

Dead Hive Autopsy

Nothing spreads gloom over a beekeeper's day than to find a dead hive. Watching a once-thriving colony dwindle and die off, especially if there is no obvious reason, can bring on dark despair. In memoriam, the final field inspection sheet for one such hive is attached below.

But, in addition to the records that have been kept, there is much to be learned from the final inspection as the hive is broken down into its components and prepped for storage.

The package was brought from California by one of our club members, and introduced on 04/21/2013 to its original brood box, designated Bear-13 for the small concrete figurine used as a top weight, and the year of its introduction. The queen was designated as Italian, and was marked with the red dot for that year. The hive was situated on a grassy bench about 20' feet above the North River in SW Washington. The site was protected on the north and east by scrub willows about 25' feet from the hive, and was open to the west for the afternoon sun.

Most of the surrounding forage area is covered with farmed Douglas fir, which is no benefit to the bees. Earlier spring forage includes willows, skunk cabbage and salmonberry, but little else. By early April, the first major nectar flow and pollen production begins with the broadleaf maples that dot the valley. After that, there is a succession of various wildflowers, scrub willows, and such, most in small, scattered patches. The second major flow comes in May and June with the blackberries: First out is usually our native Cascade variety, then the invasive Himalayan and Evergreen, all of which deliver the best forage for the season. Later summer forage includes clover, thistle and daisies, and a host of small wildflowers, again in small and in scattered patches that erupt in the surrounding pastures. By mid-September, there is virtually nothing flowering, even though an occasional forager will return with pollen.

The introduction went smoothly, with the queen, liberated from her cage, scurrying down between the frames. The initial feeding came to 1.5 quarts of cappings wash, approximating a #3 syrup, installed in two entrance feeders, and an 8 oz pollen patty. Both feeders were empty and removed within 2 weeks, and the bees were on their own. The next feeding wouldn't happen until early spring the next year, timed a few weeks before the broad leaf maples.

The summer progressed as usual, foragers coming and going, and no indication of a compromised hive. By the middle of September, there were 8 frames of capped honey in each of the top two boxes, with brood in the lower two. The colony had ample stores for the winter.

In the new year, the first feeding came in mid-February with 1 quart of cappings wash, followed by another pint in the first week of March. By mid-March, the feeders were empty, and a week later ample foragers were piling in and out of the hive, just in time for the maples. By the last week of July, a second super had been filled, and a third added. The hive, composed of all shallow boxes, now stacked to 3 brood boxes, an excluder, 3 honey supers, with a solid bottom board and an insulated top. Through August and into September, when the bees were working on 4 frames of uncapped honey in the uppermost box, the hive showed good odor, adequate foragers, and pollen on up to 25% of landings.

Then in the third week of September, the colony started its decline. Fewer foragers were active, and some of the returning bees were actively attacked by the guard bees, balling the interlopers and pushing them off the entrance. The neighbor to the west is also a beekeeper, usually with a half-dozen hives, and is the likely source of the thieves. A block of wood was placed at the entrance, reducing it to about 4 inches. At the end of the month, the entrance was full of guard bees, no sign of robbers, and good odor and sound emanating at the top. By the first week of October, though, a few robbers had returned. The bees were still making their usual hum, but the odor seemed a bit off. Not acrid like foulbrood, just "off."

Two weeks later, in mid-October, all heck seemed to break loose. There were several dead bees at the entrance, and a multitude flying all around the hive - front, back and sides. And they were aggressive, confronting anything within 15 feet of the hive. None were noticeably bringing in pollen. The departing bees seemed to be heading to the neighbor's hives, albeit by a round-about way. By the end of the month, the robbers had given up, leaving the hive to a couple of hornets, several kinds of flies, and a small scattering of wax debris at the entrance. The odor

was better, closer to the smell of a healthy hive, but no one was bringing in pollen. A week later, there was no sound, no odor. Just to be sure, a pint of cappings wash was installed, only to be robbed out within a few days.

The day finally arrived to break down the hive. The cover and insulation were both dry, as they should be, and there were very few dead at the entrance. The boxes, however, began to tell a different story. The top honey super had, in addition to 5 frames empty honeycomb, 4 frames of empty brood comb, and one frame undrawn. The next box down was similar, with 4 empty brood frames and 6 empty honey frames. The lowest super had 7 frames of brood comb, 1 of honey, and 2 frames undrawn. All frames were empty: No brood, no honey, no pollen.

Below the queen excluder, the final disposition was more puzzling. There was no brood comb, even though the package was installed directly into the bottom two brood boxes. For all three boxes, there was just a little bit of pollen, and still a few frames undrawn, and again, all frames were empty. There was a moderate amount of debris on the bottom board, but minimal and without mold.

The hive was dry and mold free, with the minor exception of some mold on the remaining pollen cells. There was also no evidence of foulbrood, mites, moths or any other invasive pests. There was no indication of starvation - no scattered dead resting headfirst in honey cells - nor was there evidence of hypothermia - no compact dead resting headfirst in brood cells. There were irregularities in the combs, but nothing more than typical. There were no queen cells found anywhere, nor was the dead queen.

The pile of dead, however, was not located on the bottom board, as would be expected, but on the top side of the queen excluder. Since the honey supers had no brood comb when installed, the extent of brood comb in those boxes, and the location of the remaining dead, it was apparent that the queen and brood were not located in the lower boxes, but had somehow managed to migrate above the excluder.

So, what happened? With no indication of pests, and the virtual absence of pesticide use in their foraging area, the cause of their demise becomes murkier. The excluder was raised to include the then-top honey super in the fall the year before. The records indicate typical bee behavior observed throughout the following spring and summer and into the middle of September. Indeed, as of the last week of July, the records indicate a third honey super was added, as the two already installed were reasonably full.

The ultimate cause of this colony's decline and collapse is still unanswered. In the absence of evidence, it is likely that the queen "aged out" and quit laying, probably in early- or mid-September. Even if the colony had tried to supercede or swarm, for which there was no evidence, the queen, new or old, would have been trapped between the excluder and the hive top, and the colony would have succumbed anyway.

Yet there are still lessons to be learned. As the records show, nearly all the inspections were of the exterior, entrance and top. The honey supers were simply stacked as needed, and the brood boxes were undisturbed. A more thorough inspection of the honey supers, from the top down to the excluder, would have revealed the brood activity in those boxes, and corrective action could have been taken. Alternatively, the excluder could have been completely removed, and the field inspections starting at the top box, proceeding down to the uppermost brood. The boxes with brood could then be left largely undisturbed, unless there are other indications of developing problems - bee behavior, hive odor, etc. When raiding from other hives was suspected, the hive should have been opened completely for inspection and remedy, if there are still queen and brood, or for harvest, if not. Some of the combs were malformed, suggesting a replacement of foundation on those frames.

The observations we make, the records we keep, and the analyses we apply, are the surest way to mitigate the issues our hives encounter, and will improve our beekeeping understanding and skills.

Apiary Field Inspection Sheet

Bee Tracker.com

Hive # Bear-13 Retired Frame
 Queen # Bear-13-1 Source Can Am
 Intro Date 04 /21 /2013 Race Italian
 Marker Color Red
 Location North River Primary Forage
 Contact diverse
 Tel #



Inspection Date 11 / 21 / 2014
 Entrance Littered Dry Workers Listless
 Dead/Def Normal Min Drones None
 Top Dry Queen Not Found
 Odor Normal Queen Cells None
 Feeder Interior Ful Brood Not Noted
 Box ID# Comments
 #3 5 4 brd/5 hny/1 undrn
 #2 9 4 brd/6 hny
 Supers #1 2 7 brd/1 hny/undrn

 Brood #1 16 4 plln-uncp/3 hny/3 und
 #2 14 8 hny/2 undrn
 #3 4 10 hny

Prior Inspection 11 / 07 / 2014

Pests	Type	Extent
/ /	None	None
/ /	None	None

Treatment/Medication	Type	Amount
/ /		qt
/ /		qt
/ /		qt

Feeding	Type	Amount
04 / 21 / 2013	#3 syrup	1.5 qt
11 / 01 / 2014	capp wash	0.5 q
02 / 14 / 2014	capp wash	1 qt
03 / 08 / 2014	capp wash	0.5 qt

Yields

Honey	lb	Wax	oz
/ /		/ /	
Pollen	oz	Propolis	oz
/ /		/ /	

Comments

11/21/14 Mouse nest in #5. 8 with no foundation in #14. Irregular coverage on old foundations.
 11/07/14 Return of robbers - interior feeder nearly empty.
 11/01/14 1 guard, 1 forager - 1/2 qt capping wash in interior feeder - no sound, odor.
 10/27/14 Several Am entering - no pollen seen - 2 hornets, several kinds of flies, cap debris at entrance - better odor.
 10/18/14 Several dead at entrance; many flying around all sides of hive; aggressive - robbing in progress?
 10/04/14 Guard bees at entrance, few robbers. Good sound - off-odor?
 09/27/14 Guard bees at entrance, no sign of robbers. Good odor, good sound.
 09/20/14 Fewer at entrance; robbers?; entrance reduced to 4" +/-.
 09/14/14 Fanning at entrance; dark orange pollen on several landings.
 08/23/14 Good odor, adequate workers, pollen on approx 25% of landings.
 07/26/14 #9 full, #5 added. Insulating top w/ feeder port installed.
 03/21/14 Ample foragers.
 03/14/14 Feeder empty, removed.
 03/08/14 2nd feeder installed.
 02/14/14 Feeder installed.
 09/04/13 Excluder raised above brood boxes.
 07/14/13 Super #16 added, supers tumbled.