THE BEE LINE

The Newsletter of the Oregon State Beekeepers Association

Volume 27, Number 1 **January/February 2002**

Oregon State University Honey Bee Program Receives a Gift

Dr. Michael Burgett, OSU

In December of 2001 the Oregon State University Honey Bee Laboratory received a gift bequest of $11,000 from Mr. & Mrs. Ralph Eagleson of Eddyville, Oregon. This generous donation is in memory of their son Steve, who passed away in 2001. Steve was an active member of the Tualatin Valley Beekeepers' Association and through an effort of the membership, Steve's beekeeping operation was auctioned last summer. Steve's parents wished that the proceeds of this sale be given to Oregon State University in Steve's name. The money has been added to the Herman A. Scullen Fellowship that is administered by the Oregon State University E.R. Jackman Foundation. The Scullen Fellowship is dedicated to assisting Oregon State University students who are actively involved in honey bee programs. Most recently the Scullen Fellowship was used to assist Ms. Deborah Delaney, a Masters degree student who is working on the sublethal effects of pesticides on drone honey bee reproduction.

On behalf of the Honey Bee Laboratory I wish to acknowledge the Eagleson's thoughtful gift and the work of the Tualatin Valley beekeepers in bringing it about. Steve's love of bees will continue be expressed through student aid at Oregon State University.

Honey Bee Stock, Traits and Breeding

Gary S. Reuter

(a summary of the presentation by Mr. Reuter at the Northwest Corner Fall Conference)

In this talk I will review a number of the traits that you can breed for. I will look at the importance (in my opinion) of each one.

Color for the most part is an aesthetic preference. You can breed for almost every other trait in any color. Therefore, color should be at the bottom of the list. It is a lot like the color of your truck. The truck will operate the same whether it is midnight blue of hot pink. It may be that you are like me and just cannot drive a hot pink truck. If that is the case then breed for color in your bees.

Temperment can also be bred for independent of almost every other trait. I choose to breed for the most gentle bees. Building excessive burr comb and brace comb may be a heritable trait. Be careful that behavior is not caused by the beekeeper not putting enough supers on in time.
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WHAT'S INSIDE:

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Oregon State Beekeepers Association

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President's Notes

by Ray Varner

Hope you had a wonderful holiday season. Things were busy in December as I had three OSBA committee meetings and several association meetings. We did take time off for the holidays, but more meetings are scheduled for January. This is a busy time!

The Federal funding to Oregon for promoting specialty agricultural crops totalled $3.2 million. The committee working on writing the grant application met at Joe Steven's home in Estacada. We are fortunate to have a technical grant writer in our group – Mike Rodia from the Willamette Valley Association. The deadline for filing is the end of January, and the process is well under way.

Another busy committee is the one working on preserving Dr. Burgett's position at Oregon State University when he retires. Professional lobbyist Fred Van Natta chairs the committee, which met with Dr. Burgett, George Hansen and myself to discuss strategy.

Local Associations are busy planning their agendas for the coming year. It is exciting to see such enthusiasm and interest as individual groups grow.

Diane was able to get a number of our Conference speakers to give her written articles for use in *The BeeLine*. For those of you who weren't able to attend the Conference, I hope you find them interesting and informative. For those of you who did attend, perhaps they will be handy reminders. As always, your feedback is welcome and appreciated.

Our son Ric continues in remission but undergoes regular bouts of chemotherapy, mostly on an inpatient basis (usually four days at a time). No decision has been made yet as to whether or not to proceed with a bone marrow transplant. Diane and I have appreciated your care and support as we continue to go through this difficult experience.

Happy beekeeping!

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Cleanliness of the bottom board (do not confuse this with hygienic behavior) can be bred for but be

careful not to breed for neurotic behavior in this trait.

Honey production you can measure by the amount of honey taken at the end of the year of by using a short term weight gain test. To do the short term weight gain test, weigh all the colonies, after ten days go weigh them again and subtract the two weights. The difference between the colonies can be used to compare them for honey production within that yard. You cannot use this method to compare colonies in different apiaries.

Pollen hoarding may be a trait useful for pollinators and/or those collecting pollen for sale. Propolis collecting may be a trait to breed for if you collect propolis to sell and you may want to breed away from it for honey production and pollination colonies.

Swarming is a trait that you should not breed for. Do not collect swarms and then use them for breeder colonies. Earlier or more drone production can be bred for in a queen production outfit.

Wintering ability and spring buildup are probably more of a criteria than a trait. There are most likely many traits that go into good wintering ability. The traits are probably different in different geographic areas. Minnesota and Oregon winters are very different. By choosing the correct evaluations these traits can be bred for.

You can breed for disease resistance. The most important trait for resistance to American foulbrood and chalkbrood is hygienic behavior. This trait has been shown repeatedly to have resistance. Our most recent study at the University of Minnesota had 39% of the hygienic and 100% of the non-hygienic colonies challenged with AFB show symptoms of the disease. Five of seven hygienic colonies and only two of eighteen non-hygienic colonies recovered without antibiotic treatment. Six of eighteen hygienic and ALL eighteen non-hygienic colonies showed signs of natural occurring chalkbrood. All of the hygienic colonies cleared up by the end of the experiment. Only two non-hygienic colonies had the chalkbrood cleared up and one of those went queenless and there was no brood. The other one superceded early in the experiment and was probably more hygienic. DO NOT use any colony as a breeder that shows any sign of disease.

Varroa mite resistance can be bred for. There are a number of traits being studied. The hygienic behavior is effective for low levels of varroa infestation. The SMR (suppression of mite reproduction) trait is very effective. The SMR is being studied by Dr. John Harbo at the USDA lab in Baton Rouge. The grooming behavior is effective only if the bees damage the mites when grooming themselves or others. The post capping and cell size have been worked on but have not shown much promise against the varroa mite. The Russian bee is showing promise against the varroa mite but as yet we do not know the mechanism they are using to control them.

Tracheal mite resistance can be bred for also and there is work being done on assays for that.

Not all traits are heritable. For instance you cannot breed your bees to put themselves onto the truck. There are some linked traits so that you may have to take one trait to get the other one. Depending on the traits involved this may or may not be acceptable.

There are also environmental influences. For instance if you are breeding for color your yellow queen will come out black if it is incubated at 90 degrees during its pupal stage.

A breeding program has four essential components of selective breeding according to R.E. Page and H.H. Laidlaw in "The Hive and the Honey Bee." They are stock selection, genetic variability, controlled mating and stock maintenance.

The first step is to choose the traits you want to follow. Choose from the list we discussed above and any other you can think of that are important to you. Set up a good record system. In order to make good selections you must have good information. You can use any system from bar code scanning to marks on the side of the hive. Whatever it is it must be consistent, accurate and permanent. Clumps of grass on the cover are not a good system because you need to follow each potential breeder for at least a year. To make evaluations on all the traits the colony must be evaluated through an entire season. Mark all of your potential breeder queens. It is

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important that the queen you breed from is the same one you have been following all year. If you are breeding for mite and/or disease resistance you will have to stop chemical treatments of those hives. If you don't stop treatments you will be breeding for bees that require treatments; unless you have a known trait you are breeding for and the assay works even though you are treating.

The more traits you want to select for the more colonies you have to follow to choose from. It is like hiring a helper. If you want someone that can lift heavy boxes you interview a few people and you can probably find someone. Then if you want someone to drive a forklift you could interview a few more and find someone to do that. They you may need a truck driver with a CDL and you could interview a few people and find one. If you can only hire one person and they need to do all of those things plus not mind getting stung, you will have to interview many more people before you find someone to do all three things.

So how many colonies do you need to follow? If you have less than 20 colonies follow them all! If you have more than that follow at least 20 (100 preferred) for each breeder queen you will need.

After choosing the traits you are selecting for assign a weight to each trait. Before it is all done you will have to make decisions between a colony good in one trait A and not so good in trait B and a colony good in trait B and not so good in trait A. Choose an assay for each trait. This means a test to tell you if the colony has that trait or not. An example is the test for hygienic behavior. To do this you cut a piece of sealed brood from the comb that has about 100 sealed cells on each side. Put this comb into the freezer for 24 hours to kill the brood. Put the freeze-killed brood back in the colony and wait 24-48 hours. When you return check the killed brood to see if it was removed. The more that is removed the more hygienic they are.

Evaluate each colony for each trait using the assay you have chosen. Keep accurate records of all of the colonies you are evaluating. One down and dirty method is to mark each colony and when you find an unacceptable result from your assay remove the mark. Anyone left with a mark at the end is OK to use as a breeder. The reason for marking all of them and removing a mark for failure is it is best to err by throwing out a good colony rather than leave in a bad colony. If you mark them as bad and the mark falls off you will inadvertently put them back in the program. Do not use an unmarked queen as a breeder. If the queen is not marked it means it is not the queen you have been evaluating all season.

It is important to keep genetic variability in your program. To do this either bring new stock in periodically or be sure you have at least ten lines of bees being used in your operation.

Controlled mating is important in a breeding program. You can control mating with instrumental insemination or by control of drone stock which requires an isolated area. I will talk about the effects of natural mating in the talk tomorrow. *(Editor's note: the talk referred to will be printed in another issue of The BeeLine.)*

Stock maintenance is required. As you get further into your breeding program the selection process gets easier because more of your colonies will have your traits. However, you must continue the selection pressure or the bees will revert to the non-selected state.

Research's role in this process should be to identify valuable traits and develop assays for those traits. Emphasis should be on finding traits that do not interfere with honey production or pollination.

If you select for bees from your own outfit you will develop bees that perform well in your environment and under your management style. You will develop bees that work toward your goals whether that is honey production or pollination. You may be able to breed for bees that require less chemical control, saving you time and money. Last but not least, you can also develop bees that are pleasant to be around.

Editor's note: If you wish to contact Mr. Reuter, I am including that information:

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Northwest Beekeeping

January/February

- Lift the hives to find any light ones. Give these emergency feed of dry sugar or sugar candy on top of the brood frames.
- By the end of January or *early* February, treat hives for varroa mites. Use one strip of Apistan for every five combs of bees or less in each brood chamber (Langstroth deep frames or equivalent in other sizes). Hang the strips within two combs of the edge of the bee cluster. If two deep supers are used for the brood nest, hang Apistan strips in alternate corners of the cluster, in the top and bottom super. Mark 56 days on your calendar, so you can remove the strips *before* the honey flow arrives. Be sure to read all directions on the Apistan box label.
- Move stores closer to brood area.
- Continue the repair and/or assembly of next year's equipment.
- Dust all colonies three times at seven day intervals with a 2 Tablespoon portion of Terramycin (TM25) mixed with eight parts powdered sugar. Sprinkle on top of brood frames.
- The following flower bloom and pollen vary from year to year, from weeks 5-12, which stimulates brood rearing and winter break-up: pussy willow, crocus, skunk cabbage, flowering plum, tulip bush, filberts, daffodil, dandelion and Oregon grape.
- When daytime highs are above 55 degrees F., start feeding brood pollen supplement and cane sugar syrup in Doolittle or hivetop feeders.
- Make up or buy at least six 5-ounce pollen supplement patties per colony, storing in the freezer until needed.
- Check stored frames for wax moth infestation.
- Attend beekeeping meetings in your area, to learn, have fun and share.

NHB Marketing Tools – Check These Out!

The National Honey Board has produced some amazing brochures like "Honey Magic: a Cookbook for Kids" and "Honey, The Latest Research." Consider using some of these at your Farmer's Market booths or other events. Customers love having these informative handouts and they are affordable. Contact the NHB at their web site or at 1-800-553-7162.

"I'm Here to Tell You the Bear Facts About Honey" is a larger (8 ½ x 11), eight-page reference guide that provides technical information for those customers who want to know more about honey. It gives highly detailed, specific information about things like Antimicrobial Properties (lists 14 factors), Chemical Characteristics, Color Designations, Enzymes (what kind and what they do), Grading, Infant Botulism, Nutrient Values and more. It's colorful, easy to use, and full of impressive information. These cost 75 cents, too much to give away but worth every penny to have on hand to answer customer questions. Contact the National Honey Board!

Early Beekeeping in Eastern Oregon

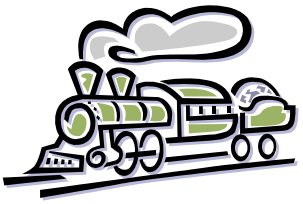
By Tom W. Foster

My father, Wilber William Foster (1886-1980), a beekeeper, make a scouting trip from Boulder, Colorado to Eastern Oregon in 1910. The Union Pacific Railroad provided reduced fares to encourage settlers to come West. He determined that the lower Snake River Valley was a promising location for bees. The Owyhee Ditch had just been built which brought water down the valley from the lower end of the Owyhee River. The canal provided irrigation for many acres of land that previously grew native sagebrush and grass. The Owyhee Dam was planned by the U.S. Bureau of Reclamation to bring thousands of acres of productive land under irrigation. He was quite certain that wild sweet clover and alfalfa hay fields would provide an abundance of honey.

In 1911 he brought 250 colonies of bees from Colorado to the town of Nyssa, Oregon where he established his bee and honey business that continued there for more than sixty years. He moved those bees on the railroad and unloaded them just east of the tracks in the location, which is now occupied by the very large Almagamated Sugar Factory. The bees were in one boxcar and his supplies, mostly comb honey supers, were in another boxcar. The bees were treated the same as cattle and were moved onto siding tracks periodically for the purpose of giving water to both the cattle and the bees. My father traveled with those bees and slept in a hammock in one of those railroad cars.

In 1912 he returned to Boulder and married the love of his life, Ruth Childers on May the first. They lived in Nyssa until their deaths in 1976 and 1980. They raised seven children, all of whom graduated from Nyssa High School between 1932 and 1951. He served for a time as President of the Oregon Beekeepers Association. My mother, Ruth C. Foster, was chosen as "Oregon Mother of 1958." My oldest brother, Howard Foster, also became a beekeeper with bees first in Idaho, later in Montana and California. He served two years as President of the American Beekeepers Federation from 1973-1975. In 1975 the ABF Convention was held in Boise, Idaho and our parents were able to attend and be honored. Howard joined in 1944, just one year after the ABF was formed. No other person has been a member longer than he has. He now lives in Mt. Vernon, WA.

The Foster bee and honey operation continued in Nyssa from 1911 until 1969 when it was sold to DeWayne Keller of Ontario. From about 1956 until it was sold the business was run by Raymond and Crete Sager. Crete was Wilber & Ruth's oldest child. I am their youngest child.



Bee Diseases and Pests Quiz

(Reprinted courtesy Southcentral Alaska Beekeepers Association)

1. American Foulbrood (AFB) is caused by the organism *Bacillus larvae* which is a:

a) virus b) protozoa c) fungus d) bacteria

2. European Foulbrood (EFB) is caused by the microorganism *Melissococcus pluton* which is a:

a) virus b) protozoa c) fungus d) bacteria

3. Chalkbrood is caused by the organism *Ascosphaera apis* which is a:

a) virus b) protozoa c) fungus d) bacteria

4. Nosema is caused by *Nosema apis* which is a:

a) virus b) protozoa c) fungus d) bacteria

5. Choose the correct statement:

a) the causal agent for AFB is spore forming but that for EFB it is not; b) the causal agent for EFB but that for AFB it is not; c) both are spore forming; d) neither is spore forming.

6. Choose the correct statement:

a) as they age larvae become less susceptible to AFB and EFB; b) as they age larvae become more susceptible to AFB and EFB; c) larval age makes no difference to susceptibility.

7. Varroa mites are believed to be vectors of:

a) AFB, EFB, nosema and chalkbrood; b) viral infections such as deformed wing virus; c) nosema only; d) chalkbrood only.

8. In 1992 Shimanuki, et al noted that a decline in the incidence of EFB was accompanied by an increase in:

a) chalkbrood; b) sacbrood; c) nosema; d) varroa mites.

9. A frame has scattered and sunken partially open cells. A matchstick inserted into one of the cells is stirred a few times and when withdrawn, the larval remains adhere to the stick and stretches into a thread about an inch long. The hive probably has:

a) AFB; b) EFB; c) chalkbrood; d) sacbrood.

10. Choose the correct statement:

a) nosema is caused by dysentery; b) dysentery is caused by nosema; c) dysentery and nosema are the same; d) none of the above.

(answers on page 8)

Honey for Oral Health
From The National Honey Board

On Friday, March 9, 2001 Dr. Peter C. Molan, Associate Professor of Biochemistry as the University of Waikato, New Zealand, spoke at a

symposium titled "Functional Foods for Oral Health," organized by the University of Illinois College of Dentistry. The symposium was part of the American Association for Dental Research annual meeting being held in Chicago. In his presentation, "Honey for Oral Health," Dr. Molan presented the results of laboratory research to test the effect of honey of the species of dental plaque bacteria believed to be responsible for dental caries.

Honey contains an enzyme that produces hydrogen peroxide, which is believed to be the main reason for the antimicrobial activity of honey. Types of honey differ greatly in their antimicrobial potency, varying as much as a hundred fold. The research has shown that honey not only stops the growth if dental plaque bacteria, it reduces the amount of acid produced, which stops the bacteria from producing dextran. Dextran, a compound of dental plaque, is the gummy polysaccharide that the bacteria produce in order to adhere to the surface of the teeth.

Dr. Molan's research is showing potential for the use of selected highly antimicrobial types of

honey in the treatment of periodontal disease and gingivitis. These diseases are inflammatory conditions resulting from infection of the gums. The factors involved are very similar to those in inflamed and infected wounds. Clinical research is showing that the honeys selected rapidly clear bacteria from infected wounds, even when the infection is deep-seated. However, unlike some other antiseptics, honey is gentler on tissue. The potent and anti-inflammatory property of honey rapidly removes the swelling and pain. Honey also has a marked stimulatory effect of the growth of cells that repair the tissues damaged by infection.

Dr. Molan heads the University of Waikato Honey Research Unit, recognized for its expertise in the composition of honey, including antimicrobial activity. In New Zealand and Australia honey producers have batches of honey tested in the laboratory to identify the samples with high activity. Those types are now labeled and marked as "antiseptic." The National Honey Board is now coordinating efforts to have varieties of honey found in the United States tested to identify the floral types that have good antimicrobial activity.

Answers to Bee Diseases and Pests Quiz
(see page 7)

1. d) bacteria
2. d) bacteria
3. c) fungus
4. b) protozoa
5. a) ABF bacteria form spores; EFB bacteria are non-spore forming; however, the bacteria may overwinter on the sides of cell walls or in feces and wax debris on the hive bottom.
6. a) susceptibility to AFB decreases with increasing age and larvae become immune 53 hours after egg hatch. EFB affects only young larvae (those less than 48 hours old).
7. b) varroa mites are vectors of some virus infections in honey bees.
8. a) chalkbrood. Shimanuki found that antibacterial material from chalkbrood mummies inhibited the growth of *Melissococcus pluton* and *Bacillus larvae.* The material was subsequently identified as the fatty acid, linoleic acid.
9. a) AFB – the "ropiness" test is one of the methods used to check for the disease.
10. d) when dysentery does occur, the disease is often aggravated and spread in a colony affected by nosema.

National Honey Board News

- Honey from Argentina and China injures US industry, says the US International Trade Commission (ITC). On Nov. 7, the ITC determined that the honey industry in the United States is materially injured by imports of honey from Argentina and China that the Department of Commerce has determined are sold in the United States at less than fair value, and honey from Argentina has been subsidized. As a result, antidumping and countervailing duty orders will be issued. View the press release at htty://www.usitc.gov/er/nl2001/ER1107Y1.htm.

- *Agricultural Research Magazine* highlights bee research in two articles on current ARS research: "Russian Honey Bee Earning its Stripes" and "Keeping Transgenic Pollen in its Place." The research is part of Crop Production, an ARS National Program. To find out more on the program, go to http://www.nps.ars.usda.gov./programs/programs.htm?NPNUMBER=305

- Necki J. Engseth (a researcher who the NHB funds to antioxident research on honey), assistant professor at the University of Illinois, was awarded a $20,000 seed grant by the Functional Food for Health group at the U of I for "Honey's Potential to Protect Against Cardiovascular Disease."

- A delectable event, the 2001 Epcot International Food and Wine Festival, was held Oct. 20-Nov. 18. From Nov. 9-13, the National Honey Board showed off some sweet honey expertise at a booth at the event. Honey Chef Mani Niall presented honey-cooking demonstrations. Disney created a blossoming garden filled with sculptures, topiaries and all the plants that bees love. With informational plaques along the way, visitors learned about the busy lives of bees and how they make honey.