




Increase & Expansion techniques

Sustainability in your Apiary



“As Mark Twain might have said, ‘The difference between queens you buy and queens you raise yourself is almost always the difference between light and lightening’”.
-Kim Flottum (editor Bee Culture)

Making Increase

Increase can be made a number of ways, but the following conditions align with success...

1. Season & Weather: During Increase phase of year (Spring Equinox-Summer solstice) with temps consistently above 60 degrees
2. Drone Presence: Drones must be present in great enough numbers to ensure queens are mated well
3. Resources: lots of brood, nurse bees, and drawn comb
4. Quality overwintered genetics
5. Quality Nutrition- nectar flow/pollen ,proceeding a nectar flow



Reasons to Rear Queens?

- Swarm Suppression
- Locally adapted genetics
- Biodiversity
- Cost
- Sustainability & Resilience

Queen AGE
Don't bet your
season on an aging
queen!





Biodiversity in your Apiary

"Researchers studied approximately 1,063 hives from hobbyist, and commercial beekeepers in 45 U.S. states, the District of Columbia (D.C.), and two US territories (Guam and Puerto Rico). The data showed that the nation's managed honey bee populations rely intensively on a single honey bee evolutionary lineage. In fact, 94 percent of U.S. honey bees belonged to the North Mediterranean C lineage. Data reflected that the remainder of genetic diversity belongs to the West Mediterranean M lineage (3%) and the African A lineage (3%)."
Dept. of Agriculture Agricultural Research Service

Genetic diversity is at an all time low in the United States. Low biodiversity creates major vulnerability to organisms to withstand climate change, parasites and virus.

Biodiversity allows for possibilities beyond just production...



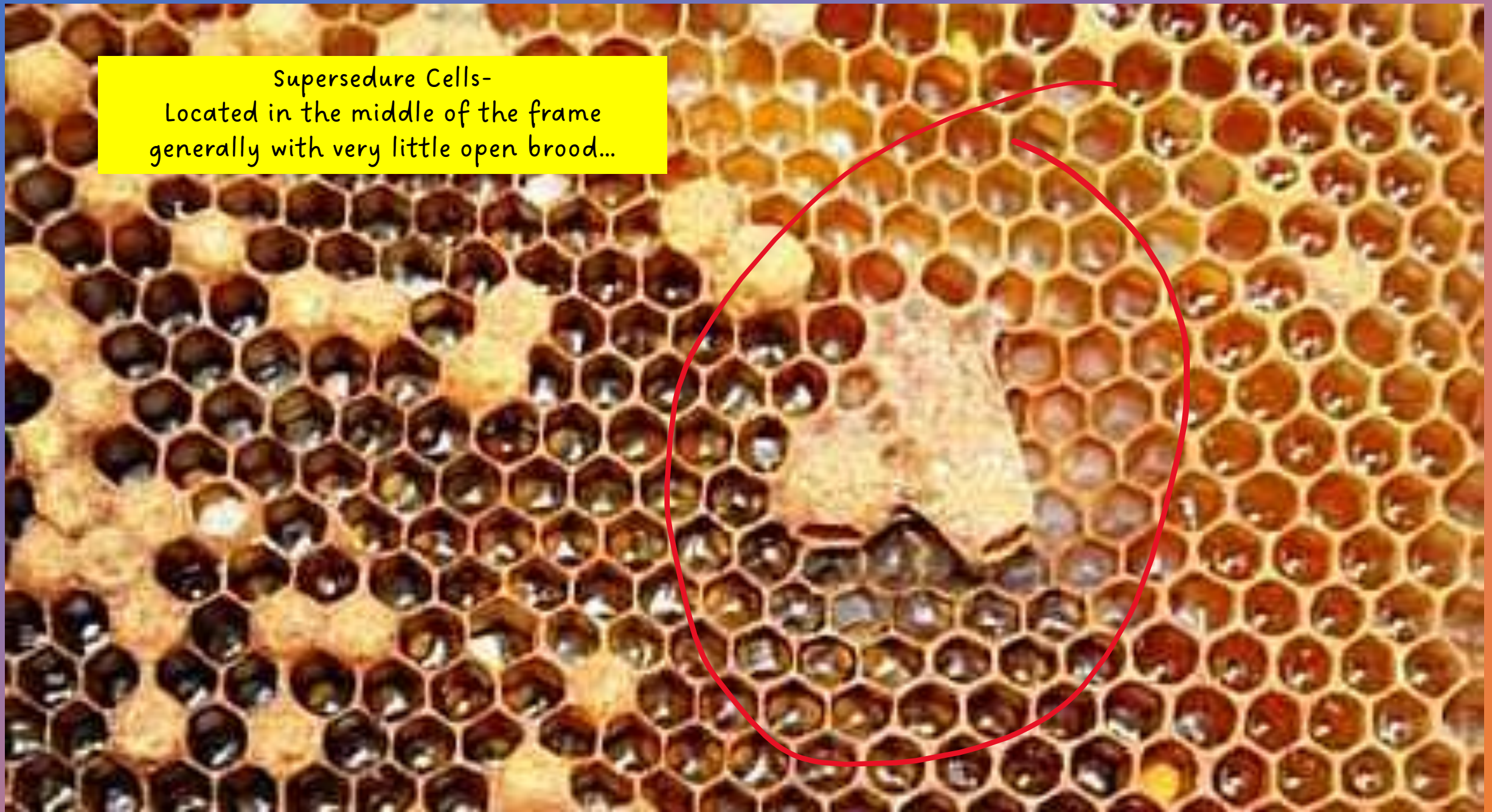
*Queen cells occur Naturally
under three conditions:*

Swarming- when hive is full of
resources especially capped brood
Supersedure- when hives replace a
failing Queen
Emergency- Sudden Queen loss



SWARM Cells
located at the bottom and sides of frames

Supersedure Cells-
Located in the middle of the frame
generally with very little open brood...



Emergency Queen Cells-
Found throughout the broodnest in areas of
open brood usually with darker recycled wax



Conditions for good Queen Rearing outcomes

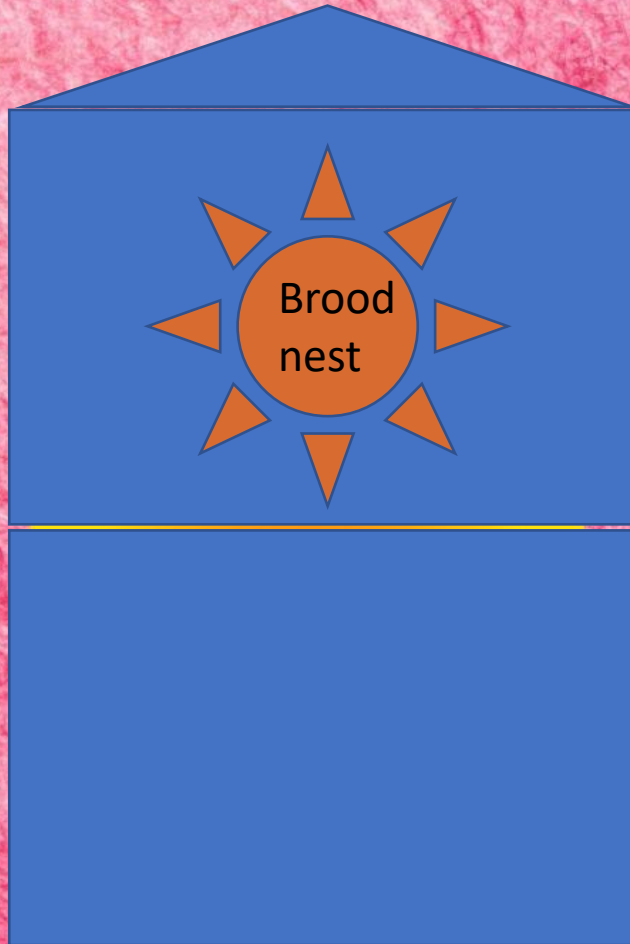
- Replication of Swarming conditions through a Crowded Colony (lots of capped brood)
- a nectar flow or Simulated flow i.e. sugar Syrup
- Lots of Young freshly hatched Nurse bees
- Lots of Pollen
- Good Queen Genetics
 - 1. Overwintered
 - 2. Good temperament
 - 3. Hygienic (chalkbrood indicator)
 - 4. Honey production & resourcefulness
- Weather during mating
(69 degrees optimal mating flight)
- Close observation of Queen Calendar

Graft-Free Queen Rearing
Morris Ostrofsky

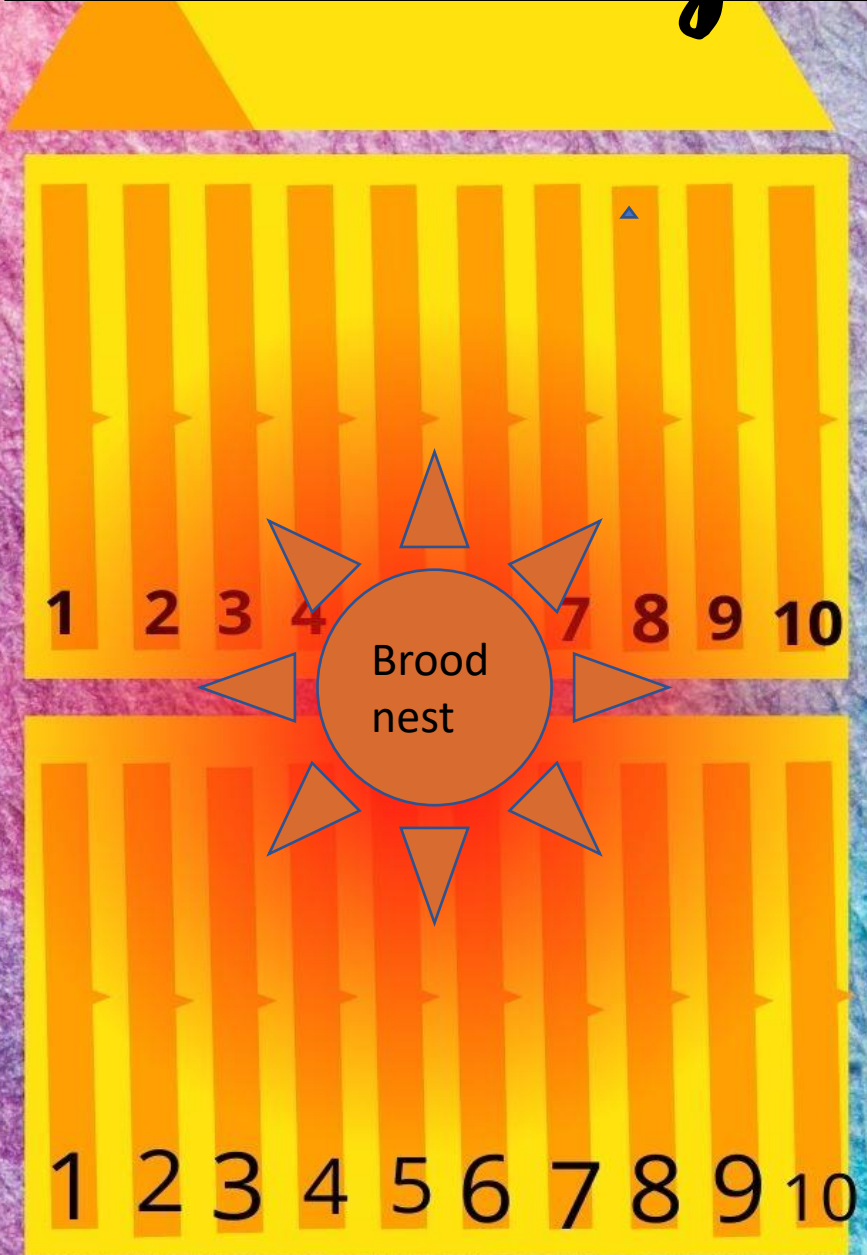
Queen Development Chart

Stage	Day
Egg	1
	2
	3
Unsealed larva	4 Egg hatches into tiny larva
	5
	6
	7
	8.5
Egg fed lavishly on royal jelly during larval stage	
+/- .5 day; some variation	
Capped	8.5 – 9 Note: hive will swarm +/- 1 day of capping
Pre-pupa	10
	11
	12
Pupa	13
	14
	15
The queen pupa is fully formed. Days 13 – 14 are the best times to move cells for distribution	
Queen emerges	16
Mating flights	20
Egg laying starts	23 – 30

Brood nest within a Langstroth hive



Determining Resources



Basic Hive Split: the Walk away Split

- Most basic form of an increase

1. Find Queen if you can.

Take brood box with Queen and move off hive stand. It can be put next door or taken away. Make sure colony in new location has a lot of capped brood. If you can't find queen just even out both boxes and wait!

2. Leave Queenless Colony on original hive stand. Make sure colony has eggs and some open brood with very small larva.

3. Wait 4-6 weeks to see if colony is queen right (check for eggs)

Basic Split

- If you cant find the Queen
Even out the resources between the
two boxes! Wait 4 weeks!



Queen



Field Force

- Eggs & young Larva
- Capped brood
- Food Stores
- empty frames



- Capped brood
- older larva open brood
- Food Stores
- empty frames

Original Location

Original Location

new location

Foundational Recipe-Making NUCLEI

Nucleus: Defined as the central most important part of an object, forming the basis for activity and growth...



Nucleus Colonies consist of 5 frames. They are a fully functioning complete colony in miniature.

Allowing a Fresh made Nuc to rear their own Queen often results in Scrub Queens that are made with older larva and not well fed... Provide Capped Queen Cell or mated Queens.

Nucleus configuration Recipe

- Two frames of capped brood with some cells that are emerging
 - Queen introduction : Eggs, Old Queen, queen in cage or via capped cells on frame:
- One frame of Food (Nectar/honey & Pollen)
- one frame of drawn comb
- Attending Cluster: Young Nurse bees (Clinging to frame)

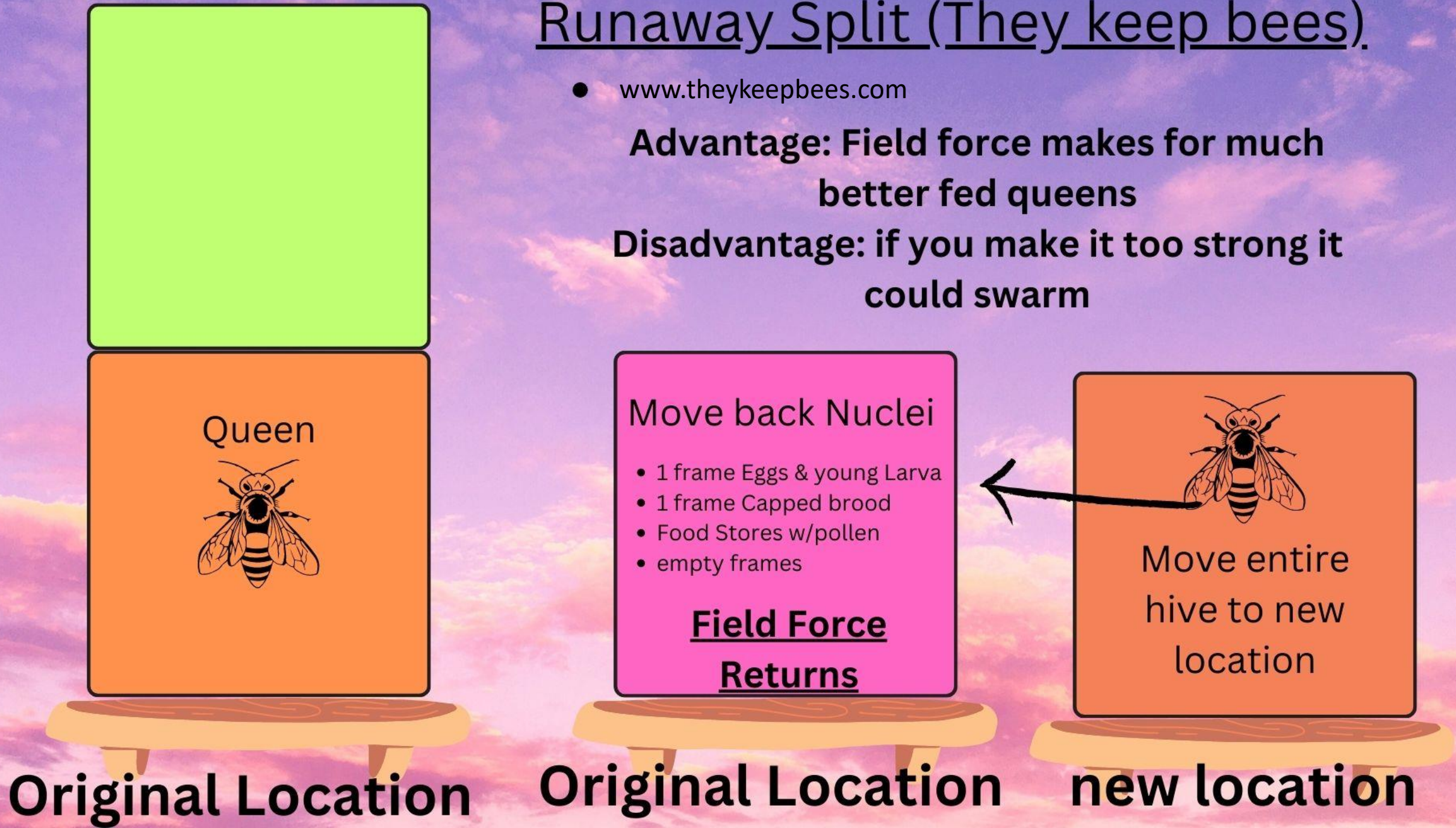


Runaway Split (They keep bees).

- www.theykeepbees.com

Advantage: Field force makes for much better fed queens

Disadvantage: if you make it too strong it could swarm



Sun Queen Split Method

aka Modified walk back
Day 1 ("graft day")-

a. Remove Queen and all
open brood and most stores
to new location in apiary

b. In original location: all
capped brood, some stores
with honey, POLLEN & 1-3
frames with eggs or micro
larva (mark tops)

Optional: add a box of
naked frames to top of
queenless colony for big wax
production benefit!



Sun Queen Split

(aka modified walk back split)

- You must find the Queen for this method
- brood break for original hive & partial for new location and old queen

Naked frames

1. Set up cell raiser at original location:

- Capped brood
- very little stores 2-3 frames w/honey&pollen
- 1-3 frames with eggs or micro larva (mark tops)

Day 1 "Graft Day"



Queen



- all open brood w/clinging nurse bees
- lots of food stores
- 1-5 empty or drawn

Original Location

new location

Day 5-

Walk back!

1. Pull marked frames with cells
2. Cull off all CAPPED cells
3. Cull off mini and misshaped cells
4. Mark number of cells on each frame
5. Note total amount of queen cells on lid



Sun Queen Split

(aka modified walk back split)

- If you don't cull the capped cells you may have a scrub queen that hatches and kills all the other cells

Day 5

1. Cull Capped, small and misshaped cells
2. Mark top of frames with queen cells noting how many on each frame
3. Note number of cells on lid

Due to lack of open brood field force will make lots of comb and honey

Cells, nurse bees & field force

Original Location

Day 10-

Mating NUCS!

1. Divide out resources into nuc boxes using nuclei recipe

2. When making nuclei the frame the Queen cell is on will supply brood or if cutting off cells provide capped brood from another colony.

3. Don't forget to leave queen cell for the original location!

Wait 4 weeks!



Day 10

Stores

Queen Cells

Original Location

1. Place enough nucs for Queen cells
2. Divide resources into nucs Making a Nuclei
3. Deal out 1-2 cells per nuc but dont forget to provide one for the original hive location
4. Shake in extra bees to account for drift or remove to outyard



NUCLEI FOR MATING:

- 1-2 frames of mostly honey and pollen
- 1-2 frames capped brood with emerging brood and if pulling from another colony a small bit of open brood with older larva is nice
- 1 frame drawn comb
- 1 naked or partial frame
- 2 queen cells.
- enough workers to cover the brood and queen cells

Don't forget! Leave one or two capped cells and at least one brood frame behind in the original hive.

- If the nuc or mating box remains in the same yard as the mother hive, add an equal amount of nurse bees to the nuc/mating box to compensate for the fact that the field bees will drift back to the original hive.

Be sure a queen is not included when adding the extra bees from a neighbor colony

Reduce Entrance & after a week or two feed and monitor cluster size!

Day 15-17

1. Virgin Queens will Emerge!
2. Day 18-20 Virgin Queens will take their mating Flights They need good weather to be well mated!!!
3. Day 30-33 Mated Queen will begin laying
4. Stay vigilant about cluster size shake in bees if necessary and feed if bad weather keeps bees from foraging.



Original Location



A bit about Drift





- Foragers will Drift to Original Hive Stand: You must factor that into all new Colonies you make! You can mitigate that by:
 1. Shaking in lots of Nurse Bees- anything that flies off a frame is a forager anything that clings is a nurse bee.
 2. Use Capped brood in nucs that require less population to tend
 3. these clusters may shrink a bit before queen starts to lay
 4. Make splits and take them off property for a week or two then return them.

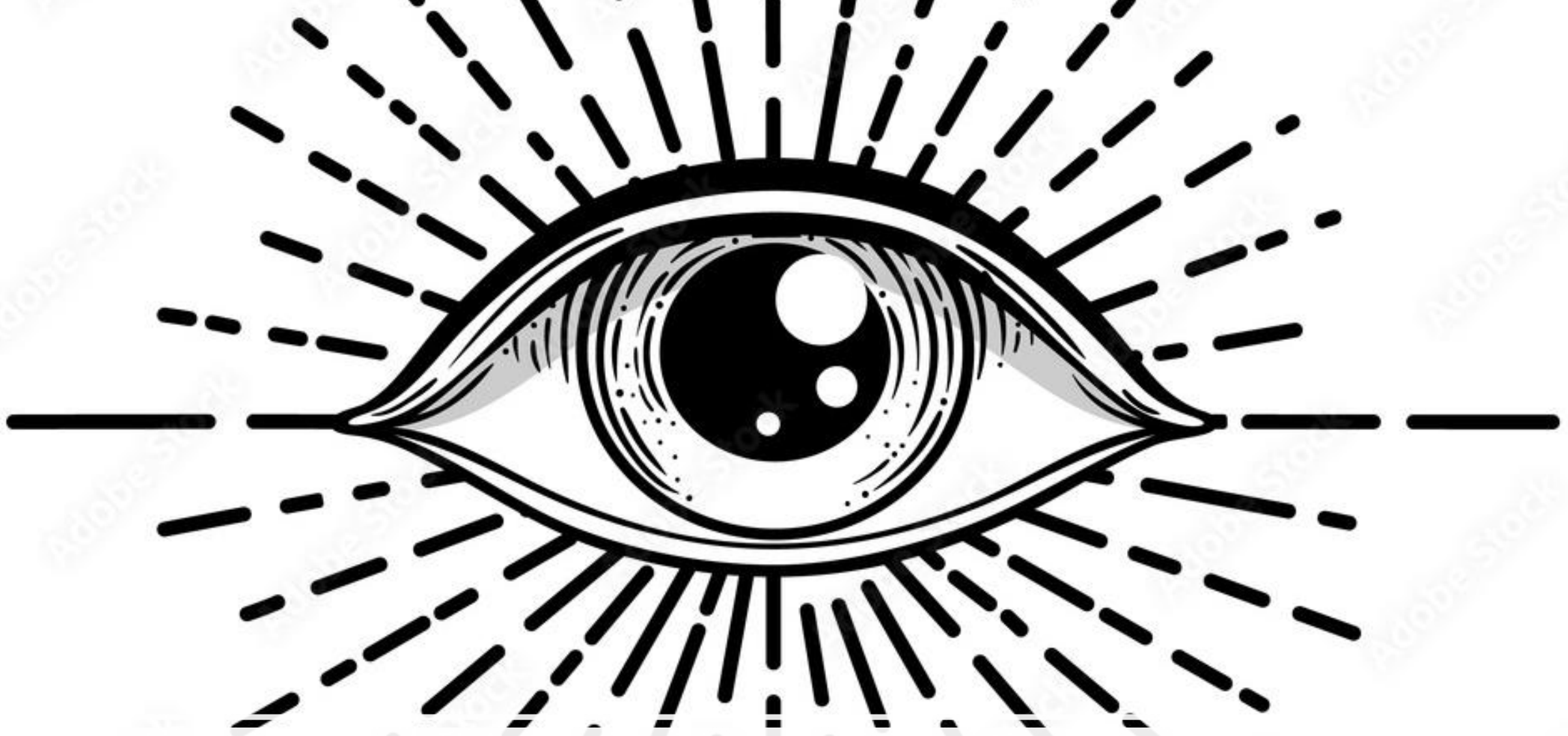
Reminders!

Queen will emerge on Day 16/17 Between day 18-22 Queens will take mating flight! That is the most important day for weather to be good so she will be well mated!

Use a Queen Rearing Calendar and follow it precisely!

If your Queen doesn't get mated or "take" simply provide a frame of eggs, another queen cell or combine with another colony.

DAYS WITHIN A STAGE BEE CASTES			
	WORKER	DRONE	QUEEN
EGG 	3	3	3
LARVA 	6	6½	5½
PUPA 	12	14½	7½
TOTAL	21 days	24 days	16 days



For a complete booklet of Queen Rearing recipes & resources
www.linktr.ee/beekeepingbotanist



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