

# BACKFILLING

Walt Wright

It's a word. Properly used, it replaces a whole sentence and describes a key process in colony development toward reproductive swarming. The sentence replaced is variations of the following description: To reduce brood nest size, upper reaches of cells in the brood nest are filled with nectar or pollen as capped brood emerges. It should be obvious that a single word replacing that mouthful has its advantages.

The term is borrowed from construction jargon. When a residence with basement is built, an oversized excavation is made. When the floor and walls of the basement are complete, the oversized excavation has served its purpose. Dirt removed is then backfilled against the basement walls to bring the adjacent area up to grade level.

That temporary space usage has similarities in brood nest size adjustment in the honey bee colony. In the Spring quest for reproduction, the colony expands the brood nest to the maximum safe limit. They need the extra bees to populate the reproductive swarm. When the expanded brood nest has generated sufficient bees for division by the swarm, the extra brood cells have served their purpose. Then, the colony needs to reduce the brood volume to a level that can be maintained by the population remaining after swarm departure. They do this by filling from the top with nectar or pollen. Nectar is preferred – it is easier and quicker, but if nectar is scarce and pollen is available, they will use pollen. As brood emerges at the top, available forage fills those cells to reduce brood volume. That's the process that we call "backfilling."

As best I can tell, the literature sees backfilling as "congestion." Along with overcrowding, nectar in the brood nest is another form of congestion. Correct me if I'm wrong, but you are not told in the popular literature what congestion really is. I have yet to see a clear description of congestion in all its forms. Most accounts make it plain that congestion is only relevant "in the brood nest," and other areas of the hive can have empty space.

Mark Winston, in his '05 EAS presentation on swarming showed a slide that surprised me. It was a perfect picture of maximum brood nest expansion. On a deep frame, the brood was all capped. The solid, capped brood was shown inside the typical arch of the brood nest expansion dome, and reached nearly to the top bar at

the peak of the arch. Separating the brood from capped honey outside the arch was a single band of liquid feed only one cell wide. The honey outside the arc of brood was the reserve that limits expansion. Although the slide was a classic picture of maximum brood nest expansion, Dr. Winston said it depicted congestion. That floored me. If that was congestion, it was a meaning of congestion that I had not considered. Peak brood nest expansion is the point in the swarm process where backfilling (brood nest reduction) starts. In two weeks that frame of brood will still have the capped honey outside the arch, and the inside will be filled with nectar.

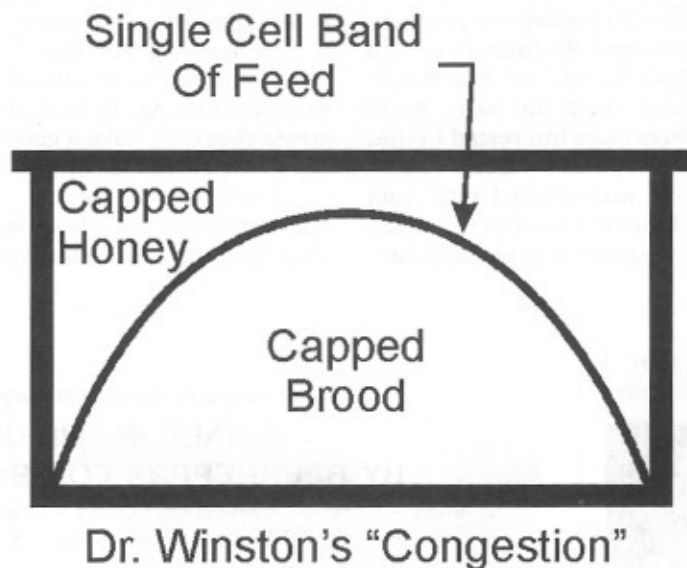
"Room for the queen to lay" keeps coming up in the literature, but descriptions of that concept are rather nebulous also. That expression, to me, implies empty cells. Observation of the internal workings of the colony

suggests that the colony can't tolerate empty cells within the cluster perimeter. Within the constraints of field forage availability, and flying weather to collect it, empty cells are filled on a priority basis. Given the opportunity, there are no empty cells within the cluster most of the time. Brood nest expansion is accomplished by consumption of honey/nectar in the direction of the anticipated growth. When those cells are emptied and prepared for eggs they are soon occupied with brood. Very little "empty" time.

Backing up a notch, Dr. Winston's slide of peak brood nest expansion had no "room for the queen to

lay." All cells occupied. If that is another type of congestion, who knows what else that term means. Open to interpretation, both "room for the queen to lay" and "congestion" mean different things to different people.

I take no pleasure in consistently knocking literature inaccuracies or the experts who perpetuate them. It's an ugly job that generates more adversaries than friends. But misinformation needs to be corrected by somebody. Otherwise, a hundred years from now, we'll still be applying, or trying to apply, bum data in our management of honey bee colonies. Wrong is wrong, no matter how you slice it, and I can take the heat. I didn't hire in to beekeeping to fill a vacancy in the nice guy department. Some senior members of my home association still consider me a crackpot. Some of my observations are contrary to what they "know" to be true.



## Tip of the Month

Forget inspection for swarm cells. That literature recommendation is ancient history. When swarm cells are started, the colony is committed to swarm, and it takes a major upheaval to turn them around.

Instead, monitor for backfilling. If your colony count exceeds memory limits place a stick pin or small nail through the comb at the peak of the expansion dome of brood. If nectar shows up below your marker, you have about two weeks to take corrective action before swarm commit.

You have the right to challenge my credentials as a dissident to conventional wisdom. There are no credentials relevant to beekeeping; no degree – not even a single course of study in entomology. But a self-taught skill in electrical/electronic trouble-shooting more than compensates for the lack of formal training in the specific discipline. Problem investigation skills are not discipline unique, and I know of no courses of study where those techniques are taught. There is a heavy dependence on observation skills – no data is considered irrelevant until the problem is solved.

In the past communications with beekeepers my aerospace work history has been deliberately down-played. If the beekeeper learned that I had “hands-on” experience with man-rated launch vehicles since the early moon rocket days, he was nearly always more interested in that period than what was learned about honey bees.

When I started beekeeping, everything I read said swarming is inevitable. To someone confident in his trouble-shooting skills, that's a sporting challenge. Get-

ting to the bottom of the swarming process was a very early interest. Beginner's books and the reference books treat the mechanics of beekeeping – building hive parts, hiving a package, etc. There is almost no definition in those books of how the bees run their shop. Learning what is going on in the colony with season change took several years. Data comes slowly. Variations in seasons, colony strength and mite effects need to be distilled down to what most colonies do, most of the time. In spite of the data scatter, by year five a hypothesis was developed on the swarm process. But nobody wanted to hear about it. So, another five years was spent on demonstrating the validity of the hypothesis. During that period we studied ways to improve honey production and colony wintering. The point of the above filler material is that what has been learned about colony internal activities did not come easy. A lot of box shuffling and comb reading went into the effort. I should be entitled to call a process not previously described in the literature anything I choose. And I choose backfilling.

Backfilling is not restricted to swarm prep brood nest reduction. Any time the brood volume is reduced backfilling is applied. That happens all the way through the Spring season and the main flow. It's also applied in the Fall locally, but further north forage can terminate before brood nest closeout.

Beekeepers who have tuned in to my recommended Spring management approach have no trouble using the word backfilling. In fact, they seem pleased to demonstrate that they have a good grasp of the swarm process. Try it – what harm can it do? **BC**

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*Walt Wright is a retired engineer and a hobby beekeeper in Tennessee. He is a frequent contributor to these pages.*