Overwintering of Col
Restricted and Unrestric

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Summary

In a test during fall and winter in Louisiana, brood rearing was continuous in colonies of honey bees, *Apis mellifera* L., with uncaged queens and the populations increased throughout the test. In similar colonies with caged queens (brood rearing was held at a drastically reduced level), the populations had decreased rapidly by April. Pollen storage increased in the colonies with uncaged queens, but the increase in those with caged queens was not statistically significant. The relationship of stored pollen to brood rearing in the colonies with uncaged queens was significant at the 0.1 per cent level. Honey storage decreased in both groups.

Introduction

DURING the 1960's, beekeepers in Louisiana and Texas complained about the fall and winter losses of bees in their apiaries (the so-called "disappearing disease").

Oertel (1965) noted that the "disease" occurred in Louisiana from late September to early January when colony populations literally disappeared within a short time; only a "handful" of bees was left; honey stores were present; small amounts of pollen were sometimes present although pollen was generally absent; and brood rearing was almost nonexistent. He found that his checks for pesticide residues were negative and also observed that there were no samples of dead bees with which to conduct any analysis for (Nosema) disease. Williams and Kauffeld (1973) noted that the loss of bees in three commercial apiaries occurred during February which was later than the losses of bees during the 1960's.

Since the loss of large numbers of colonies still recurs from time to time, we set up an apiary to observe the differences in colonies of bees with restricted and unrestricted broodrearing during fall and winter months in the Gulf Coast region. The effect of different food treatments on the population, amount of stored pollen and its relation to brood rearing, and consumption and storage of honey in the colonies from December to the end of March were also to be observed. It was hoped that the results would show the importance of continued broodrearing during the winter months in this region.

Methods and Materials

In October 1970, 24 colonies in standard Langstroth 2-broodchamber hives (outside dimensions: 51.4 cm, w. 42.2 cm, h. 24.1 cm) were selected for this test from one of our research yards, and frames with brood, pollen, and honey were shifted between colonies to equalize the amounts in each as much as possible without recording the square inches of pollen, honey, and brood in each. All the queens in the test colonies were sisters (artificially inseminated) and were produced by this laboratory. The populations of the colonies from the beginning (12/10/70) to the end (3/25/71) of the test were determined by counting the number of frames covered by a single layer of bees on both side (approximately 1,900 bees; CO_2 treated; counted). All colonies were observed for their acceptance of the newly introduced sister queens, queen egg laying, and egg viabilities (90-100 per cent) before the first data were taken on December 10, 1970. From early October to December the populations of adult bees in the colonies changed to that of the new queens.

The test was set up as a 2-3 factorial experiment in which the 24 colonies were randomly divided into two groups of 12 colonies each, one with the queens free, so they could lay eggs and brood rearing would be continuous throughout the test, and the second with the queens restricted. The queens were restricted with a wire screen push-in cage with one side made of queen excluder material so bees could enter the cage to feed and groom the queen. However, these queens in the second group could lay a maximum of only 25.8 cm^2 (4 $in.^2$) of eggs (brood). Thus, these colonies were forced into conditions that prevail in the north in October when egg laying and brood rearing most generally stop.

Each of the two groups was then subdivided into three treatments, each of which was replicated four times. The three treatments used with both groups of 12 colonies consisted of the following:

4 colonies that received no feeding

4 colonies that received 226.8 gr (½ lb) cakes of pollen + Drivert† feed. Drivert is composed of 92 per cent finely pulverized sucrose plus eight per cent invert sugar.

4 colonies that received 226.8 gr (½ lb) cakes of soybean flour (95 per cent protein) + Drivert feed.

The pollen and soybean flour cakes were mixed with Drivert sugar at the rate of 40 per cent pollen or soybean flour (95 per cent protein) and 60 per cent Drivert and fed every two weeks. The 226.8 gr (½ lb) cakes were not intended to be a measure of the total amount that the bees would have eaten within a two-week period, but rather a measured amount to act as a stimulant for brood rearing.

Data Collection

The data collected consisted of measurements of the square inches of brood, honey, and pollen every two weeks by means of a grid with 2.54 x 2.54 cm (1 in.) squares. However, inclement weather that occurred during the winter sometimes caused a slight change in the dates for data collection.

Results

The data in Table One indicate that pollen storage increased generally throughout the test in the two groups of colonies with uncaged (continuous brood rearing) and caged (very little or no brood rearing) queens. Analysis of variance indicated that variability in the amount of pollen storage from the start of the test (12/10/70) to the end (3/25/71) with **uncaged queens** was significant at the 5 per cent level whereas the **caged group did not** show a significant difference in their pollen

storage. The amount of pollen stored fluctuated in all three treatments of the group with uncaged queens.

Table One also shows a significant decrease in the amount of stored honey throughout the test in both groups of colonies. The group with caged queens showed a greater amount of stored honey for each treatment at the end of the test than the group with uncaged queens. This, undoubtedly was the result of less brood reared and the steady decrease in populations of the latter.

Analysis of variance for data (Table One) indicated a highly significant difference in the amount of brood between the beginning and end of the test for all treatments of the group of 12 colonies with uncaged queens. There was a high correlation between the amount of stored pollen and brood rearing in the group with uncaged queens.

Discussion

The primary aim of the test was to determine how long honey bee colonies with populations of young bees could be maintained in Louisiana with almost daily foraging from October to March when brood rearing was restricted (only about .12 dm^2 of brood emerged every three weeks). The October population of all colonies in both groups covered slightly more than 10 Hoffman frames of a Langstroth hive; the March populations of the two groups were very different. Colonies with uncaged queens had increased in population to cover an average of 14 frames (continuous brood rearing and subsequent replacement of old dying bees by young bees). Colonies with caged queens (brood restricted) had an average of only 2.2 frames of bees. Two weeks after March 25, 50 per cent of these colonies were dead even though food supplies were present in the hives. March conditions in these colonies were similar to those associated with disappearing disease in the southern states.

In the Gulf Coast States, bees probably do not live as long during winter months as those in the north because of the almost constant foraging activity for food supplies. Therefore, the maintenance of brood rearing would be desirable during winter months within colonies in Louisiana so that a constant supply of young bees will replace those that are dying. Under northern conditions the majority of adult bees live from October to March because of the reduced field activity. Brood rearing which starts around January in the north is carried on with pollen and honey that were stored during the previous fall. Stimulative feeding is often practiced to offset a lack of stored pollen (Farrar 1968). The colonies which received no feed besides what they collected from the field and those that received a diet of pollen and drivert showed increases in the amounts of brood and stored pollen. Those that received soybean flour and drivert had less brood and stored pollen than the other two groups.

s of Honey Bees With Broodrearing in Louisiana*

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REFERENCES

Farrar, C. L. 1968. Productive management of honeybee colonies. Am. Bee J. **108**(3-10): 20.

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Table 1. Average total square decimeters of brood, honey, and pollen in 24 colonies of bees under three different feeding treatments and two groupings of queens in an evaluation of colony conditions from December to March.

Dates	No Feed				Pollen + Drivert				Soybean Meal + Drivert			
	Brood	Honey	Pollen	A-F*	Brood	Honey	Pollen	A-F	Brood	Honey	Pollen	A-F
Queens not caged												
12/10/70	6.54	98.59	2.32	10.5	6.62	88.19	4.54	10.6	8.19	91.16	3.62	10.5
12/23/70	8.96	99.48	4.54	9.3	12.74	91.74	4.78	9.5	8.87	90.22	4.35	9.1
1/21/71	27.22	67.10	4.38	9.1	26.17	68.38	4.27	9.2	28.87	55.59	4.14	8.8
2/04/71	57.35	50.45	7.51	10.0	50.12	52.75	6.09	10.5	49.27	44.07	7.30	9.2
2/24/71	62.46	21.14	11.41	11.2	53.75	22.04	4.83	13.5	48.85	12.70	12.54	10.5
3/10/71	55.32	11.03	11.69	12.7	68.88	12.88	8.83	14.7	55.30	5.22	4.19	11.0
3/25/71	74.98	9.41	10.10	14.5	84.03	.81	14.74	16.0	47.75	.83	6.69	11.5
Queens caged												
12/10/70	.12	62.96	3.85	10.4	.10	79.90	9.98	10.4	.10	71.33	1.48	10.3
12/23/70	.10	58.38	4.30	9.5	.17	72.25	7.70	9.7	.17	45.98	2.19	9.2
1/21/71	.12	50.32	5.77	8.6	.25	70.72	5.64	9.0	.23	48.04	4.10	8.3
2/04/71	.14	41.03	5.75	5.7	.14	63.12	13.49	6.5	.22	41.93	6.09	5.2
2/24/71	.27	29.01	3.35	4.2	.19	51.49	7.52	4.5	.19	30.59	3.43	4.0
3/10/71	.29	34.78	6.83	2.5	.12	49.36	10.58	3.0	.20	29.54	2.59	2.7
3/25/71	.22	23.30	5.87	2.0	.17	39.87	8.88	2.5	.19	21.90	4.75	2.3

* A-F = Average number of frames covered by bees.

Honey exhibit sent in by Dick Christiansen of Newell, Ia.

VERMONT FARM SHOW

The 1976 Farm Show is to be held at the Barre Auditorium, Barre, Vermont, January 27, 28, and 29. Admission — Free.

For further information contact Everett A. Willard, manager, Vermont Department of Agriculture, 116 State Street, Montpelier, Vermont 05602.

COMMERCIAL BEEKEEPING WORKSHOP —

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ricultural Economics and Rural Soc., OSU; discussing "Are You Managing the Business or is the Business Managing You?"

"What's New in Equipment?" with representatives from beekeeping supply companies, bottling and labeling manufacturing representatives and other companies, specializing in the commercial beekeeping area.

Dr. Allen Lines, Dept. of Agricultural Economics and Rural Soc., OSU, discussing money management and record keeping, including cash flow, investments and other areas of financial management for beekeepers, including computer analysis of key business problems.

Dr. Harry Laidlaw, Professor of Entomology, Emeritus, University of California, Davis, will head a major section of the program on "Queen Management; genetics, artificial insemination and commercial production." Also discussing bee genetics will be Dr. Walter Rothenbuhler and Mr. Victor Thompson, Department of Entomology, OSU Bee Lab. with concentration on "Selecting the Perfect Honey Bee; Behavior and Genetics for Commercial Beekeepers."

Dr. Lawrence J. Connor CBMW-76 cordinator and Extension Entomologist at OSU, will discuss "New Developments in Beekeeping" to include latest research and technical developments in the beekeeping areas, with particular emphasis in bee flora, pollination, bee disease control, and pesticides.

A panel discussion with commercial beekeepers and authorities such as Professor William W. Clarke, Emeritus Professor, Pennsylvania State University, on the general subject of "Bee Yard Management," will be on the program.

Dr. Gordon Townsend, professor, environmental biology, University of Guelph, Guelph Ontario, Canada, will participate on the subject "Honey House Design and Management." Professor Townsend is internationally known as an authority on this subject.

Dr. Connor and Thom Mezick, Beekeeper/Publisher from New London, Ohio will discuss "Promotion and Professionalism in the Beekeeping Industry."

The program will begin Sunday evening, January 4, 1976 with an informal banquet and program and will continue through Friday January 9, 1976. One day of the workshop will include a bus tour of several large commercial beekeeping operations in Ohio and Michigan.

For information on the CBMW-76, contact Dr. Lawrence J. Connor, Extension Entomology, 1735 Neil Avenue, Columbus, Ohio 43210, phone 614 - 422 - 5274. Registration materials will be sent upon request to commercial beekeepers. The registration fee has been set at $75.00, with 'second person' registration set at $60.00. This includes seven meals, speakers, bus tours, and other expenses, but not lodging.

ABF CONVENTION —

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Honey Queen Competition

An aspect of the convention that will appeal to the general public will be the selection of the 1976 American Honey Queen. The young ladies who will compete for the title will provide "sweet" publicity for apiculture's best-known product — honey.

Sightseeing Tours

Convention-goers will have a chance to sample Philadelphia's food specialties: scrapple for breakfast, huge soft pretzels bought from streetcorner vendors; and listen to a local institution: a befeathered and costumed string band at the Honey Queen Coronation. Along with these attractions are a variety of walking and motor tours, ranging from visits to the Betsy Ross House and the Liberty Bell to bus trips to nearby Valley Forge.

In addition, Ralph Gamber has arranged a special bus tour for Friday, January 23, after the general sessions have ended. This will include a visit to Dr. Johnathan White's USDA honey research laboratory in suburban Philadelphia, a ride through the picturesque Pennsylvania Dutch country of the Lancaster-York area, with glimpses of the traditional Amish and Mennonite lifestyles, and winding up at the Dutch Gold honey packing plant near York. As a special preview, Ralph Gamber gave the convention committee a guided tour through his new facilities, said to be the largest such east of the Mississippi.

CONTACT: Mr. and Mrs. Franklin B. Blank, publicity co-chairmen, 1408 Taylor Road, Lansdale, Pa. 19446, telephone: (215) 855-0667.

OVERWINTERING —

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Oertel, E. 1965. Many bee colonies die of an unknown cause. Am. Bee J. **105**(2): 48-49.

Williams, J. L. and N. M. Kauffeld. 1973. Winter conditions in commercial colonies in Louisiana. Am. Bee J. **114**(6): 219-221.

FOOTNOTES

* In cooperation with Louisiana State University Agricultural Experiment Station.

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BEEKEEPER'S RIGHT —

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FOOTNOTES:

[1] A general discussion of ordinances and statutes restricting locations of bees are the subject of an article planned for future publication here.

[2] **City of Arkadelphia v. Clark,** 11 S.W. 957 (1889)

[3] **Olmstead v. Rich,** 6 N.Y. Supp. 826 (1889)

[4] **Ferreira v. D'Asaro,** 152 So. 2d 736 (Fla. App. 1963)

Next Month — **Beehive Locations and Zoning Regulations.**

CLASSROOM —

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early this coming spring, you will have your equipment ready and can avoid being rushed when the honey season starts. Another point you might wish to consider this coming spring is feeding your bees with a supplement such as Quik-Gro to help start quicker buildup in the colonies. This feeding will boost the packages and cause faster brood rearing and thus a stronger colony which is better able to take advantage of the coming honeyflow.