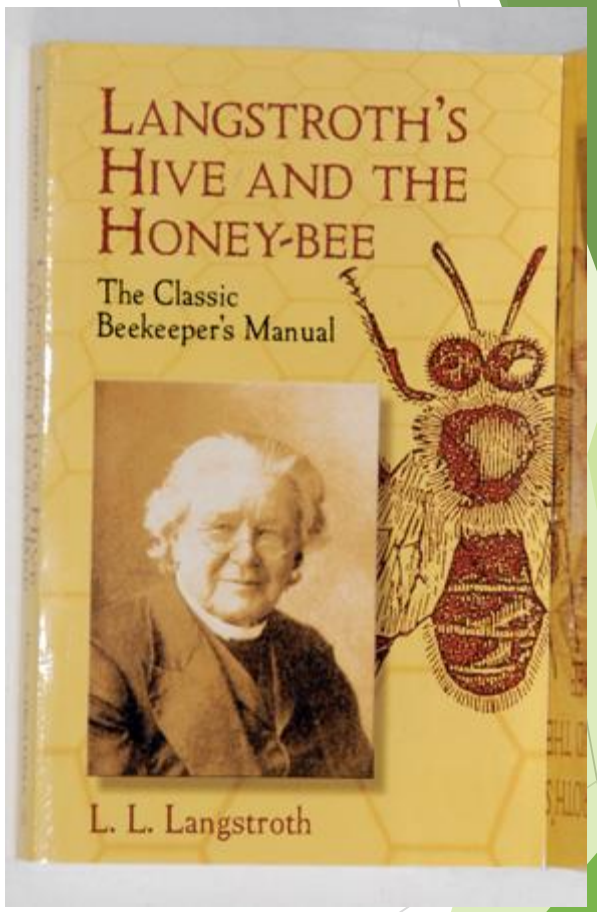
Natural Beekeeping

Small Hive Beekeeping to Manage Varroa Mites

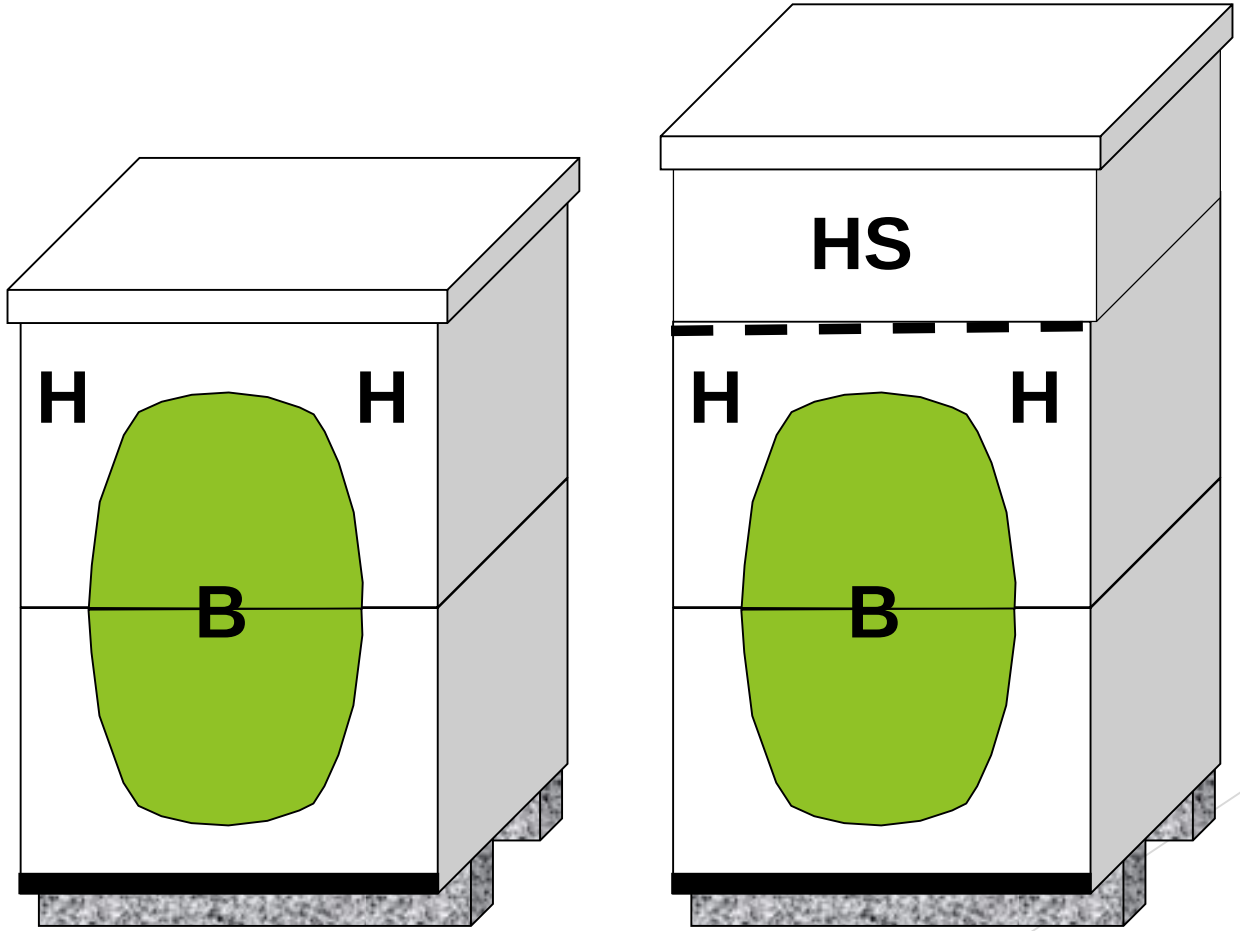
Honey Bee Nests

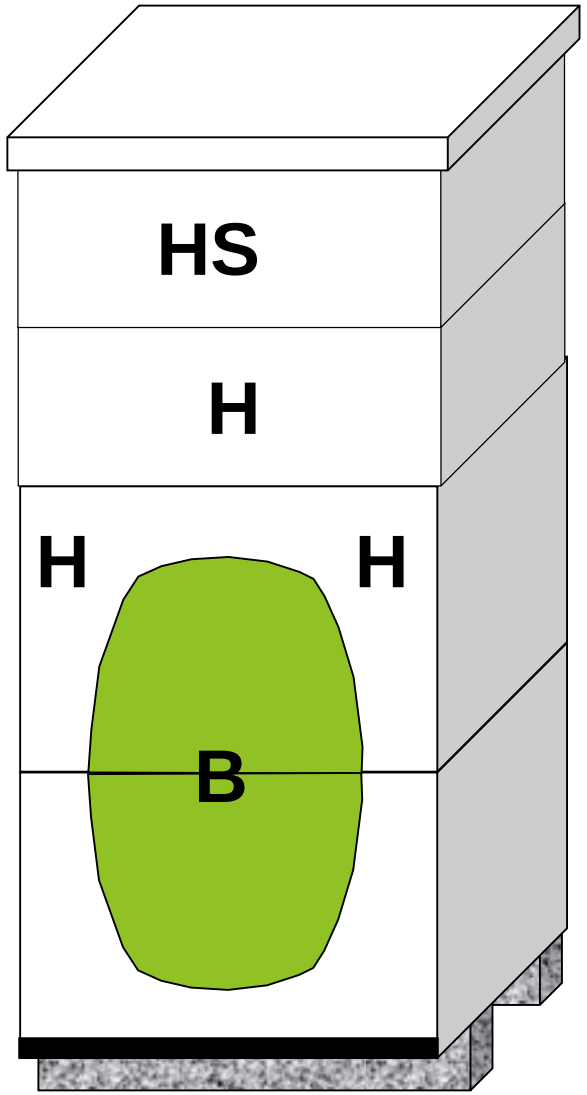

LANGSTROTH'S
HIVE AND THE
HONEY-BEE
The Classic
Beekeeper's Manual
L. L. Langstroth

Seasonal Management

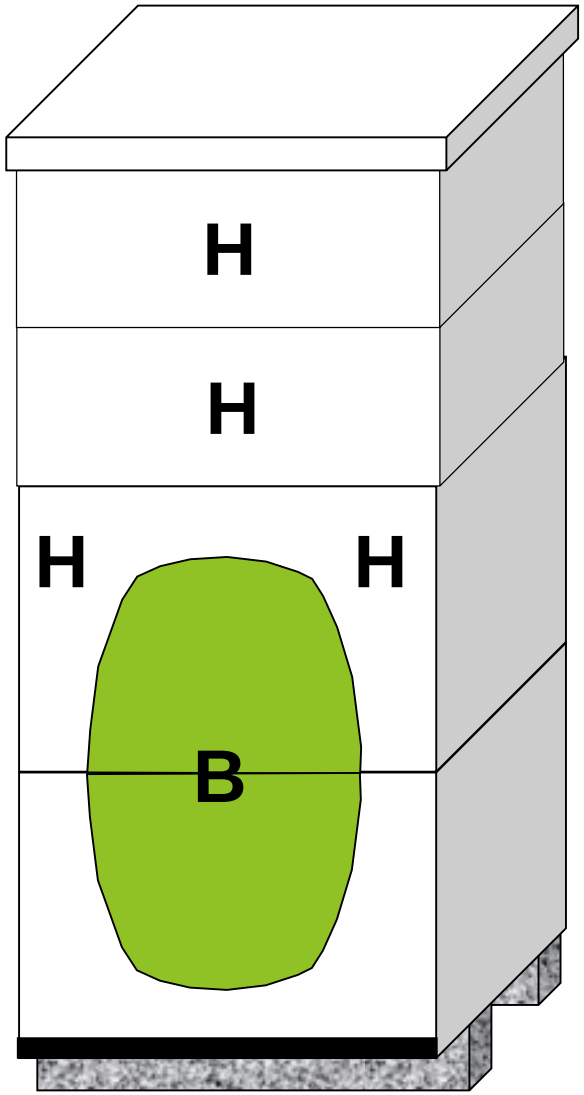
Traditional Southern Beekeeping

LATE SPRING

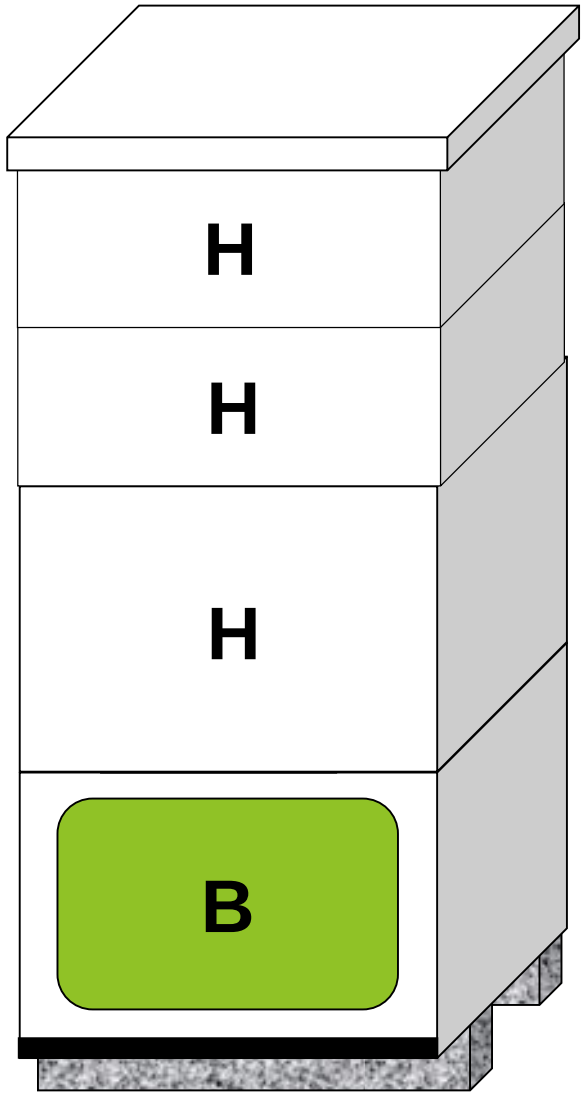




EARLY SUMMER



MID-SUMMER



LATE SUMMER

Langstroth Beekeeping

- Maximizes growth of bee populations
- Maximizes honey production
- Maximizes growth of Varroa populations
- Necessitates intervention – which is usually a chemical treatment

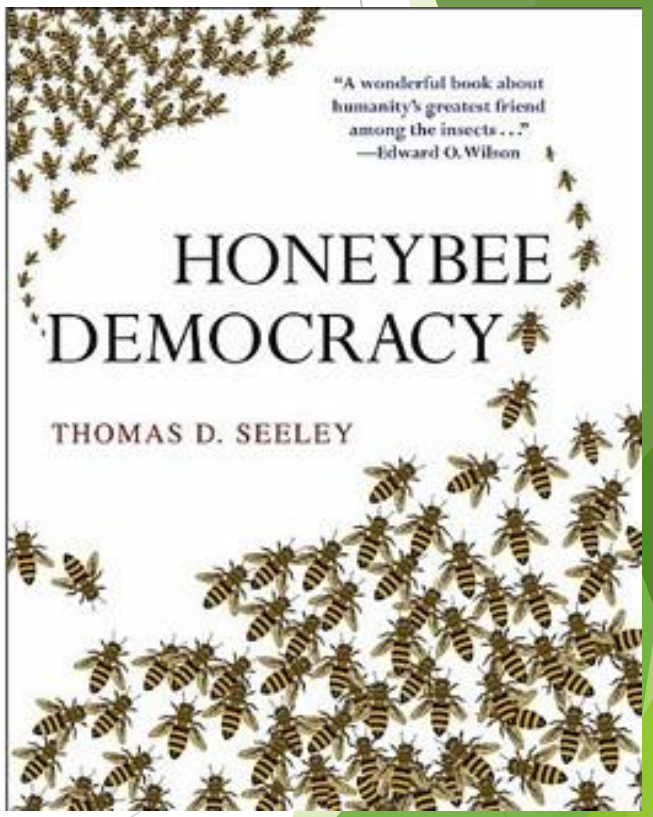
Honey Bees in Natural Cavities

- Cavity volume is usually much smaller than managed Langstroth hives
- Colonies swarm at least once a year
- Bees in trees survive now about as well as they did in the 1970s before Varroa came to the U.S.

Honey Bees in Natural Cavities

- Swarming reduces colony loads of Varroa mites
  - Mites leave with 60% of bee population
  - Brood break during swarming event
    - (5 – 21 = 16 days of emerging brood from old queen)
    - (3 + 7 + 5 + 21 = 36 days before brood from new queen emerges)
    - About 20 days with NO BROOD emerging

Dr. Tom Seeley (Cornell University)



What is Darwinian Beekeeping?

The essence of Darwinian Beekeeping is letting the bees live as naturally as possible, so they can make full use of the toolkit of adaptations that they have acquired over the last 30 million years. I want to stress that it is <u>not</u> a recipe for let-alone beekeeping. Indeed, it requires diligent beekeeping, especially in monitoring colonies for high levels of *Varroa* and preemptively killing colonies that develop skyrocketing mite populations. Doing so selects against colonies without resistance to *Varroa*, it creates selection against highly virulent mites, and it prevents resistant colonies from getting fatally flooded with *Varroa* from the neighbors.

How does Modern Beekeeping differ from evolutionary past?

1. Our bees are not locally adapted
2. We keep them in higher densities (number of colonies per unit area)
3. Much larger hive volumes
4. Propolis envelope is discouraged
5. Hive walls are much thinner than tree walls
6. Our hive entrances are much larger
7. Modern hives sometimes discourage all drone production
8. Beekeeping disrupts nest organization (high frequency; hives moved)
9. Unable to respond to novel diseases very well
10. Food variability greatly reduced by man’s activities

Tenants of Darwinian Beekeeping

1. Work with bees that are adapted to your location. For example, if you live in New England, buy queens and nucs produced up north rather than queens and packages shipped up from the south. Or, if you live in a location where there are few beekeepers, use bait hives to capture swarms from the wild colonies living in your area. (Incidentally, these swarms will build you beautiful new combs, and this will enable you to retire old combs that could have heavy loads of pesticide residues and pathogen spores/cells.) The key thing is to acquire queens of a stock that is adapted to your climate.

2. Space your hives as widely as possible. Where I live, in central New York State, there are vast forests filled with wild honey bee colonies spaced roughly a half mile apart. This is perhaps ideal for wild colonies but problematic for the beekeeper. Still, spacing colonies just 30-50 yards apart in an apiary greatly reduces drifting and thus the spread of disease.

3. House your bees in small hives. Consider using just one deep hive body for a broodnest and one medium-depth super over a queen excluder for honey. You won't harvest as much honey, but you will likely have reduced disease and pest problems, particularly Varroa. And yes, your colonies will swarm, but swarming is natural and research shows that it promotes colony health by helping keep Varroa mite populations at safe levels (see Loftus et al 2016).

Tenants of Darwinian Beekeeping

4. Roughen the inner walls of your hives, or build them of rough-sawn lumber. This will stimulate your colonies to coat the interior surfaces of their hives with propolis, thereby creating antimicrobial envelopes around their nests.

5. Use hives whose walls provide good insulation. These might be hives built of thick lumber, or they might be hives made of plastic foam. We urgently need research on how much insulation is best for colonies in different climates, and how it is best provided.

6. Position hives high off the ground. This is not always doable, but if you have a porch or deck where you can position some hives, then perhaps it is feasible. We urgently need research on how much entrance height is best in different climates.

Tenants of Darwinian Beekeeping

7. Let 10-20% of the comb in your hives be drone comb. Giving your colonies the opportunity to rear drones can help improve the genetics in your area. Drones are costly, so it is only the strongest and healthiest colonies that can afford to produce legions of drones. Unfortunately, drone brood also fosters rapid growth of a colony's population of Varroa mites, so providing plentiful drone comb requires careful monitoring of the Varroa levels in your hives (see suggestion 10, below).

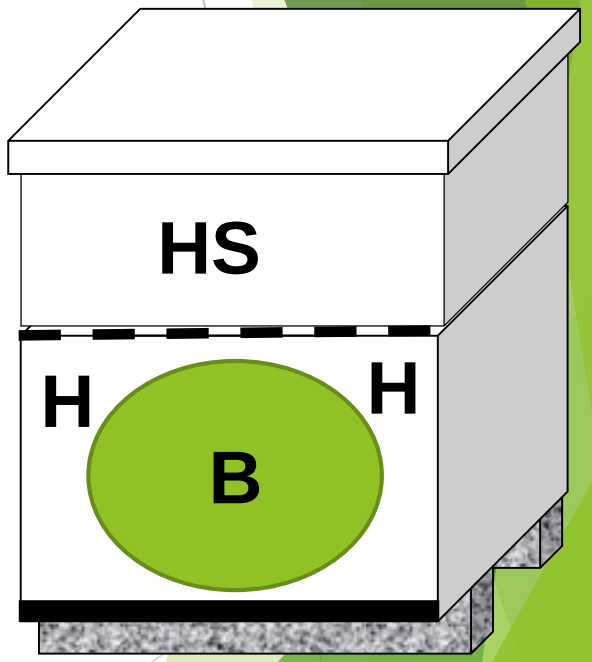
8. Minimize disturbances of nest organization. When working a colony, replace each frame in its original position and orientation. Also, avoid inserting empty frames in the broodnest to inhibit swarming.

9. Minimize relocations of hives. Move colonies as rarely as possible. If you must do so, then do so when there is little forage available.

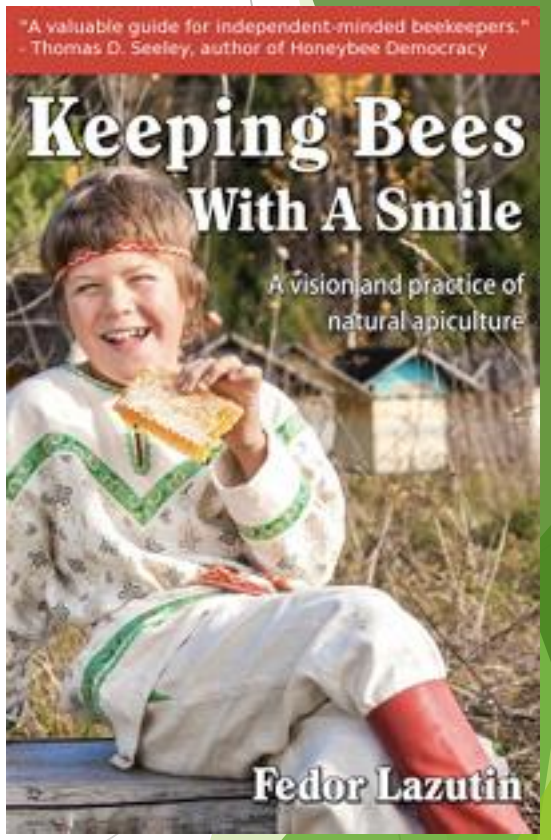
10. Refrain from treating colonies for Varroa. **WARNING:** This last suggestion should only be adopted if you can do so carefully, as part of a program of extremely diligent beekeeping. If you pursue treatment-free beekeeping without close attention to your colonies, then you will create a situation in your apiary in which natural selection is favoring virulent Varroa mites, not Varroa-resistant bees. To help natural selection favor Varroa-resistant bees, you will need to monitor closely the mite levels in all your colonies and euthanize those whose mite populations are skyrocketing long before these colonies collapse. By preemptively killing your Varroa-susceptible colonies, you will accomplish two important things: 1) you will eliminate your colonies that lack Varroa resistance and 2) you will prevent the "mite bomb" phenomenon of mites spreading en masse to other colonies. If you don't perform these preemptive killings, then even your most resistant colonies, living near the collapsing one(s) could become overrun with mites and die. If this happens, then there will be no natural selection for mite resistance in your apiary. Failure to perform preemptive killings can also spread virulent mites to your neighbors' colonies and even to the wild colonies in your area that are slowly evolving resistance on their own. If you are not willing to euthanize your mite-susceptible colonies, then you will need to treat them to kill the mites and then requeen them with a queen of mite-resistant stock.

Darwinian Beekeeping with Standard Langstroth Hive Bodies

- Colony size is similar to natural cavities
- Colonies usually swarm at least once
- Honey production is usually enough for many hobbyists
- NEVER need to treat for Varroa mites



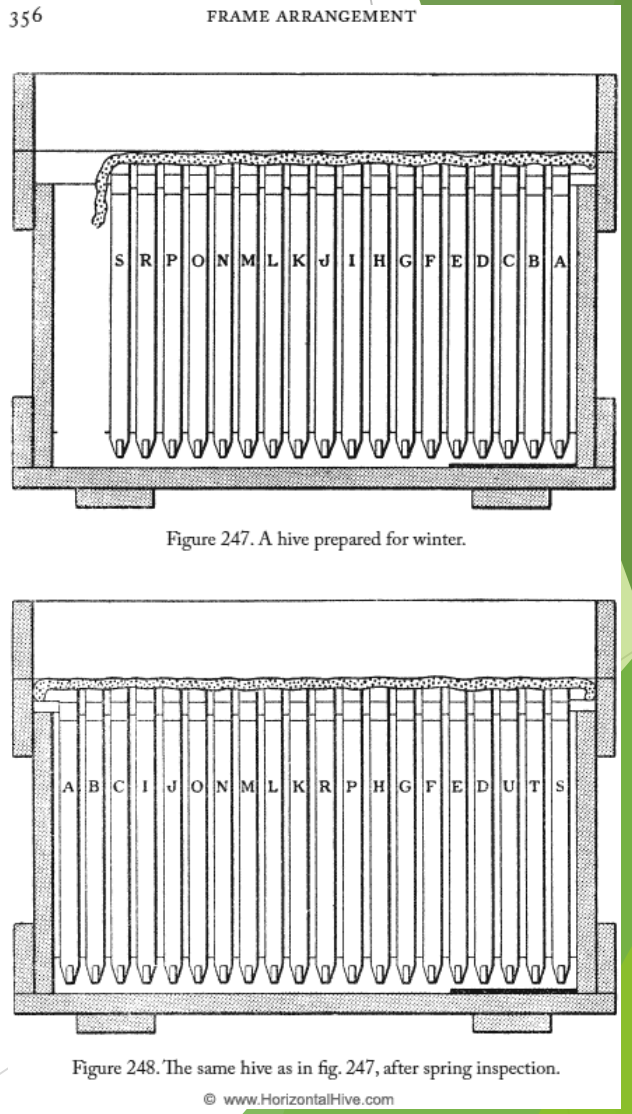
Dr. Leo Sharashkin



Horizontal Hives

- Uses thicker lumber
- Entrance often on one end – broodnest stays near entrance
- Honey stored more internally
- Often the hive is limited to only 15-20 combs
- Allowed to swarm; no Varroa treatment; spaced far apart, etc.

Horizontal Hives with Langstroth Combs



Variations of Horizontal Hives

Top-Bar Beekeeping

Natural Beekeeping – Important Points

- Maximize reproductive efficiency of bees (encourage swarming)
- Minimize development of virulent mites (discourage ease of movement between colonies)
- Do not treat with chemicals
- DO NOT ALLOW COLONIES with HIGH MITE LOADS to persist – EUTHANIZE!