

Honey Bee Problems in the Rio Grande Valley of Texas

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AT the request of some migrating beekeepers, a 5-day trip was made to the Rio Grande Valley near Weslaco, Texas in May, 1974 to observe honey bee (*Apis mellifera* L.) colonies (transported from northern locations in January) that were dying out or had not built up their populations by April. Similar losses of varying severity had been reported during the previous 6 years, but the samples of dead bees examined at the USDA Bee Laboratory, Laramie, Wyoming, and the Department of Microbiology, Ohio State University had contained no disease organisms. Pesticide poisoning during the early part of the year is not normally a problem, and no pesticide residues were found in the bee samples that were analyzed. Colonies continued to decline or often died out after they were returned to their northern locations in April.

Review of Literature

In anticipation of the visit, the literature concerning other puzzling declines in honey bee colonies was reviewed. In the early 1960's, beekeepers in Louisiana and Texas complained of large-scale losses of colonies of honey bees. However, Oertel (1965) could not identify any transmissible disease (e.g., acarine disease, Nosema disease, paralysis, septicemia), pesticide, or poisonous honey, or poisonous pollen as the cause of the disappearing bees. Foote (1966), too, reported losses of honey bee colonies in some areas of California. One operator in southern Louisiana had verified losses of several hundred colonies in the fall of 1963 (Oertel 1965) and a similar loss of more than 100 colonies in a queen yard from January to February 1969 (personal observations).

Williams and Kauffeld (1974), therefore, conducted a study of colony conditions during the winter in Louisiana

and found that the average amount of brood in 30 commercial colonies rapidly decreased from 893 to 136 square inches from October to December. Meanwhile, the populations of the colonies had also steadily declined and the average amount of stored pollen in the same colonies had decreased from 182 to 19 square inches. After the red maple bloom (December 20 to January 17) the average amount of brood and pollen in the same colonies began to increase and reached 606 and 145 square inches, respectively, by early February. Finally, Mackensen (1951) had found that reduced egg viability in honey bees could be transmitted through inbreeding and that egg viability was reduced when the two lines (parents) had the same lethal gene. Subsequently, Roberts and Mackensen (1953) noted that drone combs must be put into colonies for the production of drones in queen rearing.

Conditions in the Problem Colonies

Colonies: During the visit to the problem colonies, 14 nucleus (4 standard frames) and 20 single story (10 standard frames) hives of the 400 present near Roma, Texas, were randomly selected and examined. All showed similar conditions: the hives had brood (eggs, larvae, and pupae), but only one was observed to have a drone. However, drones were present in four 2-story standard hives at Mission, Texas which was a few miles away.

The percentages of single-story hives at Roma and their respective egg viabilities were 7.1 with 50-59 per cent, 21.4 with 60-69 per cent, 35.7 with 70-79 per cent, 21.4 with 80-89 per

cent, and 14.2 with 90-99 per cent. The percentage of nucleus hives at Roma and their respective egg viabilities were: 5.0 with 50-59 per cent, 25.0 with 60-69 per cent, 30.0 with 70-79 per cent, 10.0 with 80-89 per cent, and 6.0 with 90-99 per cent. Thus, 64 per cent of the single story hives and 60 per cent of the nucleus hives at Roma had egg viabilities less than 80 per cent. Colonies with egg viabilities of 50-80 per cent would have considerable difficulty producing the populations needed for obtaining the maximum honey crop or pollinating a crop adequately.

An examination of the stored food supplies (honey and pollen) in the large story hives showed 7 per cent had honey rings on all combs and a large patch (15 sq. in.) plus small circles or patches of pollen scattered over each of the combs; 28.5 per cent had honey rings on 50 per cent of the combs and small patches of pollen in each of 3 combs, a total of 4 sq. in.; 7 per cent had honey present in all the combs but no honey rings and small patches of pollen totaling less than 4 sq. in. scattered in each of 3 combs; and 57.1 per cent had small amounts of honey in 50 per cent of the combs and small amounts of pollen (few cells) scattered in 2 combs. In the nucleus hives 5 per cent had honey rings on all the combs and a large patch (15 sq. in.) and small patches or circles of pollen in each comb; 50 per cent had honey rings in 50 per cent of the combs plus patches totaling 4 sq. in. of pollen in each of 3 combs; 15 per cent had honey pres-

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Table 1. Analysis of 30 dead bees per sample collected from colonies at Mission, Texas, for Nosema infection, 4/23-26/74.

Colony	Spore ^a Count (10 ³)	No. Dead Workers	No. Dead Drones
1	0.1	820	6
2	1.0	273	77
3	0.0	274	6
4	1.0	148	7

^a Counts are per bee.

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ent in all the combs but no honey rings and small patches of pollen totaling less than 4 sq. in. in 3 frames; and 30 per cent had small amounts of honey in 50 per cent of the combs and small amounts of pollen (a few cells) in 2 combs. The pollen and honey stores were of very recent origin.

Diseases: Table 1 shows that Nosema disease was present in 3 of the 4 colonies at Mission, though the infections were relatively mild (one colony showed 1.0×10^6 spores/bees), and Nosema was not considered a problem. However, the 4 colonies showed a great range in numbers of dead workers and drones. At Roma, dead bees were lying scattered over the area where the 400 nucs were located but not in unusual numbers.

Many of the dead bees from the 4 colonies at Mission disintegrated like bees do that are infected with septicemia. However, septicemia could not be determined because of the large numbers of bacteria from decay.

Beekkeeping in the Area

Several thousand colonies of honey bees are maintained by beekeepers in the Rio Grande Valley for pollination of crops and honey production. Also, some migratory beekeepers bring colonies from northern locations to the Rio Grande Valley in January in hopes of producing a crop of citrus honey or of rebuilding the populations of their colonies. These colonies therefore, arrive in the area of Weslaco at a time when there are no or only minor nectar and pollen flows. The flight of these bees increases because of the warmer temperatures with the result that food stores are used increasingly. Also, the reduced brood rearing causes the population of adult bees to so dwindle rapidly, that those with low populations in January and February are not capable of collecting a crop of honey from citrus in March. Nevertheless, after foraging on the citrus bloom during March and April, some of the colonies are able to rebuild their populations to the point that they can be divided to make up 4-frame nucleus or single-story hives in April. Of course, weather conditions can affect the citrus bloom, and when that happens, colonies often do not build up as they should.

The beekeepers interviewed reported that the divides, without queens, are requeened by inserting 9-day-old (2 or 3 days before emergence) queen cells

bought from a local queenrearer or with queens that the beekeepers had reared themselves in small "baby" hives in their own queen yards. These nucleus and single-story colonies (divides) are then transported back to the northern locations. Thus, they are taken out of the Weslaco, Texas area where temperatures range from the 40's to the 70's into locations where the range is from the low 20's to the 50's. In such a situation, bees in nucleus and single-story colonies with relatively large amounts of combs with brood must contract the cluster which can result in a loss of larvae and pupae from chilling. Once located in the northern locations, the divides must build up on plant sources of nectar and pollen in preparation for the sweetclover nectar flow, but extended periods of cold temperatures can often keep bees from foraging for the supplies needed to maintain the volume of broodrearing, and a condition known as spring dwindling can occur. A honey crop from alfalfa is obtained later in the season.

From discussions with the beekeepers no specific effort was made by the queen rearers in the area from whom queens or queen cells were purchased to produce sufficient drones to adequately mate the virgin queens that were produced. However, when drones are not specifically produced; adequate matings of queens will occur some years and not in others. (Adverse weather can also affect proper queen matings regardless of the number of drones present.) As a rule, inadequately mated queens have poor brood patterns and are often quickly superseded after they are introduced into a colony. Similarly, queens with poor egg viabilities cannot increase the populations of their colonies to sufficiently produce good honey crops or furnish adequate pollination of crops. More-

over, the queen yards are not always properly selected and prepared to provide for the return of the maximum number of queens from their mating flights. One such queen yard was in such dense brush that one had to almost crawl on hands and knees to get to the "baby" hives. Losses of queens in this yard probably occurred because of the inability of the queens to orient back to the baby hives after they went on the mating flights.

Plant Sampling

Several field trips were made between Mission and Roma to collect samples of plants that were considered good "bee plants" by the beekeepers. The samples were identified by James Everitt, Range Conservationist, USDA Soil and Water Conservation Research Laboratory, Weslaco, Texas. The 22 plants collected comprised only a fraction of the total number bee plants that annually bloom in the valley. It was not possible to determine their relative importance as pollen or nectar sources nor their competitive value in relation to the pollination of such crops as cantaloupes, watermelons, cucumbers, citrus, and bell peppers. A list of some crops grown in the valley with their cash values is presented in Table 2.

At Mission, Texas, newly designed pollen traps (Kauffeld 1973) were put onto the four 2-story hives as a means of determining the plants bees were visiting in the area. Results indicated that bees were visiting 17 plants for pollen. The amounts of pollen gathered by the 4 colonies varied, as expected, and a few varieties also were not visited by all the colonies.

Wild plants adversely affect the pollination of crops adjacent to them by competing for honey bee visits though

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Table 2. Acreage, production, and value of some vegetables and citrus grown in the Rio Grande Valley of Texas. Values obtained from Texas Department of Agriculture and U. S. Department of Agriculture Crop Report Service, Austin, Texas (1972, 1974).

Vegetable	Acreage Acres	\$ Value 1000 dol.
Cantaloupes	7,300	6,513
Cucumbers	3,400	1,783
Honeydew Melons	1,500	1,200
Green Peppers	4,300	5,433
Tomatoes	5,600	5,187
Watermelons ^a	16,300	3,780
Citrus		
Oranges	31,500	12,430
Grapefruit	42,400	22,617
	106,700	58,943

^a Produced in rangeland area including Brooks, Duval, and Jim Wells counties

ARTICLES REQUESTED

Do you have an interesting beekeeping story you would like to share with other beekeepers? Possibly you have unusual beekeeping pictures. These will also be appreciated. Photos will be returned if return after use is requested. Perhaps you even have an innovation or gadget that just might help other beekeepers, too. We look forward to hearing from you. American Bee Journal, Hamilton, Ill. 62341.

BEEKEEPING SHORT COURSE 1976

Delaware Valley College,
Doylestown, Pa. 18901

Summer: Wednesday, June 23, Thursday, June 24 and Friday, June 26, 1976.

Delaware Valley College will be offering its regular summer three-day beekeeping short course this year. The course is being offered under the direction of Dr. Robert Berthold (Assistant Professor of Biology) in cooperation with Mr. Jack Matthenius (New Jersey Supervisor of Bee Culture). Instruction will take place on the Delaware Valley Campus, with the College bee yards and small scale honey house being utilized.

About 100 persons attended the 1975 summer short course. Included in this group were experienced beekeepers, novices, and those considering taking up beekeeping as a hobby. There were also quite a few educators who were planning to use the information presented during the short course in their own classroom situation.

Total cost for the three days of instruction is \$17 (this does not include meals or lodging). An application for the course or further information may be obtained by writing Dr. Berthold, c/o Delaware Valley College, Doylestown, Pa., 18901, or calling him at Area Code 215-345-1500.

On Saturday, June 26, 1976, Mr. Paul Raybol, N. J. Department of Agriculture Apiary Inspector, will give a talk on queen and package bee production. The talk will begin at 1:30 p.m. in Mandell Hall on the Delaware Valley College campus and be preceded by a bring your own picnic lunch beginning at noon. There is no charge, and anyone interested is invited to attend.

— PROGRAM —

Day 1 — Wednesday, June 23, 1976

- 9:00 a.m. Registration and Coffee (Mandell Hall Auditorium).
- 9:45 a.m. Welcome to Delaware Valley College
- 10:00 a.m. Introduction of Participants

- 10:15 a.m. Honey Bee Life History (Film)
- 11:00 a.m. Bee Yard — Manipulation of Colony and Members of Hive
- 11:30 a.m. Lunch
- 1:00 p.m. Beekeeping Equipment and How to Assemble
- 2:00 p.m. Major Honey Bee Diseases & Enemies
- 2:45 p.m. Bee Yard — Colony Manipulation Class Assembling of Equipment

Day 2 — Thursday, June 24, 1976

- 9:00 a.m. Obtaining Your Bees
- 9:45 a.m. Bee Yard — Establishing Colonies
- 10:00 a.m. Coffee Break
- 10:30 a.m. Summer Management including Swarm Prevention & Control
- 11:30 a.m. Lunch
- 1:00 p.m. Managing for Honey Flow
- 1:45 p.m. Successful Overwintering
- 2:15 p.m. Queen Rearing
- 2:45 p.m. Bee Yard — Queen Rearing & Introduction

Day 3 — Friday, June 26, 1976

- 9:00 a.m. Nectar Producing Flora
- 10:00 a.m. Coffee Break
- 10:30 a.m. Beekeeping Organizations and Services
- 11:15 a.m. Questions and Answers
- 11:30 a.m. Lunch
- 1:00 p.m. Presentation of Certificates
- 1:15 p.m. Removal, Extraction and Processing of Honey Crop
- 1:45 p.m. Marketing the Honey Crop and Beeswax
- 2:15 p.m. Bee House — Removal, Extraction, and Bottling of Honey. Handling and use of Beeswax. Mead making.

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they are important to the bees. The beekeepers revealed that recent clean culture in the citrus groves (during February and March) has wiped out the mustard and other plants that formerly furnished good supplies of nectar and pollen for early buildup.

In the late summer months it is hazardous for a beekeeper to maintain colonies in the irrigated and dry land

farming areas because of the repeated application of various pesticides.

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visual search method. Queens were apparently not affected by the radiopaque tags placed on their thorax.

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