SOME FACTORS AFFECTING HONEY BEE QUEEN'S PRODUCTION

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بعض العوامل التى تؤثر في إنتاج ملكات نحل العسل

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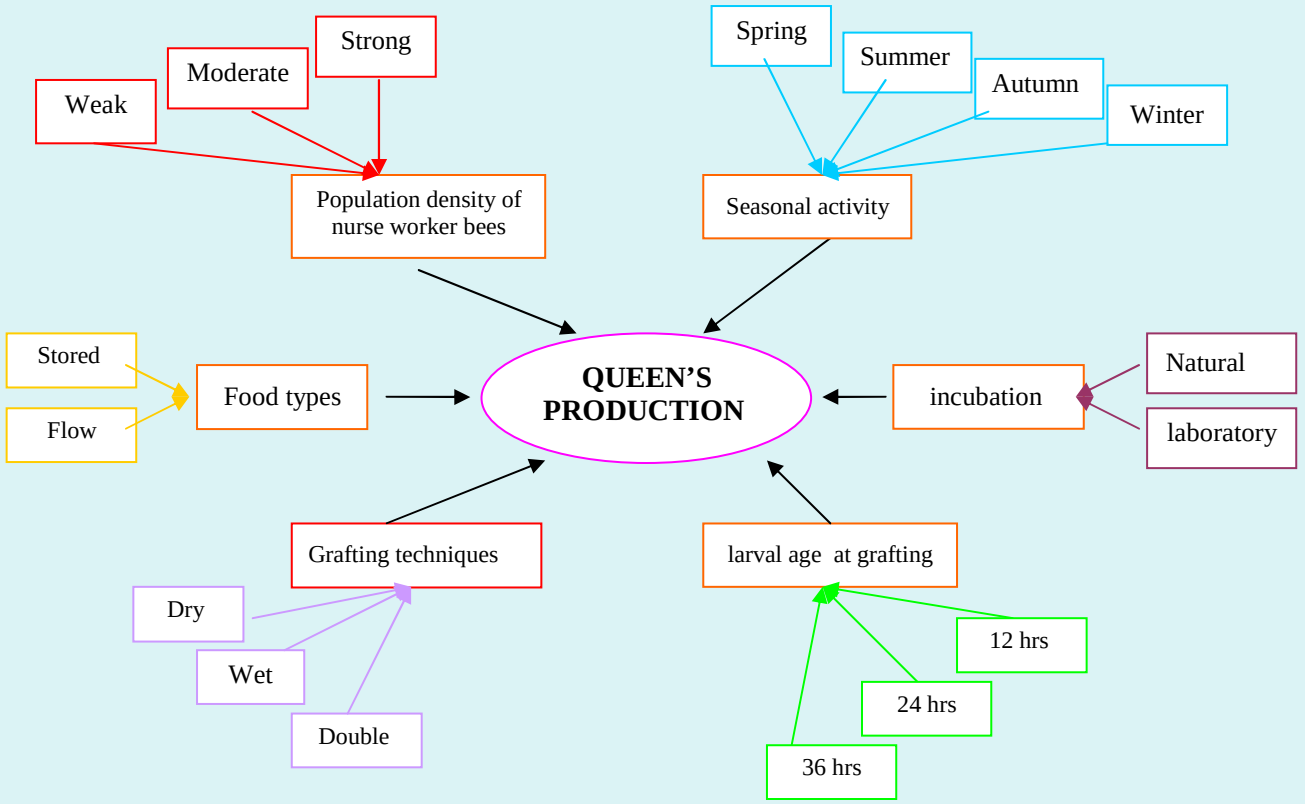

QUEEN'S PRODUCTION
Population density of nurse worker bees
Strong
Moderate
Weak
Seasonal activity
Spring
Summer
Autumn
Winter
Food types
Stored
Flow
incubation
Natural
laboratory
Grafting techniques
Dry
Wet
Double
larval age at grafting
12 hrs
24 hrs
36 hrs

Preparing Queen Cell Cups

Preparing Hive for Rearing Queens

LARVAL AGE

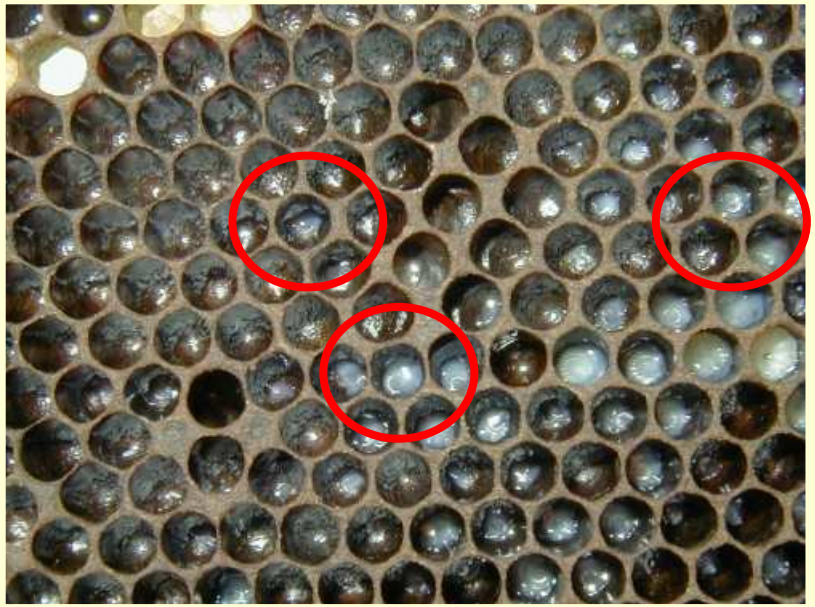
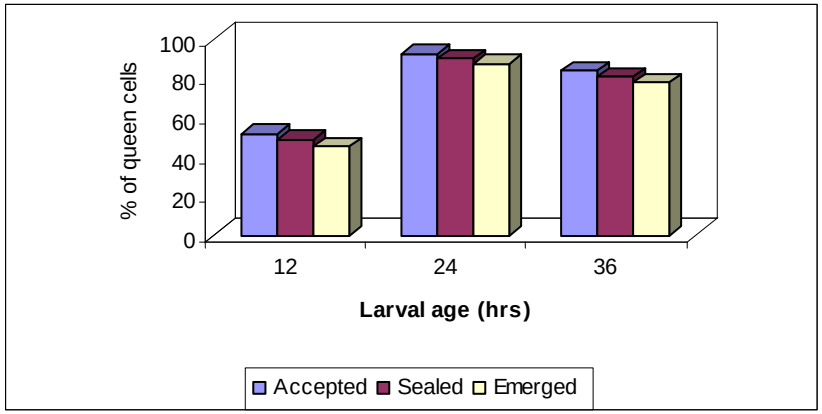


Table (1) Mean numbers and Percentages of accepted, sealed and emerged queen cells produced under different ages of larvae during 2000 and 2001 seasons (means ± S.E.).

Larval Age (hrs.)	Accepted						Sealed						Emerged					
	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%
	No.	%	No.	%			No.	%	No.	%			No.	%	No.	%		
12	17.0 ±0.5	56.6	14.00 ± 0.58	46. 67	**15.5 ± 0.5 c**	**51.6**	16.0 ± 0.58	53.3	13.0 ± 0.67	43.33	**14.3 ±0.05 c**	**48.3**	12.0 ±0.5	40. 00	15.00 ±0.58	50.0	**13.50 ±0.50 c**	**45.00**
24	28.0 ±0.0 1	93.3	27.33 ± 0.33	91.10	**27.67 ± 0.3 a**	**92.2**	27.3 ± 0.33	91.1	26.3 ± 0.33	87.7	**26.8 ± 0.01a**	**89.4**	26.0 ±0.5	86. 67	26.33 ±0.33	87.7	**26.17 ±0.16 a**	**87.22**
36	24.6 ±0.3	82.2 0	25.33 ± 0.33	84.43	**25.00 ± 0.3b**	**83.3**	24.0 ± 0.58	80.0	24.3 ± 0.33	81.10	**24.17 ± 0.13b**	**80.5**	23.3 ±0.3	77. 77	23.00 ±0.58	76.6	**23.17 ±0.16 b**	**77.22**
Mean ± s.e.	23.2 ±0.3	77.4	22.22 ± 0.41	74.06	**22.72 ± 0.50**	**75.3**	51.3 ± 0.50	74.8	21.2 ± 0.44	70.7	**21.83 ± 0.30**	**72.7**	20.4 ±0.5	68. 15	21.44 ±0.50	71.4	**20.94 ±0.50**	**69.28**
F	10.33						7.15						6.00					
L. S. D	0.726						0.873						0.906					

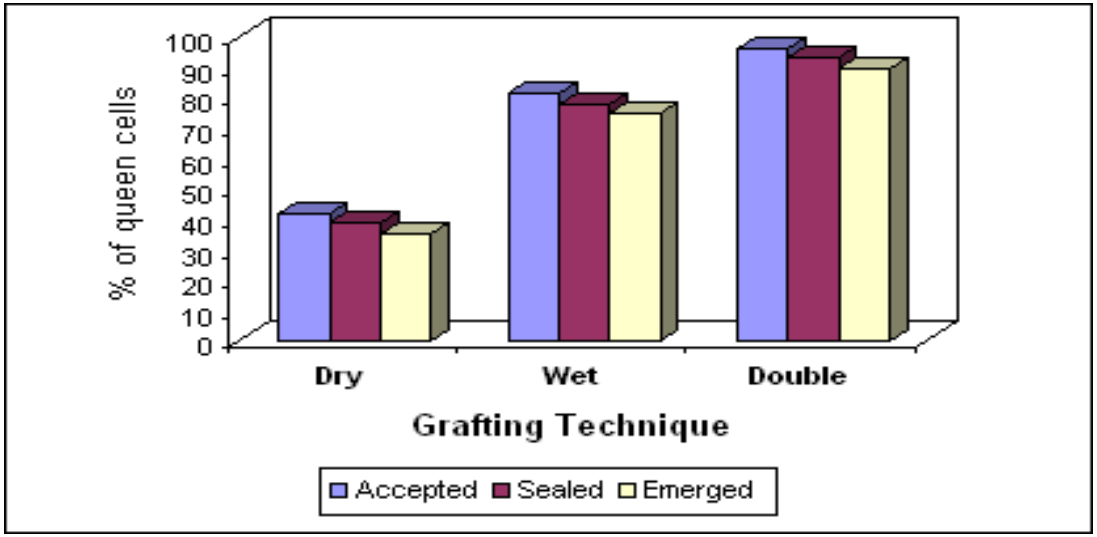
Three replicates were used for each treatment, starting with 30 queen cups.



Grafting Techniques

Table (2) Mean numbers and Percentages of accepted, sealed and emerged queen cells produced under different grafting techniques during 2000 and 2001 seasons (Means ± s.e.).

Grafting Techniques	Accepted						Sealed						Emerged					
	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%
	No.	%	No.	%			No.	%	No.	%			No.	%	No.	%		
Dry	12.0 ±0.5	40.0	13.00 ± 0.58	34.33	**12.50 ± 0.01**	**41.66**	11.00 ±0.5	63.67	12.00 ±0.5	40.00	**11.5 ±0.1**	**38.33**	10.0 ±0.5	33.33	11.00 ±0.58	36.67	**10.50 ±0.50 c**	**35.00**
Wet	24.6 ±0.3	82.2	24.00 ± 0.58	80.00	**24.33 ± 0.13**	**81.10**	23.66 ±0.5	78.87	23.00 ±0.5	76.67	**23.3 ±0.1**	**77.77**	22.6 ±0.3	75.53	22.00 ±0.58	73.33	**22.33 ±0.33 b**	**74.43**
Double	29.0 ±0.1	96.6	28.33 ± 0.33	94.43	**28.67 ± 0.13**	**95.55**	28.33 ±0.3	94.43	27.33 ±0.3	91.10	**27.8 ±0.3**	**92.77**	27.3 ±0.3	91.10	26.33 ±0.33	87.77	**26.83 ±0.50 a**	**89.44**
Mean ± s.e.	21.8 ±0.3	72.9	21.78 ± 0.50	72.59	21.84 ± 0.55	72.78	21.00 ±0.5	70.00	20.78 ±0.5	69.25	20.8 ±0.4	69.62	20.0 ±0.4	66.65	19.78 ±0.50	65.92	19.89 ±0.11	66.28
F value	2.27						2.58						2.58					
L. S. D	0.803						0.839						0.839					



Queen cells (A)

Queen cells (B)

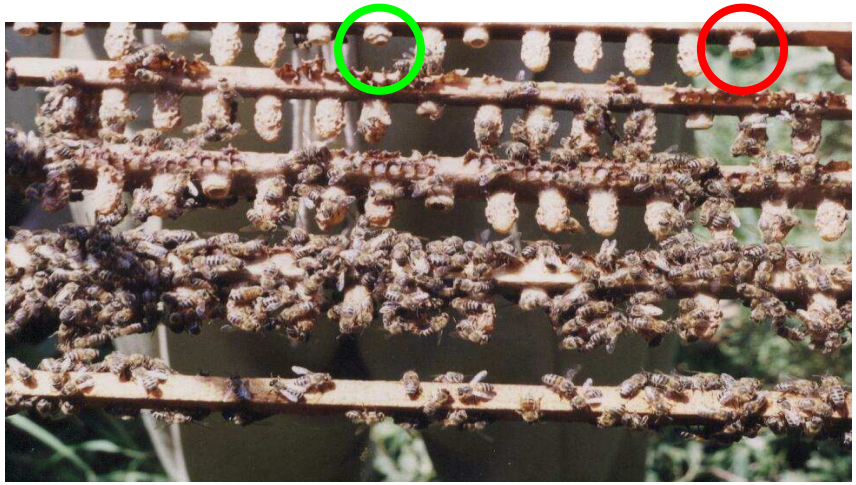


Table (3) Mean numbers and percentages of accepted, sealed and emerged queen cells produced under different Food Types during 2000 and 2001 seasons (Means ± S.E.).

Food Types	Accepted						Sealed						Emerged					
	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%
	No.	%	No.	%			No.	%	No.	%			No.	%	No.	%		
Stored honey and pollen in combs.	12.0 ±0.5	40.0	11.33 ± 0.88	37.7	**11.67 ± 0.3 e**	**38.8**	11.0 ± 0.58	36.7	10.3 ± 0.88	34.43	**10.6 ± 0.3 e**	**35.56**	10.0 ± 0.58	33.33	9.66 ± 0.66	32.20	**9.83 ± 0.17 e**	**32.77**
Carrots' jam.	14.6 ± 0.33	48.8	15.33 ± 0.33	51.1	**15.00 ± 0.3 d**	**49.9**	13.6 ± 0.33	45.5	14.3 ± 0.33	47.77	**14.0 ± 0.3 d**	**46.65**	12.6 ± 0.33	42.20	13.33 ± 0.33	44.43	**12.99 ± 0.33 d**	**43.32**
Semi-dry date fruits.	16.3 ± 0.33	54.4	16.00 ± 0.56	53.3	**16.17 ± 0.5 c**	**53.8**	15.3 ± 0.33	51.1	15.0 ± 0.58	50.00	**15.1 ± 0.2c**	**50.55**	14.3 ± 0.33	47.77	14.00 ± 0.58	46.67	**14.17 ± 0.16 c**	**47.22**
Sucrose yeast cake.	25.3 ± 0.33	84.4	25.00 ± 0.58	83.3	**25.17 ± 0.2 b**	**83.8**	24.3 ± 0.33	81.1	24.0 ± 0.58	80.00	**24.1 ± 0.2 b**	**80.55**	23.3 ± 0.33	77.77	23.00 ± 0.58	76.67	**23.17 ± 0.16 b**	**77.22**
Yeast cake fortified with pollen.	27.3 ± 0.33	91.1	27.00 ± 0.58	90.0	**27.17 ± 0.2a**	**90.5**	26.3 ± 0.33	87.7	26.0 ± 0.58	86.67	**26.2 ± 0.16 a**	**87.22**	25.3 ± 0.33	84.43	25.00 ± 0.58	83.33	**25.17 ± 0.16 a**	**83.88**
Mean ± S.E.	19.1 ± 0.38	63.7	19.00 ± 0.58	47.0	**19.06 ± 0.06**	**55.8**	18.1 ± 0.38	60.4	18.0 ± 0.59	59.77	**18. 1 ± 0.06**	**50.10**	17.1 ± 0..3	57.10	17.00 ± 0.55	54.86	**17.07 ± 0.0.06**	**56.88**
F value	7.48						6.48						8.43					
L. S. D	0.681						0.861						0.736					

Three replicates were used for each treatment, starting with 30 queen cups.

Food Types

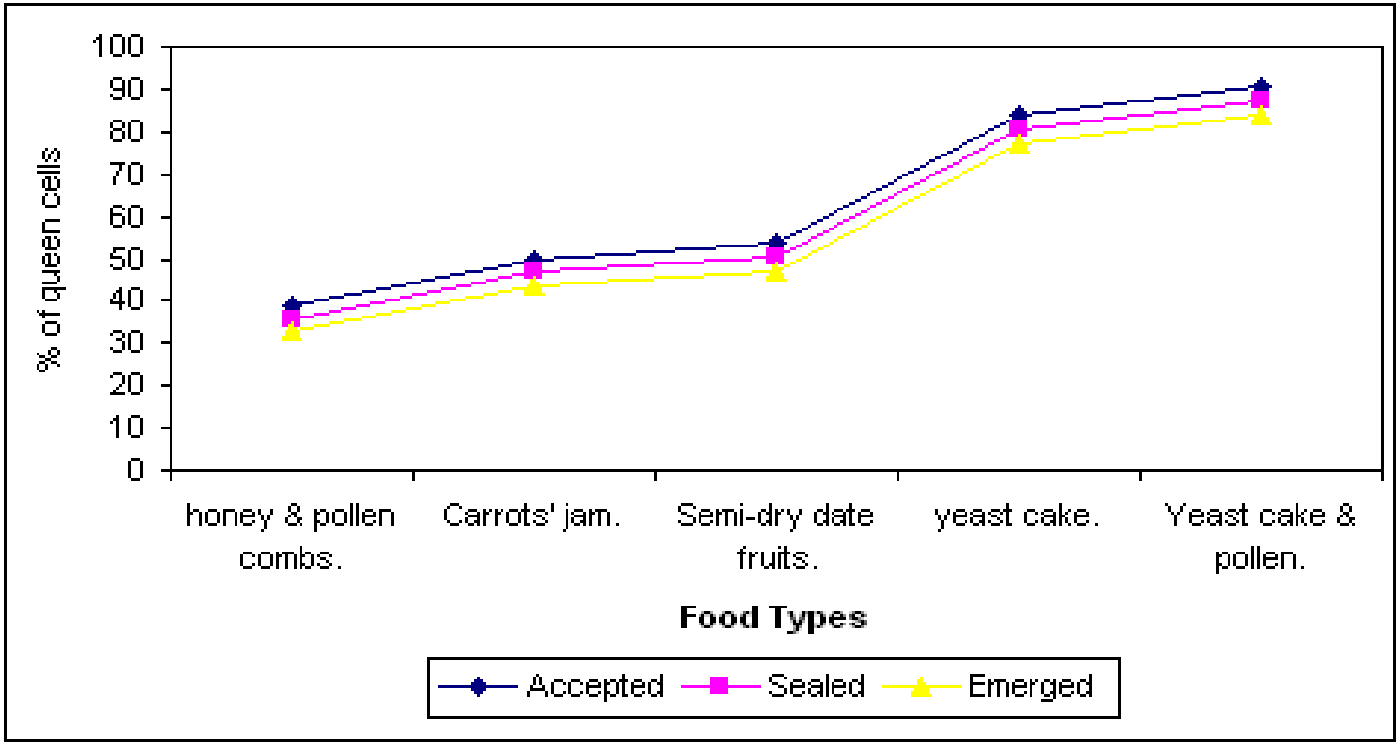
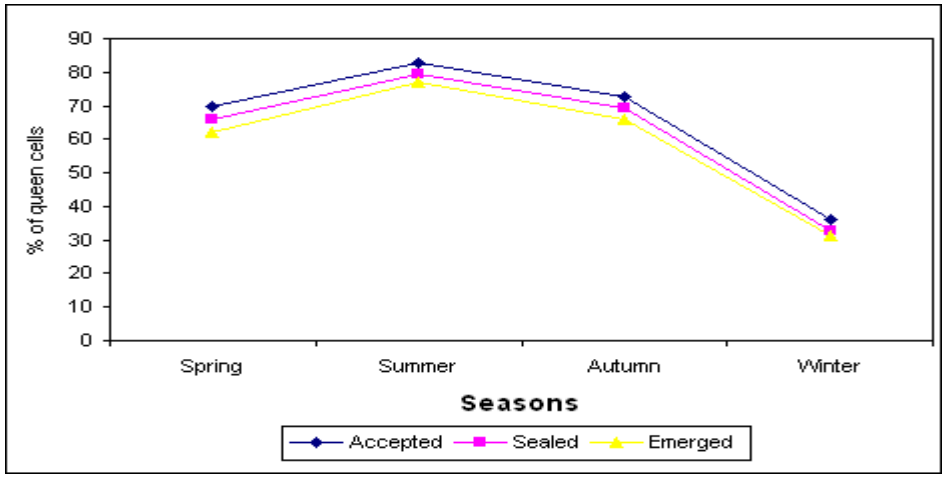

100
90
80
70
60
50
40
30
20
10
0
% of queen cells
honey & pollen combs.
Carrots' jam.
Semi-dry date fruits.
yeast cake.
Yeast cake & pollen.
Food Types
Accepted
Sealed
Emerged

Table (5) Mean numbers and Percentages of accepted, sealed and emerged queen cells produced in different seasons during 2000 and 2001 seasons (Means ± s.e.).

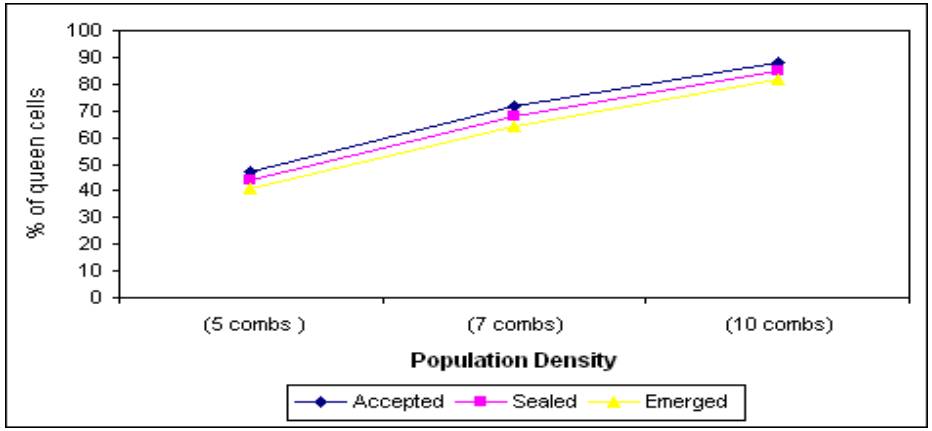
Seasons	Accepted						Sealed						Emerged					
	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%
	No.	%	No.	%			No.	%	No.	%			No.	%	No.	%		
Spring	21.33 ± 0.33	71.1	20.66 ± 0.33	68.8	**21.00 ± 0.2b**	**70.0**	20.0 ±0.5	66.6	19.6 ±0.3	65.5	**19.83 ± 0.17 b**	**66.10**	19.0 ± 0.58	63.33	18.33 ± 0.33	61.10	**18.67 ± 0.33 b**	**62.22**
Summer	25.33 ± 0.66	84.4	24.33 ± 0.33	81.1	**24.83 ± 0.5a**	**82.7**	24.33 ±0.6	81.1	23.3 ±0.3	77.7	**23.83 ± 0.50 a**	**79.43**	23.6 ± 0.88	78.87	22.23 ± 0.33	74.43	**22.95 ± 0.71 a**	**76.84**
Autumn	22.00 ± 0.58	73.3	21.66 ± 0.88	72.2	**21.83 ± 0.2b**	**72.7**	21.0 ±0.5	70.0	20.6 ±0.8	68.8	**20.83 ± 0.17 b**	**69.43**	20.3 ± 0.33	67.77	19.33 ± 0.67	64.43	**19.83 ± 0.50 b**	**66.10**
Winter	11.00 ± 0.58	36.6	10.66 ± 0.33	35.5	**10.83 ± 0.2c**	**36.1**	10.0 ±0.5	33.3	9.66 ±0.3	32.2	**9.83 ± 0.17 c**	**32.77**	10.0 ± 0.58	33.33	8.66 ± 0.33	28.87	**9.33 ± 0.67 c**	**31.10**
Mean ± s.e.	19.91 ± 0.54	66.3	19.32 ± 0.46	64.4	**19.62 ± 0.29**	**65.3**	18.7 ±0.6	62.7	18.3 ±0.4	61.0	**18.54 ± 0.21**	**61.78**	18.2 ± 0.59	60.82	17.16 ± 0.42	57.20	**17.70 ± 0.54**	**59.00**
F. Value	5.17						6.17						5.37					
L. S. D	0.810						0.847						0.810					



Colony Strength

Table (4) Mean numbers and Percentages of accepted, sealed and emerged queen cells produced under different Population Density (combs covered with adult bees) during 2000 and 2001 seasons (Means ± s.e.).

Population Density	Accepted						Sealed						Emerged					
	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%	2000		2001		Mean ± s.e.	%
	No.	%	No.	%			No.	%	No.	%			No.	%	No.	%		
Weak colonies (5 combs)	14.33 ± 0.67	47.77	14.00 ± 0.58	46.67	**14.17 ± 0.2c**	**47.2**	13.3 ± 0.6	44.4	13.0 ± 0.58	43.3	**13.16 ± 0.16 c**	**43.87**	12.33 ± 0.6	41.1	12.00 ± 0.58	40.00	**12.17 ± 0.16 c**	**40.57**
Moderate colonies (7 combs)	21.33 ± 0.33	71.10	21.66 ± 0.33	72.20	**21.50 ± 0.2b**	**71.6**	20.0 ± 0.58	66.6	20.6 ± 0.33	68.8	**20.33 ± 0.33 b**	**67.77**	19.00 ± 0.5	63.3	19.66 ± 0.33	65.53	**19.33 ± 0.33 b**	**64.43**
Strong colonies (10 combs)	26.00 ± 0.58	86.66	27.00 ± 0.58	90.00	**26.50 ± 0.5a**	**88.3**	25.0 ± 0.58	83.3	26.0 ± 0.58	86.6	**25.50 ± 0.50 a**	**85.00**	24.00 ± 0.5	80.0	25.00 ± 0.58	83.33	**24.50 ± 0.50 a**	**81.67**
Mean ± s.e.	20.55 ± 0.53	68.51	20.88 ± 0.50	69.62	**20.72 ± 0.16**	**69.1**	19.4 ± 0.61	64.8	19.8 ± 0.50	66.3	**19.67 ± 0.22**	**65.57**	18.44 ± 0.6	61.4	18.89 ± 0.61	62.95	**18.7 ± 0.23**	**62.22**
F. Value	8.80						7.76						6.76					
L. S. D	0.938						0.998						0.998					



Starter – Finisher Colony

Incubation

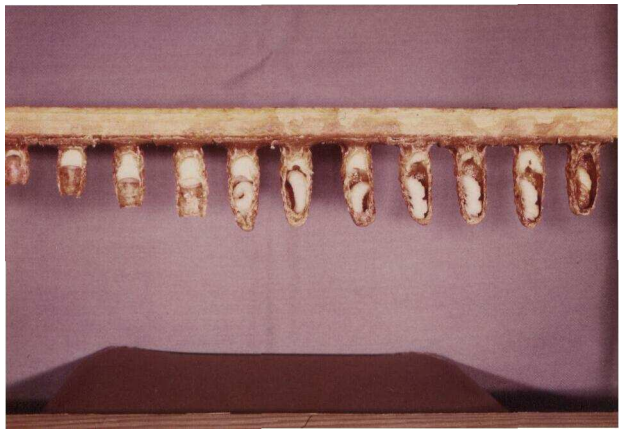
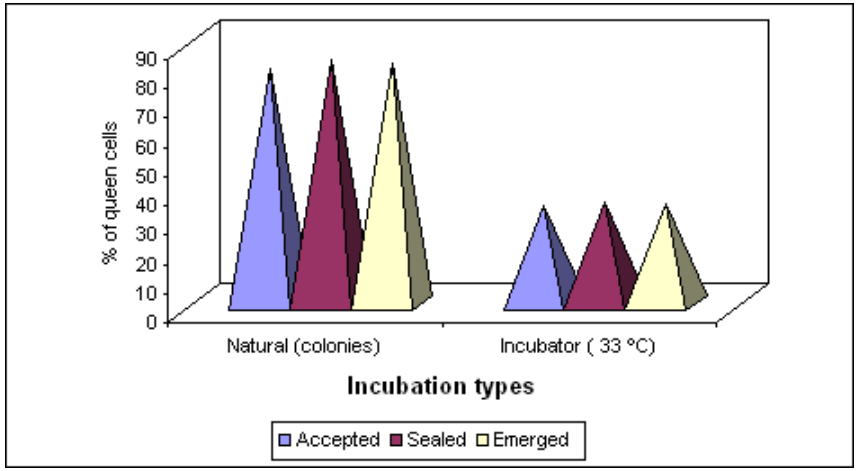


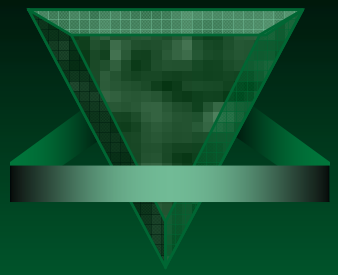
Table (6) Mean numbers and Percentages of virgin queens emerged under different Incubation Types during 2000 and 2001 seasons (means ± S.E.).

Incubation Types	Emerged					
	2000		2001		Mean ± s.e.	%
	No.	%	No.	%		
Natural (in bee colonies)	24.00 ± 0.58	80.00	25.00 ± 0.58	83.33	**24.50** ± 0.01 a	**81.66**
Incubator (at 33 ºC)	10.00 ± 0.58	33.33	10.33 ± 0.33	34.43	**10.17** ± 0.01 b	**33.88**
Mean ± s.e.	17.00 ± 0.58	56.67	17.50 ± 0.15	57.22	**17.25** ± 0.01	**57.50**
F value	**8.10**					
L. S. D	**1.215**					

Three replicates were used for each treatment, starting with 30 queen cups.



Emergence



THANKS