President’s Message May 2012
Richard Ellis

For those of us who got new bees this year, I hope you are having fun working with them. I helped a neighbor go through his hive a few days ago and after we were through he said “it is fun working with the bees and doing something different each time. Every hive is different and you learn something different each time”.

I have a small observation hive and I wanted to get some bees to put into it, so I made a swarm hive trap and hung it up in a tree where I thought I might get a swarm. In three weeks I had a swarm and the Queen was laying a lot of eggs. It was fun putting the bees in the observation hive. I learned a lot from this project. I encourage you to things that will help you learn and enjoy being a beekeeper.

What’s the Buzz?

What’s a-happening is swarms. From the first of May to the First of July the bees decide it is time to make new bees. They create new bees by swarming. They will build swarm cells when they feel crowded and one day you will walk out and see your hive in flight. Not good. A lot of people look at swarms as free bees and they are indeed that yet the more important thing is being good neighbors. It is the beekeepers responsibility to do everything they can to prevent swarming and to collect swarms as soon as possible to avoid the bees getting a bad reputation. It is also up to us to educate the public that bees when swarming are not aggressive because they have nothing to protect but if they spray them with the hose, soapy water of poison their attitude may change drastically. Happy Swarm Collecting!!!

Ashe McFionn borilar_e@yahoo.com

Suggestions for Introducing New Queens

Be absolutely certain the colony is queenless and that any developing queen cells have been destroyed. Allow the colony to stay queenless for a day or so. If possible, allow the queen to be caged within the colony for about two days. To release the queen, place the cage between the frames with the screen side down and with the candy plug exposed near the vicinity of young bees and brood. Allow the bees approximately two days to release the queen. Remove the cage as soon as possible to prevent burr comb from being produced in the space around the queen’s cage. If the queen is to be manually released, watch the surrounding bees to determine if they are clinging tightly to the cage in which the queen is confined. If they are showing aggressive behavior, do not release the queen until the surrounding workers act passively toward the caged queen. After releasing the new queen manually, watch the surrounding workers to see if they react hostilely to the new queen as she explores the comb on which she was released. It is possible, don’t open the hive again until the queen has had time to develop a brood nest of her own (about days). Introducing queens into hives is never foolproof; but, generally, a good technique and careful handling will be successful. Environmental conditions, changing seasons, food availability, and beekeeper competence can affect the queen introduction’s outcome.

Laying Workers

If a colony is without a queen and her pheromones for awhile, some of the workers develop the capability of laying unfertilized eggs. Since laying worker colonies are difficult to requeen, and most of the bees are old, beekeepers frequently decide to combine the colony with another queenright colony. However, if requeening of laying worker colonies is attempted, one should follow normal requeening techniques. Adding a frame of uncapped brood along with a caged mated queen increases the chances of acceptance by the colony. Laying workers are indistinguishable from normal workers. Laying workers fly and forage freely unlike a normal queen that spends most of her life confined to the colony. Commonly, there are several laying workers within the hive, but on occasion, a laying worker may briefly overtake all her worker rivals and carry herself in a queenly manner. Such workers are called “false queens” but are still incapable of producing fertile (worker) eggs.

Chris Spencer

Make it a rule of life never to regret and never to look back. Regret is an appalling waste of energy; you can't build on it; it's only good for wallowing in.

~Katherine Mansfield
Queen Bees

The term queen bee is typically used to refer to an adult, mated female that lives in a honey bee colony or hive; she is usually the mother of most, if not all, the bees in the hive. The queens are developed from larvae selected by worker bees and specially fed in order to become sexually mature. There is normally only one adult, mated queen in a hive.

The term “queen bee” can be more generally applied to any dominant reproductive female in a colony of a eusocial bee species other than honey bees.

Metamorphosis of the queen bee

<table>
<thead>
<tr>
<th>Stage</th>
<th>Days</th>
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<tbody>
<tr>
<td>Egg</td>
<td>hatches on Day 3</td>
</tr>
<tr>
<td>Larva (several moltings)</td>
<td>Day 3 to Day 8½</td>
</tr>
<tr>
<td>Queen cell capped</td>
<td>Day 7½</td>
</tr>
<tr>
<td>Pupa</td>
<td>Day 8 until emergence</td>
</tr>
<tr>
<td>Emergence</td>
<td>Day 15½ - Day 17</td>
</tr>
<tr>
<td>Nuptial Flight(s)</td>
<td>Day 20 - 24</td>
</tr>
<tr>
<td>Egg Laying</td>
<td>Day 23 and up</td>
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When conditions are favorable for swarming, the queen will start laying eggs in queen cups. A virgin queen will develop from a fertilized egg. The young queen larva develops differently because it is more heavily fed royal jelly, a protein-rich secretion from glands on the heads of young workers. If not for being heavily fed royal jelly, the queen larva would have developed into a regular worker bee. All honey bee larvae are fed some royal jelly for the first few days after hatching but only queen larvae are fed it exclusively. As a result of the difference in diet, the queen will develop into a sexually mature female, unlike the worker bees.

Queens are raised in specially constructed queen cells. The fully constructed queen cells have a peanut-like shape and texture. Queen cells start out as queen cups. Queen cups are larger than the cells of normal brood comb and are oriented vertically instead of horizontally. Worker bees will only further build up the queen cup once the queen has laid an egg in a queen cup. In general, the old queen starts laying eggs into queen cups when conditions are right for swarming or supersede. Swarm cells hang from the bottom of a frame while supersede queens or emergency queens are generally raised in cells built out from the face of a frame.

As the young queen larva pupates with her head down, the workers cap the queen cell with beeswax. When ready to emerge, the virgin queen will chew a circular cut around the cap of her cell. Often the cap swings open when most of the cut is made, so as to appear like a hinged lid. During swarming season, the old queen will likely leave with the prime swarm before the first virgin queen emerges from a queen cell.

Virgin queen bee

A virgin queen is a queen bee that has not mated with a drone. Virgins are intermediate in size between workers and mated, laying queens, and are much more active than the latter. They are hard to spot while inspecting a frame, because they run across the comb, climbing over worker bees if necessary, and may even take flight if sufficiently disturbed. Virgin queens can often be found clinging to the walls or corners of a hive during inspections.

Virgin queens appear to have little queen pheromone and often do not appear to be recognized as queens by the workers. A virgin queen in her first few hours after emergence can be placed into the entrance of any queenless hive or nuc and acceptance is usually very good, whereas a mated queen is usually recognized as a stranger and runs a high risk of being killed by the older workers.

When a young virgin queen emerges from a queen cell, she will generally seek out virgin queen rivals and attempt to kill them. Virgin queens will quickly find and kill (by stinging) any other emerged virgin queen (or be dispatched themselves), as well as any unemerged queens. Queen cells that are opened on the side indicate that a virgin queen was likely killed by a rival virgin queen. When a colony remains in swarm mode after the prime swarm has left, the workers may prevent virgins from fighting and one or several virgins may go with after-swarms. Other virgins may stay behind with the remnant of the hive. As many as 21 virgin queens have been counted in a single large swarm. When the after-swarm settles into a new home, the virgins will then resume normal behavior and fight to the death until only one remains. If the prime swarm has a virgin queen and the old queen, the old queen will usually be allowed to live. The old queen continues laying. Within a couple of weeks she will die a natural death and the former virgin, now mated, will take her place.

Unlike the worker bees, the queen’s stinger is not barbed. The queen can sting repeatedly without dying.
Piping

Piping describes a noise made by virgin and mated queen bees during certain times of the virgin queens’ development. Fully developed virgin queens communicate through vibratory signals: “quacking” from virgin queens in their queen cells and “tooting” from queens free in the colony, collectively known as piping. A virgin queen may frequently pipe before she emerges from her cell and for a brief time afterwards. Mated queens may briefly pipe after being released in a hive.

Piping is most common when there is more than one queen in a hive. It is postulated that the piping is a form of battle cry announcing to competing queens and the workers their willingness to fight. It may also be a signal to the worker bees which queen is the most worthwhile to support.

The piping sound is a G (aka A). The adult queen pipes for a two-second pulse followed by a series of quarter-second toots. The queens of Africanized bees produce more vigorous and frequent bouts of piping.

Reproduction cycle

The surviving virgin queen will fly out on a sunny, warm day to a “drone congregation area” where she will mate with 12-15 drones. If the weather holds, she may return to the drone congregation area for several days until she is fully mated. Mating occurs in flight. The young queen stores sperm from multiple drones in her spermatheca. She will selectively release sperm for the remaining 2–7 years of her life.

The young virgin queen has a limited time to mate. If she is unable to fly for several days because of bad weather and remains unmated, she will become a “drone layer.” Drone-laying queens usually signal the death of the colony, because the workers have no fertilized (female) larvae from which to raise worker bees or a replacement queen.

A special, rare case of reproduction is thelytoky: the reproduction of female workers or queens by laying worker bees. Thelytoky occurs in the Cape bee, Apis mellifera capensis, and has been found in other strains at very low frequency.

Supersedure

Supersedure is the process by which an old queen bee is replaced by a new queen. Supersedure may be initiated due to old age of a queen or a diseased or failing queen. As the queen ages her pheromone output diminishes.

Supersedure may be forced by a beekeeper. For example, by clipping off one of the middle or posterior legs from the queen, she will be unable to properly place her eggs at the bottom of the brood cell. The workers will detect this and will then rear replacement queens. When a new queen is available, the workers will kill the reigning queen by “balling” her, colloquially known as “cuddle death”; clustering tightly around her until she dies from overheating. This method is also used to kill large predatory wasps that enter the hive and may be used against a foreign queen attempting to take over an existing colony. Balling is often a problem for beekeepers attempting to introduce a replacement queen.

If a queen suddenly dies the workers will flood several cells, where a larva has just emerged, with royal jelly. The young larva floats on the royal jelly. The worker bees then build a larger queen cell from the normal sized worker cell and it protrudes vertically from the face of the brood comb. Emergency queens are usually smaller and less prolific, and therefore not preferred by beekeepers. Sometimes a new queen bee is born while the other is still in charge. To determine the new queen, the two queen bees fight to the death.

Daily life for the queen

Although the name might imply it, a queen does not directly control the hive. Her sole function is to serve as the reproducer. A well-mated and well-fed queen of quality stock can lay about 2,000 eggs per day during the spring build-up — more than her own body weight in eggs every day. She is continuously surrounded by worker bees who meet her every need, giving her food and disposing of her waste. The attendant workers also collect and then distribute queen mandibular pheromone, a pheromone that inhibits the workers from starting queen cells. The queen lays a fertilized (female) or unfertilized (male) egg according to the width of the cell. Drones are raised in cells that are significantly larger than the cells used for workers. The queen fertilizes the egg by selectively releasing sperm from her spermatheca as the egg passes through her oviduct.

Marked queen

The queen bee’s abdomen is noticeably longer than the worker bees surrounding her. Even so, in a hive of 60,000 to 80,000 honey bees, it is often difficult for beekeepers to find the queen with any speed; for this reason, many queens in non-feral colonies are marked with a light daub of paint on their thorax. The paint used does no harm to the queen and makes her much easier to find when necessary.

http://en.wikipedia.org/wiki/Queen_bee
Queen Rearing for Commercial and Hobby Beekeepers

Raising your own queens is very rewarding in many ways.

- Save money while having the satisfaction of self sufficiency
- You control the quality and reduce the risk of introducing pests and diseases
- Disease resistant breeding stock is now available
- Well adapted local stock is utilized in matings, conserving bio diversity
- By working with nature, a fascinating natural process is unveiled
- Raising your own queens is the best investment of your beekeeping time

Requirements for successful queen rearing

- A good breeder queen to graft larva from.
- Grafting requires good light, good eyesight or appropriate magnification.
- Grafting larva of the proper age (1-24 hrs old).
- Queen rearing equipment (grafting tool, cell cups, cell bars and frame) may be made or purchased. Some queen kits eliminate grafting
- Natural mating requires 69 degree temps. and mature drones (15 days old)
- Several good books on queen rearing explain the principles of bee biology.
- Queen rearing classes.

A Simple Queen Rearing Technique

- Day 1 - Give breeder hive an empty dark brood comb to lay eggs in.
- Day 4 - Transfer (graft) larva into artificial queen cell cups, from the breeder comb. Place the frame into a strong colony (cell builder) made queenless the day before.
- Day 14 - Remove completed cells from cell builder. Leave one cell behind to replace the queen. Keep queen cells warm (80-94 F) until they are placed in queenless hives (mating nucs).
- Day 22 - Virgin queens are ready to mate. They require nice weather (69 F), and an abundance of drones to mate with. A few colonies within a mile are adequate for providing drones for mating.

- Day 27 - If queens mate without weather delay, they should now be laying eggs.
- Weather delays in mating will add days to the process, after 3 weeks delay, virgin queens may start to lay unfertilized eggs.
- Time your activities so that warm temperatures and drones are available when the queens are ready to mate.

How to graft queens

Grafting is simply the process of transferring larva from the worker cell of the breeder's hive to an artificial queen cell. The shape of the cell, along with the queenless condition of the hive receiving the newly grafted cells stimulates the workers to feed them a diet which make them develop into queens.

A grafting tool can be as simple as a bent piece of wire, or several varieties can be purchased. The tool is slipped under the larva which is lifted out and placed in the bottom of the queen cell cup. Priming the cells with a small drop of royal jelly or even diluted honey makes it easier to float the larva off the tool. Don't flip over the larva. An unsteady hand is helped by bracing it lightly on the comb.

Good light is essential, a head lamp works well, sunlight is ok if done quickly. Magnifying lamps are useful for those with poor eyesight.
The Breeder hive

- Graft from your best colony, or purchase a selectively bred breeder.
- Use the youngest (smallest) larva.
- By placing an empty brood comb in the brood nest 4 days before you graft, the larva will be the right age.

Setting up the Cell Building Colony

- Any strong hive can serve as a cell builder.
- Remove the queen one day before you graft cells.
- Place grafted cells in center of the brood nest.
- Place about 30 cells per colony.
- Large cells will be produced by well nourished colonies.
- Feeding is not necessary if a light honey flow is on and pollen is abundant.

Setting up Mating Nucs

- Cells are placed in queenless colonies the day before they hatch.
- The mating process is usually only 75% successful.
- Small mating colonies minimize the losses due to unsuccessful queens.
- Mini-nucs are convenient for raising large numbers of queens.
- Cells can be placed in any queenless colony.

Most queenless colonies will accept cells without queen cell protectors.
Recent research shows that queen quality is best when they are left to lay eggs in the nuc for about a month.

Mating conditions

- Queens are ready to mate 5-7 days after hatching.
- Temperature must be at least 69 F with no strong winds.
- Virgin queens mate with 10 to 20 drones on one or more flights.
- Drones and queens may fly a mile or more to drone congregation areas.
- Queens will begin laying eggs 2 to 4 days after mating.
- Mating can be delayed up to 3 weeks and still be successful.

http://www.glenn-apiaries.com/queenrear.html
Good Books on Queen Rearing

The following books all describe in detail, various methods of raising from one to a thousand queens. Most of the tricks of the trade are in these books.

Queen Rearing and Bee Breeding

Successful Queen Rearing
by Dr. Marla Spivak and Gary Reuter

Contemporary Queen Rearing
(1979) by Harry Laidlaw Jr., Dadant and Sons, Hamilton, Illinois.

Breeding Queens

Rearing Queen Honey Bees
by Roger Morse

Book Sources:
Wicwas Press - Comprehensive catalog of bee books
Bibliofind - Good internet source of used and out of print bee books.
Videos
Successful Queen Rearing by Marla Spivak and Gary Reuter
http://www.glenn-apiaries.com/queenrear.html

For New Beekeepers

with Langstroth bee hive

April: install your bees, wait a week, inspect your bees (make sure the queen has been released and is in the hive), wait a week. Start with the outside frame, so that you don’t roll the queen. Work from the outside, in. Look for eggs and larvae. If you have eggs and larvae, put the hive back together. If not, you need to consider options

May: check to see how many frames have drawn comb on them. If you have 8 out of 10 full frames, add a second box.

June: check every two weeks. If your frames are full, consider adding a third box.

There is information and help from many sources. If you need a mentor, consider signing up for one at the Wasatch Beekeepers Association meetings. They are held every third Thursday of the month at the Day-Riverside Library, 1575 West 1000 North, Salt Lake City, UT 84116 at 7:00pm.