The

April 2010

BUZZWORD

Interactive newsletter for West Sound Beekeepers Association
Proudly serving bees, their keepers, and the public in Kitsap County, WA
(Editor's note: The interactive newsletter is still under construction, alas!)

Refreshments
20 April, 2010 Meeting
Drinks: Nisha Grice
Snacks: Carlson Family

Meeting Schedule:
Apprentice Beekeeping Class
6PM Tuesday 20 April 2010

Regular Meeting
7 PM Tuesday20 April 2010

Steering Committee Meeting
7 PM Tuesday 03 May 2010

Queen Rearing Group
Meets after the Steering Committee

Meetings at Stedman's Beekeeping Supplies in Silverdale

Beekeeping Class
6 PM Tuesday April 20, 2010

Regular Meeting
7 PM Tuesday April 20, 2010

Program:
David Mackovjak Queen Rearing Using the Cloake Board Method

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At the Last March Meeting:
Tim Celeski gave a very interesting presentation on swarms and their capture. *Thank you, Tim!*

UPCOMING BUSINESS:
We will hold a quick vote to adopt the new by-laws finally accepted at the March regular meeting and try to quickly elect trustees for the three elected positions.

Announcement: This is the last newsletter for members who haven't renewed their membership!

Message From The President

I have noticed over the passing few years those beekeepers most successful consistently do several things. They rear queens for re-queening their hives in early fall (already mated and laying), they keep micro-colonies through the winter for backup going into early spring, and they diligently monitor their hives for pests and diseases, treating when necessary.

It does not happen every year, but something that clobbered several of us over the head this year with a resounding 'DUH' was the inconsistent weather. January proved to have a couple of weeks with extraordinarily warm temperatures, 'waking' the hive from their deep winter slumber. This early faux spring caused an increase in the consumption of stores, and in turn, starvation. Recognizing this condition put several of us into the early feed mode, only to realize the syrup never warmed enough from the previous evening to allow the bees to feed the next day. A dry sugar mound added to the top hive, fondant, and even pollen patties helped save the colonies.

In three cases, the colonies had dwindled to such an alarming low population that they could no longer service the queen, eliminating any new egg lying. Recognizing the behavior of these colonies and intervening with a frame of brood and a frame of young bees from a successful hive provided the support bees to return two queens back to functioning layers.

The whole point here – we each must be proactive recognizing symptomatic behaviors and understanding the actions taken to remedy abnormalities within the colony. With the West Sound Beekeepers Association's queen rearing bee-geeks embracing the finer arts of queen rearing, it is difficult to make excuses for the inexpensive insurance queen rearing offers.

Nobody should be enduring 100% losses, nor should there be grave monetary consequences because of a 50% colony loss. I sincerely thank the few that are taking us down that road of continued survivability (and beekeeping affordability). The skills you teach and the knowledge to back them up provides each of us a unique opportunity to learn and practice that which makes a successful beekeeper!

Jim Dunbar

Queen Rearing Group Update:

West Sound Beekeeping Association by David Mackovjak, Queen Rearing Group Leader

Purpose: The Queen Rearing group is to provide an opportunity for members of WSBA a venue to learn and explore the art of queen rearing.

2010 Goals for the Queen Rearing group of West Sound Beekeeping Association (WSBA):

1. **Explore and document different physical methods of queen rearing**
2. **Educate both the Queen Rearing group and the WSBA on queen rearing**
3. **Provide quality queens to the Queen Rearing group and WSBA**
4. **Investigate and conduct hygienic testing**
5. **Explore drone management methods**
6. **Invite at least two other local beekeeping associations to our queen rearing meeting**

Part 1 -- 6 Apr 10 (1930 to 2200)

Following the normal West Sound Beekeepers Association business meeting, the Queen Rearing Group held their second meeting on Tues, April 6, 2009. In attendance were Peggy, Jim, Paul, George, Basil, Stan, David, and a several others.

Queen rearing training was provided using the Doolittle Method of grafting queen cells and the use of the Cloake Board method.

An exceptionally excited group of queen rearers

David M giving a class on Queen rearing

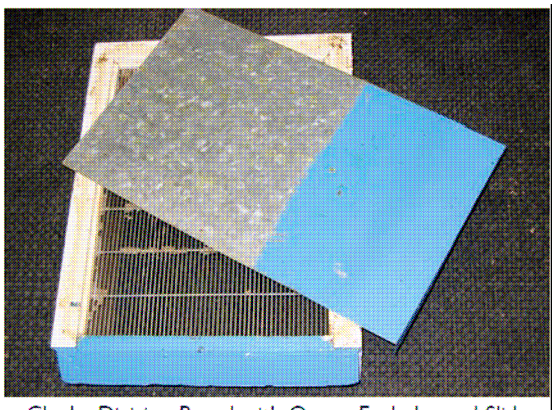
Queen rearing training was provided using the Doolittle Method of grafting queen cells and the use of the Cloake Board method.

Back in 1979, Susan Colby first published the Cloake Board Method in American Bee Journal. She stated "The Cloake Board Method takes advantage of both a queen-less and queen-right system. Queen cells started in a queen-less state tend to have a higher rate of acceptance, and those reared in a queen-right state tend to produce higher quality cells. Hence, the popularity of the starter and finisher methods used."

WSBA Apiary hive w/ Cloake Board system

We discussed the key to successful queen rearing and developing good queens were:

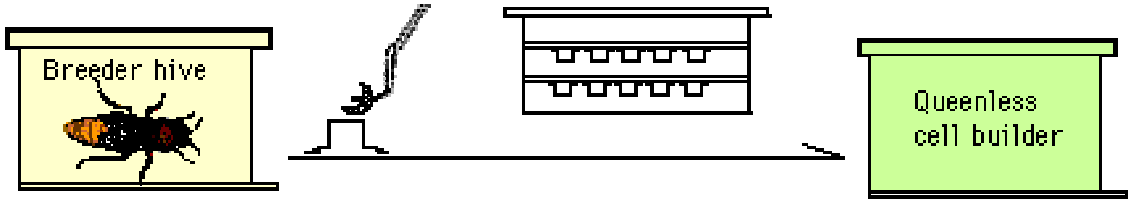
1. **Be From a Queen Mother of Superior Genetic Stock**
2. **Receive Good Care as a Larva and as a Pupa**
3. **Must Successfully Mate With Multiple Drones of Good Stock**
4. **Must Be Disease and Pest Free**
5. **She Must Be Successfully Introduced into Her New Colony**



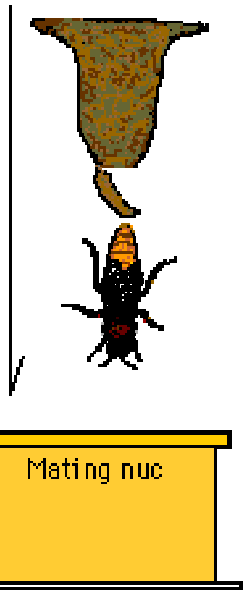
Cloake Division Board with Queen Excluder and Slide

A Cloake Board allows a single queen-right colony to serve easily as both a starter and finisher cell building colony. It is essentially a queen excluder with a sliding solid divider. It allows for quick and easy separation of the top and bottom hive boxes.

The timeline:



1 Breeder lays eggs	2	3 Eggs hatch	4 Larva grafted Into cell builder	5	6	7
8 Cells are sealed	9	10	11	12	13	14 Out builder In mating nuc
15	16 Cells hatch	17	18	19	20	21
22 Queen mates	23	24	25	26	27 Queen begins laying	28
29	30	31				



A Cloake Board allows a single queen-right colony to serve easily as both a starter and finisher cell building colony. It is essentially a queen excluder with a sliding solid divider. It allows for quick and easy separation of the top and bottom hive boxes.

We then discussed grafting.

- Grafting is simply the process of transferring larva from the worker cell of the breeder's hive to an artificial queen cell. The shape of the cell, along with the queenless condition of the hive receiving the newly grafted cells stimulates the workers to feed them a diet which make them develop into queens.
- A grafting tool can be as simple as a bent piece of wire, or several varieties can be purchased. The tool is slipped under the larva which is lifted out and placed in the bottom of the queen cell cup. Priming the cells with a small drop of royal jelly or even diluted honey makes it easier to float the larva off the tool. Don't flip over the larva. An unsteady hand is helped by bracing it lightly on the comb.
- Good light is essential, a headlamp works well, sunlight is ok if done quickly. Magnifying lamps are useful for those with poor eyesight.
- Some people are expert grafters from the start, others need more practice. Grafting is what prevents most people from attempting queen rearing. This is unfortunate, because with an hour or two of practice, anyone can acquire this valuable skill. Give it a try.

More information can be found:

Doolittle method (grafting - http://www.bushfarms.com/beesqueenrearingmethods.htm)
Cloake Board http://www.leedsbeekeepers.org.uk/modules.php?name=News&file=article&sid=225

Basil completed the evening with a demonstration of his updated/modified swarm box which he has made some interesting modifications. It was designed to hold up to five frames. It also had a "funnel" in the front to dump the bees off the frames. It contained a queen excluder to keep drones and any unnoticed queens from getting inside. On the top he had a method for installing grafted queen cells as well. We expect he will be bringing it to one of our upcoming practical classes.


Basil's improved swarm box.

Part 2 – 4/11/10 (1300-1600)

We met at Stedman's on Sunday, April 11, 2010 at 1 pm a warm and sunny day perfect for grafting! We were pleasantly surprised at the number of club members that came out to either watch or try their hand at grafting (Basil, Judy, George, David, Paul, Dominic, Ryan, Pat, Larry, Mike, Tom, Jason, Emily, and the Carlson family.) The first order of business was to briefly go over the processes of grafting. We explained and answered questions about the equipment, techniques, conditions, process, etc. It is all about practice, practice, practice…..

Now the fun really began. Everyone was given the opportunity to try their hand at grafting the newly hatched larva and placing them into the queen starter cups. Several members brought their own grafting tools so we got to try several different models. It was interesting and educational. The idea was to locate a newly hatched larva, ideally less than 24 hrs old. They were really small so we were using a light assisted magnifying glass. It was important to keep the larva in the same orientation and also from drying out so we had moist towels over the brood comb. Everyone got a chance to try grafting using both the Chinese and German tools.

Paul demonstrating how to properly graft

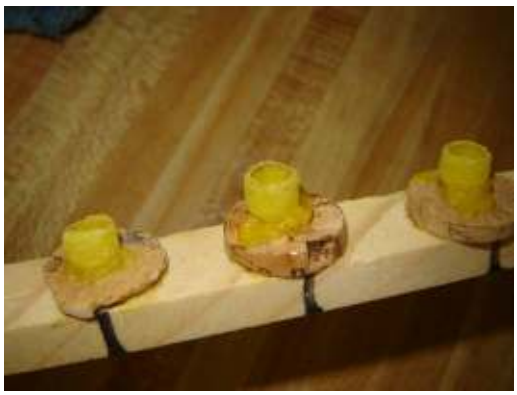
Warren looking for the correct larva (< 24 hrs old)

Emily making it look easy

Basil really getting into the spirit

At the same time George had fired up his queen cell cup maker. It consisted of a hot pot converted into a double boiler in which he had melted bees wax. Then he had dowels that had their ends shaped of which he would first dip in cool water then repeatedly dip in the beeswax four or five times and then quickly melt them to the cell board. It looked easier than it was.

George demonstrating how to make queen cups



The final product

After everyone practiced we went back out to the apiary and Paul pulled out a frame from our WSU queen so we could graft her larva for our good queen cups. (We pulled the queen cups that I had put in the cloake board hive 24 hrs the day before) Our selected grafters for our potential queens were Basil, Dominic, Brian, Mike, Judy, and Paul.

The queen rearing group ended up grafting over 45 queen cells and didn't end up leaving until late afternoon. Now that is dedication!

Paul with polished cups

Barbara stopped by to see the grafting process

Part 3 - 4/12/10 (1700)

The next afternoon I went out to the apiary to pull out the cloake board; placing the cell builder hive into a queen-right condition mimicking a swarm preparation situation. This is the best cell building condition.

I took the opportunity to exam the queen cups and counted aprox 16 to 18 wax cups that appeared to be accepted and are being drawn out into the characteristic peanut shaped queen cell. Not bad for our first grafting session!!

Bees clinging to the queen cups

Jason modified a western to become a 4 nuc super

So now we wait for Mother Nature to take her course. Below is the expected time line.

- Day 1, Egg Laid
- Day 3, Larva Hatches
- Day 4, Graft Larva Into Queen Cell
- Day 8, Queen Cell is Capped
- Day 14, Install Cell in Mating Nuc
- Day 16, Virgin Queen Emerges
- Day 20 – 25, Virgin Queen Mates
- Day 25 – 35, Queen Begins Laying
- Day 40 +, Queen Ready for Transfer to New Colony

At our next WSBA meeting, on Apr 20th we will need to go back out to the finishing hive and place the developed queen cells into mating nucs. This newsletter will already have gone to print so you'll have to show up to find out what happened!! I wanted to thank everyone who came out to try their hand at grafting. I think everyone had a good time.

Our proposed schedule for the next couple months is:

Tuesday, 20 Apr 10 – Queens handed out, 6-7 pm Stedmans
Tuesday, 4 May 10 – Queens rearing meeting, training, 8 pm Stedmans
Friday, 7 May 10 – Cloaking setup demonstration, 6 pm Stedmans
Sunday, 9 May 10 – Queen rearing grafting demonstration, 1-4 pm Stedmans
Tuesday, 18 May 10 – Queens handed out, 6-7 pm Stedmans
Tuesday, 1 Jun 10 – Queens rearing meeting, training, 8 pm Stedmans
Friday, 4 Jun 10 – Cloaking setup demonstration, 6 pm Stedmans
Sunday, 6 Jun 10 – Queen rearing grafting demonstration, 1-4 pm Stedmans
Tuesday, 15 Jun 10 – Queens handed out, 6-7 pm Stedmans

The Queen Rearing group is open to all members who are interested in learning about the art of queen rearing or would just like to learn more about bee keeping. To be included in any queen rearing correspondence please send me your name, phone number and email address.

Thanks and looking forward to seeing a great turnout at our next Queen Rearing meeting!! Come join all the fun!!

David Mackovjak
Queen Rearing group leader
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360-340-0381

Recipe Corner

Peanut Butter & Honey Biscuits

From agirlandherdogs.com – A tale of many tails. The domain name expired April 1, but I found this in the *Apis UK* newsletter for October 2008. Did I mention that these are dog biscuits?

3/4 cup of flour (wheat or white)
1 egg
1 tbs honey
1/4 cup of shortening
1 tsp of baking soda
1/4 cup rolled oats (wheat or regular - preferably quick cook)
1/2 tsp vanilla

Heat honey & peanut butter until runny (about 20 seconds in the microwave). Mix all ingredients together and drop by the spoonful onto a lightly greased cookie sheet (or roll with rolling pin between 2 sheets of floured and/or greased wax paper and then cut into cookie shapes) and bake at 350 degrees F for 8 t0 10 minutes. The writer says it should make 40 - 50 small biscuits, but she had to double it to get that many. But these were their favorites! She goes on to say "Also, I added about a 1/4 cup of Reese's peanut butter chips to the mix and it came out great! I even melted some peanut butter, table cream and honey together and made a coating to spread on top (and then I added sprinkles!)"

Honey Banana Bread **Submitted by Peggy Dunbar and eagerly consumed at the March meeting**

This recipe is from Trisha Gagne of Cambridge, Ontario, who writes, "This banana bread was in a very old recipe book published by the women in a tiny church in Southern Ontario. It has a really unique flavor thanks to the honey. The maple syrup version is also delicious served with butter. This is the only banana bread I ever make, and every crumb vanishes quickly." Trisha adds that she lines the pan with aluminum foil, which makes it super easy to clean up, and the loaf never sticks.

Ingredients:
1/3 cup butter, softened
1 egg
1 cup honey or maple syrup
1 cup mashed banana
2 cups all purpose flour
3 teaspoons baking powder
1/2 teaspoon baking soda
1/2 teaspoon salt
1/2 cup chopped pecans (optional)

Directions:
With a mixer, beat together the butter, egg, honey and banana.

Mix together the flour, baking powder, baking soda and salt. Add to the creamed mixture and stir until moistened. Fold in pecans if using.

Pour into a greased loaf pan. Bake at 350 degrees F. for 25 minutes. Turn the oven down to 300 and continue baking for around 30 minutes, or until the top springs back when lightly pressed

***This recipe is from Now....you're cooking! http://www.donogh.com/cooking/**

Self-Pollinating Almonds Key to Bountiful Harvests

Geneticist Craig Ledbetter examines the nuts of a self-pollinating almond selection in a California test plot.

California has more than 600,000 acres of almond orchards. At the beginning of each new year, these almond trees burst into bloom. That's when growers will need many millions of robust bees to ferry pollen from one cream-white blossom to the next.

Hive-rental costs to almond growers are high, ranging from $125 to $180 per hive. But in the future, these costs may be avoidable because bees may no longer be needed for almond pollinating.

This possibility could prove true as a result of the work of Agricultural Research Service geneticist Craig Ledbetter, in the Crop Diseases, Pests, and Genetics Research Unit in Parlier, California. He has developed new and improved self-pollinating almond trees—ones that can produce a bountiful harvest without being pollinated by insects.

Self-pollinating almonds are not new. The Tuono variety, originally from Spain, has been around for centuries. But it has few of the characteristics that have made California almonds beloved domestically and internationally. Almond breeders will tell you that Tuono is simply not as attractive as California's most popular almond, Nonpareil, because Tuono has a hairy texture to the seed coat.

"You can feel that hairiness with your tongue," says Ledbetter. "That can turn off U.S. almond consumers, who are used to the smooth texture of Nonpareils."

Another strike against Tuono—it has a very thick, hard shell, so only 32 percent of the nut is edible kernel. Nonpareil, however, is 60 to 65 percent kernel.

One good thing about Tuono's thick shell is that it gives the nut more resistance to the dreaded navel orangeworm, the primary pest of almonds in California. At Parlier, an areawide integrated pest management program is under way to reduce navel orangeworm damage and broad-spectrum insecticide use throughout the San Joaquin Valley. The program is being led by Joel Siegel, assisted by fellow entomologists Bas Kuenen and Chuck Burks.

A fifth instar navel orangeworm larva infesting a Nonpareil almond.

Adult navel orangeworm (Amyelois transitella) on a Nonpareil almond.

Eight Great Almond Selections

Though both Tuono and Nonpareil almonds have their strong points, the ideal almond would have the best traits of each. In 1993, Ledbetter started his work to breed a desirable self-pollinating almond. Seedlings were first planted in 1996 and every year thereafter.

Tuono was used as the male (pollen) parent in conventional hybridizations with California-adapted almond cultivars and selections. Ledbetter and his team made the crosses at bloom time and came back at harvest time to collect the nuts. The scientists grew out those nuts into seedlings and then surrounded the branches with insect-proof nylon bags to exclude insects that could serve as pollinators. The seedlings bloomed, and some produced fruits inside the bags. The scientists knew that these seedlings were the self-pollinators, because no foreign pollen had been introduced into the bags.

At first, harvests from the seedlings were small, but by 2006 the trees began producing excellent harvests. In November 2008, after a very good fall almond harvest, Ledbetter and his Parlier team brought eight very promising self-pollinating selections to the California Almond Board for evaluation of

taste and appearance. The testers were pleased with the skin color, oil content, and—most importantly—the flavor. The new almonds have many of the same characteristics of Nonpareil, which has been grown in California since the 1880s and accounts for 37 percent of all almonds grown in the state.
"What separates the Parlier-developed selections and Nonpareil, of course, is that these ARS almond trees need no external pollination," said Ledbetter. "Ours is a very good-looking kernel that's very comparable to that seen in Nonpareil."

Shells Snare Chemicals From Water

In other work, Ledbetter is working with Thomas Klasson, research leader at ARS's Commodity Research Unit in New Orleans, Louisiana, to test the adsorption ability of almond shells. Parlier is near Fresno, and as in many other cities, there are concerns about water quality. In Fresno's case, those concerns date back to World War II, when chemicals from cleaning military aircraft from the city's air base entered the groundwater supply. Use of agricultural nematicides—chemical pesticides used to kill parasitic nematodes—in orchards and vineyards around Fresno for many decades has also harmed water quality in the area's aquifer.
To purify this water, granular activated carbons (GACs) were put to use to adsorb the chemicals. Fresno has 35 GAC sites alone, each using a minimum of 20,000 pounds of granulated carbon.
In California, more than 1.3 billion pounds of almond meat is produced every year, but much of the almond shells from those nuts goes to waste. Ledbetter and Klasson have been working together for the past 2 years to see whether this mass of almond-shell carbon could be used in these mammoth municipal city GAC vessels. In laboratory testing, almond-shell carbons have proven to have high adsorption ability. Testing in a larger vessel will be done in the upcoming years.—By **Alfredo Flores,** Agricultural Research Service Information Staff.
This research is part of Plant Genetic Resources, Genomics, and Genetic Improvement, an ARS national program (#301) described at www.nps.ars.usda.gov.
Craig A. Ledbetter is in the USDA-ARS Crop Diseases, Pests, and Genetics Research Unit, 9611 S. Riverbend Ave., Parlier, CA 93648; (559) 596-2817.
"Self-Pollinating Almonds Key to Bountiful Harvests" was published in the **April 2010** issue of Agricultural Research magazine.

Entomologist Chuck Burks (right) bags almonds to exclude navel orangeworm while entomologist Joel P. Siegel hangs a pheromone dispenser to disrupt the pest's mating. These techniques are part of an integrated pest management program under way in the San Joaquin Valley.

BASICS IN NORTHWEST BEEKEEPING

Adapted from Ron Bennett and Paul Hosticka, supplemented by editors Iverson, Augustine, & Gunther

Now starts the most exciting period of the beekeeping year. Your bees should have been started, treated and fed, and should be in a dramatic growth mode. The queen (bless her little heart) is laying over 1,000 eggs a day.

Here in the Pacific Northwest, there is about a three week period from the end of April into May where the nectar flow drops to almost zero. This is a very critical situation for your bees. They have been stimulated to build up a huge population to take advantage of the main nectar flow at end of May and are committed to raising and feeding a lot of young bees. Without feed sources around, your bees, which look big and strong and hard working, can actually starve out in the first three weeks in May. So, watch your bees carefully and don't let colony stores get below 15 lbs. If the colony starts to get light, FEED!!! Use a light syrup (1:1 sugar to water by volume).

April is also the time when those beginning with packages get to start having fun. So far it has been getting equipment together, reading and learning the craft, and maybe taking a course. The sunny location has been selected and now all is ready. Putting three pounds of unrelated bees and a queen into a box of foundation and watching them organize themselves into a

cohesive, productive unit is one of the great marvels and joys of beekeeping. Make sure they have constant feed and possibly an antibiotic (traditional) at the start. After a week go in and take a look. Don't worry too much about disturbing them. It will be fine. You should see some drawn comb, eggs, and young larvae. Keep the feed on and add a second box after 6 or 7 frames are drawn out. Spend time watching them at the entrance and learn their habits. Gain confidence by going in and examining the colony every week or so. There will be no new bees for the first three weeks so expect to see some dwindling, but after that the population will explode. Make sure you give them room to grow. Keep feeding; they will let you know when they don't need it by stopping taking it. By the end of the first year you will know all you need to know about the subject. But as Ken Bennett, an old time beekeeper and a founding member of our Association says: "in beekeeping, it's what you learn after you know it all that makes the difference"!

Now is also swarm season when you hope that your neighbor beekeeper is not as good a beekeeper as you are and you can catch swarms from their hives while your good management practice keeps your hives from swarming. Swarm control is probably one of the least successful areas of beekeeping. Swarming is the natural way for bees to ensure the survival of their species, and like all teenagers, the instinct to reproduce is very difficult to control. One of the best ways to minimize swarming is by requeening your hives. A swarm is a portion of your bees leaving with the old queen, and this tends to be with queens in their second year. So by requeening with a new young queen, you not only assure yourself of a strong queen, you cut down on the chance of her swarming.

A second technique is to reverse your hive boxes. The bees will start the swarm process when the queen starts to run out of perceived space in which to lay. Since she tends to only move upward, she does not use the space available below the brood cluster. By reversing the boxes, you force the bees to reorganize their stores and therefore create new space for the queen to lay in. Another method is to remove queen cells as they appear. But this rarely works since it's next to impossible to find all the queen cells and usually the bees have committed to swarming no matter what and just build more cells. Additionally the constant intrusion into the hive will stress the colony greatly. The simple act of adding supers can also make the colony feel they have plenty of room. Give supers with foundation, but only to those colonies that are working in the supers. Place directly over the queen excluder, if you are using one.

With swarming in mind, examine your colonies about every 9 days(on the 10th day a queen could emerge from a cell started right about the time of your last visit. Then it's Sayonara! Adios! Farewell! Sometimes the bees leave *before* the queen emerges!) To inspect: Set off the supers; tilt up the second story, give a puff of smoke, and look for queen cells along the bottom of the brood comb. If you find only eggs or larvae in the queen cells and the hive is crowded with bees, remove all the cells -- top and bottom. Put the hive body containing mostly worker bees or larvae on the bottom board, and the other containing mostly sealed brood on top. Next put on the queen excluder and add supers to provide 10 to 15 empty full depth comb, or their equivalent in the supers. Place the empty comb directly on the excluder.

If you find sealed or ripe queen cells, or possibly hatched ones, divide the colony. Set the top body, usually with most of queen cells, onto a bottom board and cover with a lid. Put this hive on a separate stand. Remove all queen cells from the lower body; put on the excluder and add supers to provide 10 to 15 empty full depth combs, or their equivalent, above the excluder. Several hours later, look for the queen in the divide. If you find a virgin queen (no eggs laid), let her remain, but if you find the old queen pick her up and let her run into the entrance of the colony on the old stand. Let the queen cells hatch in the divide. If you find no attempt to rear queens, and the hive is full of bees, examine the supers and add more to provide 10 to 15 empty full depth combs, or their equivalent, above the excluder.

Think about adding a screen bottom for better ventilation, if you're not already using one, for better ventilation and mite control that doesn't cost any money after installation. Some beekeepers use a additional 3/4-1" hole in the upper box as a entrance and to provide additional ventilation. Bees seem to love these!

Keep on the lookout for American foulbrood and take remedial action as necessary. If it's a very small outbreak it may be possible to remove the affected frames and treat with Terramycin. If treating with Terramycin do not treat with supers on that you intend to extract for honey. Some strains of AFB are terramycin-resistant and the stronger and more residual antibiotic Tylosin can be used. In the event of a full-blown outbreak the recommended action is to destroy the colony and burn the equipment. Non-traditional methods of combating AFB without antibiotics include "Shook Swarming" where all the bees are shaken into clean equipment without drawn comb, just foundation. Equipment except for the comb itself (which should still be destroyed) can be reclaimed by sterilization using an autoclave, gamma irradiation, or a hot paraffin dip. Also baking, scorching, repainting and bleach are helpful techniques for reclaiming equipment

If you have been fortunate and the honey flow has been good, add new supers under supers with capped honey. Remove and extract the supers containing well-ripened honey.

PACIFIC BRANCH ENTOMOLOGICAL SOCIETY OF AMERICA, APRIL 11-14, 2010; BOISE, IDAHO, MEETING: SELECTED ABSTRACTS

http://www.ipm.wsu.edu/PBESA/PDFsPBESA2010/2010_PBESA_Abstracts_Updated.pdf

BUMBLE BEES VERSUS HONEY BEES: A COMPARISON OF POLLINATION SUCCESS IN OREGON CRANBERRIES

Kim Phillips1, Sujaya Rao2, Bill Stephen2 and Linda White1
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2Oregon State University, Crop and Soil Sciences Dept, 3017 ALS, Corvallis, OR 97331

Cranberries (*Vaccinium macrocarpon*), an important crop of cool, cloudy, and windy Southwestern Oregon, face the obstacle of pollination, the necessary precursor to fruit-set. Honey bees (*Apis mellifera*), well known as fair-weather foragers, are rented by farmers in large numbers to saturate the area with pollinators. Their increasing price, decreasing availability, and questionable pollinator efficacy are motivating Oregon cranberry farmers to seek alternative pollinators. Native bumblebees (*Bombus* sp.) forage on cranberries even under unfavorable weather conditions that keep honeybees indoors. However, their impact on cranberry pollination under Oregon conditions is not known.

Our objective was to compare pollination by honey bees and bumble bees in Oregon cranberries. Colonies were connected to 1m x 1m cages and the following treatments were compared: 1) bumble bees; 2) honey bees; 3) control (no bees); and 4) open pollination (all bees).

The experiment was set up in two separate cranberry beds with four replications. Pollination success
was evaluated using the following parameters: berry yield (g/m2), number of berries/m, size of berries, and number of seeds/berry. An analysis of variance indicated that for all measurements, honey bees and bumble bees did not differ significantly from each other. However, due to cage effect, yield in bee pollinated cages was lower than yield in open pollinated plots. Options for build-up of bumble bee populations for enhancing cranberry pollination will be discussed.

EFFECTS OF POLLEN DIVERSITY ON HONEY BEE NUTRITION AND DEVELOPMENT

Ramesh Sagili and Carolyn Breece
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Pollen is the sole source of protein for honey bees and is vital for their development and survival.
Large monoculture, habitat fragmentation and specialized greenhouse farming systems have restricted the choice of pollen diet in honey bees. Several studies suggest that loss of alternative habitat as a result of increasing urbanization, accompanied by loss of cropland and natural vegetation may also be affecting the nutritional status of honey bees. Every year large numbers of honey bee colonies from around the country are shipped to California for almond pollination. Commercial beekeepers also move their colonies to pollinate other specialty crops where the bees predominantly rely on a single source of pollen to fulfill their protein requirement. Very little is known about effects of single source pollen consumption for extended periods on honey bees. In the wake of significant colony losses attributed to colony collapse disorder and deteriorating honey bee health since past two decades, honey bee nutrition has attained greater importance than ever. Nutrition is the first line of defense and is the key in dealing with most of the stress factors that ultimately compromise the immune system of honey bees.
Recent studies have shown that diet diversity has an effect on immunocompetence in honey bees.
Bees that received poly floral diet had increased immunocompetence levels suggesting that protein nutrition and immunity were positively correlated. We are investigating and comparing the affects of single-source pollen consumption versus multi-source pollen on honey bee nutritional status, colony growth and behavior. Preliminary results from our study indicate that treatments receiving single-source pollen for six weeks had significantly reduced hypopharyngeal gland protein content, bee mass and colony growth when compared to multisource pollen consumption treatments.

HONEY BEE HEALTH

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Ongoing challenges faced by the beekeeping industry include parasitic mites, a number of pathogens and a new syndrome (colony collapse disorder) that was first reported widely in early 2008. Washington State University established a Colony Health Diagnostic Laboratory in Pullman WA in Spring 2008 and initiated several applied research projects related to honey bee health.
The diagnostic laboratory now handles over 2800 samples/year and provides beekeepers with data on *Varroa* mite levels (mites/100 bees), tracheal mite levels (percent of bees infested/colony) and Nosema spores counts (spores/bee). These data can be used to make management decisions to provide a more sustainable approach to parasite control.
Applied research projects underway at WSU include investigation of the sub-lethal effects of pesticides in brood comb at the colony level, the distribution and seasonality of *Nosema ceranae*, cryopreservation of honey bee semen and annual importations of honey bee semen from several Old World subspecies for breeding purposes. These projects and current published research on honey bee colony health research from other laboratories will be discussed.

THE GREAT SUNFLOWER PROJECT: HARNESSING THE POWER OF CITIZEN SCIENCE TO ACCELERATE POLLINATOR CONSERVATION

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Data from several places around the world suggests that pollinators are disappearing which has serious implications for our food supply and ecosystem health. The Great Sunflower Project empowers people from pre-schoolers to scientists to do something about this global crisis by identifying at risk pollinator communities. Using sunflowers as a standardized measure for each site where they are planted, participants time how long it takes for five bees to visit their sunflower, creating an index of pollinator service that can be compared across localities. When managed well, the return on investment for this type of science is potentially huge. Even a moderately successful program with 5,000 active participants could accrue 25,000 observations of bees. A wildly successful program with 60,000 active participants could accrue almost a million records in a single year. As of February 2010, the Great Sunflower Project had over 80,000 people signed up to receive seeds-creating the first social network designed to map pollinator service at either a regional or continental scale; and to gather quantitative data that is directly tied to pollinator service, rather than a correlate. Preliminary analysis of the data suggests that over 30% of the gardens participating have little or no pollinator service.

NEONICOTINOIDS, PACKAGE MIXES, RESISTANCE, INTEGRATED PEST MANAGEMENT AND THE PACIFIC NORTHWEST POTATO MARKET

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Almost one out of five insecticides registered on potatoes in the Western U.S. contain a Group 4a neonicotinoid. The leading neonicotinoid, imidacloprid, has recently become generically available. As a result of this, the number of products containing the active ingredient has greatly increased and have become exceedingly cheap. The price of imidacloprid in the potato market has fallen by 90% from its introduction 15 years ago. The class of chemistry is very effective, consistent in performance and now is very cheap, making Group 4 products very attractive to the grower. The number of pre mix insecticidal products registered on potatoes has increased from 1 to six since 2008; all of these products contain a pyrethroid or neonicotinoid. There is tremendous pressure to sell large volumes of both types of chemistries into an industry that has largely escaped development of insecticide resistance. The confluence of generification of neonicotinoids, widespread introduction of insecticidal package mixes, collapse of the pricing structure for potato insecticides and the economic straits of the potato industry in the Pacific Northwest is threatening the delivery of integrated pest management programs and poses significant risk the susceptibility of important potato insect pests.

PHEROMONE MATING DISRUPTION OF *CYDIA LATIFERREANA* (TORTRICIDAE), FILBERTWORM MOTH, IN COMMERCIAL HAZELNUT ORCHARDS

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Oregon supplies the United States with nearly 100% of its hazelnuts. Currently, the key pest threatening commercial hazelnut orchards in Oregon *is Cydia latiferreana* (Tortricidae), filbertworm moth (FBW). The current method of control for this pest is applications of Esfenvalerate (Asana XL), a broad-spectrum pyrethroid. Based on the success of using pheromone mating disruption to control *Cydia pomonella*, codling moth, a taxonomically related

generalist pest, it was hypothesized that similar methods could be used to control FBW. One of two field research seasons was completed during Summer 2009. A synthetic pheromone was tested in commercial hazelnut orchards located in the Willamette Valley of Oregon. Ring and twin-tube dispensers containing synthetic FBW sex pheromone were placed in two orchards at three densities (high, low, and untreated control). Sticky traps containing septa of synthetic sex pheromone at two strengths (1x and 10x) were placed in each test plot. Traps containing live female FBW adults were placed in each test plot to monitor for behavior change in adult male moths. Based on the first set of data, mating disruption by use of synthetic pheromone shows promise but is still inconclusive. Sticky trap counts suggested that the pheromone might have influenced behavior change in males. Hazelnuts from the test plots were examined for FBW infestation, which was less <1% in all test plots.

BOMBUS HUNTII (HYMENOPTERA: APIDAE): A WESTERN NORTH AMERICAN BUMBLE BEE AS A POTENTIAL COMMERCIAL POLLINATOR

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There is presently no commercial bumble bee pollinator native to western North America available for widespread commercial use. Because of concerns over the ecological impacts of transporting pollinators out of their native ranges, there is a need to develop a viable western pollinator specifically for the greenhouse industry in the USA, Canada and Mexico. *Bombus huntii* Greene is native to all three countries and has shown potential for commercial rearing. The present study outlines techniques for rearing the species in a laboratory setting, harvesting a second generation from lab-reared colonies, captive mating, overwintering and pollination potential in a greenhouse setting. Three nest initiation methods were tested and colony growth and size parameters were measured. Queens and males were collected at the end of the first generation and mated in a controlled environment and queens were then placed in an artificial wintering environment. The F1 generation queens were then removed from winter conditions and induced to nest for a second generation. Finally, *B. huntii* were used for pollination of both greenhouse grown bell peppers and tomatoes. These results suggest that *B. huntii* is a good candidate for further development as commercial pollinator.

Bee News Links:

Bees in the City? New York May Let the Hives Come Out of Hiding (Mar 15 2010)
http://www.nytimes.com/2010/03/15/science/earth/15bees.html

Bee hotel trains residents as bomb sniffers(Mar 22 2010)
http://www.newscientist.com/article/mg20527524.000-bee-hotel-trains-residents-as-bomb-sniffers.html

Smithsonian Scientists Report That Social Bees Have Bigger Brain Area for Learning, Memory(March 26 2010)
http://newsdesk.si.edu/releases/stri_social_bees_have_bigger_brain_area.htm

Down-Regulation of Honey Bee *IRS* Gene Biases Behavior toward Food Rich in Protein
http://www.plosgenetics.org/article/info:doi/10.1371/journal.pgen.1000896