0	57.4	50.7	217.8	54.5	49.0	57.8	57.9	54.8	219.5	54.9	32.1	14.0	59.0
June	47.3	31.1	39.6	51.7	169.7	42.4	37.8	40.1	49.6	31.5	159.0	39.8	58.6	50.3	46.2	31.9	187.0	46.8	40.5	38.7	58.0	42.3	179.5	44.9	34.3	18.5	63.0
JuLY	58.4	44.0	56.5	50.2	209.1	52.3	53.8	75.0	49.1	42.4	220.3	55.1	63.5	55.0	55.3	47.8	221.6	55.4	61.4	52.6	60.0	51.1	225.1	56.3	33.9	20.1	68.0
August	50.7	63.0	53.4	63.8	220.9	55.2	55.0	72.4	51.8	50.1	229.3	57.3	71.0	64.2	53.4	45.3	233.9	58.5	58.9	55.6	63.7	50.2	228.4	57.1	32.2	19.3	69.0
total	360.7	266.4	279.9	312.5	1219.5	304.9	294.2	343.3	320.6	248.2	120.6	301.6	360.3	316.9	329.7	285.0	1291.9	322.9	286.0	333.7	352.3	290.4	1262.4	315.6			
Mean	60.1	44.4	46.7	52.1	203.3	50.8	49.0	57.2	53.4	41.4	201.1	50.3	60.1	52.8	54.9	47.5	215.3	53.8	47.7	55.6	58.7	48.4	210.4	52.6			

* Numbers of Colonies Replicates

L.S.D		Treat	Date	Txd
	5%	N.s	13.58	N.s
	1%	N.s	21.3	N.s

Fig(15) Effect of honeybee races and their hybrids on royal jelly production during 1997.

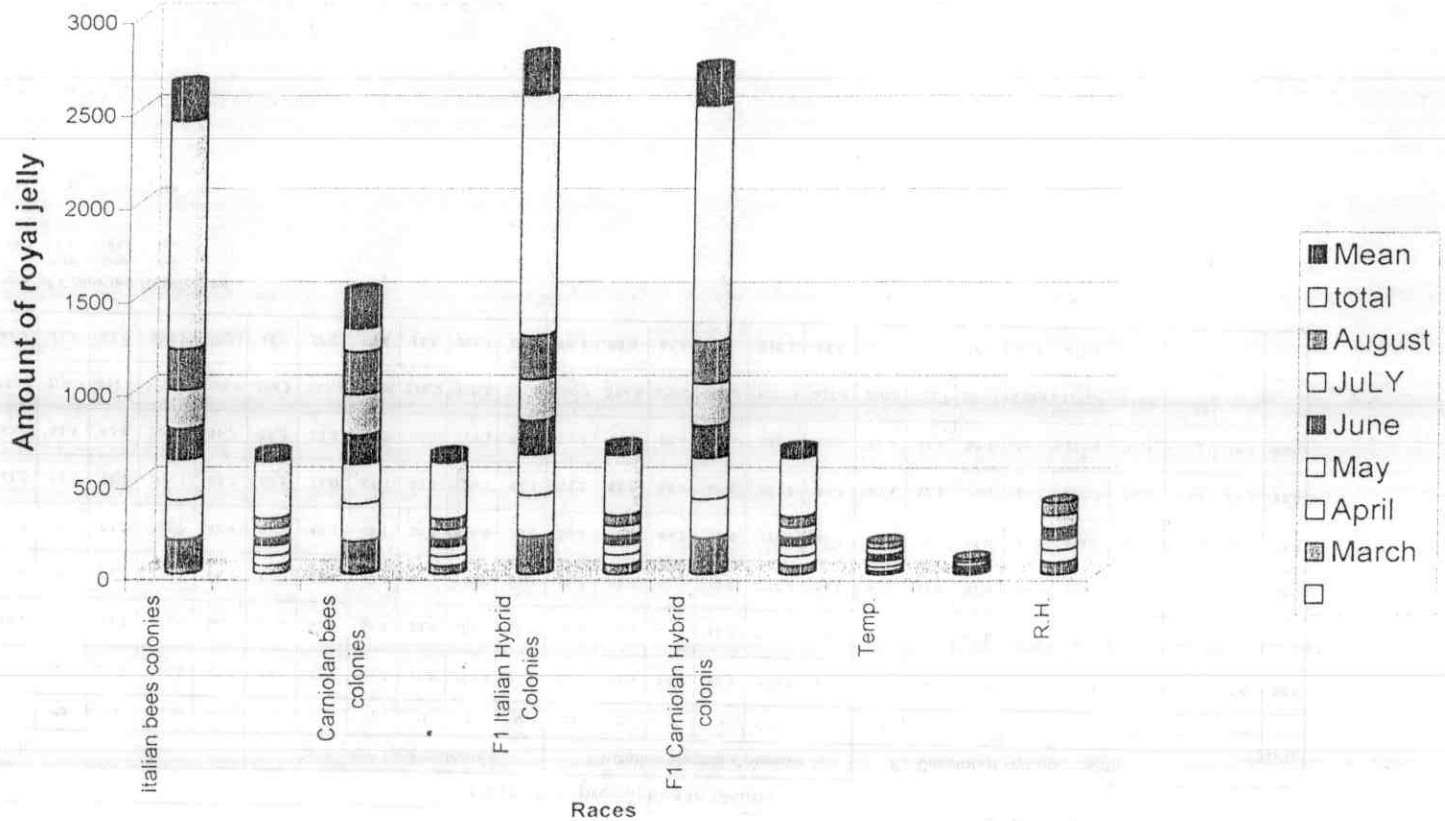


Table (24) Effect of honeybee races and their hybrids on royal jelly production during 1998 .

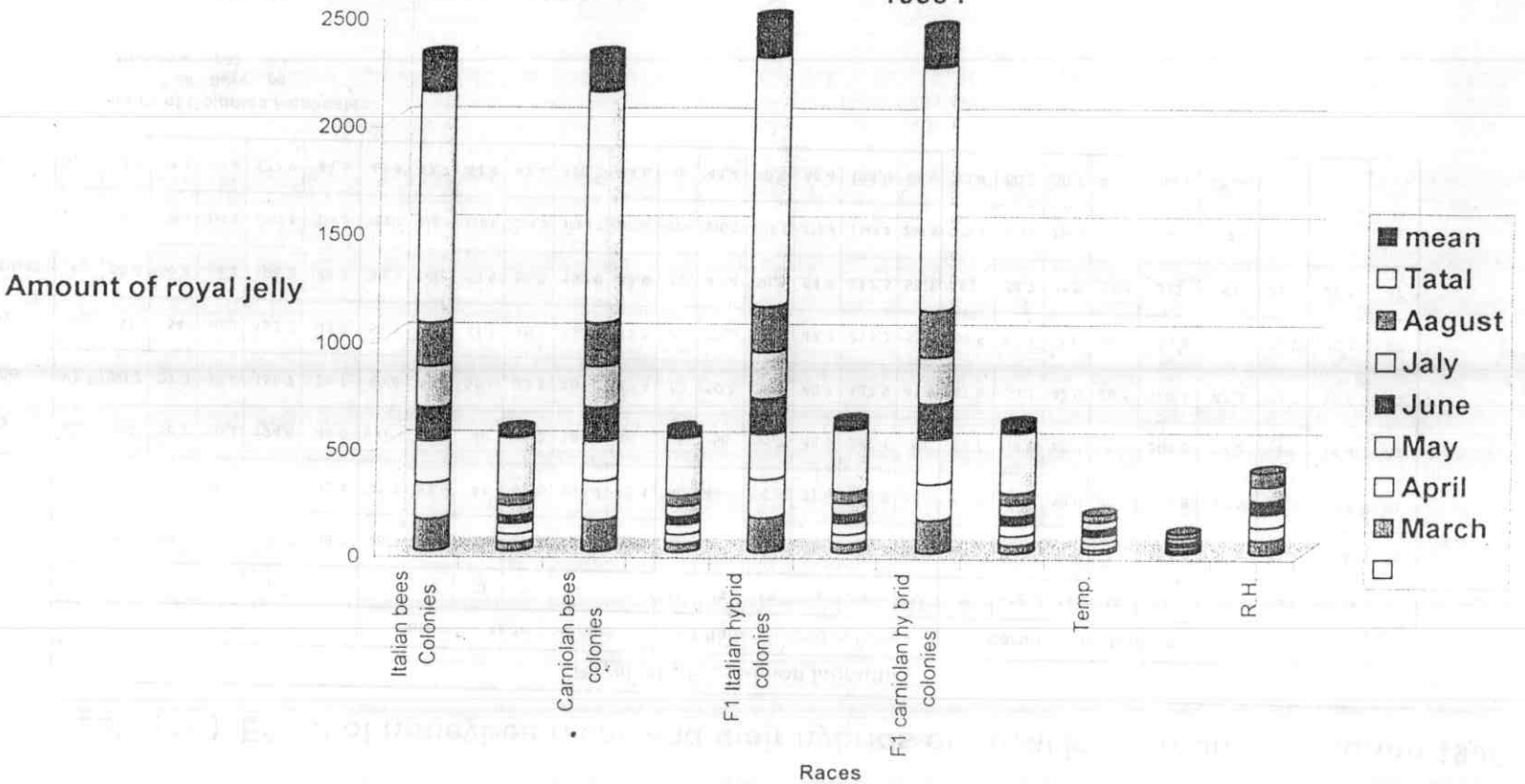
Months	Rayal jelly Production Ingrams																								
	Italian race Colonies						Carniolan race colonies						F1 Italian hybrid colonies						F1 carniolan hy brid colonies						Temp.		R.H.
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	T.	M.	*1	*2	*3	*4	T.	M	*1	*2	*3	*4	T.	M.	Max.	Mean.	
March	41.2	26.4	30.5	54.6	152.7	38.2	28.7	44.1	43.5	35.8	152.1	38	38	32.7	51.4	43.6	165.5	41.4	41.8	34.9	27.6	50	154.3	38.6	21.2	7.4	66
April	47.3	45	28.5	48.9	169.7	42.4	41.3	52.6	44	42.5	180.4	45.1	40	44.5	56.4	37.6	178.3	44.6	51.6	47	30.6	40.6	169.8	42.5	28.9	11.5	61
May	43.6	64	36.7	50.3	194.6	48.9	40	50.5	48	46.3	184.8	46.2	46	56	61.7	48.9	212.1	53	58.7	49.8	48.3	52	208.8	52.2	31	16.4	62
June	41.7	50.7	27.9	38.4	158.7	39.7	49.8	42.9	35.8	33.1	161.6	40.4	53	50.8	23.3	40.7	167.9	41.9	47.8	50.1	42.9	28.5	169.3	42.3	33.7	18.6	61
Jaly	38.5	51	54	49.8	193.3	48.3	53.5	50	41.7	45.7	190.9	47.7	60	58.8	47.6	47.2	213.3	53.3	58.5	60.7	53	42.6	214.8	53.7	34.2	20.1	67
Aagust	40	53.6	50.7	54.2	198.5	49.6	49.4	46	53.6	50.9	199.9	49.9	52	47.4	58.8	54.4	212.5	53.1	62	58.7	35.9	55.4	212	53	35.1	22.1	67
Tatal	252.3	290.7	228.3	296.2	1067.5	266.9	262.7	286.1	266.6	254.3	1069.7	267.4	288	290.2	299.2	272.4	1149.8	287.5	320.4	301.2	238.3	269.1	1129	282.3			
mean	42.1	48.5	38.1	49.4	177.9	44.5	43.8	47.7	44.4	42.4	178.3	44.6	48	48.4	49.9	45.4	191.6	47.9	53.4	50.2	39.7	44.9	188.2	47.04			

* Numbers of Colonies Replicates

L.S.D.

	Treat	Date	txd
5%	N.s	12.33	N.s
1%	N.s	19.33	N.s

Fig (16) Effect of honeybee races and their hybrids on royal jelly production during 1998 .



VII. PROPOLISCOLLECTION ACTIVITIES

1-Amount of propolis collected monthly from different races of honeybees and their hybrids during 1997 season

The activity of honeybee races and their hybrids on the propolis collecting activity during 1997. The estimated were results listed in **Table (25)** and illustrated in fig (17) .It is apparent that F_1 Italian hybrid gave the highest amounts of propolis collected with an average of 89.1 g/ colony ,followed by F_1 Carniolan hybrid with an average of 81.9 g/ colony, then followed by Carniolan race with an average of 42.9 g/ colony. The lowest amount of propolis collected was encountered in the colonies of Italian race with an average of 41.91 g/ colony. Statistical analysis indicated that, the differences between the races and hybrids were highly significant (P>0.1%).

2-Amount of propolis collected monthly from different races of honeybee and their hybrids during 1998 season

The activity of honeybee races and their hybrids on the propolis collecting activity during 1998. The estimated were results listed in **Table (26)**. and illustrated in fig (18). It is apparent that F_1 Carniolan hybrids gave the highest amounts of propolis collected with an average of 63.4 g/ colony, followed by F_1 Italian hybrid with an average of 55.8 g/ colony, then followed by Italian race with an average of 38.35 g/ colony. The lowest amount of propolis collected was encountered in the colonies of Carniolan race with an average of 36.6 g/ colony..The fluctuations in the amounts of propolis may be according to the difference of plant sources and the activities of honeybee colonies

Statistical analysis indicated that, the differences between the races and their hybrids were significant and also the difference between various races for amount of propolis collected in the different production periods was highly significant at (p<0.1%).

It could be mentioned that, the F_1 Italian and F_1 Carniolan hybrid came the first hybrids of propolis collecting in this region.

These results were in agreement with our work the results of[**Marletto and Olivero (1981), Pidek (1987) and El- Ahmadi 1998].**

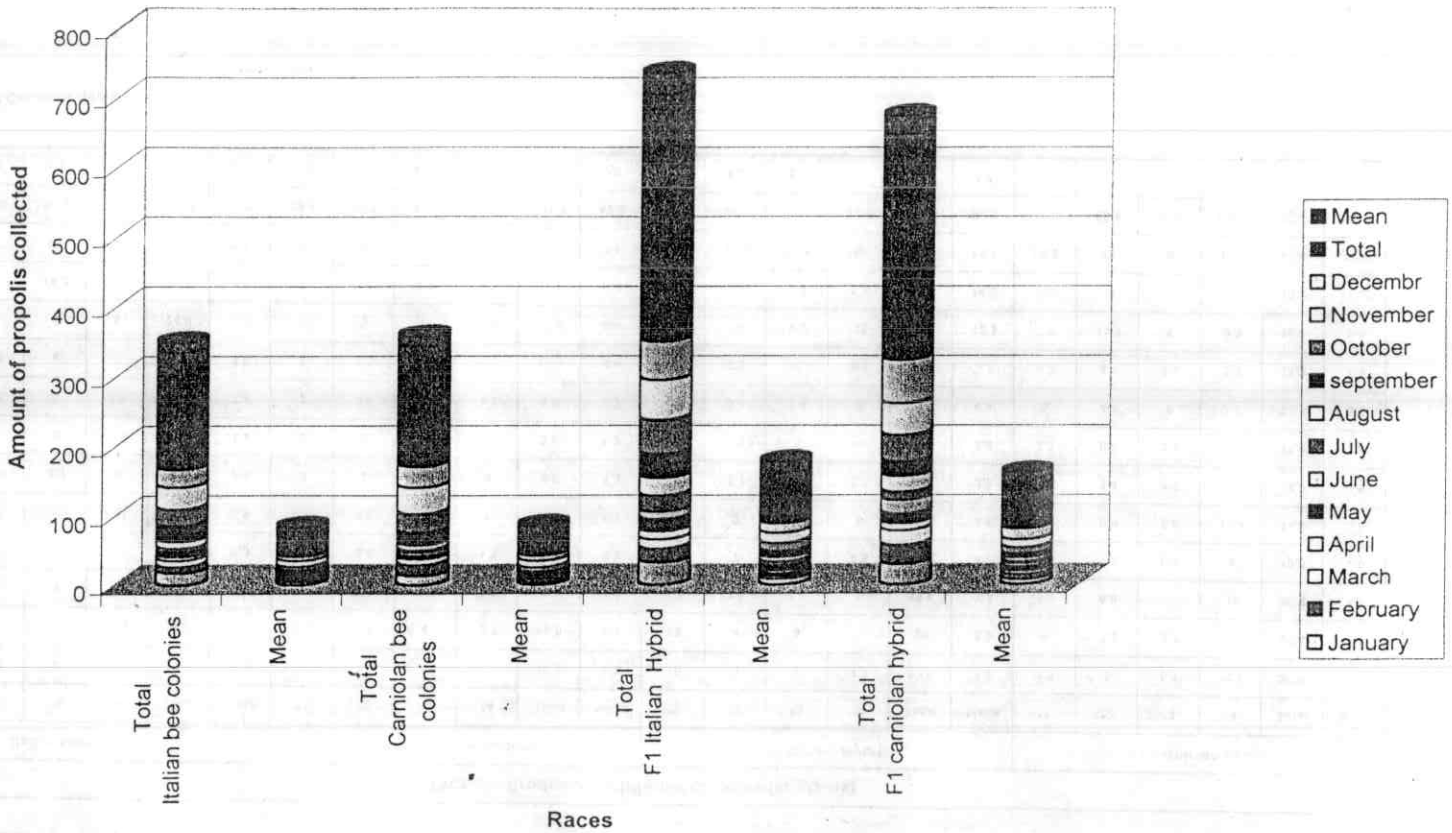
Table(25) Amount of propolis collected monthly from different races of honeybee and their hybrids 1997

Races& Rep. / Months	Propolis Produced In different colonies (in grams)																							
	Italian race colonies						Carniolan race colonies						F1 Italian Hybrid						F1 carniolan hybrid					
	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean	*1	*2	*3	*4	Total	Mean
January	2	1.5	6	8.1	17.6	4.4	8	2.2	3		13.2	3.3	15	3	7	7.8	32.8	8.2	3.3	9	5.1	12.2	29.6	7.4
February	0.0	4	4.3	1.5	9.8	2.5	2.6	5.5	6	2.7	16.8	4.2	13	4	3		20	5.0	8	7.2	3.7	9.5	28.4	7.1
March	3.6	1	3	1.2	8.8	2.2	4	0.0	3.6	0.0	7.6	1.9	4.5	2.5	1.6	5	13.6	3.4	4.5	6.3		10	20.8	5.2
April	3.9	0.0	0.5	0.8	5.2	1.3	1	0.0	0.0	1.3	2.3	0.6	3.6	7	0.0	6.6	11.2	4.3	3.5	1.5	0.0	5	10.0	2.5
May	2	0.7	1	0	3.7	0.9	0.8	0.0	1	1	2.8	0.7	6	3	4	5	18.0	4.5	4	0.0	0.0	10.4	14.4	3.6
June	1	0	2.2	0	3.2	0.8	0	2	0.0	3	5.0	1.3	2	5.7	0.0	2.7	10.4	2.6	3	3.4	4.2	9	19.6	4.9
July	1.3	0	3	1.3	5.6	1.4	0	2	1.6	0.0	3.6	0.9	8.1	7.3	3	4.8	23.2	5.8	2.3	0.0	3.3	6	11.6	2.9
August	3	1.3	2	3.3	9.6	2.4	2	0.0	3	1.6	6.8	1.7	9.8	3.4	7.4	5	25.6	6.4	5	4.1	6	7.7	22.8	5.7
septembe	5	3.2	8	7	23.2	5.6	5	0.0	7	6.4	18.4	4.6	12	7.2	7	8.6	34.8	8.7	4.3	4.1	7.5	5.3	21.2	5.3
October	6	4	5	9	24.0	6.0	7	3	11	6.2	27.2	6.8	11	16	9.2	13	49.2	12.3	7.8	11.9	9	9.3	38.0	9.5
Novembe	10	2	16.2	3	31.2	7.8	4	14	7.6	12	37.6	9.4	7.5	22	19	8.3	56.8	14.2	9.5	15	13	7.7	45.2	11.35
Decembr	9	7	5.6	4	25.6	6.4	5	9	8.4	8	30.4	7.6	8	18.3	10.5	18	54.8	13.7	15.6	21	9	16.8	62.4	15.6
Total	46.8	24.8	56.8	39.2	167.5	41.9	39.4	37.7	52.2	42.2	171.7	42.9	100.5	99.4	71.7	84.8	356.4	89.1	70.8	83.5	60.8	108.9	324	81
Mean	3.9	2.1	4.7	3.3	13.9	0.0	3.3	3.1	4.35	3.5	14.3	0.0	8.4	8.3	6.0	7.1	29.7	0.0	5.9	7.5	5.1	9.1	27.0	0.0

* Numbers of Colonies Replicates

L.S.D.		Treat	Date	txd
	5%	6.32	2.52	N.s
	1%	11.6	3.55	N.s

Fig(17) Amount of propolis collected monthly 1997



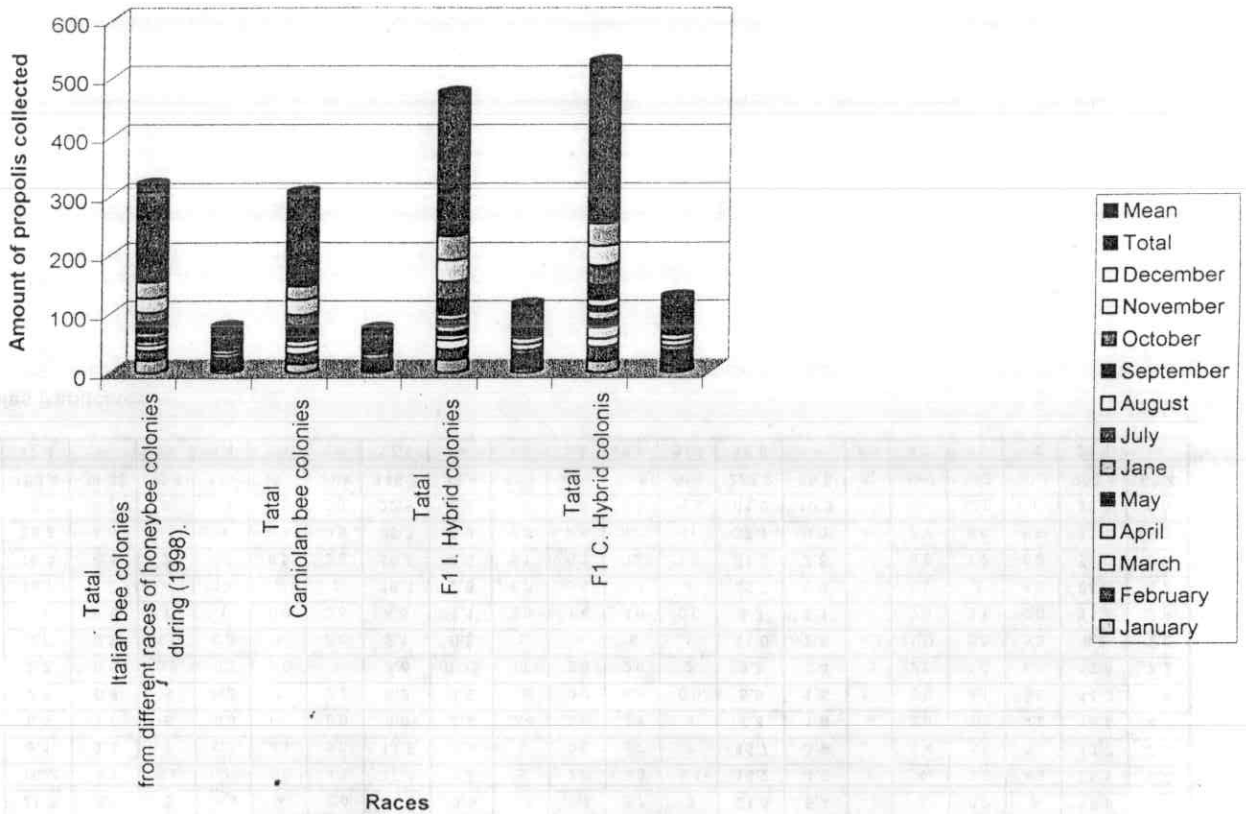
Table(26) Amount of propolis collected monthly from different races of honeybee and their hybrids 1998

Months	Propolis production from different races and hybrids (In grams)																					
	Italian race colonies						Carniolan race colonies						F1 I. Hybrid colonies						F1 C. Hybrid colonis					
	*1	*2	*3	*4	Tatal	Mean	*1	*2	*3	*4	Tatal	Mean	*1	*2	*3	*4	Tatal	Mean	*1	*2	*3	*4	Tatal	Mean
January	8.3	4	7.5	1.5	21.3	5.3	6	4.3	4	0.0	14.3	3.6	4.5	7.4	6.7	3	21.6	5.4	4.6	3	6.2	5	18.8	4.7
February	11	1.8	3.4	0.0	16.2	4.1	8.6	2	5.5	1.7	17.8	4.5	5	2.5	4.3	6.4	18.2	4.6	8	4	8.6	4.5	25.1	6.3
March	7.1	0.0	2	0.0	9.1	2.3	7	0.0	4.9	0.0	11.9	2.9	3	0.0	5.7	7	15.7	3.9	3.1	1.4	5.7	3.5	13.7	3.4
April	3	0.0	1.7	1.7	6.4	1.6	5	0.0	4	0.0	9.0	2.3	2.4	0.0	2.4	3	7.8	1.9	4	2.8	7.6	4.2	18.6	4.7
May	2.5	0.0	0.0	0.0	2.5	0.6	3	0.0	1	2.2	6.2	1.6	1.6	0.0	4.3	0.0	5.9	1.5	4.7	0.0	6.1	3.5	14.3	3.8
Jane	1.2	0.0	1	0.0	2.2	0.6	2.8	0.0	0.0	1	3.8	0.95	1.5	3.6	2.6	2	9.7	2.4	3	2.5	1.6	5.7	12.8	3.2
July	2	0.0	1.7	0.0	3.7	0.9	1.1	0.0	1	0.0	2.1	0.5	1	4	5	1	11.0	2.8	4.3	1.0	0.0	3.3	8.6	2.2
August	3	2	0.0	1.4	6.4	1.6	1	1	0.0	2.5	4.5	1.1	2.3	1.4	4.6	0.0	8.3	2.1	6	2.3	3.1	0.0	11.4	2.9
September	5	5.9	4.6	3.2	18.7	4.7	4	1.4	3	2	10.4	2.6	6.7	6.6	8.4	4	25.7	6.4	9.3	5.9	5	4.6	24.8	6.2
October	7.3	2.4	5	1.7	16.4	4.1	7	0.0	8.5	2.9	18.4	4.6	5.1	6.3	12	7.8	31.2	7.8	12	8.6	7.2	6.2	34.0	8.5
November	8.0	4.3	7	4.5	23.8	6.0	9.1	3	9.7	3.5	25.3	6.3	7.2	8.6	10.3	11	37.1	9.3	11	7.7	8.6	5.8	33.1	8.3
December	8.6	6	5.1	7	26.7	6.7	8	5.4	3.5	5.6	22.5	5.6	13	2.9	9.5	15.6	41.0	10.3	13	10.7	10.5	4	38.2	9.6
Total	67	26.4	39	21	153.4	38.35	62.6	17.1	45.1	21.4	146.2	36.6	53.3	43.3	75.8	60.8	223.2	55.8	83	49.9	70.2	50.3	253.4	63.4
Mean	5.6	2.2	3.3	1.75	12.4	--	5.4	1.4	3.8	1.8	12.1	--	4.4	3.6	6.3	5.06	18.6	--	6.9	4.2	5.9	4.2	21.1	--

* Numbers of Colonies Replicates

		Treat	Date	txd
L.S.D.	5%	9.6	3.83	N.s
	1%		5.4	N.s

Fig(18) Amount of propolis collected monthly 1998



VIII. Biometrics studies of honeybee worker of some honeybee races and hybrids

The present investigation was operated to compare between the two races and their hybrids Italian, Carniolan, F_1 Italian and F_1 Carniolan measurements of different important organs of the bee workers. The morphometrical measurements investigated were the length of legs, pollen basket area (corbicula), the length of tongue, hypopharyngeal glands and wax glands. In this experiment the mentioned parts of the honeybee worker races and hybrids was indicated and calculated in **Table (27)** and illustrated in **Fig. (19)**. The mean length of legs of honeybee races and hybrids Italian, Carniolan, F_1 Italian and F_1 Carniolan bees were 9.38,9. 9.26, 9.23, and 9.32 mm, respectively.

The mean area of the pollen basket (corbicula) for Italian, Carniolan, F_1 Italian and F_1 Carniolan bees were 1.67, 1.66, 1.61 and 1.62 mm, respectively. It also showed that the largest area of corbicula was 1.67 mm2 in the Italian bees, and the smallest area was 1.61mm2 in the F_1 Italian bees, and the other honeybee races were intermediate between these two honeybee races

The mean length of proboscis (glossa) for Italian Carniolan, F_1 Italian and F_1 Carniolan bees were 6.13, 6.29, 6.33 and 6.16mm, respectively.

From the data showed that the longest proboscis was 6.33mm in the F_1 Italian workers, while the shortest was 6.13 in the Italian bees. The other honeybee races were intermediate between these two races. The maximum length for proboscis was 7.4mm, while the shortest was 4.3 mm.

Hypopharyngeal glands and wax glands of honeybee races measurements in Italian, Carniolan, F_1 Italian and F_1 Carniolan

This study showed that the hypopharyngeal glands start developing in workers of honeybees from four days of worker age after emergence and

finished in fourteen days of worker age and was to do well period activity of the hypopharyngeal glands.

From the data recorded in **Table** (28) it showed that the length of the lobe of hypopharyngeal (glands where 0.24, 0.19, 0.21 and 0.20mm was Italian, Carniolan, F_1 Italian and F_1 Carniolan, respectively, while the shortest one were 0.15, 0.14, 0.16 and 0.13 mm, respectively.

From this study the wax glands have to start activity for wax secretion from the six tenth day of worker age and continue until twenty- two days of worker age. The development of these glands depends to on the age of the worker in the hive.

Data recorded in **Table** (29) showed that the maximum length of wax plate of the races were 2.50, 2.56, 2.51 and 2.54 mm in Italian, Carniolan, F_1 Italian and F_1 Carniolan bees. respectively, while the minimum length of the same gland of these races were 1.7, 1.73, 1.75 and 1.63mm, respectively.

Also, the data recorded indicated that the maximum wild (w) in the same races of worker Italian, Carniolan, F_1 Italian and F_1 Carniolan were 2.73, 2.93, 2.69 and 2.87mm, respectively, while the minimum on in the same races of worker of these races were 1.96, 2.03, 2.01 and 1.96 mm, respectively.

These results were in agreement of those obtained by **(*Snodgrass* 1956 and El-Samni 1967)** who mentioned that the development and physiological activity of the food glands vary with the worker in which the bee is engaged, the gland being fully functional when the worker is serving in the hive as a nurse bee feeding the larvae and the queen.

Table (27): Some Biometrics characters of honeybee races (mean at mm.)

Races	Legs		Glossa	Wax gland		Hypopharyngeal gland	
	Length	Pollen basket		L	W	L	W
Italian race	9.38	1.67	6.13	2.26	2.41	0.18	0.11
Carniolan	9.26	1.66	6.29	2.31	2.48	0.16	0.11
F1 Italian	9.23	1.61	6.33	2.26	2.43	0.19	0.10
F1 Carniolan	9.32	1.62	6.16	2.29	2.48	0.17	0.1

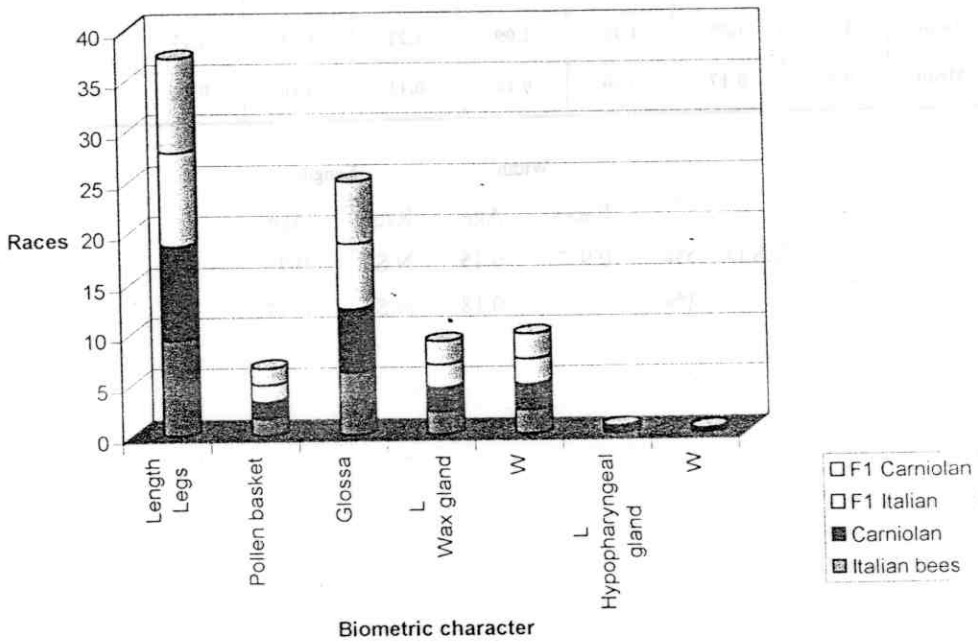


Fig (19) Some biometric character of honeybee races

Table (28) The Mean diameters of hypopharyngeal glands in honeybee races.

Age	Italian		Carniolan		F_1 Italian		F_1 Carniolan	
	Length	Width	Length	Width	Length	Width	Length	Width
4	0.13	0.18	0.11	0.20	0.13	0.16	0.10	0.18
5	0.10	0.18	0.12	0.21	0.14	0.18	0.10	0.21
6	0.14	0.20	0.11	0.18	0.10	0.16	0.15	0.24
7	0.09	0.15	0.12	0.21	0.12	0.19	0.12	0.19
8	0.08	0.19	0.11	0.18	0.12	0.18	0.11	0.19
9	0.12	0.18	0.12	0.21	0.13	0.15	0.12	0.18
10	0.12	0.17	0.11	0.20	0.11	0.17	0.08	0.18
11	0.11	0.16	0.10	0.20	0.09	0.14	0.08	0.17
12	0.09	0.17	0.09	0.16	0.09	0.15	0.09	0.17
13	0.12	0.18	0.11	0.18	0.11	0.16	0.09	0.15
14	0.07	0.13	0.08	0.16	0.08	0.14	0.09	0.16
Total	1.17	1.89	1.18	2.09	1.22	1.78	1.17	2.02
Mean	0.10	0.17	0.10	0.19	0.11	0.16	0.11	0.18

		Width		Length	
		Races	Age	Races	Age
L.S.D.	5%	0.9	0.15	N.S.	0.7
	1%	....	0.18	N.S.	0.14

Table (29) Wax Glands of honeybee races and its hybrids.

Age	Italian		Carniolan		F_1 Italian		F_1 Carniolan		Total	
	L	W	L	W	L	W	L	W	L	W
1	1.7	2.09	1.73	2.03	1.75	2.18	1.63	2.21	6.81	8.51
2	2.25	2.51	2.23	2.56	2.31	2.42	2.38	2.87	9.17	10.36
3	2	2.52	2.13	2.23	2.35	2.51	2.1	2.56	8.58	10.12
4	2.13	2.32	2.18	2.55	2.25	2.31	2.28	2.31	8.84	9.49
5	2.28	2.17	2.4	2.35	2.37	2.80	2.41	2.28	9.46	9.6
6	2.18	2.38	2.35	2.73	2.26	2.1	2.27	2.45	9.06	9.66
7	2.32	2.03	2.49	2.56	2.05	2.01	2.12	2.33	8.98	8.93
8	2.26	2.56	2.27	2.08	2.27	2.69	2.46	2.82	9.26	10.15
9	2.47	2.56	2.19	2.4	2.25	2.69	2.27	2.51	9.18	10.16
10	2.33	2.04	2.23	2.41	2.0	2.26	2.37	2.72	8.93	9.43
11	2.25	2.5	2.27	2.48	2.27	2.43	2.31	2.5	9.1	9.91
12	2.28	2.34	2.13	2.16	2.28	2.2	2.26	2.2	8.95	8.9
13	2.23	2.35	2.43	2.46	2.25	2.31	2.27	2.38	9.18	9.5
14	2.32	2.6	2.5	2.55	2.51	2.53	2.49	2.43	9.5	10.11
15	2.50	2.66	2.35	2.76	2.05	2.21	2.0	1.96	8.9	9.59
16	2.36	2.55	2.25	2.28	2.5	2.59	2.5	2.61	9.61	10.03
17	2.36	2.73	2.56	2.93	2.5	2.82	2.43	2.38	9.85	10.86
18	2.38	2.45	2.4	2.5	2.27	2.5	2.46	2.69	9.51	10.14
19	2.04	1.96	2.50	2.6	2.27	2.5	2.25	2.4	9.06	9.46
20	2.5	2.59	2.54	2.52	2.37	2.43	2.36	2.55	9.77	10.09
21	2.35	2.73	2.56	2.87	2.47	2.7	2.54	2.68	9.92	10.98
Total	47.49	50.64	48.69	52.01	47.6	51.19	48.16	52.14	191.94	205.98
Mean	2.26	2.41	2.31	2.48	2.26	2.43	2.29	2.48		

		L		W	
		Races	Age	Races	Age
L.S.D For	5%	0.8	0.3	N.S	0.13
	1%	--	0.15	N.S	0.22