Mid-Atlantic Apicultural Research & Extension Consortium

MAAREC

Delaware, Maryland, New Jersey, Pennsylvania, West Virginia and the USDA cooperating

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SWARMING - CONTROL

Swarming remains one of the greatest bee management problems in the production of honey or the providing of pollination services. Swarming represents the natural method of increase of the honey bee colony. Although the cause of swarming is not known, several factors that are connected with swarm biology serve as the basis of preventive manipulations. Control of swarming, once the honey bee colony has begun swarm preparations, involves more extensive manipulation and rather critical timing. These require time and knowledge on the part of the beekeeper.

The prevention and, when necessary, the control of swarming is good bee management. Colonies that swarm do not store extra surplus honey or provide a good working population for pollination of a crop. Increase of colony number and colony division should be planned and not the result of capture of one's own swarms. With an understanding of swarming and some efforts to prevent it, beekeeping will be improved and it will become more enjoyable and more profitable.

SWARMING BIOLOGY

Swarming normally occurs in strong populous colonies. The first apparent preparation in swarming is the laying of fertile eggs by the queen in the special queen cups that are normally present. With subsequent hatching of the egg and development of queen larvae (provided they are not destroyed), queen cells are capped 8 days later and ready to emerge in another 7 or 8 days depending upon weather and other factors. With development of the several queen cells, a series of behavioral changes occur in colonies. The queen loses from 1/3 to 1/2 of her normal body weight. The field bees do less work and may congregate at the hive entrance and/or on the lower frames. More drones are often reared; fewer and fewer eggs are laid by the queen. Finally, prior to leaving the hive, the workers engorge themselves on honey and nearly cease normal flight activity.

A swarm normally emerges from the parent hive during nice weather and settles on some support such as tree limb, shrub or building. This clustering occurs a varying distance from the former hive often within sight of the parent hive. Each swarm consists of the colony queen, and a proportion (1/2 to 2/3rds) of the workers and drones of the former colony. One or more sealed queen cells are present in the original hive. Swarms may remain only a few minutes to several days at the cluster location before moving to a new darkened cavity suitable for nest building. The net result after hatching of a queen cell in the former hive is two active colonies in two separate homes.

PREVENTING BEE SWARMS

Three factors that are connected with swarming are the brood and adult population as related to room within the hive, the amount and distribution of available queen substance (a chemical produced by the queen) and the hive environment as it relates to the above two factors. The measures listed below are all aimed at insuring that queen cells, the first step in swarming, are not started. In most years attention to each factor will keep the incidence of swarming at a very low and tolerable level.

• *Provision of plenty of room (not just adequate room) for queen egg laying in the brood nest.* Two full depth hive bodies may not be sufficient room for brood rearing in strong colonies; one hive body is never adequate in healthy colonies (comb honey production usually involves one hive body with intensive management including the cutting of queen cells). Reversal of brood chamber hive bodies every 8-10 days helps insure adequate brood room when 1-1/2 or 2 brood chamber colonies are maintained. All brood nest combs should be in good condition for egg laying, contain a minimum of drone comb and should not possess large amounts of stored honey or pollen after late April (all colonies should have 15-20 pounds of honey to protect against spring starvation).

• *Provision of sufficient nectar storage space.* Some super space should always be available for nectar from late April to mid-August. When supers are added it is sometimes necessary to entice bees into working in them immediately. Bottom supering (adding supers on top of brood area below other supers) and baiting of new supers (raising a frame or two of capped brood into super added or by dripping syrup on the comb face) is recommended. Full supers of foundation should not be added until the honey flow has begun or late in the season after the greatest danger of swarming has passed (after mid-June).

• *Colonies should receive maximum sunlight early in the season but have shade if the temperature becomes high later.* Afternoon shaded apiary sites are recommended. Colony entrances facing the morning sun or south are preferable. Hives painted white are useful in temperature regulation by the colony.

• *Sufficient ventilation should be present.* Winter entrance blocks are best removed early in the season. Hive bodies can be staggered to aid ventilation. Some apiaries with poor air circulation could benefit if colonies are supplied with a deep ventilating bottom board. (If steps are taken to aid ventilation, insure that robbing does not become prevalent.)

• *Young queens heading all colonies.* This is a definite aid in swarm prevention. All requeening should be done with stock with low swarming tendencies. Queens can be marked with paint on the top of the thorax to help find them. Most bee locations will support queen rearing activities so the beekeeper can rear replacement stock.

•*Removal of queen cells as they are started.* If the queen cells are advanced or completed, removal will only postpone swarming and the time necessary to look for cells is seldom worth the effort except for the hobbyist. If a colony is just beginning queen cells, providing more room and adjusting the hive environment combined with the removal of all cells will help. It will be necessary to examine the colony again in a week to 10 days to insure that more cells are not started.

REMEDIAL MEASURES

Once a colony begins rearing a number of queens and they are not discovered by the beekeeper until well advanced, more drastic action than explained above will be necessary to stop the colony from swarming. While all involve some work, the surplus honey crop or proper pollination service are well worth the effort. Three basic techniques are given below with some variations of each. All queen cells should be destroyed before proceeding with one of the swarm control techniques listed.

• *Removal of the Queen* - Dequeening a colony rearing queen cells is effective swarm control but often takes considerable time searching for the queen. After queen removal, the colony is left for 7 to 9 days and then the queen is placed in a cage and put back into the colony after all queen cells are again destroyed. Variations of this technique include the destroying of the original queen and introducing a newly purchased or reared queen or adding a queen cell 7 to 9 days later or, finally, cutting out all queen cells except one which is allowed to emerge, mate and head the colony. Removal of the queen for swarm control always produces a break in brood rearing. This can affect the honey surplus stored from summer nectar sources, but late spring flows such as tulip poplar will not suffer from lack of bees.

• *Removal of the Brood* - By dividing a colony, the beekeeper obtains the net result of swarming but does so at his convenience and without the work of swarm capture or risk of missing or being unable to capture the swarm. To divide a colony, 3-5 frames of brood with clinging bees are removed from those colonies that begin rearing queens. These frames are placed in a small hive (nucleus) and a queen cell or new queen added. The unit is placed on a new location and the entrance reduced to help prevent robbing and aid field worker bees in orienting to the new location. Frames of brood from colonies requiring swarm control may also be added to weaker colonies to equalize colony strength provided disease is not present.

A variation of brood removal is that of Snelgrove who advocates separation of adult nurse and field bees within the hive (and thus brood rearing and nectar ripening areas). His technique calls for placing of queen and 1 or 2 frames of unsealed brood in an otherwise empty super on bottom. A special double screen with 8 wedge openings (4 top and 4 bottom openings, one to a side) is then put on top of this super. The remaining brood frames are placed on top of the double screen.

The wedge screen is opened to permit entry-exit into the top brood hive body (the normal entrance to lower brood chamber and honey super always remains open) and then after 7 to 8 days it is closed. Another top opening on the side or back of the hive is opened for normal egress from the top hive body. At closing of the original top hive body entrance the lower wedge opening of the same side is opened in addition to the new top hive body entrance. Field bees foraging from the top brood hive body at the time of this action do not adjust quickly and most go below after their first flight (they do this without learning of the new top entrance at side or back). This means older foragers use the lower hive area while younger bees remain above on brood frames. After 9-10 days new brood containing frames in the hive body below the double screen must be removed again and placed above. Queen cells that are started above the double screen must be removed or alternately allowed to hatch and a two-queen colony maintained for the honey flow.

• *Separation of Queen from the Brood* - Separation of queen from brood, or Demareeing, is probably the most widely used swarm control practice and is the easiest and most successful method in use today to control swarming. A large number of variations exist and almost all recent articles in the literature on swarming utilize the same basic principle of queen and brood separation.

The basic technique involves rearranging of the colony. The queen is placed with 1 or 2 frames of sealed brood in a hive body of otherwise empty comb (or foundation) on the bottom board and then a queen excluder placed over the single hive body. One or two supers are added

above the excluder and then the remainder of the brood containing frames are placed on top of the rearranged colony in another hive body. The procedure of separating most brood from the queen should be repeated after 9-10 days with queen cells cut from the top chamber. Alternately some beekeepers permit a queen to hatch above and provide a second entrance and manage two queen colonies.

A modification of this plan is to permit the bees to expand their brood nest through 4 standard hive bodies in the spring. This manipulation is accomplished by reversing the 2 wintering hive bodies in mid to late April, raising one frame to the second body (formerly the lowest), and adding two standard hive bodies or 3 shallow supers. At flow, the queen is placed or driven into the lowest hive body and queen excluder placed over the single brood chamber. As the brood above the excluder hatches, the newly emptied cells are used for honey storage.

Still another variation closely resembles swarming and is often called artificial swarming or the "Shook" plan. This technique calls for shaking all bees from the hive onto the ground at the entrance. A full hive body of foundation is put on the hive and then a queen excluder. The brood containing frames are put back at the top of the colony. This modification yields a very nice surplus if performed during an early flow as the nectar, not needed for the small amount of developing brood, is stored in cells above as adults emerge.

MAAREC, the Mid-Atlantic Apiculture Research and Extension Consortium, is an official activity of five land grant universities and the U. S. Department of Agriculture. The following are cooperating members:

University of Delaware
Newark, Delaware

University of Maryland
College Park, Maryland

Rutgers University
New Brunswick, New Jersey

The Pennsylvania State University
University Park, Pennsylvania

West Virginia University
Morgantown, West Virginia

USDA/ARS
Bee Research Lab
Beltsville, Maryland

Requests for information or publications should be sent to: MAAREC, 501 ASI Building, University Park, PA 16802 Phone: (814) 865-1896 Fax: (814) 865-3048 Web site: http://MAAREC.cas.psu.edu

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Participants in MAAREC also include state beekeeper associations, and State Departments of Agriculture from Delaware, Maryland, New Jersey, Pennsylvania and West Virginia.

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