

Honey Bee Polyandry

or

What Kind of Family is This Anyway ?

Understanding the relationships among members of a bee colony is made more difficult by the metaphors we use to describe them. When we project titles from human social groupings onto various six-legged individuals in a beehive, this may lead to confusion rather than clarity. At the top of the list, of course, labeling the sole egg-laying female in a hive “*queen*” is not quite right. The British appellation of “*mother bee*” gets a bit closer to the truth, but she’s not like any mother we’ve ever known or loved. Stepping back a bit, let’s consider the life and times of this important bee we call the queen. How does her reproductive style so profoundly affect behavior in the hive?

Several days after emerging from her pupa, the adult queen makes one to three mating flights (“*nuptial*”? ... *wrong again*). These occur just after noon, when she flies to an area in which thousands of male bees – *drones* – from tens or even hundreds of different beehives in the surrounding area congregate daily ... with one thing on their tiny minds. As a queen enters the area, pheromones from glands in her head announce her arrival. Drones by the hundreds then *stream behind her*, the successful ones mating in mid air, lucky and unlucky all at once: as each mates, his penis breaks off, he falls to the ground, and dies. In this manner, over several days, the new queen mates with up to 20 different males from different local hives – average number of matings is an even dozen.



Back in the hive, the mated queen settles in to the business of egg-laying - *hundreds to over a thousand a day* – perhaps for years ... until she dies or leaves with a swarm to found a new hive. All along the way, she dispenses a single stored sperm to fertilize each egg that is set to develop into a female worker. From this mixed bag is generated a diverse family of mostly *half-sisters* – who may look alike, but whose genetic make-up is quite variable, *having so many different fathers*. There are many roles to play in the work of a hive over a long season – this diversity of available talent, built into the reproductive biology of the honey bee, is a factor used to benefit the colony.

Nectar forager, pollen forager, water gatherer, guard, undertaker, heater bee, fanner ... the list goes on. Having a particular *genetic disposition to suit the position* works to the advantage of the successful hive. How exactly bees within a hive gravitate toward the role that best suits their talents is not completely clear. But this much is true: they’re not taking orders from the queen.

References:

- 1) <http://www.genetics.org/content/108/4/985.full.pdf>
- 2) <ftp://psyftp.mcmaster.ca/dalywilson/Papers/ZoologicaFennica/tarpy.pdf>
- 3) http://entomology.ucdavis.edu/News/Robert_E_Page_Jr_The_Spirit_of_the_Hive/