

# Washington State Beekeepers Association



*Keep the "Bee" in Business*

Publication of Washington State Beekeepers Association

www.wasba.org

February 2005

## President's Message

It has been a busy time since the 2004 convention. On Jan 8, the executive board met and I feel we really made some movement forward on many issues. It has been difficult to get all the ducks lined up, but we now have a nice shooting gallery. The meeting started with committee meetings of the Education Committee and the Master Beekeepers. I'm glad to say that they both did great. I will let Paul report on the Master Beekeepers, but I would like to say that with the addition of Ted Swenson from Inland Empire and Jody Pilarski from Pierce County to the Master Beekeepers, the committee is about to full strength again.

We have created the Education Committee to work with WSU and local associations to put on WSBA/WSU/Local Associations field days similar to what we have done the last two years at WSU. We will be deciding on the dates during our March meeting. The first will be at WSU and the second one will be in Puyallup at the WSU bee yard. Bob Arnold is pulling together all the input from the members and then we will be meeting with WSU and have it all laid out for the March Executive Board. I want to thank all of you who helped us work it out. Didn't know how easy it is to get on a committee did you? Thanks again.

Dr. Sheppard and WSU put together two proposals for grants from the Washington State Commission on Pesticide Registration. Steve did a great job of getting it all coordinated. Jamie pitched the proposals to the commission on Jan. 5. I have received written notification that both proposals have been accepted and will be funded. The first proposal was to support Development of an Integrated Pest Management Program for Parasitic Mites on Honeybees in Washington State and the second proposal was for Evaluation of WSU Selected Honey Bee Stocks in WA Commercial Operations. This adds up to over \$50,000 in research and will allow WSU to add two more graduate students to the staff at WSU. Congratulations to Steve, Jamie and WSU. WSU/WSBA have some work to do and we will need to support the proposals with matching funds and in kind donations. These proposals will be reviewed and final approval given at the March Executive Board Meeting.

I just returned from an interesting American Beekeeping Federation meeting in Reno. The rumors about major colony losses are true. Many folks have lost 50% or more of their operations, and what is left looks really weak. The varroa has just hammered many beekeepers, with resistance to our current mite medications being the number one problem. Pollination fees in CA are running \$85 to \$120, if you have any bees.

## Washington State Updates

### 2005 Program Calendar for the Association.

- MARCH 26, 2005:** WSBA Executive Board meeting  
**Bar 14 Ranch House Restaurant**  
1800 South Canyon Road, Ellensburg, WA  
10 AM to 2PM
- JUNE 17 & 18 2005:** WSBA & WSU June  
East Field day WSU campus
- JULY 2005:** WSBA & WSU July West Field day  
Puyallup, WSU extension station TBA
- OCTOBER 2005:** WSBA & OSBA joint meeting  
Oct. 28, 29 & 30th in Oregon  
Executive Board Meeting TBA
- JANUARY 2006:** WSBA Executive Board Meeting  
LOCATION TBA

We are seeing a substantial increase in package costs and queens. If there is any hope (I think so), we will have Formic acid approved by Feb. 28 with Miteaway.

I also realize that we need to do a better job of reporting spray and pesticide kills so there is a better job done with applicators and labeling requirements. If we don't report they can't do anything to help us. The best thing I saw was the direct correlation to hygienic behavior and resistances to mites. This led me to believe that we need to reinforce our queen program and that the results with hygienic behavior could be our savior in the Northwest. And the last thing from the convention was how we don't want the hive beetles. They just make a horrible mess and just explode on the beekeeper that isn't watching the hives all the time. Watching slime run out of your comb and hive just doesn't fit with what we want from beekeeping. It about destroys your honey house. I realized that there are a lot of beekeepers working for our industry and they have a lot of energy and vision.

News out of California is about all bad. Everyone is short on bees for their pollination contracts and are trying to find bees. It looked like everything had stabilized about early January but many hives are getting hit again. Beltsville bee lab is sending a person to review the situation the first week of Feb. That could be way too late as they are moving into to almonds now. Lets pray for the best.

Jerry Tate

## Executive Board Meeting Minutes

The meeting was called to order at 11 AM, January 8, 2005. The previous meeting minutes were accepted as published in the newsletter.

The Treasurer, Lisa Knox, distributed the **Treasurer's Report**. Lisa went over each account and explained the total of \$59,411.08 in checking, savings, and scholarship funds. The report was accepted.

**Master Beekeepers Committee Report-** The master beekeepers have \$2,050.86 in checking including a \$50 deposit from Jim Miller. The goal of the Master Beekeepers is to make programs accessible to members. They want to make information available through extension offices, fairs, local agencies and events sponsored by local and State beekeeping associations. The committee focused most of their discussion on the resolution passed at the annual state meeting regarding correspondence courses for Apprentice, Journeyman, and Master Beekeeping. They discussed posting the Apprentice curriculum on the website and how to get a booklet and who to contact regarding a correspondence course. When an individual passes the course they will get a certificate from WSU. (As a reminder, the programs are still part of the WSU extension office) The Journeyman could have a similar web site with information. Local Master Beekeepers in that area could test this level on an individual basis. This will be effective now because of smaller groups. The details need to be worked out and given to Frank Seiler to put on the website. Jody Pilarski from PCBA is taking over for Bob Stump. A replacement was also needed to replace Bob Zahler for Secretary on the committee. Ted Swenson, President of IEBA, accepted an invitation to join the committee.

**Medication Updates** -Tylosen has gotten approved according to Jerry Tate by FDA and will be sold through Mann Lake. It will be available in fall for AFB treatment in dust form only. It is to be used only if AFB exists in the bee yard. There is no word on Formic Acid at this time.

### Grant Submissions

President Tate went with Jamie Strange to "pitch grants" to the WSDA. The first was for commercial beekeepers and the second an IPM program for the west side of the State. Because of the cost of the commercial beekeeping one, Eric Olsen sent in a letter stating he would support an "in-kind" contribution. The requests seemed to get a good reception from the members of the committee.

The West is different and time is different for mite treatment. The grant asked for is different because of the environmental issues on the west side of the State. The west side must check thresholds and determine what are the thresholds and what tests must be run and then decide what to treat with because of honey production. This is significantly different than the tests that have taken place on the east side. This is of great concern because a lot of the members present at the meetings rely on bees for their pollination.

There is a concern WA may not get enough bees for pollination. Many think the commercial beekeepers may stop in CA and do splits and raise queens and not move North. Talk is \$35 for WA and \$100+ for CA. How will this affect WA's agriculture? No one knows at this time but the growers are nervous.

President Tate said he learned that our Association needs to be more specific on terms and expectations of IPM grants and our in-kind donations and money. He was able to get some forms he believes may be helpful to us in the future.

### The Area Reps Reports were skipped.

It was suggested to have local association webmasters added to our contact list so we can put them on a master sheet in our Association's contact form. Paul will make it part of his annual information request.

**Oregon and Washington Convention.** This time the responsibilities will be split. The Presidents of both State Organizations are developing the speakers. They will be putting together a budget that will be funded by both organizations. (The last shared convention, Oregon had taken care of the of the advertising. & WA did not contribute.) There will be a new location because we have outgrown Hood River, Oregon. The next convention will be held at Agate Beach in a new hotel right on the beach in Newport, Oregon. The dates are October, 28,29, and 30<sup>th</sup>. The other main subject was the distribution of funds earned at the auction. It has been agreed that the money donated by a specific bidder will go to the organization to which the bidder belongs. If the bidder does not belong to either WSBA or Oregon, an advertiser for example, then the money will be split 50/50. The Presidents have agreed upon these terms.

**WSBA field days.** Plenty of ideas were presented for having two field days in 2005. One at WSU in June and a second at

*(Continued on page 3)*

**Buckfast & All – American  
Queens • Package Bees**  
www.rweaver.com

**The R Weaver Apiaries, Inc.**

16495 C.R. 319 Navasota, TX 77868

Phone: 936-825-2333 Fax: 936-825-3642

E-MAIL: rweaver@tca.net



*Everything  
for the Beekeeper*

Call our branch offices: Pat in Fresno or John in Chico  
for fast courteous service. *Free Full Color Catalog*

PO Box 2837 2765 South Golden State Blvd. Fresno, CA 93745 Phone (559) 495-0230 Fax (559) 495-0232 Toll Free 1-877-432-3268	  	15 C Valley Court Chico, CA 95973 Phone (530) 893-0921 Fax (530) 893-0922 Toll Free 1-877-332-3268
---	---	--

**Website:**  
www.dadant.com

# Executive Board Meeting Minutes

(Continued from page 2)

the Puyallup bee yard in July. Bob Arnold presented some general ideas for the programs, which had been brought up by some of the members. There will be about 40 hives available for the day. Some classroom instruction will be first then the rest of the day will be hands on experience. Some ideas for Pullman are queen introduction into a hive, nuc preparation, mite information including detection and counting, and hive inspection. For Pullman, fall management would replace hive inspections. Lisa Knox was volunteered to coordinate a barbeque and a quick easy lunch.

At the March meeting the IEBA will have information available for WSBA regarding more details about the field days. That will leave plenty of time to make changes. At the March meeting the WSBA can coordinate with WSU and be able to state what is going to happen at Pullman and have a coordinated effort. People have already volunteered to help with hives and other chores. The WSBA is trying to get cross over attendance so both locations will have something a little different to offer. If any local beekeepers have a particular interest, be sure and have them inform Bob Arnold or President Tate of the matter so it may be integrated into the events. Dr. Steve Sheppard will be at the March meeting.

Paul Lundy went over the highlights of the 2004 survey.

(Continued on page 4)



## Trees 'n Bees, Inc.

Beekeeping Supplies  
Queens & Packages  
Honey and Gift Items

Saturday 10 - 4  
Monday 5 - 8 pm  
Thursday Noon - 7 pm

Loren & Carolyn Elliott  
34747 162nd Ave SE  
Auburn, WA 98092

253-939-1149  
800-696-8288  
info@treesnbees.com

## Local News

### WSU wins 2 grants from the Washington State Commission On Pesticide Registration to support Bee Research

WSU recently made two proposals to the Pesticide Commission for funding of two research projects. These two grants will allow WSU to add two additional graduate students to the honey bee program. This will increase beekeeping at the University and work on more programs requested by the beekeepers. The first proposal was on IMP programs and the second one involved WSU queens and Commercial Operators. Steve

(Continued on page 5)

## Our Assembled Kits Are Ready When You Are!



**ONLY \$72.95!**

**WW-730** Assembled 9 5/8\" data-bbox="300 590 510 615">

1 Assembled 9 5/8\" data-bbox="300 625 530 690">



**Complete! \$39.95**

**WW-825** Assembled 9 5/8\" data-bbox="675 700 875 725">

1 Assembled 9 5/8\" data-bbox="675 735 910 775">

# 800-880-7694



**Assembled! \$35.95**

**WW-830** Assembled 6 5/8\" data-bbox="310 765 510 795">

1 Assembled 6 5/8\" data-bbox="310 805 540 845">



Call for your free copy of our full color catalog!

beekeeper@mannlakeltd.com  
www.mannlakeltd.com

Prices subject to change without notice.  
Shipping charges not included.

Mann Lake Ltd.  
501 S. 1st Street  
Hackensack, MN 56452-2001

## Executive Board Meeting Minutes

(Continued from page 3)

Many members voiced their opinion about noticing changes have already begun bettering communication and the Association and members are more open to giving out information. We have begun to open programs up to membership. We will be encouraging the area representatives to call on local organizations such as the county extension offices and encourage cooperation, education and assistance and get more activities going. The first goal should be to “nail the key areas for extension offices.” The Puyallup area and the county extension office seem to be working with the area now. But the WSBA needs to open up to other projects for the local beekeepers. Get us visibility. An example is swarm control listings and an observation hive for the extension offices. It can help with referrals. It was suggested that the local county extension websites begin to have links to the WSBA and local association websites. If the master gardeners and beekeepers get a good relationship going, that may benefit both organizations.

President Tate and the members present think the biggest benefit to the beekeeping community will be the field days. It will help bring the local associations together and bring exposure to beekeepers. In 2006 there are plans on having field days North of Seattle at the Mount Vernon site and perhaps even one in the South of Washington. We can do mini surveys to get feed back so we can check the progress and comments.

Several members felt our WSBA should get more exposure on the Web; Get our sites into Google and Yahoo. Paul Lundy made a motion (yes, he volunteered the absent) that Frank and Glen research the idea of Google and Yahoo and are authorized to spend up to \$300 for expenses. The motion was passed.

It was proposed that the WSBA do post card mailings to local members for events that would be of value to their areas. We could send out mailings with authorization from local associations to use their membership lists. It may be more advantageous in time and expenses to use an outside service. Some members volunteered to look into the costs and will report back to the Association.

The meeting was adjourned at 3:15 PM.



**HEITKAMS'  
HONEY  
BEES**

PAT, RUSSELL & CRAIG HEITKAM  
4700 FIRST AVENUE • ORLAND, CA 95963  
BUS. 530-865-9562 • FAX 530-865-7839  
Email: heitkamsbees@sisna.com



Queens, Bees, Honey & Pollination

## New WSBA Ball Cap



ball cap w/traditional plastic  
adjustment, item #39-460

The new ball caps have arrived. This year we have added a traditional ball cap with the good old fashioned plastic adjuster on the back. The price, at \$15, is still the same. To order, email us at [treasurer@wasba.org](mailto:treasurer@wasba.org), or call 360-297-6743.

**The Bee Masters' 2005 Short Course** is set for February 28–March 4, 2005, at Simon Fraser University's main campus in Burnaby, British Columbia.

This is an advanced level course, and participants are expected to have kept bees and have some knowledge about bees and beekeeping. Topics include: spring, summer and fall management, wintering, queen rearing, swarming, bee behavior, hive products, adult bee diseases, exotic mites, nucleus production, bee brood diseases, pollination, and much more. Participation is limited to 50.

### Special Guest Lecturers

Rob Currie, University of Manitoba  
Keith Delaplane, University of Georgia  
Tanya Pankiw, Texas A & M University  
Stephen Pernal, Agriculture Canada

### Local Speakers

Mark Winston, Simon Fraser University  
Paul van Westendorp, BC Ministry of Agriculture & Food (Apiculture)  
Margriet Dogterom, Crop Pollination Consultants

### Registration Information

Conference Services, Halpern Centre  
Simon Fraser University  
8888 University Drive  
Burnaby, BC V5A 1S6 CANADA  
Telephone: 604-291-4910 or 604-291-3012  
Fax: 604-291-3420 • [Conference\\_Services@sfu.ca](mailto:Conference_Services@sfu.ca)

## Local News, continued

(Continued from page 3)

is working on getting the grad students on board so we can work on these this year. Our congratulations to Steve, for working up the proposals and Jamey did an excellent job pitching these to the commission.

### Development of an Integrated Pest Management program for parasitic mites on honeybees in Washington State

The introduction and establishment of honeybee parasitic mites that invariably cause the death of untreated honeybee colonies is the single greatest threat to the beekeeping and pollination industry of Washington. The two most effective chemical controls are failing due to mite resistance and there is an urgent need to develop an effective IPM program that will provide statewide treatment threshold recommendations for *V. destructor* and viable alternatives to the use of organophosphate treatments for mite control. The product of the proposed project will be the publication and dissemination of an IPM program suitable for honeybees in Washington. The expectation is that this IPM program can be immediately implemented by hobbyist and sideliner (less than 500 colonies) beekeepers throughout Washington State.

This project involves \$22,884, \$14,884 coming from WSCP, with \$2000 from WSBA and \$6,000 in inkind donations of labor, bees and equipment.

### Evaluation of WSU selected honeybees stocks in WA commercial beekeeping operations

Although most beekeepers in Washington State are hobbyists or sideliners (less than 500 colonies), most beehives used for pollinating managed crops belong to commercial operators with a few thousand to ten thousand or more beehives. Commercial beekeeping operations are migratory and can differ greatly from smaller beekeeping operations that are often stationary. WSU has been involved in a funded project to breed a population of honey bees expressing traits useful for beekeeping, including increased honey production, gentleness, over wintering ability, hygienic behavior and suppression of mite reproduction (SMR). Evaluation of these selected lines occurs within WSU experimental apiaries. Until now there has been no provision to test the bees within commercial operations or to use such data within the selection program. The project described here will provide a thorough test of WSU selected stock in commercial operations and feed back the information into the selection program.

This project involves \$30,660, \$16,660 from WSCP, with \$2,000 from WSBA and \$12,000 in in-kind donations of labor, bees and equipment.



## WSBA Officers & Exec. Committee

### President:

Jerry Tate, E. 8900 Maringo Dr, Spokane, WA 98212  
509-924-6669, President@wasba.org

### Vice President:

Lee Massey, 2781 Hornby Rd, Grandview, WA 98930  
509-882-4601

### Secretary:

Linda Carney, 4511 S. Freya, Spokane, WA 99223  
509-448-0417, Secretary@wasba.org

### Treasurer:

Lisa Knox, P.O. Box 1331, Kingston, WA 98346  
360-297-6743, Treasurer@wasba.org

### Area #1 Representative:

Tim Bueler (2007), 7914 69<sup>th</sup> Ave. SE, Shohomish, WA  
98290, 425-334-9684, Area1@wasba.org

### Area #1b Representative:

Van Sherod (2007), 2429 2nd Ave. W, Seattle, WA 98119  
206-284-1520

### Area #2 Representative:

Robert Smith (2005), 15525 Castle SE, Yelm, WA 98597  
360-894-2159, Area2@wasba.org

### Area #3 Upper Valley Representative:

Eric Olson (2005), 93 Camfield Rd., Yakima, WA 98908  
509-966-2867

### Area #3 Lower Valley Representative:

Arlene Massey (2006), 2781 Hornby Rd, Grandview, WA  
98930, 509-882-4601

### Area #4 Representative:

Miriam Bishop (2006), 14 Shangri Lane, Twisp, WA 98856  
509-997-9699, Area4@wasba.org

### Area #5 Representative:

John Pettigrew (2007), 2616 N. Rd. 60, Pasco, WA 99301  
509-545-3805, Area5@wasba.org

### Area #6 Representative:

Robert Arnold (2007), 42615 N. Division Rd., Deer Park,  
WA 98006, 509-276-2399, Area6@wasba.org

For more information,  
please visit us at:

**[www.wasba.org](http://www.wasba.org)**

# Master Beekeeper Program, Certification Update

Master Beekeeper Certification Course: Category #7

Category: Honey Composition, Sources and Marketable forms

By: Louis A. Matej, BS Clin. Chem (Pierce County Beekeepers Association)

## ABSTRACT

### Honey Composition, Sources and Marketable forms

The sugar concentration in nectar varies from 4% to over 80%. However, the sugar concentration in mature honey averages around 95%.

Honeybees process nectar into honey by removing water biophysically and chemically by absorbing water and passing it from one bee to another and mechanically by fanning to evaporate the stored nectar. This raw honey is composed of a variety of sugars; mainly glucose (dextrose), fructose (levulose), sucrose and maltose, however there are many other chemicals and substances in honey which contribute to its taste, color, pH, viscosity and aroma. Some of these chemicals aid in the ripening and preservation of honey.

When feeding bees sugar syrup in the spring and fall, it is important to maintain the sugar concentration to aid in the survival of the colony by mimicking their intake of nectar and honey. The bees must process sucrose, a disaccharide, by breaking it down into the two monosaccharides, glucose and fructose, with the enzyme invertase (sometimes also called sucrase). This enzyme is secreted into the honey sac of the foraging bee.

Glucose is the primary sugar used for the production of ATP, a high energy chemical used by all life forms including honey bees. The metabolism or catabolism of glucose into heat and energy (ATP) is accomplished in 3 stages: 1) The glycolysis of glucose into pyruvate in the cytoplasm of the cell. This process converts glucose into pyruvate, a chemical readily usable in the biochemical pathways involved in energy production. 2) The pyruvate molecules are coupled with coenzyme A and with the aid of other enzymes in the Krebs or Citric Acid Cycle they are converted into stored chemical energy in the form of reduced NAD and FAD (NADH and FADH). These are exothermal reactions which produce heat and the stored chemical energy is transported from the cytoplasm into the mitochondria of the cells. 3) Oxidative Phosphorylation is accomplished in the mitochondria which releases the stored chemical energy as ATP which is a readily usable form of energy. (For example: wing muscle energy, movement, wax and pheromone secretion, etc.)

The breakdown of glucose produces heat for temperature regulation and is the main source of energy for muscle movement and other metabolic pathways. In contrast, pollen is the primary source of protein and other minerals for growing larva and other necessary biological functions.

A good beekeeper will always be very conscious of the need, availability, and ongoing utilization of carbohydrates in each colony.

*(Continued on page 7)*





**HONEYBEE  
INVESTIGATIONS**

P.O. Box 163  
45289 Rd. Q NE  
Hartline, WA 99135  
rjbkdorm@televar.com

Diagnostic Laboratory for Apiaries

Jan Dormaier  
Microbiologist

(509) 639-2577

Tracheal test \$ 25/100 bees and Nosema \$ 10/test

### WSBA Beekeeper Classified Ads

Classified ads are \$5 per insertion, for a maximum of 30 words. **(FREE for WSBA Members).**

To place an ad, please mail your ad, with payment, made out to:

Washington State Beekeepers Association  
c/o Newsletter Editor  
P.O. Box 1331  
Kingston, WA 98346-9301  
Fax: (425) 527-4251

Please **CLEARLY PRINT** your ad. Don't forget to include your contact information (phone, fax, e-mail).

Your ad will run in the next printing of the Newsletter when received by the 15<sup>th</sup> of the month prior to publication. **The ad will run for two (2) newsletters.** (You may email your submission to editor@wasba.org and mail your payment to the P.O. Box.)

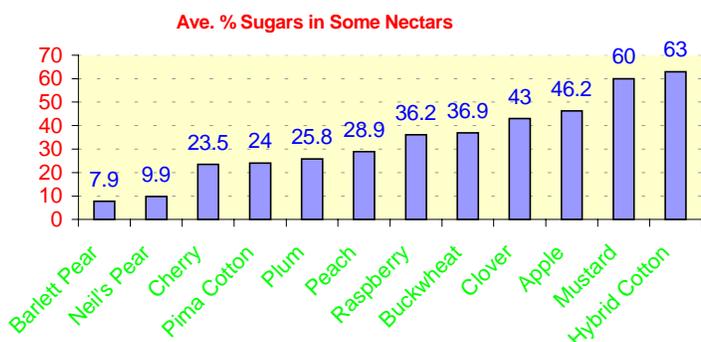
# Master Beekeeper Program, Certification Update

(Continued from page 6)

## Honey Composition and its role in the Biochemistry of Glucose Metabolism and Nutrition

### The Chemistry and Composition of Nectar and Honey

It is generally observed that honeybees (*Apis mellifera*) do not forage for nectar which has a total sugar (carbohydrate) content of less than 15% unless absolutely necessary for survival. The sugar content of nectar can vary from as low as 4% to as high as 80% depending on plant species and environmental conditions. The three main carbohydrates in nectar are glucose (dextrose) and fructose (levulose), which are monosaccharides and sucrose (table sugar), which is a disaccharide. The chart below gives the average percentages of some common nectar producing plants.



By removing water from nectar, biophysically and chemically by absorbing water and passing it from one bee to another and mechanically by fanning to evaporate stored nectar, and by adding enzymes and other secretions, the honeybee produces honey. Sealed ripe honey contains a total sugar content between 95% to 99%, regardless of the original nectar sugar concentration. For example: If honeybees collect 5 gallons of nectar at 30% sugar content, they must remove 3.4 gallons of water in order to make honey having a 95% sugar content. For this reason it is important for the beekeeper, when feeding sugar (sucrose) syrup to bees that the solutions mimic as far as possible the

nectar gathered in the spring and honey stored for use in the fall and winter.

In the picture to the right, we see two worker bees passing nectar in order to absorb water and add enzymes and other substances:



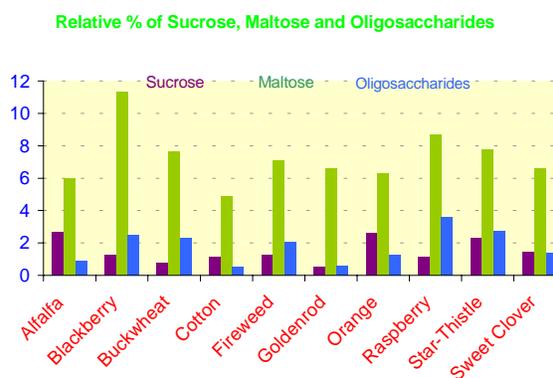
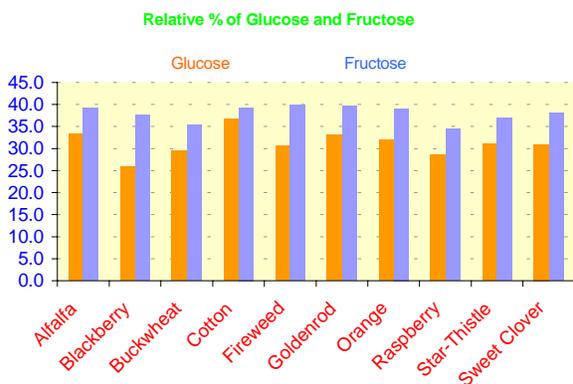
Usually when making sugar syrup in the spring, a beekeeper will add 2 parts of water to 1 part of sugar. In the laboratory, I determined that this mixture amounts to 34.0% total sugar which is similar to the average nectar concentration. In the fall and winter the beekeeper will add 1 part of water to 2 parts of sugar which amounts to 89.4%. This is very close to the concentration of total sugars in honey.

It is interesting to note that in addition to the 3 main carbohydrates mentioned above, honey contains maltose, isomaltose, maltulose

turanose and kojibiose, which are disaccharides and other complex sugars (oligosaccharides, sometimes called "higher sugars"). These are formed during ripening and storage by effects of bee enzymes (specifically invertase).

Below are charts showing the relative amounts of fructose, glucose, sucrose maltose and oligosaccharides found in various types of honey. Note that the relative amounts of fructose to glucose do not vary greatly from one variety to another.

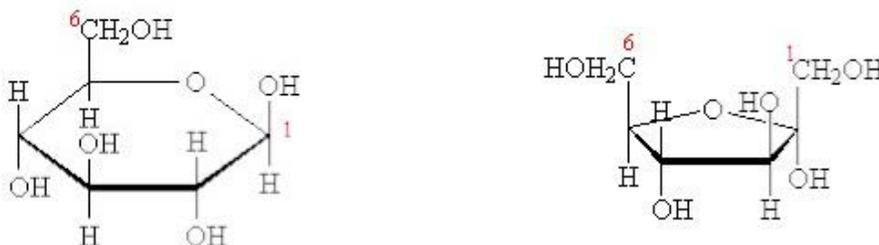
(Continued on page 8)



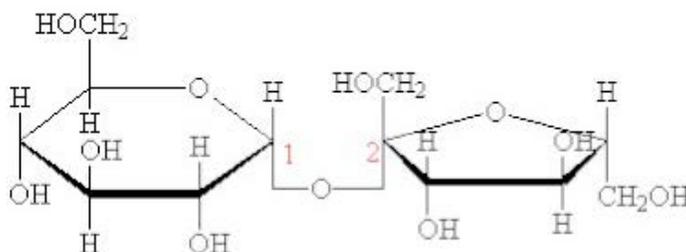
# Master Beekeeper Program, Certification Update

(Continued from page 7)

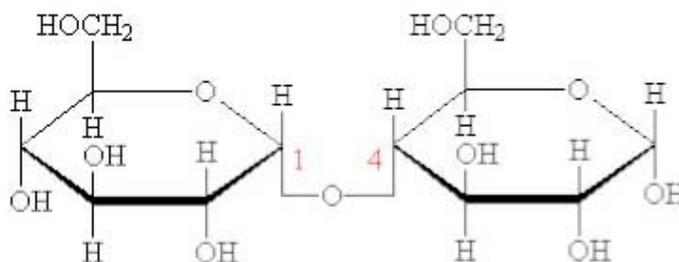
Similarly, the relative amounts of sucrose, maltose and oligosaccharides do not change significantly from one variety of honey to another, varying by only a few percentages. Glucose and fructose are monosaccharides. The chemical structure of glucose shows that it is a 6 carbon molecule connected at carbons 1 and 5 forming a 6 atom ring structure. Fructose is also a 6 carbon molecule connected at carbons 2 and 5 forming a 5 atom ring structure. (Note: in nature sugars exist in isomeric forms and also exist in both the ring structure as well as in the straight chain structure).



Sucrose and maltose are disaccharides. Sucrose is a 12 carbon molecule of glucose and fructose connected by an oxygen atom (glycosidic bond). Similarly maltose is made up of 2 glucose molecules also joined by an oxygen atom.



Sucrose



Maltose

Honey is a supersaturated hygroscopic solution of carbohydrates containing many other chemicals and substances. If you look at all the honey varieties combined, it has been shown that honey contains:

Monosaccharides (70-80%):	Glucose, Fructose
Disaccharides (5.0%)	Maltose, Isomaltose, Sucrose, Nigerose, Turanose, Kojibiose, Maltulose, Trehalose, Gentiobiose, and Laminaribiose
Oligosaccharides (Higher Sugars) (2.0%)	Erlose, Theandrose, Panose, Maltotriose, 1-Ketose, Isopanose, Isomaltosyltetraose, Theandrose, Centose, Isomaltosyl glucose, Isomaltosyltriose and Isomaltosyltaose.
Organic Free Acids (0.2-2.0%)	Gluconic acid (70-80% of all free acids), Acetic acid, Butyric acid, Citric acid, Formic acid, Lactic acid, Malic acid, Oxalic acid, Succinic acid, Fumaric acid, a-Ketoglutaric acid, Pyroglutamic acid, and Maleic acid

(Continued on page 8)

## Regional News

### Hive thefts sting Calif. almond growers

By **JULIA HOLLISTER** Freelance Writer  
Friday, January 14, 2005 Capital Press

If bee shortages and the invasion of a vicious pest weren't enough to discourage California beekeepers, thievery was added to the list this week.

"The 124 hives, equivalent to a truckload, belonged to a Wyoming beekeeper who had sent them here to help with the almond pollination next month," said Ann Beekman, co-owner of Beekman Apiaries and Honey Winery in Hughson, a town in Stanislaus County. "His hives and ours were setting in the La Grange area behind a chained, locked fence but someone cut the bolt and then used a truck and forklift to steal the hives." The value of stolen bees was more than \$25,000.

Beekman theorizes that her hives were not taken because they were branded and easily recognizable. A couple of her bee pallets were damaged in the crime, and she thinks the thieves were coming back to lift the Beekman hives, too.

"It's a significant loss especially because it means almond growers are not going to get bees," she said. "There are so many almonds and we don't have enough bees to pollinate them."

"I have two lists of almond growers that need bees for pollination because their contracted beekeepers have died or dying

hives," Beekman said. "Now we have people stealing hives and renting them as their own. We have bees over the county and keeping them safe is a constant problem. It's not just the value of bees and the pollination fees, it's also their value to the state of agriculture."

Almond growers need over a million hives for the pollination period, and the industry is estimating a shortage of 500,000 colonies this year. In addition, the impact of the mite damage is being felt now as beekeepers get their hives out of storage and discover entire hives with dead bees. It's also about supply and demand. Last year, a hive rented for about \$50, and this year it ranges from \$80 to \$120.

Beekman admits catching bee thieves is difficult because of the isolation of the areas and the fact that many hives are torn apart so they can't be traced.

She advises beekeepers and growers to be vigilant in protecting their winged investments by watching for unusual activity and suspicious vehicles on their property.

"The bee shortage provides incentives for criminals to steal the hives and then rent them out to needy almond growers who don't ask questions," Beekman said. "Growers need to check out who is offering the bees and make sure they are not stolen."

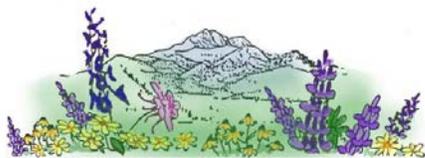
## Classified Ads

WSBA "Proudly Produced in Washington" gold labels for sale.

Rolls of 500 are \$ 7<sup>00</sup> each. To order, Call 360-297-6743 or email [myrasprings@centurytel.net](mailto:myrasprings@centurytel.net).



For Sale: 3 extractors, old Lifetime reversing 8-frame, galvanized. 2 are for parts. \$150 takes all 3! Stainless, 3 chamber sump, good condition, \$235, obo. 360-733-7764, please leave a message with phone number if no answer. (2/05)



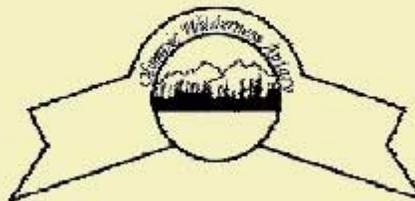
### GARDNER GARDENS™

Try our beeswax skin cream for dry itchy skin. Contains almond and coconut oils, beeswax, and propolis. Call 509-996-2522 or e-mail [sabold@methow.com](mailto:sabold@methow.com)

### PACIFIC NW BRED "SMART" QUEENS

### WILD CAUCASIAN / SMR / RUSSIAN SURVIVOR STOCK

Hardy; Work at Cooler Temperatures  
PROVEN HYGIENIC, MITE RESISTANT  
Abundant Drones,  
Isolated Mating Yards  
*Available Summer & Fall only*



### Olympic Wilderness Apiary

Toll Free: 866-204-3426  
e-mail: [harbees@olypen.com](mailto:harbees@olypen.com)  
Web Page: [www.owa.cc](http://www.owa.cc)

# Master Beekeeper Program, Certification Update

(Continued from page 6)

Amino Acids (0.2-2.0%)	Proline, Lysine, Histidine, Arginine, Aspartic acid, Threonine, Serine, Glutamic acid, Glycine, Alanine, Cysteine, Valine, Methionine, Isoleucine, Leucine, Tyrosine, Phenylalanine, Tyrtophan
Minerals (0.1-1.5%)	Potassium, Sodium, Calcium, Magnesium, Iron, Copper, Manganese, Chlorine, Phosphorus, Sulphur, Aluminum, Iodine, Boron, Titanium, Molybdenum, Cobalt, Zinc, Lead, Tin, Antimony, Chromium, and Nickel
Vitamins (Trace amounts)	Ascorbic acid (Vitamin C), Riboflavin (Vitamin B2), Panthothenic acid (Vitamin B5), Niacin (Vitamin B3), Thiamine (Vitamin B1), Pyrodoxine (Vitamin B6), Biotin (Vitamin H), Folic Acid (Vitamin B9)
Enzymes	Invertase (sucrase), Diastase (Amylase), Glucose Oxidase, Catalase, Acid Phosphatase.
Enzymes shown to be absent	Lactase, Protease, and Lipase
Esters (trace amounts):	Methyl formate, Ethyl formate, Methyl acetate, Ethyl acetate, Propyl acetate, Isopropyl acetate, Ethyl propionate, Methyl buturate, Ethyl buturate, Isoamyl butyrate, Methyl valerate, Ethyl valerate, Methyl pyruvate, Methyl benzoate, Ethyl benzoate, Methyl phenylacetate, and Ethyl phenylacetate
Ketones and Aldehydes (trace amounts):	Formaldehyde, Acetaldehyde, Propylaldehyde, Butylaldehyde, Isobutylaldehyde, Benzaldehyde, Methyleneethyl ketone, Isovaleraldehyde, Capraldehyde
Alcohols (trace amounts):	Methanol, Ethanol, Propan-1-ol, Propan-2-ol, Butan-1-ol, Butan-2-ol, Isobutanol, 2-methyl-butan-2-ol, Benzyl alcohol
Lipids (trace amounts)	Glycerides, Sterols, Phospholipids, Oleic acid, Lauric acid, Stearic acid
Trace amounts of beeswax	Beeswax
Microscopic particles	Pollen, Fungal spores, Bacterial spores, and Yeasts

A number of these trace chemicals, especially esters and organic (carboxylic) acids have been used in research to determine their effectiveness in the control of mites.



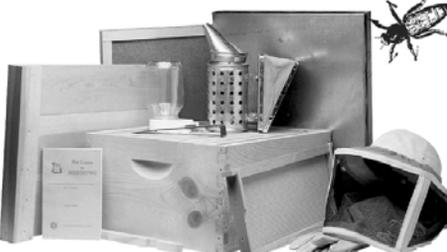
### Enzymes:

The four major enzymes in honey are invertase (sucrase, saccharase, or glucosidase), diastase (amylase), glucose oxidase, and catalase.

Invertase is secreted by the honeybee from its salivary glands into the honey sac. This enzyme catalyzes the breakdown of sucrose into glucose and fructose. This reaction is slightly reversible and invertase does catalyze the synthesis of more complex carbohydrates. This accounts for the disaccharides and oligosaccharides (higher sugars) not found in nectar. The invertase that is present in processed or sealed honey will continue to breakdown sucrose causing some honeys with higher concentrations of sucrose to ripen and mature after storage. Invertase is a key enzyme in preservation of honey.



**GLORYBEE BEEKEEPING SUPPLIES**  
*Serving Northwest Beekeepers for over 25 years*



Complete Hives  
 Live Bees  
 Bee Tools  
 Bee Feed & Medicine  
 Clothing  
 Honey Bottling  
 and much more...  
*Shop Online at*  
[www.GloryBeeFoods.com](http://www.GloryBeeFoods.com)

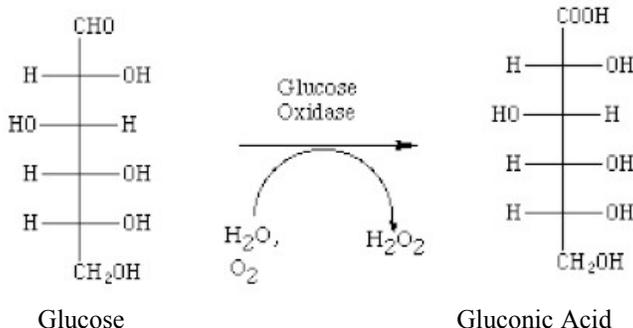
GloryBee Foods Inc. | Eugene, OR | (800) 456-7923 | [www.GloryBeeFoods.com](http://www.GloryBeeFoods.com)

(Continued on page 11)

# Master Beekeeper Program, Certification Update

(Continued from page 10)

Another major enzyme in honey is glucose oxidase, which is secreted from the hypopharyngeal gland of the bee into the nectar to assist in the formation of honey. It catalyzes the conversion of glucose to gluconolactone, which in turn equilibrates to gluconic acid. This and other carboxylic or organic acids in honey account for the slightly acid pH and also contribute much to the different tastes in various types of honey. Glucose oxidase activity helps in the preservation of honey by producing hydrogen peroxide which inhibits the growth of bacteria and yeasts.



Honey is quite acidic having a pH of between 3.2 and 4.5, which is low enough to have an inhibitory effect on many pathogens. The sweetness of honey offsets the acidic nature of honey. In addition, the hygroscopic nature of honey (it's tendency to absorb water) is detrimental toward bacteria or fungal growth because this causes dehydration.

Enzymes in honey breakdown over time and are destroyed with increased heat.

## Minerals:

Even though there are a number of compounds in honey which contribute to the variance in color, the 22 minerals found in honey are partly responsible for the range of colors of honey from different sources. These are categorized as water white, extra white, white, extra light amber, light amber, amber, and extra dark amber.

Below are charts showing the relative concentrations of some minerals contained in Fireweed honey (water white) and Buckwheat honey (extra dark amber)

(Continued on page 12)

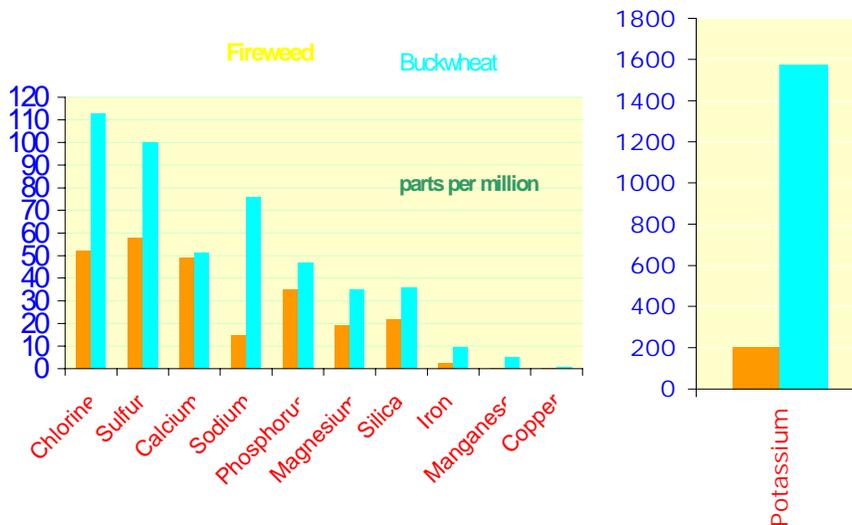


David Dahms, Paragon Press

### Comparison of the Mineral Content Between Water White Honey & Extra Dark Amber Honey



Photo Provided by: Diane Sammelaro, Penn State University



# Master Beekeeper Program, Certification Update

(Continued from page 11)

## The Metabolism of Glucose by Honeybees from Nectar and Honey into Heat and Energy:

Glucose is the primary sugar used for the production of ATP (Adenosine Triphosphate), which is a high energy chemical used by the honey bee (and most living creatures) for the production of heat and energy. The metabolism or catabolism of glucose into heat and energy (ATP) is accomplished in 3 stages:

### 1. Glycolysis of Glucose:

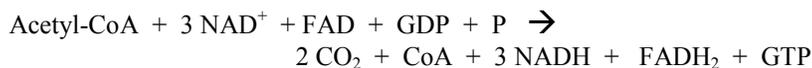
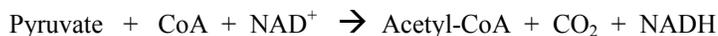
Glycolysis of glucose takes place in the cytoplasm of the cell. This process converts glucose into pyruvate, a chemical readily usable to the honey bee in the biochemical pathways involved in energy production. Pyruvate is a 3 carbon molecule, so for every one molecule of glucose there is produced 2 molecules of pyruvate:



This reaction represents 10 different equilibrium reactions each involving a specific enzyme.

### 2. The Tricarboxylic Acid Cycle:

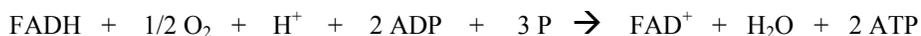
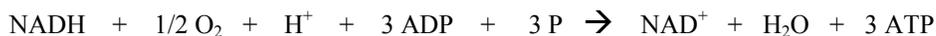
Within the cytoplasm of honeybee cells, pyruvate molecules couple with Co-enzyme A and enter into the Tricarboxylic Acid Cycle or Krebs Cycle (also called the Citric Acid Cycle). The reactions within this cycle are exothermic and heat is produced which the honey bee uses to keep the hive at a constant warm temperature. Excess energy is stored chemically in reduced molecules of NADH (Nicotinamide adenine dinucleotide, reduced form) and FADH<sub>2</sub> (flavin adenine dinucleotide, reduced form). These molecules are high in energy and are then transported to the mitochondria of each cell.



Nine separate equilibrium reactions occur to convert one molecule of pyruvate into heat and stored chemical energy in the form of NADH and FADH<sub>2</sub>, each facilitated by an enzyme catalyst.

### 3. Oxidative Phosphorylation

This final step in the conversion of glucose into energy is accomplished in the mitochondria of each cell. Here the produced NADH and FADH<sub>2</sub> release their stored energy by converting to ATP which is directly used by the cells to allow the bee to move, metabolize other reactions (synthesis of beeswax, pheromones, etc.), fly, etc.



There are 36 ATP molecules produced for every glucose molecule used by the honeybee. During flight, this ATP is used as fuel. It has been found that the metabolic rate derived from glucose metabolism in the honeybee wing muscles is 3 times as efficient as the rate in the wing muscles of hummingbirds and 30 times as efficient as in active human muscles.

In conclusion, there is an economy of direct heat generation versus stored chemical energy by the honeybee via glucose metabolism. In the winter the bees are not moving very much, yet heat is needed to keep the hive at a constant warm temperature. In the spring not only is heat needed but also more motion from stored energy. In the summer bees do not need as much heat generation but need wing movement for flight and fanning to cool the hive. From the metabolism of glucose heat and motion energy are generated in a very economical way in order to maximize the needs of the colony during times of cold and heat throughout the year.

**Join us June 17th and 18th in Pullman Washington  
for the East side Field Day.**

## Tate's Honey Farm

E. 8900 Maringo Drive  
Spokane, WA 99212

**Wes Tate Rita Tate Jerry Tate**

Beekeeping Supplies Honey, Comb Honey  
Pollination Service Pollen  
Package Bees, Queens Candle Making

Bulk Bees Wax Extracting Equipment

509-924-6669

taccon105@icehouse.net

www.tateshoneyfarm.com

stinging behavior in harnessed foragers; (7) ethanol solutions greater than 5% significantly impair Pavlovian conditioning of proboscis extension; and (8) free-flying honey bee foragers will readily drink from an artificial flower containing 5% ethanol.

**CONCLUSIONS:** The experiments on consumption, locomotion, and learning suggest that exposure to ethanol influences behavior of honey bees similar to that observed in experiments with analogous vertebrates. The honey bee model presents unique research opportunities regarding the influence of ethanol in the areas of language, social interaction, development, and learning. Although the behavioral results are interesting, similarity between the physiologic effects of ethanol on honey bees and vertebrates has not yet been determined.

## Other News

Alcohol Clin Exp Res. 2000 Aug;24(8):1153-66.

### The development of an ethanol model using social insects I: behavior studies of the honey bee (*Apis mellifera* L.).

Abramson CI, Stone SM, Ortez RA, Luccardi A, Vann KL, Hanig KD, Rice J.

Department of Psychology, Oklahoma State University, Stillwater, USA. charles@okstate.edu

**BACKGROUND:** The purpose of this experiment was to test the feasibility of creating an animal model of ethanol consumption using social insects. Honey bees were selected as the model social insect because much is known about their natural history, physiology, genetics, and behavior. They are also inexpensive to procure and maintain. Of special interest is their use of communication and social organization.

**METHODS:** Using both between- and within-experiment designs, studies were conducted with harnessed foragers to determine whether honey bees would consume ethanol mixed with sucrose (and, in some cases, water). Shuttle-box and running-wheel studies were conducted to examine the effect of ethanol on locomotion. The effect of ethanol on stinging behavior in harnessed foragers was investigated. The effect of ethanol on Pavlovian conditioning of proboscis extension was also investigated. Finally, in a self-administration study, foraging honey bees were trained to fly to an artificial flower containing ethanol.

**RESULTS:** (1) Harnessed honey bees readily consume 1%, 5%, 10%, and 20% ethanol solutions; (2) 95% ethanol will also be consumed as long as the antennae do not make contact with the solution; (3) with the exception of 95% ethanol, consumption as measured by contact time or amount consumed does not differ in animals that consume 1%, 5%, 10%, and 20% ethanol solutions; (4) exposure to a lesser (or greater) concentration of ethanol does not influence consumption of a greater (or lesser) concentration; (5) consumption of 10% and 20% ethanol solutions decreases locomotion when tested in both a shuttle-box and running-wheel situation; (6) consumption of 1%, 5%, 10%, and 20% ethanol does not influence

## Master Beekeepers Committee minutes

Master Beekeepers Committee meeting minutes for January 8th, Ellensburg Washington at 10 AM.

Committee members present: Tim Bueler, Paul Lundy, Van Sherod, Bob Smith, (and Jody Pilarski from PCBA who is interested in joining the Committee).

2004 Survey results (as it relates to improving Master Beekeepers).

It was agreed that the Committee needs to increase visibility of the Master Beekeepers Certification Program. This will be done in a number of ways. Specifically; Paul will help create a Master Beekeepers page for the WSBA web site, and will forward it to Frank Seiler for posting. The content will generally be the items discussed further in the meeting minutes. We will create brochures for use at WSU extension offices, WSBA events, county and state fairs, community colleges and any other place we feel may contribute to raising awareness of the Master Beekeeper Certification Program.

2005 plans for focus and growth:

Correspondence certification program will be developed at the Apprentice and Journeyman level.

Both Programs will have:

WSBA web site presence by listing the Program curriculum and requirements for each level, list the resource booklet price and contact information for purchase (Tim Bueler volunteered), list testing information and contact information to apply for testing (Van Sherod volunteered).

The booklets - \$10 dollars at a local association and \$10 plus

(Continued on page 14)

406-883-2918  
1-800-548-8440  
FAX 406-883-4336  
www.westernbee.com



Dick Molenda  
President/General Manager

P.O. Box 190

WESTERN BEE  
SUPPLIES, INC.  
BEE WARE  
&  
WOOD PELLETS

5 9th Avenue East  
Polson, Montana 59860

## Master Beekeepers Committee minutes, continued

(Continued from page 13)

shipping & handling if mailed.

Apprentice only: The test is free if done at a local association and \$5 (actual posted price to be determined by Van) if by mail. We will provide a self addressed and stamped envelope for the test to be returned.

Journeyman testing will be in person, proctored by a Committee member. The contact for Journeyman testing will be on the web site (Van Sherod). Van will make sure the Committee member closest to the participant is put in contact with the person interested in the Journeyman test. It is then up to the Committee person to proctor the test.

Paul will revise and update the application and progress status form.

Testing by correspondence is as follows:

Apprentice test is mailed after receiving the testing fee and application form. Van receives the completed test and grades the result. If the result is a passing score, then the test result (and a brochure describing the journeyman program) are sent to the participant and to WSU for a certificate and inclusion in the Master Beekeeper Certification Program database. The certificate is sent as indicated on the application form.

If test sections did not receive a passing score, the test section is returned to the participant for re-test and the process is repeated (within reason).

Testing proctored locally (both levels) is as follows:

Participant completes an application form. The test is completed and the proctor grades the results. If the result is a passing score, then the test results (and a brochure describing the next level in the program) are given to the participant. The completed test results are sent to WSU for a certificate and inclusion in the Master Beekeeper Certification Program database.

If test sections did not receive a passing score, the test section is handed back to the participant for re-test and the process is repeated (within reason).

Committee Resources.

It was agreed that all Committee members need consistent information and resources in order to operate the Apprentice and Journeyman Programs. To this end all committee members will have a copy of the participant database (as updated by WSU), current Apprentice and Journeyman Resource booklet, tests and test keys. Paul will ask Bob Zahler and Jim Miller for the electronic versions so we all can have either

printed copies or the resource in computer format.

Here are the latest revisions (as I know it):

Apprentice booklet 1998 plus the 2004 mite addendum. Apprentice test 2-16-00. Apprentice test key 10-1-00.

Journeyman booklet 2000. Journeyman test (Jim Miller).

Journeyman test key (Jim Miller).

Committee membership.

Jody Pilarski from PCBA (replacing Bob Stump) and Ted Swenson from IEBA graciously volunteered to be on the Committee. Thank you Jody and Ted!

We still need a Secretary to replace Bob Zahler. Paul did the minutes at this meeting, but we really need someone else to volunteer.

Committee meeting schedule proposed by Jo Miller.

The Committee ran out of time before we were able to discuss future meeting dates. Paul will email everyone separately and we will come to a consensus on availability. Paul's preference is to meet 4 times a year.

If we meet 4 times a year, Jan. 8 (done), April 9 (or March 5 at the next WSBA meeting), July 9 (or June field day), and Oct. at the Oregon mtg.

If 3 times a year, then Jan. 8, May 14, and Sep. 10.

The meeting adjourned at 12 noon.

## International Updates

### Canada

#### Formic Acid Registration

Formic acid and associated end-use products (NOD Formic Acid Pad and Mite-Away II (tm) Formic Acid Pad), for treatment of varroa mites and tracheal mites in/on honeybees, are in **EPA Section 3 registration final stages**

NOD Apiary Products is in the final stages of satisfying the requirements for the full federal pesticide registration of Mite-Away II Formic Acid Pads within the United States. Registration had initially been slated for the end of 2004, however EPA has requested further documentation before registration can be granted. Full registration should take place by February 28, 2005. This will be just in time for spring application in most States. Keep in mind that pesticide registration must also take place state by state. Call 866-483-2929 for further information on registration status and product distribution.

**Join us in Oregon at the Joint Oregon/Washington meeting.**

**Oct 28, 29 and 30 2005**



E-mail: [ruhlbeesupply@yahoo.com](mailto:ruhlbeesupply@yahoo.com)

**RUHL BEE SUPPLY**  
Beekeeping Supplies - Honey - Bees

17845 SE 82nd Drive  
Gladstone, OR 97027

The Johnson Family  
(503) 657-5399

## India

### Jobless youths take to honey production

Gosaiganj, India - January 29, 2005 [www.webindia123.com](http://www.webindia123.com)

Jobless youth in the village of Gosaiganj are now literally enjoying the sweet taste of success.

Fed up with scouting around for jobs, two industrious youth started bee keeping and later on started a training session for others like them.

The village, located around 56 kms from Lucknow, is now a flourishing center for honey production.

"We are providing training to people which is free of cost. We also provide them boxes for bee keeping. The best thing about the whole training program is that we tell them that this is an additional source of income besides their regular occupation. Anybody who is farming or running a shop or even studying can take up this business," said Sunil Kumar Mishra, the instructor at the training center.

A well-equipped honey processing unit bears proof of their hard work. Around 200 families now earn their livelihood by honey collection and processing. More and more people are now coming forward to take up bee keeping. "I am educated but I was unemployed so I thought I will take up this training and start my own business. I can earn my livelihood," says Chedi Lal Maurya, who aims to set up his own honey production unit.

## European Union

### Honey Bee Medication On Prescription

The European Commission plans to make honeybee medications available only on prescription and therefore available only through vets. This new Directive is due to come into force in October 2005, but if the bee lobby acts now it may be possible to obtain an exemption for honeybees.

The plans for honeybee medications to be prescription-only are part of a new EC Directive (EC 2004/28/EC) which will apply to medicines for all food-producing animals. No exceptions have been made or planned, but beekeepers have been so alarmed at the new legislation that lobbying for an exemption for honeybees has begun. Max Watkins, Technical Director of Vita-Europe said "This legislation could be disastrous for beekeeping, honey production and agricultural pollination in Europe. It will lead to an increase in treatment costs, encourage the use of unapproved products and result in the loss of bee colonies across Europe." Dr Watkins continued:

"Every beekeeping body I have spoken to oppose the legislation. It is vital that beekeepers in every European Union Member State lobby their relevant government authority to secure an exemption for honeybees from this legislation." The above quoted from: <http://www.vita-europe.com/downloads/newsletter2.pdf>



**March 26, 2005**

**The next WSBA Executive Board Meeting  
will be held at::**

**Bar 14 Ranch House Restaurant  
1800 South Canyon Road, Ellensburg, WA  
Phone: 509-962-6222**

**10 AM to 2PM**

**Everyone is welcome.  
Lunch is available for purchase.**

### Meeting Agenda:

**Committees @ 10 AM**

**Master Beekeeper  
Education & Training**

**Business @ 11 AM**

**Grants coordination  
Oregon convention  
State registration fees**

Master Beekeeper Certification Committee meets from 10 AM to 11 AM.

Topics include:

Correspondence certification program.  
Master Beekeepers page for the web site.  
Participant database.  
Brochures describing the programs.



© 2004 MapQuest.com, Inc. © 2004 GDT, Inc.

### Directions from Seattle via I-90:

At exit 109, turn RIGHT onto Ramp towards Canyon Road / Ellensburg. Turn RIGHT (North) onto Canyon Rd (0.3 miles).

### Directions from Spokane via I-90:

At exit 109, turn off onto Ramp towards Canyon Rd. / Ellensburg. Turn RIGHT (North) onto Canyon Rd.





**Membership dues are due.  
Basic dues are still \$15.**

If you have not already done so, please pay dues for 2005. The membership application is inside this newsletter.

P. Lundy  
Washington State Beekeepers Association  
Newsletter Editor  
P.O. Box 1331  
Kingston, WA 98346-1331

