

# PRACTICAL BEEKEEPING

## Failing queens and laying workers Pam Gregory, UK

### Queens

The queen is the mother of the honeybee colony laying eggs that develop into female or male (drone) bees. Fertilised eggs become female bees (workers or a new queen).

Unfertilised eggs become drones. The queen can determine whether to lay a fertilised or unfertilised egg and decides this by measuring the size of the cell with her forelegs. She also checks that the cell is clean and suitable for use before turning round and depositing her egg. A queen may lay more than 1,000 eggs every day in the most active part of the season when the strength of the colony is building up.

In addition, the queen produces pheromones that keep the colony working together. These pheromones create a unique hive 'scent' so that all the colony members know where they belong and also who does not belong, so they can repel robbers. The presence of the queen, and her production of both brood and queen

substance pheromones, control and calm the bees and prevent the worker bees (that are sterile females) from laying eggs.

Under normal circumstances the queen is the only fertile female in the colony, and the colony's continued existence depends on her remaining vigorous and healthy. If the queen is lost or damaged, colonies can become weak or even die out unless a new queen is produced quickly.

### The loss of a queen

The queen usually stays inside the hive where it is dark and safe. She only goes out of the hive to mate or if the colony swarms, migrates or absconds. If the queen is lost, the change in pheromones will alert the colony to the fact very quickly. At first they will act nervously. They will make a louder than usual buzzing sound, which is sometimes known as a 'queenless roar', and they may become more defensive. After 10-24 hours the bees will be certain the queen has been lost and will start making emergency queen cells. As long as eggs are present, the bees will raise a new queen within 15 days.

### Old or failing queens

Occasionally, a queen gets very old and runs out of sperm to fertilise her eggs but for some reason the bees fail to replace her. Under these circumstances the queen will lay only unfertilised eggs that become drones. Similarly if the virgin queen was inadequately fertilised on her mating flight, the eggs she lays will not be fertile and only drones will develop. This is called a 'drone laying queen'. No new worker bees are produced and it is impossible for a new queen to develop, consequently the colony will dwindle and eventually die out.

### Laying workers

If the queen has been lost (or removed) a new queen cell will be raised to replace the queen as long as there are fertile eggs in the hive to enable the workers to do so. Occasionally there will be no eggs or brood in a colony. If the colony remains queenless for very long, some of the workers will start laying eggs as a result of the loss of queen substance and brood pheromones that usually inhibit the workers from laying eggs. However, because the workers are not mated, the eggs they lay will be infertile and produce drones.

African and Africanised races of *Apis mellifera* honeybees tolerate being queenless for a shorter period and produce laying workers

quicker than the European races of *Apis mellifera*. They are also more likely to swarm under conditions where new queens are being raised and so any hive management technique has to be carefully controlled.

### Recognising the problem

This situation is easily recognised by looking at the brood combs. The presence of either a **drone laying queen** or **laying workers** leads to the production of irregular patches of drone brood laid in worker cells. The combs will have a distinctive, untidy appearance due to scattered groups of cells with characteristically raised, dome-shaped cappings where the bees have tried to accommodate the larger drone larvae in the worker cells. In addition the pattern of egg laying may indicate there is a problem. A queen will lay her egg in the bottom of the cell. Laying workers place eggs on the sides of the cells because, unlike the queen, their bodies are not long enough to reach the bottom. They may also lay more than one egg in each cell.

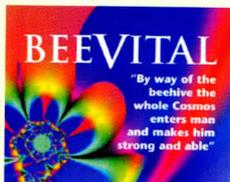
### Neglected drone brood

The diminishing number of adult bees available to tend the brood often leads to many of the larvae becoming small and undernourished. The brood becomes neglected and the larvae die and start to decompose. The decomposing larvae are soft and dark brown in colour and may be confused with infectious brood diseases, for example, American foulbrood. Sometimes the cappings are partially removed leaving the heads of the drone pupae exposed.

### Rectifying the problem

As long as they are strong enough in adult bees, colonies with drone laying queens can be saved by removing the old queen and either introducing a new queen, or by uniting the colony with another one with a productive queen. By contrast, colonies containing laying workers are very difficult to retrieve with the bees often killing any new queen that is introduced. The usual remedy is to shake out all the bees on to the ground and remove the hive from the apiary. The remaining bees that are useful will find their way into other hives to help to swell the ranks of their workers, while the abandoned combs can be melted down and any wax harvested.

## Do your bees make propolis?



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