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THE BEEKEEPER IN SPRING

"Song of the Bees"

We watch for the light of the morning to break,
And colour the eastern sky
With its blended hue of saffron and lake:
Then say to each other, "AWAKE! AWAKE!
For our winter's honey is all to make,
And our bread for a long supply.

And off we fly to the hill and dell,
To the field, to the meadow and bower;
To dip in the lilly with snow-white bell,
To search for the balm in the fragrant cell
Of the mint and rosemary flower.

While each, on the good of her sister bent,
Is busy, and cares for all,
We hope for an evening of heart's content
In the winter of life, without lament
That summer is gone, or its hours misspent,
And the harvest is past recall.

Bee Journal 1877

Ref. "ABOUT BEES", F.G. JENYNS, 1888

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Editorial

This is to report that the last issue of the EAS Journal was sent out to over 1,000 names on our mailing list.

In the March issue of the American Bee Journal there is a notice of the passing of Prof. S. S. McGregor who has contributed much to research, especially in pollination of food crops. Mr. McGregor was one of our members. He was interested in bee behavior and how the beekeeper could take advantage of it.

There are a number of beekeeping courses coming up to which you may attend for learning to keep bees better.

April is the start of a new year in beekeeping for you and a hope you will prosper as the bees do.

P. J. Hewitt, Jr. Editor

EAS Journal:

Advertisements and material for publication should be received by the 15th of the month previous to publication; Feb., April, June, July, October, December.

Ref. Bee Aware, April/May, 1979
Clarence H. Collison, Editor

Are Nucs a Good Investment?

By James R. Steinhauer Chief of Apiary Inspection

A nuc, or starter hive, usually consists of 2 or 4 frames of brood in all stages with enough adult bees to care for the brood. A laying queen and some food stores make this unit a complete miniature beehive. When placed into a full sized hive body and given supplemental feeding they usually expand rapidly into a strong colony. Often these hives will produce surplus honey in their first year.

Starting a hive with a nuc rather than a package of bees has several obvious advantages. Sales of nucs have increased tremendously over the past several years and are making roads into the well established package bee businesses.

Through our role as bee inspectors we are finding one big disadvantage to buying nucs: disease transmission. Although we recommend inspection and certification of nucs before they are sold, it seems that this is not adequate (if interstate movement is involved, certification is required by law). Bees which have been fed antibiotic drugs will appear healthy at the time of inspection. However, the equipment may be contaminated with spores which cause American Foulbrood and if the buyer does not continue the drug feeding program, it will be a matter of time until that hive breaks down with disease.

If you don't know who you are buying nucs from, and some of the history of his operation, ask to see an inspection certificate and ask if antibiotic drugs have been fed. You will find that most dealers selling nucs in Pennsylvania are reputable and will not try to hide anything, but it is up to you to ask the right questions.

Collecting Swarms

Swarms can be used to replace winter losses, strengthen weak colonies or start new ones. Many swarms are lost because people do not know beekeepers who want them. If you are interested in collecting swarms, it would be well to make this known in your community and at your county extension office.

Blue Honey from North Carolina

Ref. Bee Aware, Clarence Collison

Have you ever seen a natural honey that is a deep, blue color? Such a honey exists in North Carolina. It resembles a thick blueberry syrup but is in fact a natural honey and it doesn't come from nor is it related to blueberries.

Blue honey principally comes from Southeastern North Carolina but it has turned up in South Carolina, Georgia and Texas. Beekeepers with the honey were uncertain as to the origin of the blue color. One honey shipment from North Carolina was refused in international trade due to suspicions as to its origin. Now, John Ambrose and colleagues at North Carolina State University believe they have the solution and source of blue honey.

The blue honey comes from two plants - summer titi (**cyrilla racemiflora**) and sourwood (**Oxydendrum arboreum**). Somehow the mineral aluminum is involved. The two plants absorb aluminum from the soil; the aluminum content of blue honey is quite high. Not all sourwood honey is blue, obviously, and the soil type may be a factor - sourwood trees on clay soil do not take up aluminum as readily as trees on the sandy soil of the coastal plain.

Sourwood and titi are unique nectar sources. Their ability to produce a honey of rich, blue color certainly adds to their distinctiveness. Now that the origin has been discovered maybe blue honey will have a place (and price?) on our super market shelf.

Help for Victims of Insect Stings

Ref. US News & World Report 4/30/78

The onset of warmer weather, sending people outdoors, also increases insect activity. Have there been any advances in treating those who suffer allergic reactions to insect stings?

Yes. The Food and Drug Administration recently licensed a new vaccine for those allergic to stings. Call Pharmalgen, it is made from the venom of the insects. Its use in a strict program is found to be more effective in providing immunity to allergy victims than previous anti-sting treatments.

Who should use this vaccine?

Immunization is recommended for anyone who has had a life-threatening reaction to a sting and is found to be allergic by a skin test. The desensitization program begins with minute doses of the venom, and over a six-to-eight-week period culminates with a dose about twice the strength of an average sting. After that, booster shots must be taken year-round.

Just how serious a health problem are insect stings?

Allergy specialists say that insect stings can be very dangerous. About 50 deaths from such stings are reported to the National Center for Health Statistics every year, but doctors fear the toll may be much higher since the sudden death brought on by a sting can often be mistaken for a heart attack. Over all, an estimated 2 million Americans suffer allergic reactions to insect stings.

What are the major symptoms of a bad reaction?

Usually there is general swelling of the body, hives, shortness of breath, wheezing and asthma. The swelling can be so severe that the larynx may be blocked. If there is a drop in blood pressure, the person can faint. Death can be caused either by the body's inability to supply blood to the brain or by asphyxiation because of hives in the throat, in the larynx or at the back of the tongue. Severe reactions can develop within minutes. As a general rule, the quicker the reaction the more dangerous the sting.

And in a minor reaction?

A little redness around the sting, some swelling, temporary itching and pain are normal reactions to a sting. But if the swelling persists the lump reaches the size of a golf ball or lemon, doctors consider this a significant local reaction. A sizable proportion of people with such a response may have a general allergic reaction from the next sting.

What insects are most likely to touch off a reaction?

Wasps, honeybes, yellow jackets and hornets are the main culprits.

How can a person tell if he or she is allergic to stings?

Diagnosis is usually made after any general reaction to a sting that involves shortness of breath or hives. In most cases, doctors then can confirm the allergy with a skin test. Once the particular insect venom is identified, a desensitization program using that venom can be developed.

When a person who hasn't been vaccinated has a bad reaction, can medication relieve the symptoms?

Yes. There is a special kit that can be purchased with a doctor's prescription. An injection of adrenaline is essential to block the reaction, and each kit is equipped with a preloaded syringe. The kit also has antihistamine tablets and an aersol inhaler to help with breathing.

Is this kit recommended for every family's medicine cabinet?

The emergency kit is a must for anyone who has already had a severe reaction. Such a kit should also be available in public places such as swimming clubs, fire and police stations and meeting houses for scout troops and other groups. Those in charge should be able to recognize a severe sting reaction and know how to use the kit.

What should be done if the emergency kit is not available?

Get medical help as quickly as possible since proper medication is essential to combatting the reaction and timing is critical. While waiting for aid, the victim should lie down to keep blood circulating to the head. If the sting is on an arm or leg, a tourniquet may slow the body's absorption of the venom.

What is the best way to avoid getting stung by these insects?

Use common sense when you go outside. Do not go barefoot. Be careful while doing garden chores such as mowing the lawn, cutting vines and pulling weeds. Keep yourself covered—wear a hat, gloves, long sleeves, pants. Remember, bright colors attract insects. So do perfumes, hair sprays and suntan lotions, as well as cooking and food smells. As a general rule, more people get stung around swimming pools than anywhere else.

Ref. New Jersey Beekeepers News, 1/80

"Bee Venom Used to Treat Stings"

Several million Americans who have the risk of severe allergic reactions from insect stings now have a new kind of immunization treatment.

Many doctors have had to wait several months for the new product approved by the Food and Drug Administration. Last spring (1979) the manufacturer Phamacia Inc., Piscataway, N.J., expects to have filled all orders by September, 1980. From then on it will try to have four and six months surplus on hand.

The treatment is to use pure venom from honeybees, hornets, and other insects to treat allergic patients to these insects. Previous treatments were with injections of mascerated whole insects. These injections were not very effective as there is little volume of venom in a whole insect.

The product for treatment, used by Dr. Michael Woehler, is called "Pharmalgen", which is freeze dried venoms that are reconstituted with a special diluent before injection.

Five varieties of venoms are available, honeybee, yellow jacket, yellow European hornet, white faced hornet, and another mixture of yellow jacket and hornets. This mixture is for people who are stung by insects other than honeybes. These venoms must be administered by doctors who have applied the skin test reactions.

Fred Kalfon, production manager for the new drug has no idea of the number of people treated so far. About 30% of the allergy doctors have purchased the diagnostic kits so far. A warning on the label carries a caution for the patient to carry an emergency supply of epinepherine to use if they get stung and one reacts to the insect sting.

Book Review

This book "THE QUEEN AND I" by Edward A. Weiss, Harper and Row, N.Y., 1st ed. 1978. is a story by the author for pepole just starting to keep bees. The 1st chapter begins with purchasing new equipment by the beginner. A package of bees is bought with the new hive and is installed making a new colony.

The events of this colony is recorded and the details and actions to make the venture a success. The book is easy reading with detailed instructions for each action. The story has a surprize ending.

Another book for good reading is an easily read book called "BUMBLE BEE ECONOMICS" by Bernd Heinrich, Harvard University Press, 1st ed. 1979. It is a scientific research project by the author on how bumble bees can fly, generate heat, raise colonies, and pollinate wildflowers.

It is a monograph of how bumble bees are able to economically use sugar of plant nectars for their energy of living. Their competition among each species is defined and how honeybees effect them because of numbers.

Another feature is a color chart of bumble bees from Canada to Mexico. There is a chapter on rearing bumble bees and domiciles for them and directions for caring for captive colonies. This book is a story on the place bumble bees have in the ecology of the environment around them.

Beekeeping Short Course

Cornell University, Ithaca, NY 14853
July 18-20, 1980

($10 Advance Registration Required - not refundable)

Friday evening, July 18
5:00-8:00 p.m. Registration
7:30 p.m. Movies on bees

Saturday, July 19
8:00 a.m. Registration
8:30 a.m. Honey and Honey Products
9:30 a.m. How to start in beekeeping
10:30 a.m. Seasonal Management

1:00 p.m. Bee Diseases and Pesticides
2:00 p.m. Rearing Queens
3:00 p.m. Producing Comb Honey
4:00 p.m. Honey Plants
6:30 p.m. Banquet (with speaker)

Sunday, July 20
9:00-10:00 a.m Lecture: Beekeeping Equipment
10:00-12:00 Workshops: Homemade equipment, diagnosing diseases, queen rearing, cooking with honey, judging honey, wax working, comb honey equipment, making good combs.

1:00-3:30 p.m. Open house and demonstrations - Dyce Laboratory: Extracting, bottling, mead tasting, making colony inspections, solar wax extractor, queen rearing techniques, removing honey, installing packages, wintering bees, beekeeping gadgetry, bait hives.

Instructors include Professor Roger A. Morse, Cornell Lecturer Jon C. Glase, New York State Chief Apiary Inspector Gerald Stevens, retired Extension Specialist in Apiculture at Pennsylvania State College Professor W.W. Clarke, Author and Lecturer Bess Clarke, Author and Lecturer Dr. Grant D. Morse, Commercial Beekeeper Jonathan P. Ryan, and graduate students Richard Nowogrodski, Kirk Visscher, Ken Ross and Gene Robinson.

Participants will stay in student dormitories and eat in the university dining room. Lecture and demonstration rooms are air conditioned; the dormitory dining room and lecture hall are within a few hundred feet of each other. Enrollment will be limited. The total cost is $80 per person. This includes a single room for two nights, three meals on Saturday and two on Sunday, all instruction materials and the advance registration fee. Double rooms are $5.00 less per person (total $75). Full linen servce is provided. Registration forms may be obtained from: Office of Apiculture, Department of Entomology, Comstock Hall, Cornell University, Ithaca, New York 14853.

Special Note:

A certificate of attendance is given to each participant. These will be available at Dyce Laboratory on Sunday afternoon only; certificates can not be mailed.

During the open house at Dyce Laboratory, Sunday afternoon, with weather permitting, Professor Clarke and Mr. Stevens will demonstrate how to examine and inspect colonies in the nearby apiary. At the same time, graduate students will take groups of four to six people, who have never handled bees before, to remote bee yards where they may learn how to open and manipulate a colony. The colonies will be small units set off by themselves so as to reduce the chances of people being stung. Each person will be coached in how to open a hive, remove frames and make a routine examination. We will have veils, smokers, and hive tools available. We discourage the use of gloves; however, persons who feel they cannot make a colony examination without them may wear their own gloves.

The sessions with small groups will be repeated about every hour so that everyone should have an opportunity to examine a colony and to observe Professor Clarke and Mr. Stevens doing so. The Dyce Laboratory will be open all afternoon so that everyone should have ample time to participate in all of the activities.

Participants are invited to bring samples of their honey for examination and comment on Sunday morning. A beekeeping equipment supply dealer will have his wares available at Dyce Laboratory on Sunday afternoon.

Ref. News Release, Delaware Valley College

Delaware Valley College Beekeeping Club Purchases Honey Extractor

As part of their program to enhance the art of beekeeping at Delaware Valley College, the College's Apiary Society (beekeeping club) recently purchased a 10 frame radial stainless steel Maxant honey extractor.

The Club currently has about 50 members most of whom had never seen the inside of a bee hive until joining the Club. Club members raise money for their various activities through the sale of honey and beeswax candles to fellow students, at home football games, and at other college functions. Over the years, the Club has been involved in the purchase of many items used in the management of the College's apiaries. Also starting in 1969, the Club took over an abandoned college building, and with the cooperation of the administration, it completely renovated the building which now serves as a honey house and also as the center for other honey bee related activities on campus.

The Club has been involved in many other honey bee related activities both on and off campus. In Janauary, 1976 the Club set up a display at the Annual Meeting of the American Beekeeping Federation which was held in Philadelphia that year. The display was entitled the "Story of Honey" and it showed to those in attendance the progression of honey from the flower to the grocer's shelf. The Club has also been involved in judging honey shows in Pennsylvania and New Jersey; in helping with the Delaware Valley College beekeeping short course; and in sponsoring programs on campus with Mr. Jim Steinhauer, PA Dept. of Agriculture being this year's guest speaker in March.

The Club's origin goes back to the early days of the College. With the death of Professor Schmeider in the early 1960s, the Club became inactive. The arrival of Jeff Clark, son of Bill and Bess Clark, as a student in 1966, brought about a revitilization of the club. In 1968 Jeff took a leave of absence for a stint in the Service and Dr. Robert Berthold arrived as a member of the Biology Department at which time he became club advisor. From the initial seven club members upon his arrival, Dr. Berthold has seen the Club's numbers greatly increase.

Dr. Berthold is currently Associate Professor of Biology and Assistant Chairman of the Biology Department. He is active as a coach in Cross Country and Track and teaches General Biology and Entomology. He serves part time with the Pa. Dept. of Agriculture as an Apiary Inspector and lectures throughout the year on the subject of beekeeping.

As one of its elective courses, Delaware Valley College offers a regular three credit Apiculture course during the spring semester. In the course, Dr. Berthold attempts to associate both the theoretical and the practical aspects of beekeeping. During the course, the students are exposed to many of the interesting facts of bees and beekeeping with the Honey House and College Apiary being extensively utilized. From the onset of the course, each student is also assigned a colony of honey bees which he or she has the opportunity of managing for the remainder of the semester. The College also offers two three day beekeeping short courses each year one in the spring and one in the summer.

Over the years through participation in the club and taking either the short course or the regular course, many Delaware Valley College graduates have become involved in beekeeping either as a full time avocation, a side line, or a hobby.

Connecticut Beekeeping Course

A three credit, 200 level course, The Biology of the Honeybee, will be offered this summer at the University of Connecticut Waterbury Campus. The course will run for six weeks and begins on May 19th. The instructor will be Professor Alphonse Avitabile, co-author of the Beekeeper's Handbook.

The structure and function in the honeybee and its colonies with emphasis on chemical communication and practical aspects of beekeeping will be the topics of the course. For further information, call Mr. Losey, 757-1231, ext. 27 or Mr. Avitabile, 757-1231 ext. 38.

Ref. Journal of Economic Entomology

Honey Bees[1]: Response to Galactose and Lactose Incorporated into Sucrose Syrup[2,3]

H. ALLEN SYLVESTER[4]

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ABSTRACT

J. Econ. Entomol. 72: 81-82 (1979)

The addition of 10% lactose or galactose to 50% (wt/wt) sucrose solution reduced the amount of solution hoarded by Apis mellifera L. held in cages with comb pieces. Thus, bees are able to detect lactose and galactose. Lactose and galactose were toxic in a hoarding test. Oxytetracycline and sulfathiazole had no effect on the toxicity of lactose.

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Previous experiments on the effects of various sugars on the feeding behavior and mortality of honey bees, Apis mellifera L., have used bees in cages without comb available for food storage (Barker and Lehner 1976, Barker 1977). Also, Barker and Lehner (1974) reported that artifacts in a variety of added sugars altered syrup uptake by combless cages of bees. I used the external food storage behavior (hoarding; Kulincevic and Rothenbuhler 1973) of honey bees in cages provided with comb pieces to determine the effects of the incorporation of lactose or galactose in sucrose syrup on syrup uptake and storage by caged honey bees and to measure the relative longevity of the bees fed treated and untreated syrups. In addition, the effects of sodium sulfathiazole or oxytetracycline added to lactose-sucrose syrup were measured.

Materials and Methods

The 8 colonies with the best rates of survival out of 35 colonies previously surveyed for hoarding behavior were chosen as source colonies. Brood combs containing emerging adult worker bees were removed from each of these colonies and placed in emergence cages in a 35° C incubator. Newly emerged worker bees, ages 0-24 h, were then collected from the combs of each source colony and placed in groups of 30 in hoarding cages similar to those of Kulincevic and Rothenbuhler (1973). East cage was fitted with a 20-ml water vial and a 20-ml syrup vial, but no pollen substitute was provided. Within each replicate group of cages, the different syrup treatments were randomly assigned. The cages were placed in incubators held at 35° C and 50% RH.

For the lactose and galactose tests, sucrose syrup (50% wt/wt) was used as the control solution and as the base for the 4 test solutions. Lactose (Sigma Chemical Co. L-3625) or galactose (Sigma G-0625) was individually added to aliquots of sucrose syrup at 4 and 10% (wt/vol) rates. Each source colony was represented by 3-6 replicate groups of 5 cages, for a total of 27 cages/treatment. Evaulations were made in July 1977. For the drug test, sucrose and 10% lactose syrups were made as mentioned previously. Sodium sulfathiazole (Walter T. Kelley Co.) at 0.15 and 0.25 mg/ml and oxytetracycline (TM 50, Walter T. Kelley Co.) at 0.7 and 1.4 mg/ml were added to aliquots of 10% lactose syrup. Of the aforementioned 8 colonies, 5 were chosen as source colonies, and 3 replicate groups of 6 cages were tested per colony. The evaluations were made in Sept. and Oct. 1977.

The amounts of sugar syrup removed from the feeders were recorded daily. Bees that died in each cage were removed and counted daily until ½ or more had died. Mortality was calculated by converting the total numbers of bees that had died after 8 and 16 complete days of testing to percentages of the initial cage populations to yield % dead at day 8 and % dead at day 16, respectively. Days to median mortality were calculated as the number of complete test days until at least ½ of the bees in the cage had died.

Results and Discussion

Syrup consumption

The mean quantities of 10% lactose and 10% galactose syrups taken from the feeder vials were significantly different (P 0.01) relative to the 4% syrups and the control (Table 1). Thus, in these experiments, both lactose and galactose at 10% concentrations reduced the uptake of sugar syrup by bees. Von Frisch (1967) stated that galactose curtailed the life of bees. Dietz (1975) stated "... that bees with their ability to differentiate between sweet and unsweet sugars are, however, unable to use their sense of taste to differentiate between toxic and nontoxic sugars." When the bees are able to obtain and store syrup beyond the amount they are able to consume, it becomes clear that the addition of 10% lactose or galactose reduces the removal of sugar syrup from the feeder.

I conclude that this reduced uptake occurs because 10% lactose or galactose reduces the acceptability of sugar solutions to bees. Thus, more information can indeed be obtained about the acceptability of sugar solutions to bees when hoarding is made a part of an experiment than when it is not. Since the bees in any given cage were not allowed a choice, the present experiment demonstrates nothing about preference.

Since in nature, bees collect amounts of nectar that are beyond their immediate needs and store the excess as honey, bees may, in fact, be able to differentiate between at least some toxic and nontoxic sugars. However, if their immediate needs are not satisfied, they may still collect the toxic sugars.

Mortality

Mean days to median mortality were significantly different ($P<0.05$) for all treatments (Table 1). The fact that the median mortality in cages with solutions of 4% lactose ($\bar{X}\pm SE=12.9\pm0.2$) was almost as high as that in cages with 10% galactose ($\bar{X}\pm SE = 11.9\pm0.2$) further supports the statement of Barker and Lehner (1976) that "...the galactose unit per se fails to account for the toxicity of lactose." The mean % bees dead at both days 8 and 16 (Table 1) is generally in close agreement with the figures of Barker and Lehner (1976) and confirm that lactose and galactose are toxic to bees.

Drugs

Neither level of drugs had a statistically significant ($P<0.05$) effect on mean days to median mortality. For syrup containing the high level of oxytetracycline, 1.4 mg/ml, the hoarding rate was significantly different ($P<0.05$) from syrup containing only lactose and sucrose ($\bar{X}\pm SE = 3.4\pm0.3$ ml vs. 5.3 ± 0.4 ml, respectively) but was not significantly different from other drug treatments, i.e., 0.15 mg/ml sulfa 5.0 ± 0.3 ml, 0.25 mg/ml sulfa 4.6 ± 0.4 ml, and 0.7 mg/ml oxytetracycline 3.9 ± 0.3 ml. Thus a solution of 1.4 mg/ml of TM 50 oxytetracycline may be repellent to bees.

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[1]Hymenoptera: Apidae.
[2]In cooperation with La. Agric. Exp. Stn.
[3]Mention of a commercial or proprietary product does not constitute an endorsement by the USDA. Received for publication June 29. 1978.
[4]I thank Tom Gochnauer, Ottawa Research Station, Agriculture, Canada, and Tom Rinderer, FR, SEA, USDA, for their assistance with this manuscript.

Ref. American Bee Journal 12/78

Assessing Longevity, Hoarding Behavior, and Response to *Nosema* in Honey Bees

by H. ALLEN SYLVESTER and THOMAS E. RINDERER
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USDA, Baton Rouge, Louisiana 70808

A LONG-RANGE program for the genetic improvement of honey bee stocks is being conducted at the Baton Rouge Bee Breeding Laboratory (Rinderer 1977). We have summarized here what we have found out in laboratory tests about longevity, response to Nosema apis, and hoarding behavior in honey bees. Laboratory tests were used because they provide more precise and repeatable measurements than field tests.

Longevity was one of the characteristics studies because, all things being equal, a bee that lives longer should contribute more to the buildup of large colony populations. It was therefore of interest to find out whether bees vary in longevity and whether this variation leads to or is related to variation in any other characteristics. We also looked for variations in susceptibility to Nosema disease since treatment is expensive. It would be helpful to have bees that are genetically resistant to Nosema unless this resistence is accompanied by an undesirable change in another characteristic. Finally, we measured hoarding behavior, that is, the removal by caged bees of sugar syrup from feeders. In this latter case we are attempting to determine whether the hoarding rate in the laboratory is correlated with nectar collection in the field; that is, whether bees that are repid or high hoarders in the lab will also be high honey producers in the field. However, again, any correlation of hoarding behavior with other characteristics is important since, for example, if high hoarding rate is genetically linked to short life (negative correlation), there may be no net gain from selection for high hoarding.

The studies were made with bees obtained from 38 randomly selected colonies containing naturally mated queens. Combs of emerging brood from each of these source colonies were separately caged in an incubator. Worker bees less than 1 day old were collected from the cages and tested for longevity, hoarding behavior, and response to Nosema apis. Tests were made from June to August 1976.

The two vials visible on top of the test cages had two holes drilled in each cap to convert them into gravity feeders. One contained sugar syrup while the other contained water. A pollen substitute feeder was placed inside the cage in the tests for longevity and response to Nosema. While an experiment was in progress, the incubator door was closed so the bees were in the dark at 35° C. and 50% relative humidity.

The bees were fed Nosema spore suspension (response to Nosema test) or sugar syrup (longevity test). This was done by confining the newly emerged bees individually in feeding chambers (Figure 2). These chambers were holes in a board that were closed by corks with a piece of glass tubing through their length. A droplet of a suspension of Nosema spores or of sugar syrup was placed in the end of the tubing and lights were shone on the chambers to attract the bees to the food (Rinderer 1976). After feeding, the bees were placed in the test cages (Kulincevic and Rothenbuhler 1973) and held in incubators. Dead bees were removed daily and counted. The results, calculated as the number of days for ½ of the bees in each cage to die, were analyzed statistically.

For the tests of hoarding behavior, bees from 34 of the source colonies were placed directly in the test cages from the brood cages without individual feeding. The amounts of sugar syrup removed from the feeders daily during the first 3 complete days after the bees were put into the cages were recorded. The results were analyzed statistically.

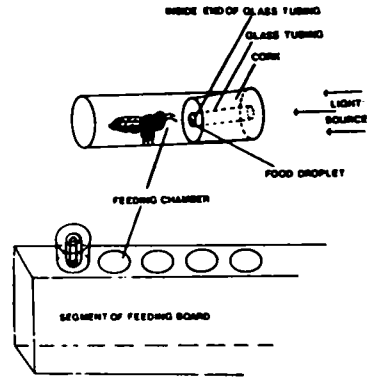

Figure 2 - Device used to feed individual bees measured amounts of sugar syrup or Nosema spore suspension.

We found highly significant differences among the colonies for all three characteristics. These variations we observed among the colonies in these three characteristics indicate that genetic differences exist with a good potential for the genetic improvement of bee stocks for these traits through the use of selection procedures.

The correlation between longevity and response to Nosema was highly significant. There was no correlation between hoarding behavior and either longevity or response to Nosema, which indicates that there is little genetic relationship between hoarding and either longevity or response to Nosema. The reasonably high correlation between longevity and response to Nosema indicates that improvement in one has a stong likelihood of improving the other. However, two colonies performed counter to this general correlation so a few colonies may show a negative correlation for these two traits. The unintentional use of such colonies in a breeding program in which testing is done for only one trait might develop the second characteristic in an undesirable direction in the breeding stock. That is, if bees from such colonies were selected solely for reslistance to Nosema, the progeny would probably be more resistant to Nosema but they might also become shortlived.

In summary, our experiments indicate the following:

1) longevity and response to Nosema are genetically related,
2) hoarding rate is not genetically related to either longevity or response to Nosema,
3) bees vary genetically for all three characteristics examined,
4) improvement for all three traits should be possible with selection,
5) selection for long life generally should produce bees that also live longer when infected with Nosema,
6) selection for long life may sometimes produce bees that die soomer when infected with Nosema.

American Bee Journal

FOOTNOTES

1In cooperation with Louisiana Agricultural Experiment Station.

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*Chemistry Of The Sting Apparatus Of The Worker Honeybee**

Murray S. Blum[1], Henry M. Fales[2], Kenneth W. Tucker[3], Anita M. Collins[3]

Introduction

The chemical basis of alarm behaviour in the honeybee (Apis mellifera) has been primarily identified with isoamyl acetate, a compound demonstrated to be present on the worker sting apparatus (Boch, Shearer & Stone, 1962). However, the presence of additional chemical releasers of alarm behaviour was indicated by the fact that guard bees would attack and sting a cotton ball to which freshly excised stings had been added, but not one treated with isoamyl acetate alone; Free and Simpson (1968) reached a similar conclusion. Boch, Shearer and Petrasocits (1970) demonstrated that a sting was significantly more active than isoamyl acetate in alerting and attracting bees at the hive entrance.

Gas-chromatographic analyses of extracts of honeybee stings have shown that the sting apparatus is a rich source of both low- and high-boiling compounds (Boch & Shearer, 1966; Gunnison & Morse, 1968). As part of a programme for studying the chemical bases of defensive behaviour in honeybees, we have analysed the volatile compounds present in extracts of the sting apparatus of worker honeybees.

Materials and Methods

Stings were collected from workers that originated from three colonies in Baton Rouge, LA, USA, which were considered to be of average temperament, neither too aggressive nor too gentle. Workers were collected in plastic bags which were transferred to a refrigerator at 7°C. After the bees were immobilized, the sting apparatus (100/vial), together with the motor mechanism and attached glands, was pulled from the bee's body with fine forceps. Included with the excised sting apparatus was the setose lobe which enfolds the base of the sting shaft in which the volatiles are located (Ghent & Gary, 1962). The sting apparatuses were transferred to reaction vials (100/vial), containing 70 mg of anhydrous sodium sulphate and 0.5 ml of reagent methylene chloride, which were nested in dry ice. The vials were wrapped in Parafilm and stored at - 8°C before being shipped to Athens, GA, and Bethesda, MD, for analyses.

Extracts (6 replicates) were analysed without further treatment on a LKB-9000 gas chromatograph—mass spectrometer using a 3.66-m column of 10% SP-1000 as a stationary phase. The columm temperature was programmed from 60 to 200°C at 5°/min. Peak areas were determined by electronic integration.

Results

Identifications of the oxygenated compounds were based on congruent mass spectra and GC retention times with standard compounds. These compounds and their significant mass spectral characteristics are listed in Table 1, together with the mean percentage of each compound, based on the average from 6 chromatograms.

The presence of three alcohols in these extracts demonstrates that this class of compounds is also a qualitatively important feature of the honeybee sting apparatus.

It seems remarkable that isoamyl alcohol and acetate should replace so completely the expected n-amyl group in the series. This suggests an important crossing of short-chain fatty acid and mevolanate pathways in worker honeybees.

Several of these oxygenated compounds have been detected previously as exocrine products of insects: 2-nonanol has been identified as a mandibular gland product of several Trigona species (Luby et al., 1973; Blum, 1974); where it appears to function as both part of

TABLE 1. Oxygenated compounds in extracts of the worker honeybee sting apparatus.

Compound	Significant mass spectral ions (m/e)	Mean percentage SE
n-butyl acetate	43b, 56, 61, 73, 116a	1±0.3
isoamyl acetate	43b, 55, 70, 130a	27±6.2
isoamyl alcohol	43, 55b, 56, 57, 70, 88a	12±3.7
n-hexyl acetate	43b, 55,56, 61, 69, 84, 144a	3±0.7
X[1] (acetate ester)	43b, 55, 56, 57, 61, 69, 70, 71, 83, 87, 98, 99, 112, 126, 142, 143	9±2.8
n-octyl acetate	43b, 55, 56, 57, 70, 172a	14±4.1
2-nonanol	43, 45b, 55, 69, 144a	9±3.2
X2 (acetate ester)	43b, 54, 55, 57, 67, 68, 69, 81, 82, 95, 110, 127, 128	6±2.1
n-decyl acetate	68, 69, 70b, 71, 82, 83, 84, 94, 112, 140, 200o	1±0.5
benzyl acetate	43, 79, 90, 91, 108b, 150a	13±4.5
benzyl alcohol	50, 51, 77, 79b, 107, 108a	3±1.1

a molecular ion b base peak

a trail pheromone and a defensive secretion.

Since honeybee workers are exposed to a mixture of sting volatiles, not to a single compound, caution should be exercised in drawing conclusions about the alarm-releasing activities of the individual volatiles.

Summary

Volatile compounds present in extracts of the sting apparatus of foraging worker honeybees were analysed by gas chromatography and mass spectrometry. Eight acetates were detected, including n-butyl, isoamyl, n-hexyl, n-octyl, n-decyl, and benzyl acetate. These esters were accompanied by isoamyl alcohol, 2-nonanol and benzyl alcohol, as well as a series of aliphatic hydrocarbons.

Ref. Ohio State Beekeepers News, Vol. 7, No. 1, 1967

A Report of a Visit by John Kefuss To Otto Stewart, Spanish Forks, Utah.

Mr. Stewart, a 6,000 hive beekeeper, showed Mr. Kefuss several short cuts in his beekeeping operation. One is to use a hot box to warm old frames and supers before scraping them. They clean off better.

No. 2. to get paint off a super or box for repainting, a round roller steel brush is attached to a 1 horse electric motor. This way of removing or preparing wood work is fast and eliminates the cost of sanding belts.

To quickly paint hive bodies or supers he has two racks, one on either side of a dip-tank on which newly dipped boxes are placed to drain. Each rack holds 8 boxes and are drained in rotation. Each set of 8 boxes are loaded onto a wheeled cart and rolled into a heated drying room. Under each rack and the dipping tank are hot water coils to warm the paint for faster draining as the heat thins the paint. This dipping paints the inside of a box as well and it tightens the box joints.

To make nuclis units quickly and easily all sealed brood of a 3 story hive is placed in the 3rd story. Then the bees are driven down off this brood by carbolic acid fumes. After the bees are out of the brood queen excluders are placed under the 3rd story. The next day nuclis are made up from these bees and brood. Three nuclis are made from each box.

LOSP and EASI 3 - Handy Names for Handy Indexes

LOSP is a new alphabetical list of 3345 serial publications with the standard abbreviation for each. It includes titles of all journals that are known to the IBRA as having provided material on bees and beekeeeping in the last thirty years. Its full name is "List of Serial Publications that have provided material relevant to bees and beekeeping, with their standard abbreviations currently used by the International Bee Research Association" (1979).

LOSP is invaluable to anyone wishing to quote references in a consistent way, as required for instance in writing for **Journal of Apicultural Research** and **Bee World**. It also enables full titles to be found if abbreviations are know.

EASI 3 is the familiar name of another index just issued by IBRA: "English Alphabetical Subject Index to Universal Decimal Classification numbers used by the International Bee Research Association in Apicultural Abstracts and in subject indexes. Third enlarged edition" (1979). The full title, although rather a mouthful, describes exactly what the book is. This veteran among subject indexes and descriptor lists used in computer storage of information contains 8250 entries, and incorporates two previous editions, and many supplements containing new terms. It is valuable to anyone classifying material on bees and related subjects, and especially to the user of our journal **Apicultural Abstracts.**

Prices: LOSP (91 pages) 9.50 or 21.50 and EASI 3 (114 pages) 13.50 or 30.50, both post free, direct from the International Bee Research Association, Hill House, Gerrards Cross, Bucks SL9 ONR. England.

Beekeeping Short Course 1980
Delaware Valley College, Doylestown, Pa. 18901

Summer: Friday, Saturday and Sunday, June 20, 21 and 22, 1980

Delaware Valley College will again be offering its Summer Beekeeping Short Course. The course is offered under the direction of Dr. Robert Berthold (Associate Professor, Biology) in cooperation with Mr. Jack Mattenius (New Jersey Supervisor of Bee Culture). The program will include a special talk by Mrs. Marnie Berthold on home honey uses. Instruction will take place on the Delaware Valley campus, with the College apiary and honey house being utilized.

Total cost for the three days of instruction is $21.00 ($16.00 for those 17 years of age or younger and those 65 years of age or older). Further informtion may be obtained by writing Dr. Berthold, Delaware Valley College, Doylestown, Pa. 18901, or by calling him at Area Code 215-345-1500.

There will be a beekeepers' meeting at the College featuring a guest speaker, Saturday, June 14, 1980; picnic lunch at noon (bring your own); speaker at 1:30; refreshments.

— PROGRAM —

First Day		**Second Day continued**	
8:30 a.m.	Registration and Coffee (Mandell Hall Auditorium)	11:15 a.m.	Hiving Swarms, Packages & Nucs; Queen Rearing & Introduction
9:15 a.m.	"Secret in the Hive" film		
9:45 a.m.	Introduction of Participants	12:00 Noon	Lunch
10:00 a.m.	Honey Bee Life History and Avoiding Stings	1:00 p.m.	Seasonal Management Con't.
		2:15 p.m.	Queen Rearing & Introduction
11:00 a.m.	Bee Yard - Colony Manipulation and Hive Members	2:45 p.m.	Bee Yard
12:00 Noon	Lunch	**Third Day**	
1:00 p.m.	Major Honey Bee Diseases and Enemies	9:00 a.m.	Honey Plants
		10:00 a.m.	Home Uses of Honey
2:00 p.m.	Beekeeping Equipment and How to Assemble It	10:30 a.m.	Coffee Break
		11:00 a.m.	Beekeeping Organizations and Services
3:00 p.m.	Bee Yard - Colony Manipulation and Assembling Equipment	11:15 a.m.	Removal, Ext. & Processing the Honey Crop
		12:00 Noon	Lunch
Second Day		1:00 p.m.	Presentation of Diplomas
9:00 a.m.	Apiary Location and Obtaining Your Bees	1:15 p.m.	Honey Marketing
		1:45 p.m.	Mead Making and Candle Making
10:15 a.m.	Coffee Break		
10:30 a.m.	Seasonal Management Including Swarm Prevention & Swarm Control	3:00 p.m.	Bee Yard - Removal Extraction, & Processing of Honey, Candle Making

Application: - Delaware Valley Beekeeping Short Courses 1980.
Date: Friday, Saturday and Sunday, June 20, 21, 22, 1980.
Time: 9:00 a.m. to 4:00 p.m.
Cost: Total $21.00 ($16.00 for those 17 years or younger and those 65 years or older)
Deposit: Check or money order for $5.00 should accompany application with balance due at registration on June 20th.
Deposit refundable up until Saturday, June 14th.
Place: Mandell Hall, Delaware Valley College, Route 202, about 1 mile south of Doylestown, Pa. 18901. Area Code 215 - 345-1500.
Equipment: All those having their own bee veils should bring them. It is also suggested that you bring a 3-ring loose-leaf binder to hold various prepared materials which will be distributed.
Age: Participants must be 13 years of age or older. Younger participants must be accompanied by an adult.
Lunch: Though there are restaurants nearby, it is suggested that you bring your lunch.

(Keep this part of application for your information)

(Detach and Mail This Portion of Application With Your Deposit)

DELAWARE VALLEY COLLEGE 1980 BEE SHORT COURSES

Summer Course☐

Your Name:_____
(Please print or type)

Address: _____

_____

Phone: _____ Number of Colonies of Bees _____

Age: _____ Profession:_____ Date:_____

Deposit of $5.00 _____ Check No. _____ (Refundable until Saturday, June 14th.)
Balance of fee due at registration on first day of course.

Memoriam
Floyd H. Sandt, 87; Beekeeper

Floyd H. Sandt, 87, prominent throughout Pennsylvania as a beekeeper, died yesterday in Easton Hospital where he was admitted Jan. 18. He lived at 714 Wagner Lane, Forks, Township.

A beekeeper for 57 years, he operated Sandt's Honey Business, Forks Township.

Mr. Sandt was a member and past president of the Lehigh Valley Beekeepers Association and the State Farm Show Committee of the Pennsylvania Beekeepers Association and a member of Eastern Apicultural Society. He won numerous blue ribbons as an exhibitor at the State Farm Show. Harrisburg; the Allentown Fair and Nazareth Farm Show. He also received trophies at the annual honey show at Cornell University, Ithaca, N.Y.

He worked as a salesman for D.D. Wagner Orchards from 1905 until 1948.

Born in Newton, N.J., on March 12, 1892, he was a son of the late James and Ellen Snyder Sandt.

He and his wife, the former Rose M. Rice, celebrated their 65th wedding anniversary last April 25, 1979.

He was a lifelong member of Arndt's Lutheran Church, Forks Township, where he was a former council member of the POS of A. No. 407, Easton; an official member of Valley Forge Washington Camp No. 150, Patriotic Order Sons of America; a member of the Nut Growers Association and an associate member of the American Museum of Natural History.

Surviving in addition to his wife are two daughters, Mrs. Raymond Hulshizer, Wilson, and Mrs. Lewis Link, West Easton; two sons Richard H. of Boca Raton, Fla. and James G. of Venice, Fla.; 11 grandchildren and 19 great-grandchildren.

Services were held at 11 a.m. Saturday in Arndt's Lutheran Church. Interment was in Arndt's Lutheran Cemetery.

Obituary
S. E. McGregor

S. E. McGregor, a bee scientist, died on Feb. 4, 1980. Mr. McGregor was best known for his pollination research. In 1976 his monumental work, Insect Pollination of Cultivated Crops, was published by the U.S. Government and it is recognized as a comprehensive and authoritative work on pollination.

In 1977, Dr. McGregor was the fifth recipient of the James I. Hambleton Award given by the EAS at the University of Delaware.

Recently, Dr. McGregor had continued as a collaborator in Tucson, Ariz. He also had been doing private research for an alfalfa seed growers group to determine honey bee colony quality for alfalfa pollination. These results were published in the October and November 1979 issues of the American Bee Journal.

The Eastern Apicultural Society extends its deepest sympathy to Mrs. McGregor.