

# Bee Math by Michael Bush

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All of the numbers about the life cycle of bees may seem irrelevant, so let's put them in a chart here and talk about what they are useful for.

Caste	Hatch	Cap	Emerge		
Queen	3½ days +-5	8 days +-1	16 days +/-2	Laying	28 days
Worker	3½ days +-7	9 days +-1	20 days +/-1	Foraging	42 days
Drone	3½ days +-5	10 days +-1	24 days +/-1	Flying to DCA	38 days

If you find eggs, and no queen how long ago do you KNOW there was a queen? At least there was one three days ago and possibly is one now. If you find just hatched larvae and open brood but no eggs when was there a queen? Four days.

If you do a "walk away" split, how long before the queenless split has a laying queen? They will start with a just hatched larvae (4 days from when it was laid) so if you subtract 4 days from the queen chart above you get about 24 days +-5 days.

If you put an excluder between two boxes and come back in four days and find eggs in one and not the other, what do you know? That the queen is in the one with eggs.

If you find a capped queen cell, how long before it should have emerged for sure? 9 days, but probably eight.

If you find a capped queen cell, how long before you should see eggs from that queen? 20 days.

If you killed or lost a queen, how long before you'll have a laying queen again? 24 days because the bees will start from a just hatched larvae.

If you start from larvae and graft, how long before you need to transfer the larvae to a mating nuc? 10 days. (day 14)

If you confine the queen to get the larvae how long before you graft? Four days because some won't have hatched at the beginning for day 3.

If you confined the queen to get the larvae how long before we have a laying queen? 28 days.

If a queen is killed and the bees raise a new one how much brood will be left in the hive just before the new queen starts to lay? None. It will take 24 or 25 days for the new queen (raised from a four day old) to be laying and in 21 days all the workers will have emerged and in 24 days all the drones will have emerged.

If the queens starts laying today how long before that brood will be foraging for honey? 42 days.

If a hive just swarmed today, how long before the new queen is laying? Assuming this was the primary swarm, it usually leaves the day the first queen cell gets capped. So that means a new queen will emerge in 8 days. That queen may leave with another swarm or the workers may allow her to kill all the others and stay. Assuming she kills all the others (which are staggered in age, so they will emerge at different times if they do afterswarm) then she should be laying most likely two weeks later. So that's about three weeks give or take a week. (two to four weeks).

You can see how knowing how long things take helps you predict where things are going or where things have been.

Sometimes you just have to figure best and worst case. For instance, an uncapped queen cell with a larvae in it is between four and eight days old (from the egg). A capped queen cell is between eight and sixteen days old. By looking at the tip of the cell you can tell one that is just capped (soft and white) from one that is about to emerge (brown and papery and often cleaned down to the cocoon by the workers). A soft white queen cell is between eight and twelve days old. A papery one is between thirteen and sixteen days old. The queen will emerge at sixteen (fifteen if it's hot out). She'll be laying by twenty eight days usually.