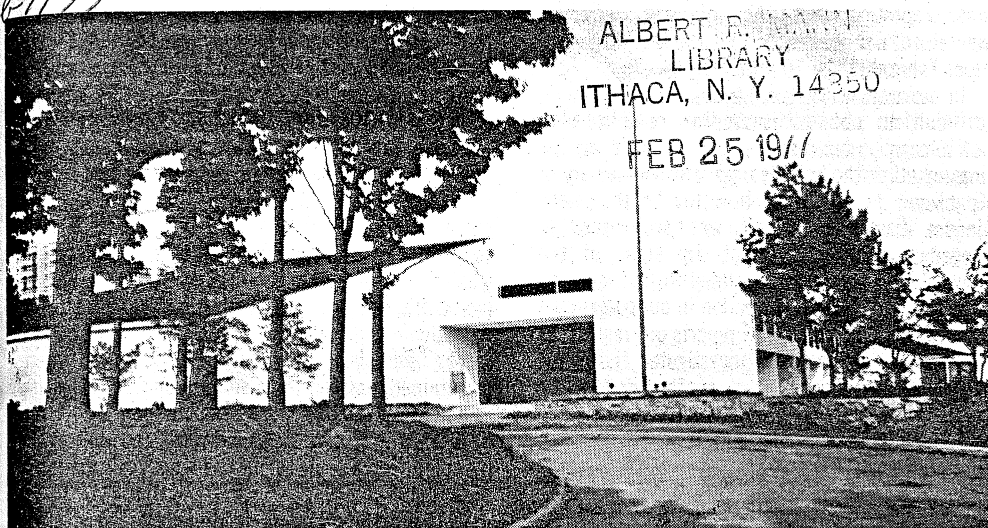
EAS JOURNAL

EASTERN APICULTURAL SOCIETY OF NORTH AMERICA, INC.

FEBRUARY, 1977



MEETING PLACE OF THE 23RD ANNUAL CONFERENCE OF EAS - AUG. 17, 18, 19 & 20th - University of Delaware, Newark, Delaware. John M. Clayton Hall is the University of Delaware's modern, new continuing education center. Located on the North Campus, this beautiful building features an attractive lounge area with fireplace, 500 seat auditorium, banquet facilities for 800 and a dozen conference and seminar rooms of varying size, including a case study room with tiered seating. Food and beverage services, parking and registration facilities are provided.

4-H ESSAY CONTEST

The American Beekeeping Federation, Inc. announces an annual 4-H club essay contest open to all active 4-H club members in the United States on the subject - "The Role of Honey Bees In Feeding the World". Please encourage the 4-H members of your county to participate and take advantage of this opportunity.

The American Beekeeping Federation, Inc., Route 1, Box 68, Cannon Falls, MN, 55009 essay contest is open to all active 4-H Club members in the United States. A $250. cash award will be presented to the 4-H Club member submitting the best essay.

Essays are to be 750-1000 words in length and may be typed or handwritten. It shall be the responsibility of each state 4-H Club office to determine the winner for that state and to forward that essay with a brief resume about the author to the Secretary of the American Beekeeping Federation, Inc., Route 1 Box 68, Cannon Falls, MN 55009. All entries must be received no later than May 31st to be eligible for judging. Selection of the winner will be made by the Essay Committee of the American Beekeeping Federation and judging will be on the basis of originality and completeness and accuracy of ideas expressed.

The winner will be announced by July 1st each year and the presentation will be made by winner's state representative to the Board of Directors of the American Beekeeping Federation or someone designated by them. The presentation of the award will be made at the states annual 4-H Club Congress if possible.

All entries become the property of the American Beekeeping Federation, Inc., and may be published or otherwise used as they see fit.

Mortality of Nosema Apis and the Greater Wax Moth, Galleria Mellonella L, Caused by Heat Treatment

by George E. Cantwell and Thor Lehnert
Entomology Research Division, USDA, Beltsville, Maryland

The protozoan parasite Nosema apis is the cause of a chronic insidious disease of the honey bee, Apis mellifera L., in colonies throughout most of this country. G. F. White, one of the pioneer investigators of bee diseases, as early as 1919 reported that nearly 100 percent of the colonies in his apiary were infected. He also (1914) demonstrated the lethal effect of heat on Nosema spores, reporting that the minimum effective temperature was between 131 degrees and 140 degrees Fahrenheit for 10 minutes.

In our work with Nosema apis, we have found it difficult to obtain disease-free colonies with which to carry on our research, especially during the spring, whether the colonies are from our apiary or are packaged bees shipped from the South. Lately, to insure disease-free stock, we have turned to packaged bees from the hot dry areas of the Southwest. Our research is directed toward lowering the incidence of Nosema infection in our colonies by using heat. The present paper reports our results. As an adjunct to this work, we investigated the effect of the same heat treatment on another pest of the beehive, the greater wax moth, Galleria mellonella L.

METHODS AND RESULTS

Laboratory Tests

Since temperatures of 131 to 140 degrees F are close to the melting point of wax and may cause the combs to sag, we wanted to find a way to use a lower temperature that would still effectively inactivate the Nosema spore. Laboratory tests were therefore conducted with spores treated with both moist and dry heat and with newly emerged adults that had not been previously fed.

The spores that were to be treated with dry heat were first mixed with a sucrose solution (1 part sugar to 1 part water, by weight), and the suspension was placed on a glass slide and allowed to dry in a dessicator. When dry, the spores were exposed to different temperatures and then resuspended by adding water to the slides. Spores were also exposed to heat in a Dubnoff metabolic shaking incubator while they were in a sucrose solution. Suspensions of both dry and moist heat-treated spores were then adjusted to a certain concentration and fed with a micro-injector to individual newly emerged bees at the rate of 50,000 spores per bee. Two sets of controls were maintained, one fed plain sucrose and the other fed an untreated sucrose suspension of spores. Fourteen days later, each bee was sacrificed, and the rate of infection was determined by microscopic examination.

The first laboratory feeding tests were made with spores treated at 110 degrees F and 120 degrees F for 10 minutes with most heat. Neither treatment was effective in lessening the rate of infectivity. After 14 days, the spore count ranged between 19×10^6 and 48×10^6 spores per bee. the average being 30×10^6. Also, spores exposed to moist heat at 120 degrees F for 3 or 6 hours were fed to bees. Examination 14 days later revealed an average of a few thousands spores per bee. Since the inoculum consisted of 50 thousands spores and since these caged bees did not defecate, we assumed that the recovered spores were spores from the inoculum.

In view of results obtained with long exposure to moist heat, we tested spores exposed to 100 degrees F and 120 degrees F for 3 to 6 hours. Results indicated that exposure at 110 degrees F for 6 hours did not inactivate all the spores, but infection amounted to less than 2×10^6 spores per bee. No infection was produced by inoculum exposed at 120 Degrees for 6 hours.

Colony Tests

Tests were then conducted with eight colonies in 3-frame glass hives in our research apiarium (Lehnert and Cantwell 1966) and in 12 standard 10-frame hives. Treatments were accomplished as follows: previously-collected Nosema spores were sprayed on both sides of each drawn comb at the

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rate of one-half billion spores per side (1 billion spores per frame). The combs were then exposed to a temperature of 120 degrees F for 24 hours at a relative humidity 50 degrees in an Aminco Air incubator. Hive bodies and other items of equipment were also heat-treated. Three combs each sprayed with 3 billion Nosema spores were placed in each hive; then a queen and 3-pounds of bees were added. (A sample of 10 bees from each package had been checked previously and found to be free of Nosema). In our research apiarium, the eight colonies on test consisted of: three nosema sprayed unheated, three nosema sprayed heated, and two unsprayed and heated. Twelve-10frame colonies were used in the field test: five were nosema sprayed un-heated, five nosema sprayed heated, and two unsprayed and heated.

At intervals, samples of adult worker bees were examined microscopically for the presence of spores. Hemocytometer counts were also made to determine the rate of infection.

Colonies that were started on April 20 were first sampled 11 days later and then at four day intervals.

The results were encouraging, especially in the apiarium where no infection was detected in the treated hives as long as 30 days after the combs were inoculated. In colonies with inoculated combs that were not heat-treated, the infection rate climbed to over 10 x 10^6 spores per bee. The difference in rate of infection was not as marked in the outdoor hives, but after 22 days the number of spores per bee in the untreated hives was 25-fold greater than in the treated hives. We think the lack of spectacular success in the outdoor hives resulted from drifting of bees between treated and untreated colonies.

Wax Moth Tests.

All stages of the wax moth including one-day-old eggs, different larval instars, prepupae, pupae, and adults, were treated at 120 degree F with a relative humidity of 50% for a 24 hour period in an Aminco Air incubator. The insects were placed in petri dishes with rearing medium for the exposure; then they were put into their normal rearing chamber and held with untreated controls.

In each replication, the wax moth failed to survive the heat treatment in any stage in its life cycle. One-day-old eggs exposed at 120 degrees F for as little as 2 hours had a 100% kill. Pauli (1932) reported 100% kill of wax moth larvae subject to 120 degrees F for as little as 5 minutes but we have not been able to duplicate this.

Discussion

The tests indicate that heat treatment is effective in substantially reducing the rate of transmission of Nosema through combs and other equipment. White (1919) was unable to transmit the disease from colony to colony either by using experimental inoculated combs or combs on which colonies had died of the disease; he concluded that combs from colonies infected with Nosema could be inserted without treatment into hives containing healthy bees. However, we were successful in every one of dozens of attempts to transmit the disease by inoculated combs, and we believe that this is one of the principal ways in which the disease is spread and perpetrated. The simple and inexpensive method of heating combs and other equipment would apparently lessen the rate of infection the following season and would also reduce the damage to stored combs caused by an infestation of the wax moth.

It would be interesting to determine the effect of prolonged heat treatment on other bee diseases. White (1914) did some preliminary work along this line, but his times of exposure were short - between 2 and 20 minutes. The minimum amount of heat he found necessary for inactivation were: European Foulbrood 140 degrees F; Ameri an foulbrood 194 degrees F; and sacbrood 131 degrees F. All these temperatures are too high for use on drawn combs; however, prolonged heating at a lower temperature may also inactivate the organisms that Cause Eu ropean foulbrood. and Sacbrood.

The question of whether Nosema or any other bee diseases can be eliminated from an apiary by simply heating the equipment simply remains unanswered. The information gathered to date is sufficient to encourage further research.

BEEKEEPING SHORT COURSES 1977

Delaware Valley College,
Doylestown, Pa. 18901

Spring: Saturday, April 2, 16 & 30, 1977
Summer: Wednesday, Thursday & Friday, June 22, 23 & 24, 1977.

Delaware Valley College will again be offering its usual Spring and Summer Beekeeping Short Courses. The courses are offered under the direction of Dr. Robert Berthold (Associate Professor Biology) in cooperation with Mr. Jack Matthenius (N. J. Supervisor of Bee Culture). Instruction will take place on the Delaware Valley Campus, with the College apiary and honey being utilized.

Over 200 persons attended the 1976 courses. 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 course in their own classroom situation.

Total cost for the three days of instruction is $18.00. An application for the course or further information may be obtained by writing Dr. Berthold, c/o Delaware Valley College, Doylestown, Pa. 18901, or by calling him at area code 215-345-1500.

Program

Day 1 - Saturday, April 2 or Wednesday, June 22, 1977
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 and Enemies
2:45 - Bee Yard - Colony Manipulation Class Assembling of Equipment.

Day 2 - Saturday, April 16 or Thursday, June 23, 1977
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 and Introduction

Day 3 - Saturday, April 30 or Friday, June 24, 1977
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 & 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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ling and use of Beeswax.

TABLE 1.A — U. S. INTRASTATE LAWS

State	Registration of: Apiary Required	Registration of: Queen Apiary Required	Identification of Apiary Required	Inspection of: Apiary Required	Inspection of: Honey House Required	Inspector: Has Right of Entry	Inspector: Must Disinfect Equipment	Inspection Certificate Required	Permit for Movement of Bees and Equipment Required
Ala.	x		x	x		x		x	x
Alaska									
Ariz.	x		x	x		x		x	x
Ark.	x			x		x	x	x	x
Calif.[1]	x		x	x		x		x	
Colo.			x	x	x	x	x		
Conn.	x		x			x		x	x
Del.	x	x		x		x	x	x	
Fla.			x	x	x	x		x	x
Ga.	x	x		x		x		x	
Hawaii									
Idaho	x		x	x		x	x		x
Ill.	x	x	x	x		x		x	x
Ind.				x					
Iowa				x		x			x
Kans.	x			x		x		x	x
Ky.	x			x		x		x	x
La.				x		x		x	x
Maine	x			x		x		x	
Mass.				x		x		x	x
Md.	x		x	x	x	x			x
Mich.	x	x		x	x	x	x		x
Minn.	x		x	x	x	x	x	x	x
Miss.				x				x	x
Mo.									
Mont.	x	x	x	x		x			
N.C.		x		x		x		x	x
N. Dak.	x		x	x	x	x	x	x	x
Nebr.[1]	x	x	x	x	x	x		x	x
Nev.	x	x	x	x		x	x		x
N.H.				x		x			
N.J.				x		x		x	
N. Mex.	x		x	x		x		x	
N.Y.	x			x		x			x
Ohio	x	x	x	x		x		x	x
Okla.	x			x	x	x	x	x	
Oreg.	x		x	x	x	x		x	x
Pa.[1]				x		x	x	x	
R.I.	x	x		x		x	x		x
S.C.					x			x	x
S. Dak.	x			x	x	x	x	x	x
Tenn.	x			x	x	x	x	x	x
Tex.	x	x	x	x		x		x	x
Utah[1]	x			x	x	x	x	x	x
Va.				x	x	x	x		
Vt.	x			x					
Wash.	x	x	x			x	x		
Wis.				x	x	x			x
W. Va.	x	x	x	x		x		x	x
Wyo.	x		x	x	x	x	x	x	

[1] Wax salvage plant permitted.

TABLE 2.A — U. S. INTERSTATE LAWS

State	Entry: Prohibited	Entry: Permit Required	Entry: Must be Quarantined after Entry[1]	Entry: Fee	Certificate: Required with Application	Certificate: Must Accompany Load	Certificate: Time Limit for Inspection[1]	Certificate: Permit in lieu of
Ala.[2]	x							
Alaska								
Ariz.		x			x		90	
Ark.		x	x	x	x			
Calif.		x				x	x	
Colo.		x			x		60	
Conn.						x		
Del.		x				x		x
Fla.		x			x		30	x
Ga.		x			x		30	
Hawaii[2]		x	x		x			
Idaho		x		x	x			
Ill.		x			x	x	60	x
Ind.		x				x		
Iowa						x		x
Kans.[2]		x		x	x		180	
Ky.		x					30	
La.	x							
Maine						x	60	
Mass.		x				x	60	
Md.						x		
Mich.	x							
Minn.		x		x	x		60	
Miss.		x			x		60	
Mo.								
Mont.		x	90	x		x		
N.C.	x	x			x		60	x
N. Dak.		x			x	x	90	
Nebr.	x	x			x	x	60	
Nev.		x	x	x		x	60	
N.H.		x				x		
N.J.						x	30	x
N. Mex.						x	90	
N. Y.						x	60	
Ohio		x			x	x		
Okla.						x		
Oreg.			30			x	60	
Pa.		x	x			x	30	
R.I.						x		
S.C.						x	60	
S. Dak.		x		x	x	x	60	
Tenn.		x			x	x	60	
Tex.		x			x	x	60	
Utah						x	30	
Va.		x			x	x	60	
Vt.						x		
Wash.		x	30			x		
Wis.		x					x	
W. Va.					x	x		
Wyo.		x		x	x	x	x	

[1] Numbers refer to days.
[2] Special requirements for used equipment.

TABLE 1.B — U. S. INTRASTATE LAWS

State	Owner: Must be Notified	Owner: Subject to Tax	Owner: Subject to Fees	Owner: Subject to Penalties	Owner: Has Right of Appeal	AFB Diseased Colonies or Equipment: Must be Declared	AFB: Must be Quarantined	AFB: Must not be Concealed	AFB: Must not be Exposed	AFB: Must not be sold or Transferred	AFB: Must be Destroyed	Drug Treatment: Permitted for Control	Drug Treatment: Permitted for Prevention	Hives: Must have Movable Frames
Ala.	x		x	x	x		x	x	x	x	x		x	x
Alaska														
Ariz.	x						x		x		x		x	x
Ark.	x			x		x			x	x	x			x
Calif.	x		x	x	x		x	x	x	x	x			x
Colo.				x		x	x			x	x	x	x	x
Conn.	x		x	x			x			x		x		
Del.	x			x	x	x	x		x	x	x	x	x	x
Fla.	x			x		x	x		x	x	x		x	x
Ga.	x		x	x			x			x	x			x
[illegible]														
Mich.	x		x	x	x		x		x	x	x	x	x	x
Minn.	x		x	x			x	x	x	x	x		x	x
Miss.										x		x		x
Mo.							x		x	x	x		x	
Mont.	x		x	x	x		x				x		x	x
N.C.							x		x	x	x			x
N. Dak.	x		x	x			x		x	x		x		x
Nebr.	x	x	x	x		x	x	x	x	x	x		x	x
Nev.	x	x	x	x			x	x	x	x	x		x	x
N.H.	x			x			x	x	x	x	x		x	x
N.J.	x			x	x		x	x	x	x	x	x	x	x
N. Mex.	x	x	x	x			x	x			x	x		x
N.Y.	x			x	x	x	x	x	x	x	x		x	x
Ohio			x	x	x		x			x	x		x	x
Okla.	x						x		x	x	x		x	
Oreg.	x		x	x	x		x	x						

TABLE 2.B — INTERSTATE LAWS

State	Locations: Controlled	Locations: Advance Filing Required[1]	Notification Required upon Arrival[1]	Inspection Stamp Required on Hives	Package Bees: Certificate Required[1]	Package Bees: Food Restrictions	Queen Bees: Certificate Required[1]	Queen Bees: Food Restrictions
Ala.					60		60	x
Alaska								
Ariz.		x	x		x		x	
Ark.		x			x		x	
Calif.			3		x	x		x
Colo.			x					
Conn.					x		x	
Del.					x		x	
Fla.		10			x		x	
Ga.					x		x	
Hawaii					x		x	
Idaho	x	10			x	x	x	x
Ill.			10					
Ind.		x						
[illegible]								
Mo.					x	x	x	x
Mont.					x		x	
N.C.		x			x		x	
N. Dak.	x		x		60	x	x	x
Nebr.	x	60	x		90		90	
Nev.	x	x	x		x	x	x	x
N.H.					x	x	x	x
N.J.			x		x		x	
N. Mex.		x	x		x		x	
N. Y.					x		x	
Ohio			10		x		x	
Okla.					x	x	x	x
Oreg.			5			x		x
Pa.			x	x	x		x	
R.I.					x		x	

¹ Wax salvage plant permitted.

TABLE 1.B — U. S. INTRASTATE LAWS

State	Owner: Must be Notified	Owner: Subject to Tax	Owner: Subject to Fees	Owner: Subject to Penalties	Owner: Has Right of Appeal	AFB Diseased Colonies or Equipment: Must be Declared	Must be Quarantined	Must not be Concealed	Must not be Exposed	Must not be sold or Transferred	Must be Destroyed	Drug Treatment: Permitted for Control	Drug Treatment: Permitted for Prevention	Hives: Must have Movable Frames
Ala.	x		x	x	x		x	x	x	x	x		x	x
Alaska														
Ariz.	x						x		x		x		x	x
Ark.	x			x		x			x	x	x			x
Calif.	x		x	x	x		x	x	x	x	x			x
Colo.				x		x	x			x	x	x	x	x
Conn.	x		x	x			x			x		x		
Del.	x			x	x	x	x		x	x	x	x	x	x
Fla.	x			x		x	x		x	x	x		x	x
Ga.	x		x	x			x			x	x		x	x
[illegible rows]														
Mich.	x		x	x	x		x	x	x	x	x			x
Minn.	x		x	x						x		x	x	x
Miss.							x		x	x	x		x	
Mo.														
Mont.	x		x	x	x		x				x		x	x
N.C.							x		x	x	x			x
N. Dak.	x		x	x			x		x	x		x		x
Nebr.	x	x	x	x		x	x	x	x	x	x		x	x
Nev.	x	x	x	x			x	x	x	x	x		x	x
N.H.	x			x			x	x	x	x	x		x	x
N.J.	x			x	x		x	x	x	x	x	x	x	x
N. Mex.	x	x	x	x			x	x			x	x	x	x
N.Y.	x			x	x	x	x	x	x	x	x		x	x
Ohio			x	x	x		x			x	x		x	x
Okla.	x						x		x	x	x		x	
Oreg.	x		x	x	x		x	x		x	x		x	x
Pa.	x	x		x	x		x	x		x	x	x	x	x
R.I.	x			x					x	x	x	x	x	x
S.C.				x			x		x	x				
S. Dak.	x		x	x			x		x	x	x			x
Tenn.	x	x		x		x	x	x	x	x	x	x	x	x
Tex.	x			x			x		x	x	x	x	x	
Utah	x		x			x	x	x		x	x			x
Va.	x			x	x	x				x	x		x	x
Vt.				x						x	x	x		
Wash.	x			x			x			x	x		x	x
Wis.		x				x	x		x	x	x	x	x	x
W. Va.	x			x		x	x	x	x	x	x	x	x	x
Wyo.	x			x		x		x	x		x		x	x

TABLE 2.B — INTERSTATE LAWS

State	Locations: Controlled	Locations: Advance Filing Required[1]	Notification Required upon Arrival[1]	Inspection Stamp Required on Hives	Package Bees: Certificate Required[1]	Package Bees: Food Restrictions	Queen Bees: Certificate Required[1]	Queen Bees: Food Restrictions
Ala.					60		60	x
Alaska								
Ariz.		x	x		x		x	
Ark.		x			x		x	
Calif.			3		x	x		x
Colo.			x					
Conn.					x		x	
Del.					x		x	
Fla.		10			x		x	
Ga.					x		x	
Hawaii					x		x	
Idaho	x	10			x	x	x	x
Ill.			10					
Ind.		x						
[illegible rows]								
Miss.					x		x	
Mo.					x		x	
Mont.					x		x	
N.C.		x			60	x	x	x
N. Dak.	x		x		90		90	
Nebr.	x	60	x		x	x	x	x
Nev.	x	x	x		x	x	x	x
N.H.					x		x	
N.J.			x		x		x	
N. Mex.		x	x		x		x	
N. Y.					x		x	
Ohio			10		x	x	x	x
Okla.						x		x
Oreg.			5		x		x	
Pa.			x	x	x		x	
R.I.								
S.C.[2]								
S. Dak	x			x	x		x	
Tenn.[2]			x		x		x	x
Tex.	x	10			x		x	
Utah					x		x	
Va.		x		x	x		x	
Vt.		1			x		x	
Wash.			3		x		x	x
Wis.[2]			5		x		x	
W. Va.[3]			60		x		x	x
Wyo.	x			x	x	x	x	x

¹ Numbers refer to days.
² Special requirements for used equipment.
³ Certificate required for honey.

BEE LAWS OF THE UNITED STATES

by A.S. Michael

Although all state apiarists have at their disposal a summary of intrastate laws and laws governing interstate movement of bees and will do all they can to assist the beekeeper, it is the responsibility of you, the beekeeper, to be familiar with the laws and regulations of your own state as well as of any state into which you plan to move your bees.

Failure to do so can result in violations involving possible prosecution and seriously affect your operation. Therefore, in an effort to assist you with this problem, we have prepared a more or less complete summary of U.S. intra and interstate bee laws and regulations. Every effort has been taken to make this summary as complete and accurate as possible. However, it is advisable that you, the beekeeper, always contact a destination state for full particulars on law entrance requirements, permits, laws, and regulations before moving your bees. This will compensate for any inadvertent errors in our summary or any changes in a state's laws subsequent to the printing of this summary. It is hoped that the journal will permit an annual updating of these summaries. This will allow for corrections and law changes from year to year and supply you with a completely updated version at all times.

The first apiary inspection law in the United States was established in San Bernadino County, California in 1877. By 1883, a statewide law was passed by the California legislature, and by 1906, 12 States had laws relating to foulbrood. At present, almost all States have laws regulating honey bees and beekeeping.

State laws and regulations relating to honey bees and beekeeping are designed primarily to control bee diseases. Therefore, they usually attempt to regulate movement and entry of bees, issuances of permits and certificates apiary location control and quarantine, inspection, and methods of treating diseased colonies. These laws and regulations are summarized in tables 1 and 2. Table 1A and 1B are compilations of the bee laws for intrastate regulation; tables 2A and 2B are compilations of bee laws regulating interstate movement of bees and used bee equipment in the United States. As will be noted from these tables, there is a lack of uniformity in state bee laws and regulations, but considerable agreement on specific points of law. Most of the States require registration of apiaries, permits for movement of bees and equipment interstate, certificates of inspection, right of entry of the inspector, moveable-frame hives, quarantine of diseased apiaries, notification of the owner upon finding disease, prohibition of sale or transfer of diseased material, and use of penalties in the form of fines, jail or both. Although the destruction of American foulbrood diseased colonies is included in most state laws, table 1B shows that most states also allow the use of drugs

(continued on page 8)

BEE LAWS OF THE U.S.--

(continued from page 7)

for control or preventive treatment of this disease.

The key figure in the enforcement of bee laws and regulations is the apiary inspector. He may have the entire state, a county, or a community under his jurisdiction. His efforts are directed toward locating American foulbrood and eliminating sources of it whenever found.

The effectiveness of bee laws and regulations is based on the compliance of you, the beekeepers. In the final analysis, responsibility for disease control remains with you. You should routinely examine colonies for disease as a regular part of your management program and take the necessary steps when disease is found.

Copies of state apiary laws and regulations are available from the various state departments of agriculture. State apiary inspectors can also be consulted in care of their state departments of agriculture. The Federal government has no laws or regulations pertaining to honey bees or beekeeping within the United States.

Reprinted from July, 1976 American Bee Journal

THE RACES OF HONEY BEES AND THEIR CHARACTERISTICS (WRITTEN IN THE EARLY 1900's)

Ray Hutson, B.Sc.
Assistant Entomologist, New Jersey Agricultural Experiment Station

Each race of honey bee has arisen in response to the working of the same natural laws that have given races of every living thing. Isolation by natural barriers, mountains, seas and deserts by forcing in and in breeding and natural selection is the predominating causal agent in the origin of races. Such natural segregation give rise to the different kinds of cattle in different parts of the world, to quote a familiar example. In the last few thousand years man has speeded up nature to produce domestic cattle from wild cattle.

The definitions of races and of characteristics are pretty thoroughly tangled up. A characteristic is a trait or a structure peculiar to a group of individuals. A group possessing certain characteristics is called a race.

The Italian Bee

Italy, the home of the Italian bee, is set apart from the rest of Europe by the Alps and is almost surrounded by the sea. The bees which were brought to that country thousands of years ago have been kept in that locality all the time. Their yellow bands, comparative gentleness, house cleaning ability and comparatively great disease resistance have been built up and fixed by the principles of the survival of the fittest as gauged by Italian conditions. The poor cappings attributed to this race have been fostered in the same way by the Italian climate as has their comparative freedom from burr and brace combs and the carrying in of large quantities of propolis. Latterly, since importation to America, the Italian has been modified by dilutions of alien blood and undue attention to the single characteristic of color. This last feature is a very good example of how many can speed up natural processes in the development of a race by selection and hybridization.

The Caucasian Bee

The Caucasian bees originated in a region bounded on all sides by barriers which the bees within the enclosed region were unable to pass; sea on two sides, mountains on one side and desert on the other. Bees in this region vary somewhat in color and characteristics. Gorbachoff, the leading uthority on Caucasian bees recognizes five races. he Russian investigator, Mikhailoff recognizes but two. In any case the bees vary in color from yellowish to almost black. The variety is called the gray banded Caucasian is recognized by Gorbachoff to be a comparatively mild swarmer, builds few burr and brace combs, caps its honey well and does not build a propolis defense at the entrance. Individuals of this extremely gentle race have a brownish black body color and silver gray bands of hair on the abdomen. The queens are comparatively large when compared with the Italians, are a dark mahogany color with lighter regions near the articulations of body segments. The drones are blue-black. The workers are not very different in size from the Italians. The Caucasian bee will rob though not as enthusiastically as the Italian nor as persistently as the German. The production of honey by this bee is very satisfactory when compared to the Italians. The Caucasian bees are noted for seeking their own homes.

The Carniolan Bee

As in the case of the other races the Carniolan bee is a native to an isolated region. This is located high in the Alps Mountains. There are undoubtedly strains of these bees. Prof. Francis Jaeger is one of the authorities for this assertion although it has not been worked out as thoroughly as in the case of the two races hitherto mentioned. The Carniolan bee, it seems, is slightly larger than the Italians and Caucasians. It is very gentle and prolific. It is a good honey gatherer, and a fine cell builder for use in a queen rearing yard. They collect little propolis, winter admirably and cap their honey white. The consensus of opinion among people who have tried them is that they swarm excessively.

The German Bee

The German bees are black in color and are known among American Beekeepers as black bees. These bees are subject to very great variation which is partially explained by the hybridization with other races, chiefly the Italians. The German bee is not exception of the rule that races of bees were

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originated in distinct regions. It is probable that the true German bee arose in the region roughly outlined by the present German Republic. It is very doubtful whether at present there are pure German bees in the United States. German bees are reputedly less prolific than Italians, build more queen cells, develop fertile workers more readily, are poor housekeepers, are nervous and succumb more quickly to European foulbrood. Many beekeepers however, defend the black bees because of their habit of capping honey more attractively than Italians.

The Cyprian Bee

The Cyprian bee is very yellow and its abdomen is pointed. The queens are prolific and somewhat smaller than the Italians. They cap honey with very little air beneath the cappings which gives it a watery appearance. They swarm a great deal and this, together with their very unmanageable qualities and irritable nature, has caused their abandonment by American beekeepers after a rather thorough trial. Latterly, there has been some interest in Cyprian bees because of their reputed prolificacy and the possibility of modifying their temper through certain ultra-violate radiations. Mr. Clifford Muth of Cincinnatti has been foremost in these trials.

The Syrian Bee

The Syrian bees are noted for swarming, large number of queen cells and poor wintering. These bees were introduced in 1880 by Jones and Benton but were abandoned as valueless because of these habits and their poor wintering qualities.

The Holy Land Bee

The Holy Land bees are probably a special race of the Syrians.

The Egyptian Bee

The Egyptian bees are somewhat smaller than the race known to the American beekeepers. They are yellow in color and the abdomen is covered with grayish white hairs. According to von Buttel-Reepen they do not form a winter cluster and cannot withstand cold weather. The cappings are very watery.

The Saharian Bee

The Saharian bees are found in the region between the Atlas Mountains and the Sahara Desert in North Africa. They were brought from that country to France by Baldensperger and were exhibited by him at Quebec in 1924. They differ from the Italian bee in having orange colored segments in the abdomen. Unfortunately Baldensperger was unable to preserve the race in its purity.

The Tunisian Bee

The Tunisian bee is black. It is sometimes called Punic and came from North Africa. These bees are extremely cross, propolize excessively and winter badly. There are certain other races of bees in Africa which have not as yet been domesticated.

The Chinese Bee

Chinese bees are smaller than the Italians and are inclined to bite rather than sting. They have a heavy coat of long gray hair. It is listed as an undesirable race by people who have had experience with Italians.

Other Races of Bees

In various parts of the world where continuous isolation is obtained other races of bees have arisen. There are at least three races in India. The Giant bee, which is, as its name indicates, a much larger bee than the bees to whcih we are accustomed. There is also a race slightly smaller than Italians and a very small race. These bees all build single combs and no great effort has been made to keep them in hives as they do not seem to hold any great promise of worth.

Tarlton-Rayment has recently described another race of wild bees from Australia, which is an isolated continent. These bees build small combs in various locations and do not hold any great promise of profit.

There are also the so-called stingless bees of Mexico, Central and South America. These stingless bees belong to the Genera Melipona and Trigona and, as their name indicates, do not have a stinger. They do bite and have a habit of buzzing excitedly when disturbed. They store comparatively small amounts of an inferior honey in grape-like masses of wax cells. They are kept only to a slight extent by the natives in hollow logs suspended on the verandas of their houses or from trees nearby to protect them from depredation by lizards their chief enemy in that climate.

It would seem from this brief survey of the races of bees that there are but one or two races of bees besides the race with which we are familiar which hold any great promise of being useful in this country. It is probable that the Italian bee is superior under most conditions. However, if the same amount of care in selection and breeding had been expended upon the German bee it doubtless would also have developed into a very superior race when compared with the present German bees. The Caucasian and Carniolan bees have certain obvious advantages over the Italians while they also have certain evident disadvantages. There has been more care expended in breeding ~~Carniolans and~~ Caucasians in this country than in the case of the Germans, so it would appear that possibly the use of the Caucasians or Carniolan bees might in certain cases result in profit. However, if it is ever possible to again import German bees from Switzerland or some of the places where care and time has been expended on breeding them, we would doubtless find that these bees were as much superior to the old Germans as the Italians. In any case it would be well to supplant Italians very gradually by another race because we know pretty well what the characteristics of the Italian bees are under our conditions and we do not always know what will happen with newer races.

CRYSTALIZED HONEY IS PURE

by Dr. Eduardo Mario Bianchi

Generally all liquid honey and most honey in combs, will crystalize when allowed to stand for a period of time, especially at low temperatures.

Some honey crystalizes immediately while still in the comb but other types remain liquid for long periods. That depends largely on the kind of nectar used by bees. Thus, honey extracted from alfalfa is inclined to crystalize more quickly than other types, because it contains a large percentage of glucose. Honey rich in fructose remains liquid for longer periods of time. Honey remains liquid in warm or hot weather but will begin to crystalize in cold weather.

Reasons for crystalization - Honey consists essentially of a watery solution of fructose and glucose with small amounts of certain other substances. Generally the proportion of fructose exceeds that of glucose. On the average, honey contains approximately 40% fructose, 34% glucose, 18% water and 8% other components of which 2 or 3% could be sucrose.

Honey containing excessive quantities of glucose relative to other solubles, is said to be satured with that type of sugar. Glucose in honey naturally tends to separate from water and crystalize. Therefore, crystalized honey is pure and not adulterated or skillfully manipulated as many people erroneously think.

Ways to obviate the crystalization - There is no known method to obviate the crystalization of honey or to liquify crystalized honey without heating it. It is safe in saying that the use of steam, hot water or hot air can seriously damage the flavor of a good honey if proper precautions are not taken.

In heating, if the temperature is raised too fast or the heat maintained too long, even at very low temperature, the honey will become darker and the delicate flavor will be damaged. A large volume of commercial honey is of inferior quality only because heat was improperly applied. Heat processing would be desirable if the treated honey remained liquid, but after a period of time, it will recrystalize. Further more the process is costly.

Many dealers, in order to obtain a greater margin of profit and to satisfy consumer demand, adulterate honey with the addition of commercial glucose, a substance that actually promote crystalization. Commercial glucose contains varying amounts of dextrose which impedes crystalization of the natural glucose.

Quality of crystalized honey - Crystalization is a principal factor in determining purity and quality of a particular honey. Therefore, why heat it or adulterate it with glucose to keep it liquid? Heating destroys enzymes, vitamins and other important characteristics of honey. There is no therapeutic or nutritional advantage of liquid honey over crystalized honey.

It is true that certain classes of crystalized honey are objectionable when they contain very large crystals. There are two methods for converting crystalized honey into a white creamy mass. In the first method, crystals are mashed until the mass is smooth and creamy. In the other method honey, as taken from the extractor, is mixed with about 20% of crystalized honey containing small crystals. The mixture is allowed to stand in a cool place until transformed into a semi-solid, fine-grained honey.

Conclusion - It is frequently assumed that one handling nourishing products, manipulates them dishonestly for a profit. The retailer is the one blamed by the consumer for selling a product of lesser quality. Mistakenly, it is assumed that crystalization of honey is the result of manipulation or adultering.

It behooves government, beekeepers and the honey industry in general, to think about promoting a campaign to inform consumers that crystalized honey is unadulterated and is better in many ways than liquid honey.

This would void the sale of a product of inferior quality resulting from heating or the addition of other substances. Costs would be reduced because heating would be eliminated.

Therefore, the practice of selling honey commercially in bottles will cease in favor of selling crystalized honey in special containers.

FEEDING FUMIDIL-B

Beekeepers who have been experiencing late winter and early spring dwindling of adult populations often associated with loss of queens or queen supersedures, colonies fail to build up properly in the spring, dysentery, and high incidence of winter kill without obvious explanation would benefit by feeding Fumidil-B to their colonies. Fumagillin (Fumidil-B) is the only drug approved for use in the prevention and control of nosema disease. Nosema is widespread and generally unrecognized since there are no symptoms specifically indicative of nosema. However, it works in many ways to reduce both honey production, colony size, and winter survival.

Fumidil-B fed to wintering colonies in the fall at a rate of 75-100 mg fumagillin activity/gallon of 2:1 sugar syrup, with a minimum dose of two gallons per colony, markedly represses nosema infection in the spring.

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STORING SUPERS

Honey supers should not be left on the colonies all winter. However, in storage the combs must be protected from wax moth and mice. The threat of damage from wax moth larvae to stored combs is continuous, except when temperatures in the storage area drop below 40 degrees F. Steps must be taken to kill any existing stages of the wax moth and guard against later infestations. Freezing weather kills wax moth so some beekeepers keep their supers on the bees until after a killing frost. Supers are best stored outside in the cold or in a dry unheated building. Many beekeepers store a portion of their supers in stacks in each beeyard so that they are available for use in the spring. Dry combs without pollen store best.

If supers must be stored in a warm room or basement, they should be protected by placing paradichlorobenzene (PDB) crystals on a small piece of paper on every fifth super in the stack, which should then be covered. The treatment must be continued at regular intervals all winter. PDB kills adults and immature stages, but not eggs.. The continuous presence of crystals within the stack not only repels moths and prohibits egg laying, but also kills any young larvae that hatch after the combs are placed in storage. Untreated combs should be inspected regularly for signs of infestations, especially if temperatures rise above 60 degrees F and permit wax moth activity. Supers should be aired before using them in the spring.

Protect the combs from mice by covering the top and bottom of each pile of supers with a queen excluder, wire screen, or lid.

STORAGE OF COMB HONEY

The larvae of the wax moth do considerable damage to comb honey. The eggs are probably laid on the comb or section boxes before the comb-honey supers are removed from the hives but the damage does not become evident until sometime after the honey has been placed in storage.

PDB can be used to protect all combs in storage except those containing honey intended for human consumption. The odor of PDB is readily absorbed by honey, and though the bees do not object to this odor, such honey is unfit for market purposes. Therefore, the only approved method for preventing wax moth damage in comb honey is freezing. The USDA recommends zero degrees for 24 hours to kill wax moth. Small amounts of comb honey can be stored in the freezer. This prevents not only wax moth damage but also retards crystallization.

BEEKEEPER STUNG BY JUDGE

David Graves of Redlands Calif., was fined $200 and placed on probation for one year for failure to provide adequate water for his bees.

Redlands Municipal Court Judge Clark Davis found Graves, a beekeeper, guilty of causing a major nuisance by failing to give enough water to his 60 million bees, sending black clouds of thirst-crazed bees over the countryside for water, invading swimming pools, livestock watering troughs and kitchen sinks.

"One man had his swimming pool covered with bees, like a locust invasion," said prosecutor David Pacer. "Thev were even flying into people's homes and stinging their children in a frenzied search for water."

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