

# The Nuts and Bolts of Splits & Nucs

Jim and Pat Haskell



The extreme – 2 to 10 frames  
Photo from Mike Bush web site

## We'll Discuss--

- What are increases, splits, nucs, etc
  - Some bee biology that might help
- Why make splits & nucs
- When do you make splits & nucs
- How do you make splits & nucs
- Nuc Management
  - Nuc vs. full colony management
  - Nuc management – start to finish
  - The many uses for nucs and nuc boxes

## Definitions

- A split is basically the process of separating the two hive bodies of a colony (where deep hive bodies are used); and providing a queen for the queenless portion
- A nuc is, biologically, a fully balanced colony in miniature.
  - Can be anywhere between 2-10 frames
- An increase is simply adding to the number of colonies that you have
  - Via splits, swarms, nucs, packages, etc

## Bee biology helps us make nucs

- Nurse bees/young bees are not aggressive
- They're not particularly loyal to the queen
- Nurse bees have a specific area on a brood frame that they tend
- Young nurse bees prefer nectar over honey
- Bees have a natural tendency to swarm in the spring
- Queen cells make excellent queens, perhaps as good or better than those you purchase
- Workers from different colonies do not fight when moved into a new box together

You may take nurse or worker bees from separate colonies and put them together in a new box. They will not fight.

Nurse bees added to a colony or nuc by shaking will adapt to their new conditions.

# Why make splits & nucs?

- To grow your beekeeping business
- Cheaper than purchasing packages or nucs
- To replace winter losses
- Can use a queen of your choice
- Keeping a backup queen
- Foolproof requeening
- To sell
- Management tool in swarm prevention
- As a mentor/teaching tool
- As a food and/or brood resource for your other colonies
- Queen rearing/mating nuc

1. It is cheaper to build your own beekeeping business rather than purchase.
2. The installation of over wintered nucs allows the beekeeper interested in producing honey to maintain honey production because of their rapid growth in the spring.
3. Brood from a nuc or nucs may be used to boost a colony just before the honey flow starts, thus making a larger field force to gather honey. It may be split to make a second nuc. It can be used to make clean drawn comb for comb replacement if full sized hives in you comb replacement program.
4. If a queen is lost, the combining a nuc with the colony that lost the queen will ensure that you don't lose honey production.
5. As a teaching tool it is much easier to find a queen on 5 frames and point out eggs and larvae.
6. A prize queen is more easily introduced into a nuc colony with all nurse bees than it is into a full sized colony.
7. Queen rearing can be done in nuc boxes. Full nuc boxes make excellent mating boxes and allow the beekeeper time to observe the new queens temperament and performance before placing her in a full hive or selling her.
8. Making a nuc from a populous hive in the spring will slow down the swarming urge. If you remove the queen from the mother hive and allow that hive to raise a queen, you will have prevented that colony from swarming, and you will have broken the brood cycle which is important in mite control.
9. To sell
10. To control genetics (especially with spread of AHB)

**Everybody may have a different list, in a different order, but important thing is to do it!**

## When to make splits & nucs

- Early spring
  - Dependant on queen availability
  - May require double screen board
- Late spring/early summer (during flow)
  - Best, and easiest time to start nucs
- Late summer/early fall
  - For overwintering

### Why make splits & Nucs

To grow your beekeeping business (core of collateral beekeeping).

To replace winter losses – Over wintered nucs allow for rapid growth in the spring; thus producing a honey crop in the same year.

As resource – a ready pool of brood, eggs, comb, and frames of honey; to build comb for replacement.

Can use queen of your choice – correct genetics

Keeping a backup queen-in case a hive loses a queen

As a mentor/teaching tool

Foolproof requeening-- Allows the beekeeper to install a queen of their choice; queens are easier to introduce into a nuc colony

Queen rearing and mating nucs for grafted or swarm queen cells

A management tool in swarm prevention

Cost

For sale: to a new student; or member of the club

Better mated queens in late spring

Some queens cheaper in summer & fall

## Equipment

- Any sized equipment may be used. Use the equipment that you have at hand.
  - 1 bottom board (IPM preferred), 1 hive body, 1 inner cover, 1 telescoping cover, 1 queen excluder, 1 entrance reducer, a bee brush, and a spray bottle of sugar water
  - frames of foundation or drawn comb, and a feeder to fit equipment being used.
- For an early spring split or nuc
  - All equipment above plus a double screen board
- For multiple splits or nucs (we'll cover this at a later date)
- A nuc box for a “safe house,” if desired

I have used full hive bodies, queen condos, and nuc boxes. I have worked with medium and deep equipment. The bees do not care what size the equipment is.

May want to invest in several 5-frame nuc boxes and the necessary bottom boards, inner covers, telescoping covers, and feeders, etc

For multiple splits, may need a transition board

## Some basic “rules”

- It is easiest to make nucs/splits during the middle of the day when most of the field bees are out of the hive
- Keep the nuc in progress covered; too much sunlight is detrimental to open brood
- Use a minimum amount of smoke. You might want to have a spray bottle with light sugar water in it to help control the bees
- All nucs should have reduced entrances and robber screens

During cold weather, the nuc can be placed over a double screen board for warmth.

Also cover queen; she likes dark, not sunlight

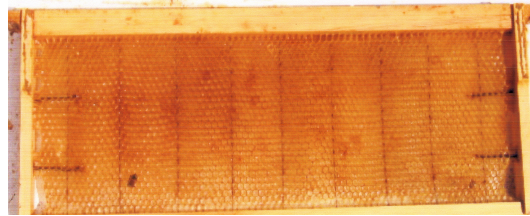
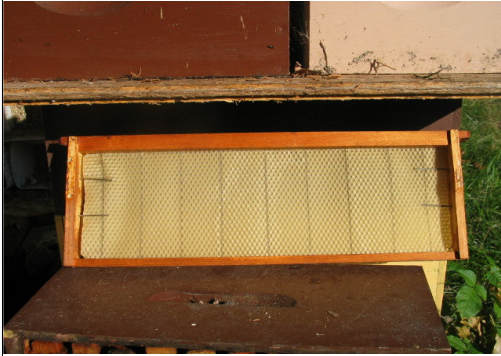
Lemon oil, honey bee healthy, to mask pheromones



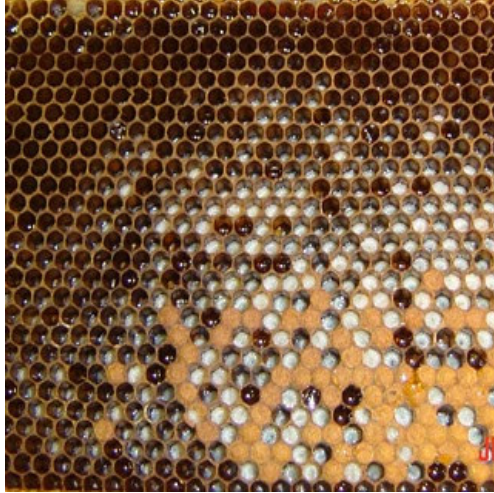
## With any Method,

- You'll have to choose which frames to remove from the “mother” hive to place in the nuc body
- There are many types of frames to choose from
- Here are some examples

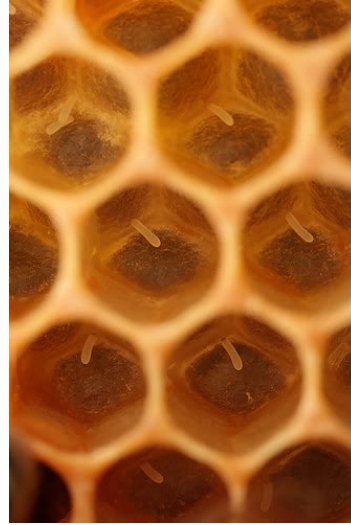
# Foundation – Drawn Comb



## Open & Capped Brood, plus Eggs



# Larvae, eggs



## Fully capped frame of honey



pollen



nectar

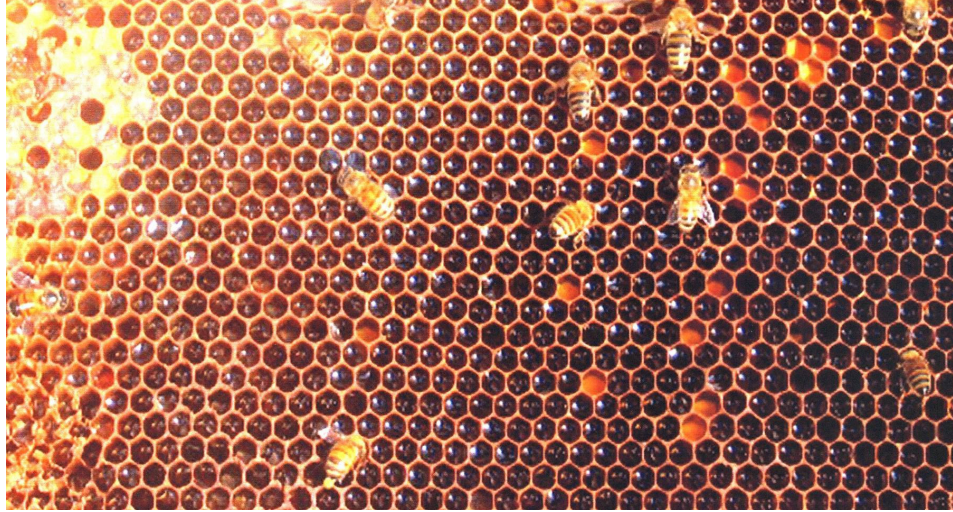


## Nectar closeup





# Nectar, honey, pollen mix



Just mention mixed frame?

## Sealed brood, some open



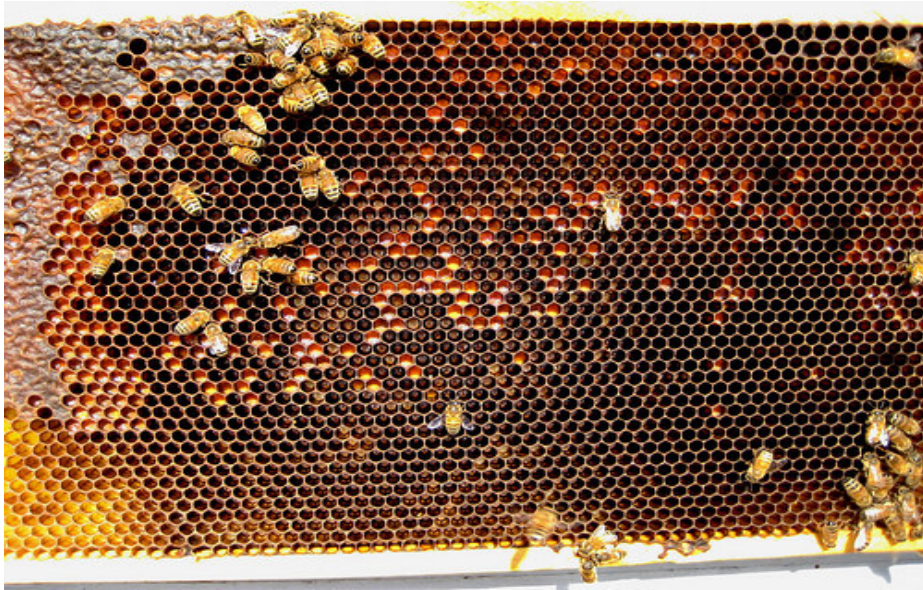
Lots of sealed brood



Everything but eggs?

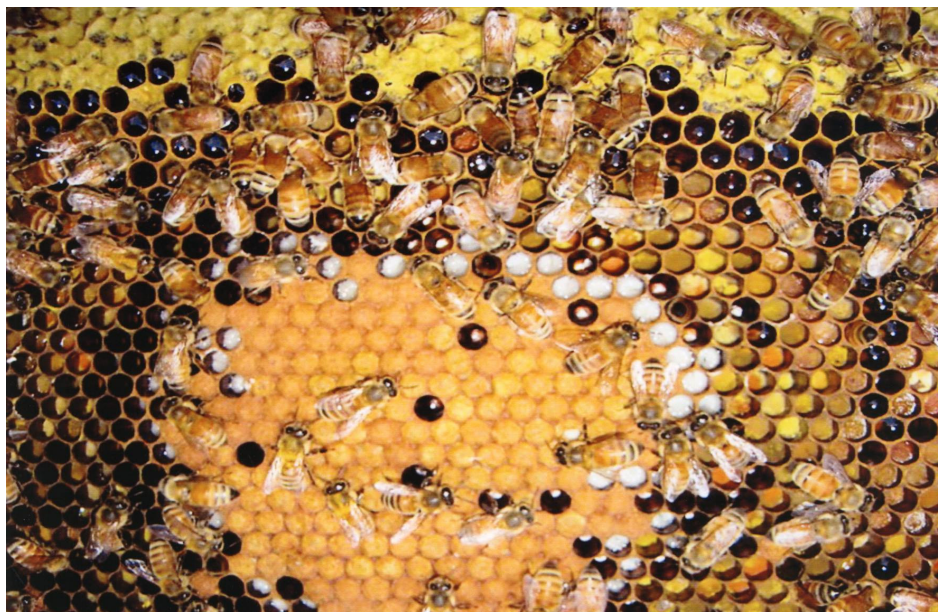


## Honey, pollen, open comb mix



Just mention mixed

Not too many frames with everything,  
but this is one!



## Other considerations

- The Queen
  - When are they available
  - Source
    - From an AHB-free area?
  - Hygienic, mite tolerant/mite resistant
  
- Which mother colony should I use, and why
  - Strong
    - Honey production could be affected
  - Non-productive (but disease free)
    - The Mike Palmer method



1. When ordering queens, be sure to check shipping dates and arrival dates. I ask for “drop-ship-over-night” from the post office or “next-day” from Fed EX. This ensures your queens arrive quickly and are still fresh.
2. If making your own queens, time your nuc to coincide with your ready to emerge queen cells.
3. Consider strongly ordering local, hygienic queens
4. Using the Mike Palmer method of nucing our nonproductive hives will give you a number of nucs to over winter to sell or requeen your own hives with or replace any hives that died over the winter.
5. It is the beekeepers choice as to which “mother” colony to use

## How to make splits & nucs— Methods

- Many methods, but we'll briefly illustrate two of them:
  - Method 1; when you can't (or don't want to) find the queen, and
  - Method 2; you can find the queen, and temporarily place her aside



## Method 1 – not necessary to find the queen

- Take to the bee yard your nuc(s), tools, frames of foundation and/or drawn comb, plus an extra hive body, bee brush, queen excluder & sugar water in a spray bottle
- From the “mother” hive, select
  - 1 frame of honey or nectar, 1 frame of primarily pollen, 1 frame of drawn comb, and two frames of brood. (frames with mixed open and sealed brood are fine); plus 2 frames of open brood(Demonstrated is a spring nuc)

### Method 1:

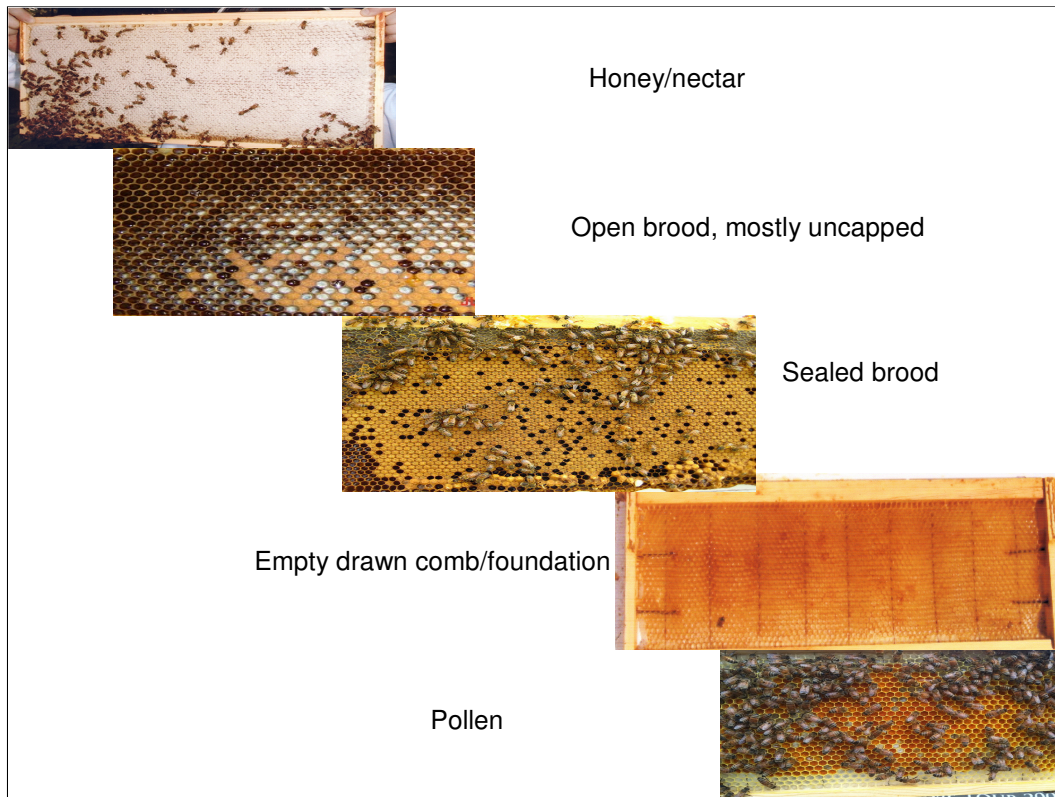
This method is recommended for beekeepers with a limited amount of space, no out-yard, and/or those beekeepers who have trouble locating and identifying the queen. The draw back is that it takes a little longer and may entail another trip to the beeyard. It is the best way to make multiple splits from one hive. You will need a bee brush or turkey feather, a queen excluder, and possibly a transition board for this method in addition to the rest of the equipment. (A transition board allows the beekeeper to place two 5 frame nuc bodies on top of a hive. Two five frame nuc bodies together are just slightly larger than the size of a 10 frame hive body.)

First: Take all equipment and a queen excluder to the beeyard.

Remove all frames from your nuc(s) and set aside.

Second: Locate, as above, two frames of open brood and a frame of capped brood for each nuc to be made. Brush the bees off of these frames of brood back into the mother hive and place them in the nuc(s). Locate a frame of honey (a frame of nectar is better) and a frame of pollen (for each nuc being made) and brush all bees off. Place them in the nucs. (As above)

Third: Reassemble the mother hive placing the frames of foundation to the outside of the brood chamber. (As above)



Note: can use foundation rather than drawn comb since your' in a nectar flow!  
Can use a frame of nectar rather than honey as nurse bees prefer nectar

## Method 1, continued

- As you remove the 5 frames for the nuc one by one, shake and/or brush off all the bees back into the mother hive
- Place each “bee free” frame into the extra hive body (full sized hive body)
- Select 2 more frames of open brood from the mother hive, and again shake and/or brush off all the bees before placing in hive body
- You now have 7 frames in your hive body. You can add 1 or 3 more frames of foundation to the outside, to completely fill it if you are going to make your nuc in full sized equipment
  - Still no bees in your hive body

Forth: Lightly smoke the bees down and place the queen excluder on the mother hive. (If you have made multiple splits from the mother hive and are using multiple nuc bodies, the transition board is now placed on top of the queen excluder.) Now pick up the newly made nuc(s) and place on top of the hive.

Fifth: Come back the next day and the nuc is full of nurse bees . This way you do not have to find the queen. Remove the nuc from the top of the mother hive and place it on it's bottom board. Screen to move to an out-yard or set in your home yard. If the weather is cool, it is important you use a double screen board. See below for suggestions.

Sixth: Once set up, a queen or queen cell may be introduced immediately. However, it may be better to wait another 24-48 hours to introduce her.

Seventh: Place pollen (artificial pollen) and feeder on nuc. Keep feeding the nuc until it is able to fend for itself.

Eighth: Check in 5-7 days to make sure queen was released or the queen cell hatched. Check in another 5-7 days to check whether the released queen is laying eggs. Or, check to see if the newly hatched queen has returned from her mating flight.

## Method 1, continued

- Replace removed frames of brood with drawn comb/foundation in the mother colony
- Put queen excluder on top box of mother hive
- Place hive body with no bees over queen excluder, add inner cover and top, and relax for a few hours, or until tomorrow
- The next day, your hive body will be full of nurse bees, with no queen!
- Remove hive body from mother hive and set on own bottom board, if using full sized equipment, **OR**,
- Transfer the 5 frames of honey/nectar, older brood, drawn comb/foundation, & pollen to your nuc body, *with bees*

Replace the “missing” frames in mother hive with foundation you brought with you to the beeyard.

Replace “missing” frames in the mother colony with frames you brought to the beeyard with you.

Good time to replace old comb

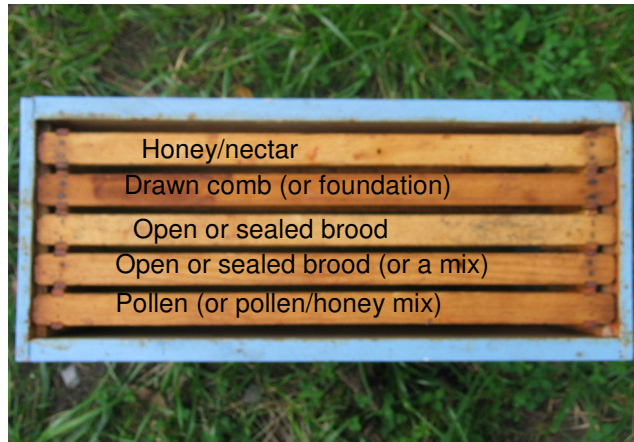
Also good time to put in a frame of drone foundation for later drone pull mite control

## Method 1, continued

- Brush bees from the extra 2 open brood frames into the nuc body, and put those frames back in the mother colony
- Replace “missing” frames in mother colony with foundation, keeping brood in the center of the hive
- Close up both nuc and mother colony
- Wait 24 hours and install the queen of your choice
  - Note Wyatt Mangum presentation

## Method 1, continued

- If using a nuc, arrange the food on the outside, brood inside, as shown



## Method 1, continued

- Add feeder; feed 1:1 sugar water and artificial pollen to stimulate growth
- Wait 7-15 days; check for eggs & new brood
- **Note: your nuc can be left right where it is in your apiary! Why?**

## Method 2 – Queen can be found

Well ventilated safe-house  
all screened in

Screen here



Can use any box with bottom and top as safe house/quiet house



## Method 2, continued

- Go to the bee yard with your tools, nuc(s), nuc safe house, frames of foundation and/or drawn comb, bee brush, strap, & sugar water in a spray bottle
- Screen in your nuc and nuc safe house
- From the “mother” hive, find
  - the frame that the queen is on
  - 1 frame of honey or nectar, 1 frame of primarily pollen, 1 frame of drawn comb, and two frames of brood. (frames with both open and sealed are fine)  
(Demonstrated is a spring nuc)

### Method 2:

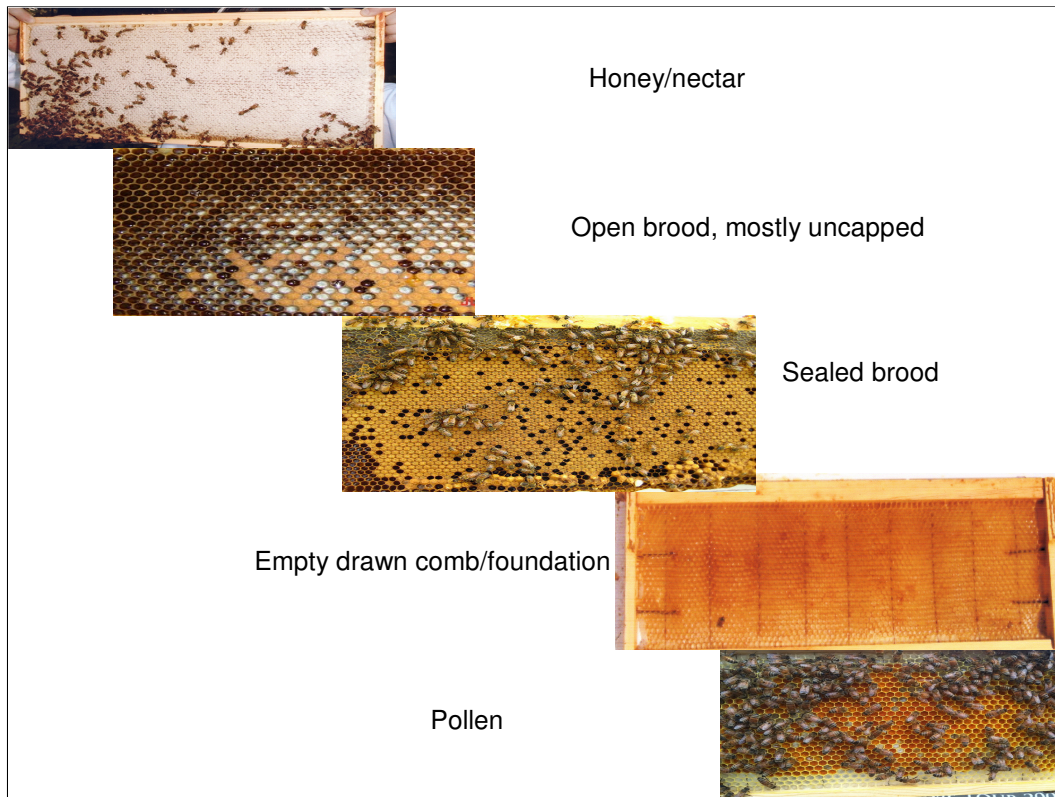
This method can be used when you have an out-yard at least 3 miles away to keep the field bees from going back to the mother hive. (You may wish to screen the bees in the new nuc for 3 days which will help break the pheromone cycle from the mother hive for the older field bees.)

First: Take all equipment to the bee yard and set-up beside your selected hive. You will need an extra hive body in which to place the queen with some type of top or cover to protect her. (Queens don't like light.) Screen the entrance to the nuc. Remove all frames with foundation from your nuc and place aside.

Second: Open your hive and locate your queen. Set her aside on a frame either in the separate hive body or put her in a cage and cover her.

Third: Select three frames of brood; two with open brood (eggs and larvae), and one with sealed brood and transfer with the covering bees into your nuc box. Select a frame of honey and a frame of pollen (honey and pollen mix is nice).

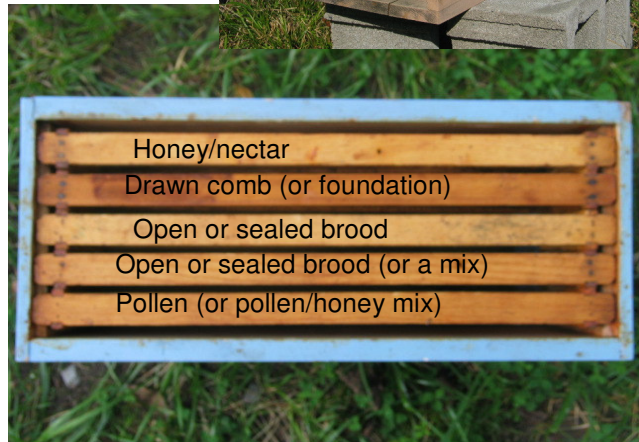
Forth: Place brood in the center of the nuc box, and surround with the frames of honey and pollen. If you are using full size equipment, you can fill the rest of the box with frames of foundation.



Note: can use foundation rather than drawn comb since your' in a nectar flow!  
Can use a frame of nectar rather than honey as nurse bees prefer nectar

## Method 2, continued

- Place frame with queen in the nuc safe house
- Screen in nuc
- Frames of food and brood are placed in nuc (with bees attached);
  - Both “foods” outside
  - Two frames of brood (or mixes) on inside



Fifth: Go back into your mother hive and select 2-3 frames of open brood. Shake all of the bees from these frames into your nuc, lightly spraying the bees with sugar water to keep them from flying. (You are adding extra bees to the nuc to ensure enough bees to keep the brood warm and fed.) Replace the frames minus covering bees back in the mother hive. Move the remaining frames of brood in the mother hive together. Back-fill with frames of foundation on the outside of the brood cluster not in the middle of the brood cluster.

Sixth: Close up your nuc. It can be moved to your out-yard or another location at this time. Wait 24-48 hours before introducing the queen or queen cell. When keeping the nuc in your home yard, wait a total of 72 hours before taking the screen off. This will allow time for the new queen's pheromone to be spread in the nuc.

Seventh: Place a pollen pattie (can be artificial pollen) and a feeder on the nuc. Keep feeding it until they are able to fend for themselves.

## Method 2, continued

- Select 2 more frames of open brood from the mother hive, and then shake and/or brush off all the bees into your new nuc
- Put these two brood frames back in the mother colony
- Replace “missing” frames in mother colony with foundation, keeping brood in the center of the hive
- Close up both nuc and mother colony
- Wait 24 hours and install the queen of your choice
  - Note Wyatt Mangum presentation

Good time to replace old comb

Also good time to put in one frame of drone foundation

## Method 2, continued

- Add feeder; feed 1:1 sugar water and artificial pollen to stimulate growth
- Wait 7-15 days; check for eggs & new brood
- **Note: your nuc can be left right where it is in your apiary, but must remain screened in for 72 hours**
- **OR**
- **You can strap it up, relocate it at least 2.5 miles away, and then take off the screen!**
- **Why?**

## Managing your nuc(s)



## Nucs are like full sized colonies in miniature

- They have all of needs and requirements of a full sized colony, such as pest and disease control

## Nucs different than full-sized colonies in –

- Size
- Bee population
  - Nuc has only 10-25% of the population of a full sized colony
- Ease of frame manipulation
- Less difficult to locate queen
- Colony difficulties are concentrated
- Less expertise needed to learn the system
- Requires intensive management

-size smaller unless you're making a full sized nuc

They develop more rapidly

-They need to manage more intensely:

Need to remove frames of capped honey to provide room; store for use later

Can remove frames of drawn wax to store and use at a later date

Can provide brood to boost weaker colonies

-Can be maintained to produce cut comb and honey for use and extraction

-Are more easily handled

Can locate queen quickly

Ideal as a teaching tool for a mentor

Ideal for use in an apiary for handicapped people

-Frames of honey, drawn comb, etc. can and should be harvested individually.



## All nucs need

- A reduced entrance
  - Due to smaller population, helps in defense
- Robber screen
- A method of feeding
- In the Mid-Atlantic Region, small hive beetle traps
  - An IPM SHB control system
- Nucs for overwintering have some special needs—will discuss later

# Spring nuc management

- Usually made during nectar flow
  - recommend 2, not 3 frames of brood (some call this a “weak” nuc)
- Spring nucs ideal for students, new beekeepers
  - Great way to watch hive development from the start
  - Not usually interested in excess honey the first year
  - Strong (3 frames of brood) nucs may swarm before student is prepared to deal with it
- Add 2<sup>nd</sup> box (foundation is OK) as soon as population warrants (resource box)
- If not sold, given away, or not needed in your own operation, can be overwintered

## SPRING, EARLY SUMMER NUCS.

-It is usually done during a nectar flow.

-It is recommended that they be made small (two frames of brood) to slow down development.

-If you make a strong nuc, be prepared to install it in a full hive in the near future. Can be used to collect honey if put into full equipment with drawn comb.

-Ideal for a student; students need to watch the development of the hive. They do not need to collect honey in the first year. Strong nucs often result in swarms which a student is usually unprepared to deal with.

-Can be transferred into a full hive in mid to late summer to over winter.

-Can be over wintered in the nuc body.

-add a second box with foundation as needed.

**Reminder that spring nucs present opportunity for 1. replacing old comb, and 2. replacing frames in mother hive with drone foundation**

# Summer nuc management

- Since usually made after the flow, mother colony should be fed 1:1 a week prior to splitting
- Nuc should be made with 3 full frames of older larvae and sealed brood. **No eggs or young larvae!**
- Feed the new nuc 1:1 to simulate nectar flow
  - Queen more easily introduced
- **Queen introduction must be handled with caution** (The frames should be inspected for queen cells both before and after queen introduction)
- Once queen is accepted and laying, you can add the 2<sup>nd</sup> box
  - drawn comb or mixed drawn comb and foundation may be used (not a resource box)
- Overwintered nucs are excellent for replacing any winter losses!

## MID SUMMER TO EARLY FALL NUCS

-Must be made with 3 full frames of older larvae and sealed brood. Precaution: Use older brood, no eggs or young brood.

-Feed target hive for at least one week with 1:1 sugar water and pollen to simulate a nectar flow. Comments: Queens are more easily introduced during a nectar flow, thus feeding the colony mimics a nectar flow.

-Queen introduction must be handled with caution. (Use Wyatt Mangum's Method) We found that the bees had started their own queen cells both before the queens were introduced and after the queens were introduced following Wyatt Mangum's Method. We ended up with good acceptance following this close inspection

-Once queen is accepted, a second box of foundation, drawn comb, or mixed drawn comb-foundation may be added.

-Excellent for replacing lost hives in spring. You will not lose a honey crop as these nucs are very strong in the spring! (Probably due to the economics of thermal use.)

NOTE; BREAK IN BROOD CYCLE IN SUMMER NUCS—MITE MANAGEMENT!

## Nucs great tool for Mentors!

- In finding the queen, drones, various brood stages, etc
- In illustrating brood patterns, nectar, honey, pollen, diseases, pests
- A source for adding food, brood, & other resources to problem colonies
- For making home grown queens; and for teaching others how to do it

## Over wintering nuc management

- We'll look briefly at
  - Setting up the nuc
  - What you're looking for going into winter
  - Feeding
  - Nuc placement options for the winter
  - Wind protection

## Overwintering

initial setup; 1<sup>st</sup> box (A)

In our area, June 15 thru  
July 30 is best time to  
establish nucs for  
overwintering

Start with one box

Add 2<sup>nd</sup> box as soon as  
population warrants



## Overwintering

initial setup; 2<sup>nd</sup> box (B)

Ideally, all 5 frames in 2<sup>nd</sup> box would be drawn comb

A good population can draw out foundation in late summer/fall

Need to feed 1:1 early, 2:1 later

And pollen patties of course



## Going Into Winter Bottom Box (A)

Ideal positioning! may vary a little depending on weather and/or beekeeper management

Cluster will normally locate on middle three frames

Cluster may move a frame toward the SE, (warm side) depending on nuc orientation

On warm days, bees should basically cover all 5 top bars on the lower box





## Going Into Winter Top Box (B)

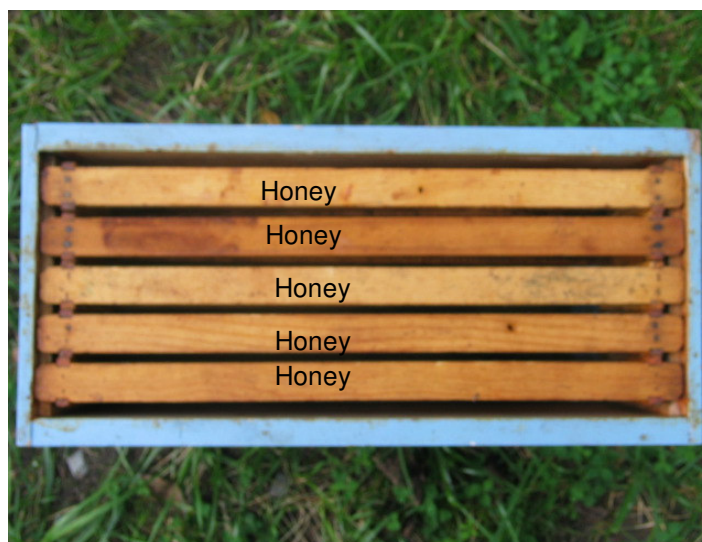
At this time, remove all undrawn foundation; replace with frames of honey

All frames should be capped honey

Some may be actual honey; others may be sugar honey from your 2:1 or 1:1 feedings

### **Watch winter stores!**

feed bee candy/fondant as needed (use shim or extra hive body)



# overwintering

**Initial setup**



Box A

**Ready for winter**



Box B

But who asked for this?



## Overwintering placement alternatives double (5-frame) nucs on full sized colony



## Overwintering placement alternatives side-by-side - and - separately



## Four (2-frame) nucs in standard Langstroth box



- For mating nucs only!
- Not good for overwintering

## Winter “protection”

- Nuc entrances should face downwind in the winter; fortunately, our winter winds are mostly from the N or NW
- Mite boards must be left in to cut off heavy drafts
- Note: overwintered nucs need a lot of and the right kind of ventilation in the winter!
- Protection from strong winter winds can come from several sources

# Hillsides, hedges, & fences can aid in wind protection





however

- Not all hillsides can protect all nucs from everything



# How you can use your nuc box

As a “safe house” for your queen during hive inspection

Bait hive for swarms

To house a swarm

A “starter” colony for raising your queens

Mating nuc

Queen Bank

Comb building

Transporting honey (especially if you harvest by the frame)

Make a nuc

Making comb honey/regular honey

Good for handicapped people