

Forensics Process Flow

Intro: History assessment

By examining a dead colony to determine the root cause of loss, we can alter management strategies and make process improvements to reduce losses in the future. Primary causes for overwinter losses are: inadequate population going into winter, starvation, environmental conditions (moisture), and/or disease. Strong colonies die from starvation and disease, weak colonies die from starvation coupled with environmental stress. Fall robbing losses are not included in this process, only spontaneous winter losses.

PART 1 - Colony strength/weakness assessment

- Colony started as a split/divide or Nuc previous season
- Colony established on foundation frames after main nectar flow
- Colony fed at installation and at least 3 more times
- Greater than 6 seams of bees during last fall inspection
- Evidence of swarm/supersedure during the reproductive season
- Number of seams of debris on bottom board – fresh or old
- No evidence of mass die off – no piles of bees behind entrance reducer after early winter
- Queen found - freshly dead

PART 2 – Starvation assessment

- Honey harvest data – frames of CH taken after nectar flow
- Fed syrup during the fall dearth
- Colony fed at installation and at least 3 more times
- Evidence of capped honey remaining in the hive
- Known date of colony collapse
- Colony was still alive in January
- Weight data during the winter season
- Evidence of cluster bees dead in cells containing no honey – any honey available is not within reach at cold temps.
- Environmental data to support cold period loss
- SBB open
- Colony was still alive in January

PART 3 – Disease/queen failure assessment

- Known date of colony collapse
- Varroa counts during the fall assessment period
- Mid-winter varroa treatment/assessment done
- Screened bottom board evidence of mites
- Treatment protocols utilized during the last season (resistance issues)
- Evidence of varroa in combs
- Clinical signs of viral disease (deformed wing)

Clinical Examination Work

Outside examination:

- Signs of dysentery – where inside on frames/outside at entrance
- Dead bees piled behind entrance reducer
- A few dead bees outside the entrance

Bottom board examination:

- Presence of deformed bees or prehatched pupae on bottom board
- Layer of dead bees uniform or isolated to under the cluster
- Dead are moldy or fresh
- Assess debris lines on bottom board – cluster size/food availability and location in the box
- Mite evidence
- Mouse droppings/evidence of wood damage from predators
- Water pooled on bottom board

Inner cover examination:

- Wet/moisture level
- Mold present
- Upper entrance available

Cluster examination:

- Size of cluster left in the combs
- Location of cluster relative to sun side of the box
- Location of cluster relative to the honey left
- Any brood present
- Evidence of mites – crystals/perforated cappings/deformed wings/etc.
- Condition of the comb the cluster died in
- Queen present in last of the dead, any capped brood
- Wax moth present

Adjunct diagnostics done:

- Nosema counts on fresh dead
- Bottom board mite count
- AFB/EFB diagnostics if req'd.

PART 1

Weak/inadequate size to overwinter. Handful or more of dead bees on the bottom board &/or a small dead cluster with bees head-first into cells. May or may not be a small patch of dead capped brood located on one of the brood combs. Queen failure associated with weak colony loss may have evidence of drone brood, dead bees with deformed wing or no brood at all (may also be due to small size of cluster not warranting brood care).



PART 2

Inadequate stores. Dead cluster (handful or so of bees with many single bees head-first into cells around a patch of capped brood cells). Large colonies will have a layer of dead on the bottom board with old brood moldy. Concentric circles of dead. No signs of any food in the combs or just enough to keep the last cluster remnants alive until they succumbed to cold.



PART 3

Disease. Cluster of dead bees with bees head-first into the cells is only "the way" they died, not why. There will most likely be scattered capped brood cells, many with holes in the cappings. Looking into former brood cells, you might note a bright white "stain" on upper cell wall (mite guano). Presence of deformed wing in the last to hatch. Queen failure has drone brood or no brood. Maybe no queen.

