Apply Survival Traits of Honey Bees for Swarm Prevention and Increased Honey Production[1]

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Part I of Two Parts

Virtually everything the bees do as a colony is rooted in survival instincts. Honey bees have been at this survival business for a very long time. The popular literature has lost sight of this basic fact.

The literature acknowledges that the honey bee is a social insect, but does not identify its effects on their colony operations. The social insect lifestyle chosen by the honey bee imposes some rather rigid requirements on the colony. The colony must generate a reproductive swarm without jeopardizing survival of the parent colony. Numbers 2 through 5 of the survival traits below, are part of that aspect of the reproductive swarming process.

When one tunes into survival characteristics or traits, a whole new world opens up for the beekeeper. Swarming becomes a non-problem and increased honey production is automatic. Instead of fighting the colony's natural instincts, you can let them do it their way and benefit from much less effort expended.

To keep this article within a reasonable length, we will just state the trait or characteristic. Very little explanation will be provided. A thorough explanation of almost any one would require an article by itself. We will offer a few words that we consider relevant.

The survival traits presented in this two-part article are not found in the popular literature. Literature writers generally reside in more northerly locations. Climatic conditions in Tennessee provide access to the overwintered colony for most of the year. Mild weather for colony opening is available periodically very early in the season. The beekeeper who takes time to observe colony activities such as storage patterns, stores consumption, foraging priorities, and brood nest growth/reduction can see these survival traits in action. More accurately, he can see the effects of these traits.

For the skeptic, we might add that it is not necessary for you to believe all of the observed survival traits to take advantage of the recommendations of Part II. However, should you try the recommendations, be advised that the results might shake your faith in existing "conventional wisdom."

In the way of introduction to concepts, it is important that you recognize that the European honey bee is a forest creature. Its survival format is based on forest support. Its format is adaptable to desert and prairie where there are no trees, but it was developed for forest survival.

The survival format was developed before man cleared large areas for his purposes. With that baseline, some specific survival characteristics follow:

Characteristic 1: The colony target date for reproductive swarm issue is early hardwood green-up.

Most trees bloom just before, during, or just after Spring leaf-out. The offspring swarm has a smorgasbord of sources from which to choose. To become established in a new location, it is imperative to have ample forage availability.

[redacted]

through frosty mornings of early spring (build-up) is dedicated to generation of the reproductive swarm (species survival). Colony priorities during this period differ from priorities for the remainder of the season.

Characteristic 2: The colony that has not committed to swarm by starting swarm cells, prior to hardwood green-up, abandons reproductive swarm ambition.

The two weeks of swarm cell preparation would add that much more delay. Most beekeepers are aware that at some point in the season the colony loses interest in swarming, but the literature gives you no timing reference. Existing colony survival has priority over species survival of reproductive swarming. When it is too late for the swarm to have full benefit of the Spring forage availability, the overwintered colony turns its attention to its own survival. Three weeks prior to the start of the new wax period of the "main flow" for your area, the colony without swarm cells in progress cancels reproductive swarm ambition.

Note that the mismanaged colony can generate an over-crowding swarm after that point of the season. Overcrowding swarms are generated in the interest of existing colony survival.

Both characteristics 1 and 2 are provided to give the eastern beekeeper a seasonal reference for swarming. They are not used in the application descriptions of Part II.

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[1] **Mr. Wright's theories on colony behavior and management are not necessarily supported by the existing literature on these subjects. If interested, we suggest you experiment on**

point reproductive swarm cut-off timing in their area.

Characteristic 3: The colony that is building population to swarm strength does not use all the honey or nectar overhead in brood nest expansion. It saves a reserve at the top and sides of the brood nest to carry them through the swarm season.

This survival trait is sometimes not seen in more northerly locations where the colony consumes all overhead stores to sustain them through the longer winter. They may have brood to the hive cover under those conditions. In the southeast, with shorter winters and early forage availability, the trait is quite conspicuous. Maximum brood nest expansion stops short of the reserve. A typical reserve in our area is about the equivalent of a shallow super of honey. Increasing the brood nest to this reserve initiates swarm preparations. They have generated all the population that is safely possible within the constraints of stores available for that point in the build up.

Characteristic 4: The colony reduces the brood nest size with stored nectar prior to starting swarm queen cells.

Brood nest reduction with nectar and bee crowding are lumped in the literature in the term "congestion". They are two different things and should be treated independently. Some bee crowding is necessary to generate enough bees to staff two viable colonies after swarm separation. Brood nest reduction serves several purposes. The most obvious is that the parent colony needs fewer bees to support the reduced nest. The open-cell nectar reservoir created by the reduction supports wax makers and the filling of bees leaving with the swarm. If you understand the mechanics of swarming, you will be able to identify other advantages.

We see the brood nest reduction as the first action of swarm preparation. Because it precedes swarm cells, the literature treats nectar congestion as the "cause" of swarming. We believe that both types of congestion, bee crowding and nectar congestion, are effects of the reproduction game plan.

The bees prefer the nectar used for brood nest reduction be at the top of the brood nest. If located above, it can be readily converted to winter honey stores after swarm departure. The primary advantage of periodic hive body reversal is moving solid brood to the top, causing the colony to start over with nectar congestion at the top as brood emerges.

Characteristic 5: The colony that perceives overhead empty comb during the build-up puts a priority on filling the empty comb, and puts a temporary hold on swarm ambition. Brood nest expansion continues for the period required to fill the empty comb overhead.

This trait can be seen in action when a colony wintered in a double deep had brood in the top box, and the bottom deep was empty. When reversed, brood seems to jump into the raised empty. But this does not happen until nectar is stored there first. In a few days, brood will displace some of the nectar. The colony will revert to swarm ambition when the brood volume reaches the maximum safety limit as described in 3, above.

The colony has poor perception of empty comb above solid capped honey. Some will treat the top of capped honey as the top of their residence cavity (hive). They will ignore empty comb added above their capped honey reserve, and start swarm preparations in the brood nest.

In the forest, the colony stores their winter rations on the main flow. This is the period after green-up in the spring. The brood nest is reduced to a level that generates replacement bees. (Sometimes referred to as the maintenance level.) If summer sources are minimal, some erosion of wintering honey occurs. Further, not many trees bloom in the fall. When it is time to prepare the winter brood nest, more honey is moved from stores. When the colony retrieves honey from overhead to feed on or prepare the winter brood nest, they open the honey in a random pattern. This leaves patches of open or empty cells scattered overhead. In late winter/early spring, the colony fills these cells with nectar as they are enfolded in the cluster perimeter. Swarm ambition is second priority to recovery of stores by the existing colony. When the overhead empty comb is filled, the colony perceives itself to have recovered from stores shortage, and swarm ambition is reactivated.

Nectar Management is an approach to swarm prevention that applies the above survival characteristics. A desirable side effect of the approach is the generation of large populations to produce more honey. The production increase is not a few percentage points that would disappear in annual variations. When compared to a double deep brood chamber, where the bees maintain swarm ambition, the difference is significant. In the standard management approach, the brood nest is continually being reduced by nectar congestion, even if reversed at two-week intervals. The colony's effort to reduce the brood nest prevents ever having the full capacity of brood in both boxes.

In contrast, the nectar managed colony continues to expand the brood nest through the swarming season. If the beekeeper is comfortable with the equivalent of three hive bodies of brood, the honey production can exceed a 50% increase.

Part II will describe application of the above characteristics and add some specific "how to" information.