

Judging The Quality Of Bee Queen

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Workers attending a queen bee
Photo source: Harry Edwards (50000bees.com)

The bee queen is the most valuable female in the bee colony. A colony without a queen will die. A queen can lay 1,500 eggs or more per day under favourable conditions during the active season (spring and midsummer). The more eggs she lays the stronger and more productive the colony remains. The queen usually stops laying during the hottest days of summer, lays fewer eggs in autumn and in winter she usually takes a rest from laying.

A queen may live five or more years, but egg laying decreases drastically after the second or third year. Many beekeepers replace their queens after two or three years to keep the colony strong. As a queen becomes old, she gradually uses her supply of sperm and may lay an increasing number of unfertilised eggs in worker cells. These will be given a high domed capping in the middle of the flatter capped worker brood and they will hatch into drones although smaller in size than normal drones. When a queen becomes a drone-layer or ailing or old, the bees normally begin raising replacement.

The beekeeper must learn to judge the quality of the queen and to decide either to replace her or to leave her in the hive. He should always watch for her condition and brood pattern. If she is not laying in a good pattern, he should plan to replace her. Queen replacement is best done in late summer and autumn so that the new queen will lay plenty of eggs to populate the

colony before winter and assist the colony in building up a strong populous hive rapidly in spring.



Drone brood laid in worker cells. Note the domed capping.

Photo source: www.bindaree.com.au/newsletters/NLSept05.htm

How to judge a good queen bee?

A good bee queen will have a large shiny thorax, large abdomen with tapered end, and does not suffer from the loss of a leg or a damaged antenna, which causes her to limp and affects her ability to lay. An old queen usually has frayed wings, no hair on her body and moves more slowly. The queen's quality is not judged by looking at her appearance but at her performance. In judging a queen one should be looking at:

- her ability to lay eggs
- the characteristics of her bees in the colony

The most important characteristic of a good queen is that she lays sufficient eggs to build up a strong colony in spring. A good queen will produce a colony with 30,000 - 60,000 flying bees in the major nectar flow. To determine how good a queen is look at her brood pattern in the brood nest. Uniform or uneven brood distribution across the comb will tell you the quality of the queen's laying ability. A compact and dense brood comb with few empty cells of about 5 percent (95 % of the cells contain brood) is an indicator of a good queen.

A good queen will fill at least six to nine combs of brood and most combs should be about two-third filled with brood. The cells from which bees emerged are re-laid as soon as possible. The laying pattern should be uniform in the combs and the brood takes the shape of a sphere or oval.

Spotty brood pattern reflects a poor queen. It has a lot of empty cells where the queen has not laid eggs or diseased larvae have been removed by the bees. The most common cause of a spotty pattern is an old or failing queen. Old or failing queens do not lay eggs in many of the cells and so wastes space. The brood area of a failing queen is smaller than normal or scattered on the comb.

Spotty brood pattern can also be caused by other factors such as:

i) Disease particularly AFB and EFB. A heavy American foul brood disease exhibits an increasing number of empty cells scattered about in a frame of brood. Brood with Chalk brood disease often looks like a spotty brood pattern. Bees remove the dead larvae and the queen relays in those cells, which hatch out at different times, giving the spotty brood appearance.

ii) Inbreeding: an inbred queen is a queen that has been mated with genetically close males i.e. males from the same hive in which she was raised. Such a queen lays fertilized eggs, which hatch out into drone larvae (diploid drones). The bees dispose of these diploid males a few hours after the eggs hatch, leaving empty cells among the brood which may be re-laid by the queen later, thus producing adjacent larvae of different ages.

iii) Pesticide poisoning.

iv) Lack of food: Shortage of nectar and pollen in the hive can also cause a temporarily spotty brood pattern.

v) Honey-bound brood nest: Cells filled with pollen and honey in the brood nest during a very heavy nectar flow restricts the laying of the queen.



Excellent compact brood patterns of prolific laying queen with very few empty cells
Photo by Cass Cass Cohenour



A virtually perfect brood pattern

Photo source: www.kilty.demon.co.uk/beekeeping.htm



Spotty brood [also looks like drone laying queen]

Photo source: UGA Bee Breeding Project

The final thing to look at is the queen's egg-laying rate by noting the relative amount of eggs, unsealed and sealed brood in the comb. When a queen is increasing her egg-laying rate, the ratio will be $1\frac{1}{2}:1$. When the ratio is $1:1\frac{1}{2}$ this would indicate reduction, and $1:3$ or more is rapid diminution.

A queen may also be judged by the behaviour of her offspring. The bees should be gentle and not aggressive during manipulation. The colony should be a good honey producer, and not prone to swarm and must be free from disease.