

*“Let the great plot commence.”*

— *Mary, Queen of Scots, referring to plans to take over the English throne*

The standard advice for new beekeepers is to start out with a couple or three hives, not just one. There are good reasons for this:

1. it allows a basis for comparison
2. there are certain problems that can be fixed if you have two hives, using one of them for “spare parts”
3. like all agriculture, beekeeping is a risky undertaking and sometimes “stuff happens”

Two hives double your chance of success just from a probability standpoint. It is sad when someone invests in education and equipment, starts a colony, then has it collapse, abscond or whatever within a short time. With two colonies, they can laugh that off and continue beekeeping. With one, their options are very limited.

There are countless reasons a colony can fail but there are three things that kill the vast majority of colonies in the US:

1. Varroa mite infestation and the viral diseases associated with that
2. starvation
3. failure to recover from a “queen event”

Other things do happen, such as Foulbrood, death by robbing, lightning strikes, floods and, rarely, pesticide poisoning, but the Big Three are the ones that commonly take out colonies. The first two are somewhat within the control of the beekeeper but the third can be tricky.

### Queen events

A queen event failure occurs when a colony becomes queenless and somehow fails to be restored to a queen-right state. Maybe the beekeeper deliberately replaces the queen with a new one but the workers refuse to accept it. Maybe the colony swarms and the new virgin queen gets eaten by a blue jay while on one of her mating flights. Maybe the colony replaces its queen in the winter so the new virgin doesn't have any drones to mate with and thus can only lay unfertilized eggs (I had one of those



Multiple eggs per cell and eggs poorly placed in cells are classic signs of laying workers. This hive has an abundance of both! Photo ©Michael Todd Walker.

this season). Maybe the beekeeper accidentally and unknowingly kills the queen during an inspection and when he/she later finds queen cells, the beekeeper fears swarming so cuts them out, dooming the colony to queenlessness. With so many things that can go wrong, it is truly amazing that any honey bees survive!

When a colony becomes hopelessly queenless, from a biology standpoint it has one last-ditch opportunity to spread its genetics into the world: it can raise brood from laying workers. Since workers can't mate, all such brood will be from unfertilized eggs (drones), but sons continue the family line just as daughters do. The colony cannot sustain itself with nothing but new drones (it is the workers [females] that collect food, raise brood, etc.) so it will dwindle and die. But until it finally does expire, it can cast its genes to the far winds.

The classic signs of a laying worker colony are:

1. no queen
2. the only brood is drone brood
3. brood is in an unorganized pattern
4. eggs are stuck to the sides or are off-center in cells (worker abdomens don't reach the bottom properly)
5. multiple eggs in the same cell (but this can also occur sometimes in queen-right colonies if the queen has no place to lay)

### A little (updated) biology

What can be done with a laying worker colony? First, we must be very clear about what

is going on. As we learned in bee school, worker bees are sexually immature, essentially trapped in a pre-pubescent state by inhibitory pheromones in the colony. Conventional wisdom and many textbooks say that laying workers arise when there is no longer any queen pheromone in the colony to inhibit the development of workers' reproductive glands. Therefore some workers mature and lay unfertilized eggs.

*However, this assessment isn't wholly true.* Contrary to what most people think, the problem isn't "laying workers" themselves. Kirk Visscher<sup>1</sup> found that all colonies have laying workers. There may be forty or more in a colony at any given time, and their eggs may account for 7% of the total number of drone eggs that are laid. However these worker-laid eggs aren't marked by pheromones from the queen's Dufour's gland so nurse bees quickly recognize them as "not right" and eat them. Problem solved.

The issue with so-called laying-worker colonies is that once the workers decide that they are hopelessly queenless, they accept these worker-laid eggs as being "good." This is delusional, but it fits within the overall biological imperative to give it one last shot at spreading the colony's genes. The workers all join what I call the Cult of the Laying Workers (CLW). Not only do they raise those "bad" eggs as if they were laid by a queen, they become convinced that they in fact do have a queen. If you try to introduce a new queen, the workers will kill her every time because in their warped minds, they think that they already have one.

How long it takes for a queenless colony to convert to the CLW depends on the race of bee and other factors. African honey bees (*Apis mellifera scutellata* and hybrids) can convert in a couple of weeks. Our Italians usually don't become cultic fanatics until a month or two has passed *without any worker brood*.

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<sup>1</sup> P. Kirk Visscher, "Reproductive conflict in honeybees: a stalemate of worker egg-laying and policing", *Behavioral Ecology and Sociobiology* (1996) 39:237-244

The other part of the conventional wisdom that isn't wholly true is that the absence of the queen triggers laying worker syndrome. In fact it is worker-brood pheromone that strongly controls whether workers accept worker-laid eggs or not. Adding open worker brood to a queenless colony will prevent it from joining the CLW as long as it hasn't already succumbed.

These corrections to "what we know" have major implications for how to deal with laying worker colonies. For example, I've read advice on the internet where people say all you have to do is "find and remove the laying worker" or "dump the bees away from the hive because the laying worker won't be able to return." This advice misses the whole point: the problem isn't the laying workers (and there are many, not one), it is the rest of the worker bee population. Removing the laying workers, even if that were possible, won't wash the proverbial scales from the other bees' eyes and make them abandon their crazy cult. That's why these sorts of clever remedies do not work.

So what can we do if a colony joins the CLW? One thing that will actually work, eventually, is to transfer a frame with open worker brood into the hive every week for four or five weeks. Eventually the worker-brood pheromone will "reset" the crazy bees. They'll return to "right living" and make a queen cell from the brood you've given them. I've done this, once. It works but it is a silly approach. What you are really doing is replacing the whole colony, one frame at a time. It is time consuming, resource intensive and there is a better way to deal with the CLW bees. So to be clear: don't do this except perhaps as a biology experiment!

The works-every-time way to deal with a CLW colony is to combine it with a strong queen-right colony. See July 2015's "[The Flip Side of Making Splits](#)" for combining tips. The internet advice to shake all of the bees out of a laying worker colony has a tiny grain of sense to it: this is a good way to combine colonies when a nectar flow is in progress. However the shake-out shouldn't be far from the receiving queen-right hive – a few feet in front of it works great

– and you must remove all traces of the original hive, including the stand, for it to completely work. The newspaper method is also a sure-fire technique for combining.

Combine using whatever technique you wish, but don't waste any time and resources on a CLW colony. Think about it: the colony has been without worker brood for at least a month, so even the very youngest worker bees are getting some age on them. The colony isn't worth much. Deal with it and move on, devoting your efforts to your good colonies.

### Full circle

This brings us back to our advice to start your beekeeping adventure with more than one hive. If, despite your best animal husbandry efforts, the colony should devolve into a

member of the CLW, your best option (perhaps even your only truly effective option) is to combine it with a queen-right one. Then after things have settled down you can make a split to get back to two colonies again. Doing anything else is fighting against honey bee biology.

“Stuff happens.” Be prepared, take swift action and move on to the next crisis!

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