



ApiArab Expo

FEBRUARY 5TH TO 6TH, 2018



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Honeybee Queen Rearing

المؤتمر الدولي الأول للهيئة العربية لتربية النحل

أبو ظبي 5 - 6 /2/ 2018

DONE BY

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AL-BALQA APPLIED UNIVERSITY

Introduction

Honey bee queen, mother of all individuals in the colony, and it determines with drones the inherited characteristics of the colony.



Periodic replacement of old queens and /or failing queens by young and high quality one is an important management practice in commercial beekeeping industry all over the world.



مؤتمر الجمعية العربية لتربية النحل الأول

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مركز أبوظبي الوطني للمعارض - دولة الإمارات العربية المتحدة



- The queen bee holds the most important position in a colony.
- The performance of a honey bee colony is the result of its queen's function as well as of that of the drones that mated with her.
- Commercialization of queen breeding requires the mass production of large numbers of high quality queens.

- ▶ **Queen quality**
- ▶ Depends on **genetic**, **Environmental factors** and **good management**.
- ▶ Periodical requeening with young queens less than one year old, results in more honey production than colonies headed by old queens.
- ▶ Moreover, the loss of a queen represents a serious threat to the survival of the honey bee colony and beekeepers frequently require new queens to start new colonies and replace dead or failing queens.



Why we rear queens

- ▶ Change the blood of honeybee stock.
- ▶ young queens are more prolific egg-layers and swarm less than older queens.
- ▶ To replace failing queens, lost queens and for making nuclei for sale and expanding the apiary.
- ▶ In raising queens in his apiary, the beekeeper saves money.

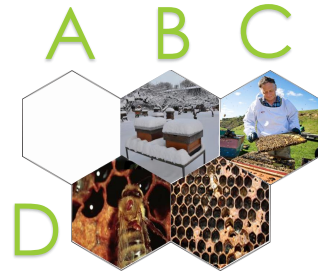
Basic criteria

There are four basic criteria of when selecting queens



Basic criteria

A. Good honey production.



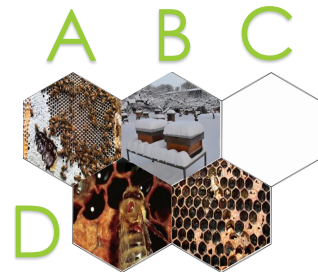
Basic criteria

B. Wintering capability.



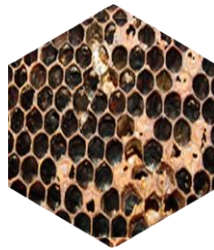
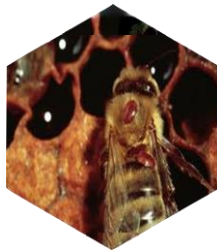
Basic criteria

C. Gentle temper and ease of management.



Basic criteria

D. Resistance and adaptability.





Doolittle rearing method

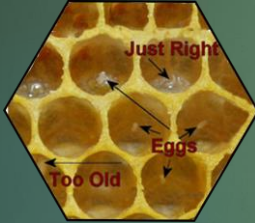


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Doolittle rearing method

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The larvae to be grafted should be well fed from the time they hatch.

Doolittle rearing method



15



The breeder colony must have plenty of young nurse bees.

16

Doolittle rearing method



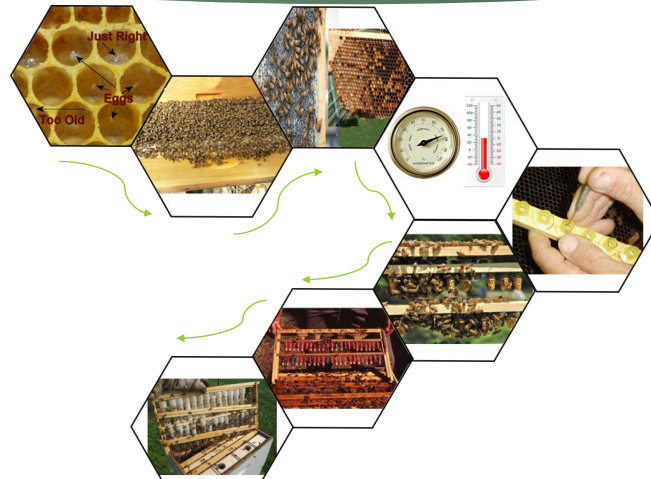
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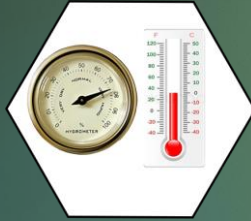
With a plenty of nectar and pollen the breeder colony .

18

Doolittle rearing method

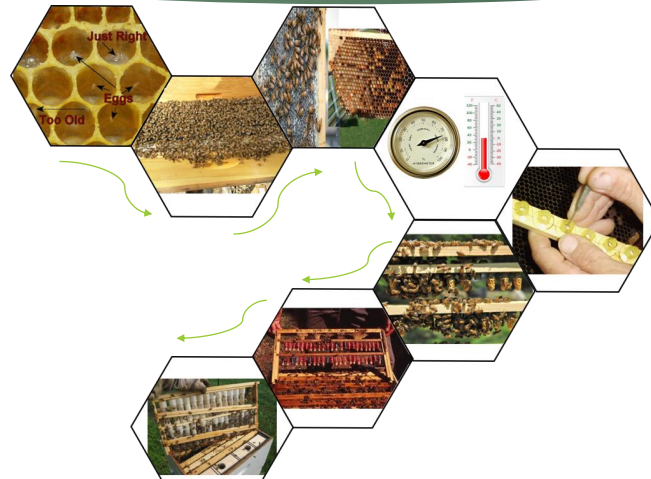


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The larvae must be kept in a warm and humid environment

Doolittle rearing method





The cells must be handled gently and kept in their natural position to prevent damage to the developing queens.

The larvae in the frames and / or queen cups should be wrapped in a warm damp towel or over a pan of warm water. The grafted larvae should be placed in the swarm box as soon as possible after grafting.

Doolittle rearing method





After the cells are sealed they must be kept at the proper temperature and humidity in the finishing colony.

Doolittle rearing method



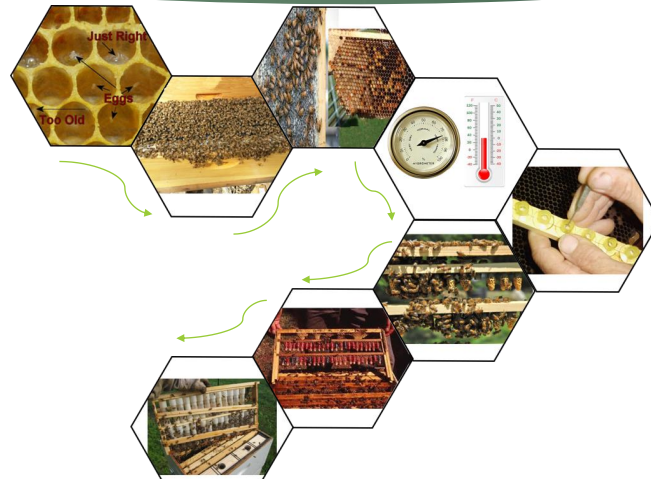
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Be sure the finishing colony contains enough bees to keep the cells at the proper temperature and humidity

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Doolittle rearing method



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Day ten: the mature queen cells should be placed into nucs or, alternatively caged temporarily, so that the first queen out cannot kill her sisters. Handle these cells gently, keep them warm and upright and avoid shaking them.

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**"POORLY REARED QUEENS OF PRODUCTIVE STOCK
GENERALLY WILL BE INFERIOR TO WELL-REARED QUEENS
FROM LESS PRODUCTIVE STOCK."**

Honeybee drone

- ▶ Adequate rearing and maintenance of healthy drones are essential for successful queen bee mating.
- ▶ Information on drone bees and their management during an extended queen bee mating season has been collated to assist in the development of management programs to provide increased drone numbers.



Honeybee drone

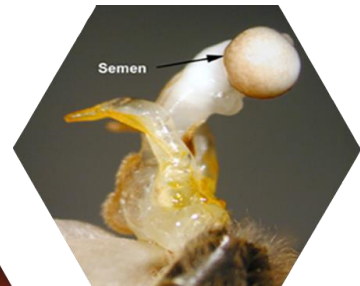
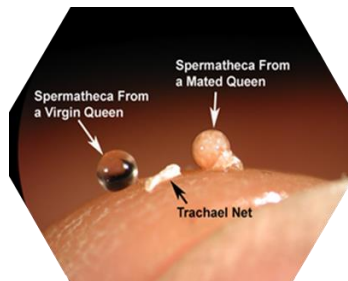
- ▶ A queen bee mates with an average of 12 drones (range 1–32) and a well reared queen bee when fully mated can contain from 4.3 million to 7 million spermatozoa in her spermatheca. A figure of 4.5 million is considered adequate for a commercially reared queen bee.



Queen with mating sign



- ▶ Queen bee uses about 2 million sperm per year and a queen bee containing less than 3 million sperm after mating can be expected to be superseded within 12 months under commercial conditions.



- ▶ Drones mature at about 16 days of age, and become less suitable for mating after 28 days of age. The average life span of a drone is 55 days, and varies with seasonal conditions.
- ▶ Always we take about the number and motility of spermatozoa



How to increase the Capacity of a colony to rear and maintain drones

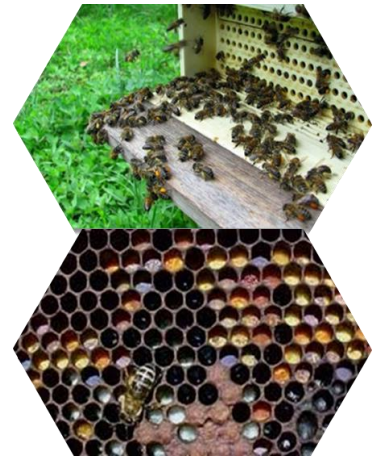
- ▶ Strong colonies with large numbers of worker bees rear and maintain more drone brood and
- ▶ adult drones than weaker colonies.



- ▶ Low numbers of healthy nurse bees in spring may contribute to problems with spring-reared drones
- ▶ Adult drones do not feed themselves but depend on an abundant supply of healthy nurse bees to feed them on honey, pollen and gland secretions.



- ▶ The ability of a colony to maintain a high population of adult drones depends on a continuous supply of pollen coming into the colony and not on stored pollen. Only pollen stored in close proximity to brood shows a positive influence on drone rearing. Strong colonies require 300–400 g of high quality pollen daily (2.1 – 2.8 kg/week).
- ▶ Colonies receiving a continuous supply of pollen maintain maximum drone populations whereas colonies which do not receive a continuous supply of pollen have fewer drones.





Factors affecting the eviction of drones

- ▶ stops feeding of drones due to a lack of incoming pollen supplies.
- ▶ The absence of a queen bee also reduces eviction, though not by as much as an abundance of pollen.
- ▶ A reduction in external hive temperature in hives containing a laying queen or laying workers contributes towards drone eviction.
- ▶ Weather conditions unsuitable for pollen production by plants or which prevent pollen collection by foraging worker bees may result in drone eviction.

Extending the drone breeding season

- ▶ The most important strategy found was to ensure that colonies are fed pollen and/or pollen supplements on a regular and consistent basis.
- ▶ An alternative method for maintaining adult drones out of season involves removing the queen from the hive and providing frames of bees and brood from a queen-right colony and supplying pollen on a regular basis.



The four basic requirements

1. Presence of plenty of pollen grains
2. Use strong colonies headed by a proven queen preferably more than one year old.
3. Drones are produced earlier if a drone comb is placed in the middle of the brood chamber in autumn, preferably a comb with a mixture of drone and worker cells. In spring add one or two frames containing drone cells as hive strength and weather conditions allow.
4. Drone mother colonies require the same amount of management as queen cell raising colonies.

Autumn honeybee queens and their relation to the seasonality of brood, adult populations and honey production

- This research work was done in the northern part of Jordan (Ajloun and Jarash).
- The main purpose was to make a comparison between the queens that reared in Autumn with those that rear in spring time.
- The comparison was done mainly on the number of produced queens, their reproductive ability and the amount of honey produced.



Methodology

- ▶ One colony was selected from among 100 strong colonies with superior features in the apiary to obtain breeding larvae and for rearing natural queen cells.
- ▶ Four colonies, of which two were used as beginning and two as finishing colonies were selected again from among strong colonies. In addition, a total of 30 colonies were formed as standard five-frame nuclei colonies

Methodology

- ▶ Queens were reared using Doolittle rearing method
- ▶ The same procedure was done in autumn and spring time.
- ▶ Number of grafted larvae, Number of accepted cells, Grafting yield (%), Number of emerging queen bees, Rate of emergence (%), Number of mating queen bees, Rate of mating (%), Sealed queen cell length (mm), Emergence weight (mg), Pre-oviposition period (days), Diameter of spermatheca (mm), the parameters that measured.

Results and Discussion

► Results of larvae transfer and mating

Feature	Autumn time	Spring time
Number of grafted larvae	60	60
Number of accepted cells	56	58
Grafting yield (%)	93	97
Number of emerging queen bees	52	56
Rate of emergence (%)	93	97
Number of mating queen bees	45	51
Rate of mating (%)	86	91

Results and Discussion

► Various features of queen bees

Queen rearing time	Sealed queen cell length (mm)	Emergence weight (mg)	Pre-oviposition period (days)	Diameter of spermatheca (mm)
Autumn queens	24.80	203.4	10.3	0.98
Spring queens	18.78	182.1	10.4	0.88

Results and Discussion

- The average honey production (kilogram) of the honeybee colonies headed by original queens and other headed by queens reared in autumn time and spring time for two seasons .

Honey production (kg)	mother colonies	Autumn queens colonies (the new divided colonies)	Spring queens colonies (the new divided colonies)
<u>First season (eucalyptus)</u>	8	16	10
<u>Second season (SILYBUM MARIANUM)</u>	6	18	9

First season (eucalyptus)



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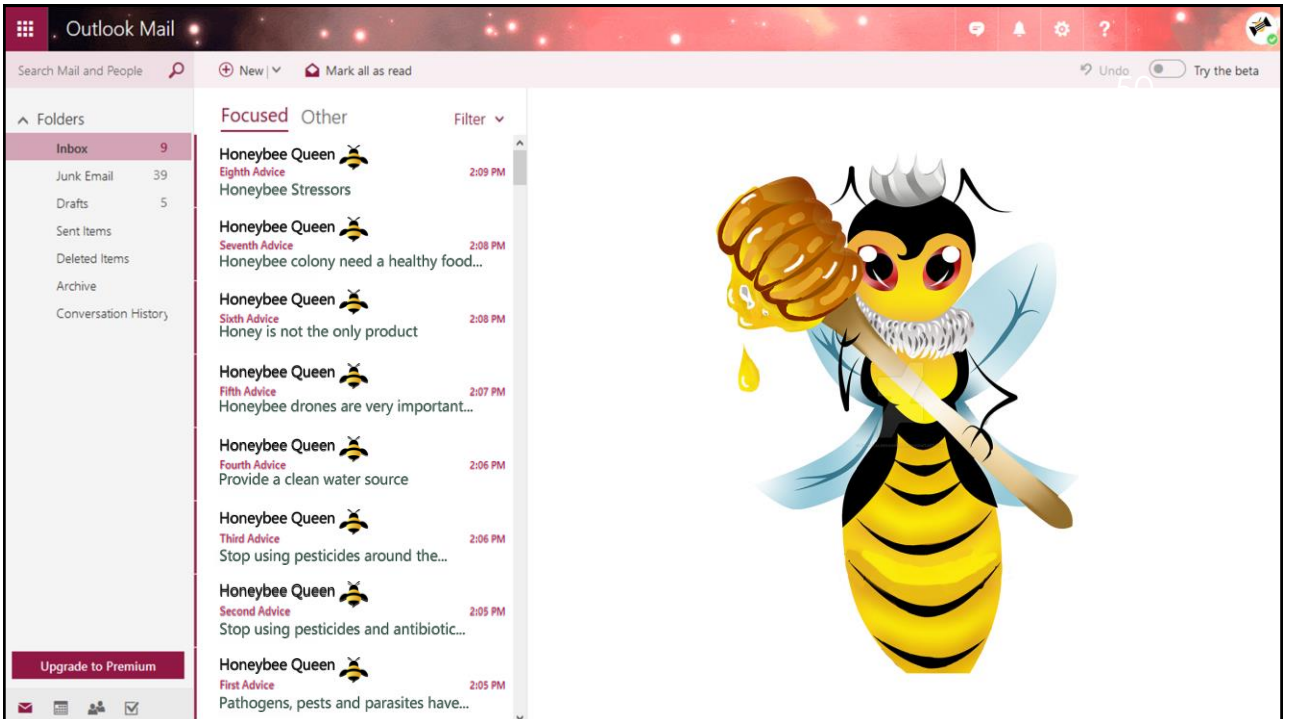
Second season (SILYBUM MARIANUM)





Conclusion and recommendations

- ▶ We could conclude that the autumn honeybee queens are superior than the spring queens in the colony strength and honey production.
- ▶ It is well recommended to rear queens in autumn to obtain strong colonies early in the season and to gain a high amount of honey.
- ▶ Choosing the mother queen is very important to get high quality queens





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Honeybee Queen 2:09 PM
Eighth Advice
Honeybee Stressors

Honeybee Queen 2:08 PM
Seventh Advice
Honeybee colony need a healthy food...

Honeybee Queen 2:08 PM
Sixth Advice
Honey is not the only product

Honeybee Queen 2:07 PM
Fifth Advice
Honeybee drones are very important...

Honeybee Queen 2:06 PM
Fourth Advice
Provide a clean water source

Honeybee Queen 2:06 PM
Third Advice
Stop using pesticides around the...

Honeybee Queen 2:05 PM
Second Advice
Stop using pesticides and antibiotic...

Honeybee Queen 2:05 PM
First Advice
Pathogens, pests and parasites have...

First Advice

HQ Honeybee Queen
Today, 2:05 PM
You

Pathogens, pests and parasites have been linked to poor colony health and can increase colony losses. Please change the honeybee stocks.

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First Advice
Pathogens, pests and parasites have...

Second Advice

HQ Honeybee Queen
Today, 2:05 PM
You

Stop using pesticides and antibiotic inside honeybee colonies.



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Third Advice

Honeybee Queen
Today, 2:06 PM
You

Stop using pesticides around the apiary.



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Fourth Advice

Honeybee Queen
Today, 2:06 PM
You

Provide a clean water source.



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Fifth Advice

HQ Honeybee Queen
Today, 2:07 PM
You

Honeybee drones are very important in the future of honeybee colony.

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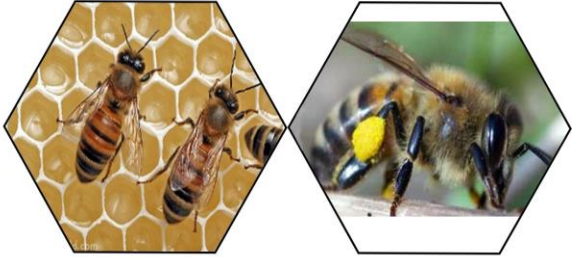
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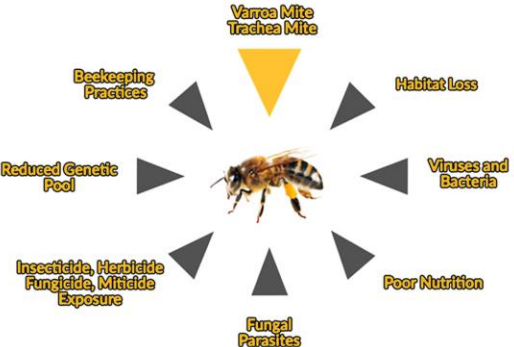
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Arab Beekeeping Association



Thank you!

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