

EVILS OF THE DOUBLE DEEP DOUBLE DEEP

We believe that the double deep is the worst possible choice of Wintering configurations for the southeast.

Walt Wright

It is true that honey bees much prefer to rear brood on the larger expense of comb provided by deep frames. It's as close as they can get to the continuous comb of the wild brood nest in the tree hollow. But a choice of two deeps to prepare the Winter brood nest is one too many. They do not want the Winter brood nest spanning the gap in functional comb between the two deeps. So they have to decide, before brood nest closeout in the Fall, which to use. In my area the choice is about 50/50. Half the colonies choose the lower, and half elect to Winter in the upper hive body. Occasionally, a colony will straddle the decision fence and wind up going into Winter with a cluster two or three frames wide and two stories high. This produces an inefficient Winter cluster shape, but is probably better than selecting one or the other of the two hive bodies.

In the double deep, during the white wax flow, (i.e. the main honey flow where you are) the colony stores Winter rations. They often treat the gap in functional comb between deeps as the dividing line between stores. Some will fill the upper with capped honey, and some will fill the lower with pollen. This pushes the brood into the other box. In both cases the brood nest is competing with Winter stores for space. This restricts brood nest expansion in the Fall when they need to be rearing young bees for Wintering.

Several features of their normal preparations for Wintering do not get much press in the literature. First, they literally fatten up for Wintering. Large amounts of pollen are consumed in late Fall/early Win-

ter by the bees expecting to Winter. Pollen is consumed to enlarge internal fat bodies for Wintering.

Second, they want to Winter over open cell liquid feed in the center of the cluster. The liquid feed can be uncured honey, nectar, or a combination of the two. This liquid feed is placed there after the last brood emerges in the Fall. The cluster feeds on this in early Winter, freeing up cells for mid-Winter brood rearing. The northern literature infers that empty cells are deliberately left unfilled to aid insulation properties of the cluster shell. A live bee in a cell is presumed to be a better insulator than trapped air space. Without getting into a discussion of the R factor of a bee, end to end, in an empty cell, I come to a different conclusion. There was still brood in those cells when field nectar and/or flying weather ran out. In the southeast, the only time we see bees upended in empty cells is when that colony starved. *The properly-prepared Winter brood nest has no empty cells in early Winter.*

Third, the colony wants to scale the cluster volume or population going into Winter to be proportional to Winter stores. The colony must strike a happy medium between two extremes. If they have too many bees for stores available, they run the risk of Winter starvation. If they do not have enough bees, build up will be slow, and the colony will not meet reproduction requirements. The timing of brood nest closeout in the Fall reflects this characteristic. Those with ample bees stop brood rearing earlier. Those with fewer bees will often extend brood

rearing into hard freeze weather, and fail to get their brood nest prepared for Winter.

And last, during the brood nest reduction of the white wax flow, the brood nest is reduced from both top and bottom. The top is compressed by capped honey and the bottom is raised with Wintering pollen. Brood feed pollen is generally maintained at the sides. In the hollow tree, with a continuous slab of comb from top to bottom, the brood nest is free to float up or down with brood feed in immediate contact with the brood. Not so in the managed hive. The colony's distaste for the break in functional comb often causes them to get it done poorly. The colony that errs in pollen placement on the main flow is stuck with it going into Fall brood nest preparation. Pollen is not readily moved and must be consumed. The experts who tell us that hive design is "optimized" didn't get that from the bees who use it. The break in functional comb seriously disrupts colony judgment on stores location.

A specific error in colony judgment created by hive design affects pollen placement. Most colonies fill a deep frame with brood. Their inclination to use the whole frame for brood seems to override their natural tendency to maintain feed pollen at the bottom of the brood nest. If rearing brood in the bottom deep during the white wax flow, the brood nest is often not raised with Wintering pollen. This leaves the Wintering cluster dependent on Fall feed pollen at the sides of the brood nest. The cluster will often migrate to one side or the other to enfold that pollen frame.

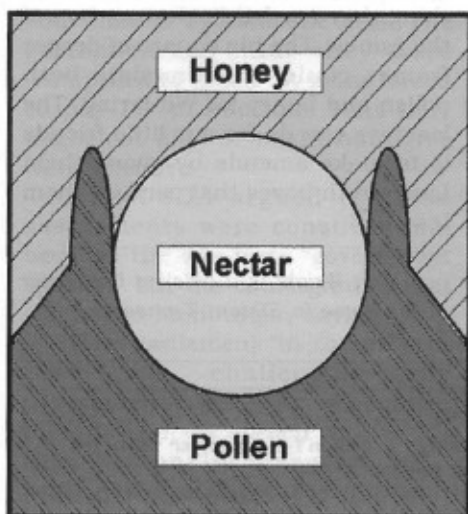
At the risk of boring the reader beyond endurance, we want to pursue the evils of the double deep a bit further. If you recognize that your production season starts in the preceding Fall, you will be patient. We believe that the double deep is the worst possible choice of Wintering configurations for the southeast. A single deep and feed box shallow, or three intermediates is better. Although the double deep is the standard for a large area of the United States, it gives the bees problems in the Fall. They do not want to have their Winter cluster span the gap in functional comb of about an inch and a half between hive bodies. That is exactly where they would like to have their cluster, but for the gap. They want to have the cluster located between honey stores above and pollen stores below. If both pollen and honey are enclosed in the cluster, mid Winter brood rearing gets off to a good start.

In the southeast, the colony does not generally move up by consumption of honey in the Winter. Those that opt to Winter in the lower hive body, and forage availability supports proper brood nest preparation, over Winter in the lower. Upward movement is limited to *expansion* of the brood nest in late Winter/early Spring. In late Winter they will expand the brood nest laterally, frame to frame, until the lower box is filled with brood. Only then will they jump the fearsome gap to rear brood in the upper. They will continue to maintain brood in the lower while expanding the brood nest into the upper.

It is a popular misconception that the colony moves up by consumption of honey in the Winter. If we can believe Dr. Farrar's sketches from Wisconsin (you might consider that Northern) bees do not move up there either. They stretch the cluster to maintain contact with both pollen stores in the bottom deep and overhead honey. This causes a tall narrow brood nest as they consume into the top of the three deeps. Like our bees, it's not so much "moving up" as expanding upward. This might sound like nit picking, but there is a point to be made when discussing the effects of the double deep. In the double

deep, in late Fall/early Winter the colony that has not prepared the brood nest for Wintering in the lower relocates the whole cluster into the upper on solid capped honey. They move up, but they didn't eat their way into the upper. Dissatisfied with empty cells in the cluster, they relocated all at once.

The colony that fills the upper hive body with capped honey during the "main flow" in early Summer automatically is rearing brood in the lower. Conversely, the colony that filled the lower with pollen is rearing brood in the top chamber. Where pollen is concerned, "filled" is not accurate. It would be more accurate to say there is some pollen in all cells (perhaps less than half a brood cell depth). It is obviously stored for



Box hive early winter stores location.

the long term because it is ugly with honey glazing. Current feed pollen is generally filled near the top of cells and is dry, retaining its bright colors.

Back to where we were headed: Locally, the colony that has all its brood in either chamber will generally get that chamber properly prepared for Winter, and Winter there. The colony that has brood in both chambers at the end of the white wax flow must decide which one to prepare for Wintering. Since they have cut back on brood production, they will often have random frames of brood and pollen in both boxes. There is no well-defined brood nest. No matter which hive body they choose, the brood volume is com-

peting with stores volume to rear young bees for Winter.

The worst-case scenario is the colony faced with the decision that opts to use the bottom box for a brood nest. They have a tendency to want brood below honey stores. They make this choice in late Summer, as the Fall flow is starting. There is already substantial pollen in the bottom box when the decision is made. This complicates consolidating the brood nest. Then, in late Fall/early Winter, when consumption of pollen increases for the "fattening up" process, that colony is uncomfortable with their situation. If they fail to fill the brood nest with nectar, they panic, and move the cluster up into the upper hive body of solid capped honey. Located over solid capped honey, the Winter brood rearing is slowed, getting them off to a poor start for the following season. Consumption of honey (with increased cell depth) is much slower than nectar at brood rearing depth. In addition, there was no deliberate pollen stored in the upper for midwinter brood rearing. The colony with the same circumstances in early Fall that chooses to Winter in the upper, and prepare it well, will Winter better. There was feed pollen at the sides through brood nest closeout. Pollen in the lower supported the fattening up process.

We did have one season locally in recent years that looked like the bees had spent the Fall in the far north. Brood nests were completely empty in late Fall. Some had a smattering of nectar in outside brood frames. They had extended brood rearing later than normal or the Fall flow ended earlier than normal. Clusters higher than expected in the hive called my attention to the problem. Some had already moved up on solid capped honey. Wholesale feeding filled their brood nests before full time clustering started. When their brood nest was filled, they moved back down. They all Wintered well.

As a side note, we found it interesting how the colonies applied the feed provided. They started at the top and filled downward all the way across the brood nest. After 1½ gallons, the top half of the brood

nest was full and the bottom half had none. Most used three gallons to fill the brood nest. A deep frame of brood comb will hold about a half gallon. That's the reason the literature recommends you think in terms of gallons if feeding is required.

Those of you that experience Winter conditions (it snows there) might consider an investigation to see what your double deep is doing to your bees. If, on your last hive opening in the Fall, the cluster is normally in the bottom, and in the Spring, normally in the top, check the concept of 'moving up by consumption.' Open a couple of hives in the middle of December. There should be very little consumption of honey at that point in the season. Consumption of honey accelerates after the honey at that point in the season. You might be surprised to find the cluster already in the top box, and the bottom box already "empty."

In summary, the colony does not need a break in functional comb right where they would like to have their Winter cluster. If they had continuous comb the size of a double deep, the early Winter brood

nest would look something like the figure. The pollen peaks at the sides are Fall feed pollen, perhaps encapsulated under honey/nectar. The rounded brood nest on continuous comb would be squarish on Langstroth frames. To avoid the problem for the bees in the Fall, a single hive body in the center between two other boxes works better. The details will be provided in a separate article, but you can already see why. The colony preference for rearing brood in the deep takes away the indecision caused by the break in functional comb, and Fall stores location supports mid Winter brood rearing.

When the beekeeping community abandoned the jumbo hive body of yesteryear, in favor of the Langstroth, they did the bees a disservice. The colony could put everything they needed in the one box of the jumbo. The big square of deeper frames could accommodate both pollen and honey for Wintering. The least we can do for our little friends is to make amends by giving them Langstroth boxes that confuse them less. **BC**

Walt Wright is a sideline beekeeper at his home in Elkton, Tennessee.

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