"I have a better internal and intuitive understanding of folklore and myth than science and technology, so in that way fantasy is easier."

— Sarah Zettel

Bee School has begun in my county. On the first night, I always tell my students to clear their minds of anything and everything that they have been previously told about honey bees and beekeeping. There is a good chance that the "common knowledge" they bring to our avocation is either misguided, flat-out wrong and/or harmful. Jerry Seinfeld's 2007 *Bee Movie* is a terrific over-the-top example of how Normal People just don't get it, preferring to substitute anthropomorphic assumptions about how things must be in place of actual research- and experience-based facts. Seinfeld made millions from that movie. How much would it have cost to have a beekeeper read over the script beforehand?

Along those lines, one of our first-night students asked an excellent question that I'm sure is ingrained in the minds of everyone who learned about bees from *Winnie the Pooh* or *Bee Movie*. The crux of the question was about honey bees defending their queen. After pondering the best way to answer, I realized that this "fact" is likely widespread amongst casual beekeepers as well as the general public; I even saw it stated in a ridiculous Wikipedia post about queen bees. Given that, it deserves to have a light shown on it.

All attentive, experienced beekeepers should understand that honey bees defend their nest, which is comprised of brood, comb and stores. The mechanisms are complex and poorly understood, but for example it has been shown that empty comb emits a triggering odor that increases colony defensiveness. Studies and anecdotal evidence tell us that European honey bees generally defend an area within ten feet of their hives. We can accept that as truth, or at least as close to truth as anything else that we "know" about our favorite bugs. And since the domain of the queen is the nest, by default, defending the nest should consequently prevent harm to the queen.

Honey bees obviously attend to the needs of their queen, just as this retinue is doing. But does that include the concept of defending her specifically?
Photo: Scott Bauer, USDA Agricultural Research Service

But honey bees do not specifically defend their queen. That's a myth. Again, attentive, experienced beekeepers know that a reproductive swarm (a mass of bees, half of the mother colony plus the old queen, that has left the hive to create a new colony elsewhere) is the most docile form of a living colony that they will encounter. A swarm has no nest. It does have a queen. But a swarm can typically be handled without smoke or protective gear, and the beekeeper can poke through it with a bare finger and pluck out the queen. I've done it many times.

Similarly, queens can be handled for marking without inciting stinging incidents. In fact, handling queens often has the effect of inducing worker bees to "love on us" if queen pheromones have tainted our hands or clothing.

Consider further: honey bee queens do have Koschevnikov glands, the ones that create alarm pheromones in worker bees, but in queens that gland doesn't produce the same pheromone as it does in workers. So they don't have a way to indicate that they are in peril, with an ironic exception that will be explained later. As far as being included in the alarm/ defense scheme of the colony, queens are just as useless as drones. Workers don't defend drones, either.

Where does this myth come from? It is a perfectly logical assumption. Workers do defend their nest and stores. Queens are, for all practical purposes, always in the nest. So they are defended by default. And in the romantic notion of the colony, queens are the most important member, right? *Ipso facto*, the workers defend them. Don't let the facts mess up a good story.

Also, queens do influence worker behavior. Queen pheromones communicate that "all is well" (or not) with regard to the overall health of the colony. A retinue of bees will feed the queen and share her pheromones with other workers.

When swarming, worker bees will assemble around a queen, creating the anthropomorphic impression that they are defending her. NCSU's Jennifer Keller often conducts a fun show-and-tell demonstration where she puts a queen cage on a post and shakes a package of bees on it. The bees all cluster around the queen. Then Jennifer moves just the queen cage to another post a couple of dozen feet away. Within minutes, the whole mass of bees drift over to the new location. That sort of attentiveness and "devotion" suggests to our human minds that the workers are defending that queen, although that isn't the case.

Now here is the fascinating irony of the whole situation. Queen bees can emit a distress pheromone under certain situations. This pheromone likely comes from the queen mandibular gland.[1] But instead of her loving children coming to her rescue, the stress pheromone causes workers to sting the queen, which in turn attracts other workers and results in a ball of bees surrounding her in a murderous frenzy. This helps to explain how foreign, superfluous and declining-production queens are removed from a colony, but the biochemistry and physiology is poorly understood.

Another irony with respect to this myth is with regard to the queen's rectal pheromone. It is only active in young queens two weeks old or younger. It repels workers and triggers nonaggression, i.e. it keeps workers from attacking young queens whose pheromonal signals aren't well developed. That seems to throw cold water on the romantic notion that workers will sacrifice their lives for the queen. To the contrary, there are situations where the queen must protect herself from the workers!

Bottom line: honey bees often don't do what we think that we would do in the same situation. They aren't human! Rather than "fill in the blanks" of our understanding of honey bee life by making fanciful assumptions, get out there in the bee yard and see what's actually going on. Supplement that with the knowledge (or well-educated guesses) found in high-quality textbooks, journals and research articles. Then, most importantly, share those learnings with your fellow beekeepers and the public. Myths may make great bedtime stories but they are harmful to productive beekeeping!

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Note: All previous articles are archived at https://baileybeesupply.com/educational_resources/

[1] Pettis, J. S., Westcott, L. C., & Winston, M. L. (1998). Balling behaviour in the honey bee in response to exogenous queen mandibular gland pheromone. *Journal of Apicultural Research*, 37(2), 125–131. https://doi.org/10.1080/00218839.1998.11100964
See also:
D., Gerula & Panasiuk, Beata & Bienkowska, Malgorzata & Węgrzynowicz, Paweł. (2018). Balling Behavior of Workers Toward Honey Bee Queens Returning from Mating Flights. *Journal of Apicultural Science*. 62. 247-256. 10.2478/jas-2018-0023.
And:
Lensky, Y., Cassier, P. (1997). Alarm Pheromones of the Queen and Worker Honey Bees (Apis Mellifera L.). In: Mizrahi, A., Lensky, Y. (eds) Bee Products. Springer, Boston, MA. https://doi.org/10.1007/978-1-4757-9371-0_19