Washington State Beekeepers Association

Keep the "Bee" in Business

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President's Message

Last month I think I messed up on the field days so I will try again. Pullman is set for Saturday June 24. We will have a wine and cheese social Friday night and I think we have a good program going. There seems to be a little concern about the date for Puyallup so until we can reconfirm that I'm not admitting to any thing. As the summer progresses things come up and make it difficult to pin some things down for everyone.

The Spokane bee yard was ready for it's queen checks today and we had a great turnout of beekeepers new and old. We went through each hive and showed how to inspect and what to look for. Even old timers learn at a field day. Started with 24 packages two weeks ago and we lost one. 23 still going good. All new equipment and foundation. Nothing prettier than new fresh drawn white comb. They should be ready for our queens from WSU.

Tim Bueler and Bill Markus have been hard at work getting the Mount Vernon bee yard up and running. The associations involved are Skagit Valley Beekeepers (SVBA), Northwest District Beekeepers (NWDBA), Stanwood-Camano Beekeepers (SCBA). We are hoping Mt Baker will join in this effort. The bees will be moved to a location at Mount Vernon shortly. Great work. It is great to see beekeepers working together and learning from each other.

My experience with new beekeepers is that they need hands on work with experienced beekeepers to have a really good experience. Having local bee yards to work and show the beginners will give every association many returns. Wait till everyone gets a chance to raise a few replacement queens for fall re-queening. Looking forward to our experiences with the new yards.

Several new meds available from the supply houses and approved for use in Washington. At the Pullman field day we will be showing all of the new ones and how to use them. Looking forward to being able to use different ones each year. We are all looking for a good honey year.

Jerry Tate

USDA Offers Farmers Market Resource Guide

Farmers markets throughout the country are opening their doors for business, and USDA's Agricultural Marketing Service wants to help. The Farmers Market Consortium is a public/private sector partnership dedicated to helping farmers markets by sharing information about available funding and resources. The Consortium's Farmers Market Resource Guide promotes a free flow of information between the programs that support farmers markets. It is divided into four types of projects: market development, producer training and support, consumer education and access, and market promotion. The Farmers Market Resource Guide and Press Release can be viewed by following the links:

http://www.ams.usda.gov/farmersmarkets/Consortium/ResourceGuide.htm

Washington State Updates

Program Calendar for the Association.

FIELD DAYS & CONVENTION 2006:

JUNE 24	Pullman Field Day @ WSU
JULY (TBA)	Puyallup Field Day
OCTOBER 12 to 14	State Convention Best Western Lakeway Inn Bellingham, WA

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Field days planned

June Field Day in Pullman:
Friday night gathering June 23rd with wine and cheese with a honey tasting and exchange in the "big" lecture hall in the newly completed "CUE" building (center for undergraduate education). Also, possibly some short intro talks and bee films for fun.

Saturday June 24th there will be 4 separate event sessions each about one hour long – with multiple topics at each.
Gloveless beekeeping – colony handling with awareness of bee behavior; colony growth dynamics and swarm control; making splits. **Varroa treatment** and monitoring options; freeze kill demo for hygienic behavior assessment; drone marking and clipping; even a Varroa finding contest ! **Honey bee biology** and physiology lectures; microscope lab with form and function demos (stings, pollen collecting structure, wing hooks, proboscis, male genital structure, antenna cleaner, etc.); walk through and intro to Apis Molecular Systematics Laboratory and research projects. **AFB demonstration**, disease talks and posters; woodenware dipping, equipment demonstrations. Even honey bee Olympics!

Plus some new features!
Friday night – word wide honey tasting and beekeepers exchange. First - a blind honey tasting exercise…more than 20 different honeys from around the world for you to taste and judge and try to match with the correct source. Second – beekeepers honey exchange. Each beekeeper brings up to three one pound jars of their own labeled honey and places it on an exchange table. At the same time – they can choose three different jars of honey from the exchange table. A chance to try out other sources around the state!

Saturday – woodenware dipping – we will have a linseed oil-beeswax heated dip tank set up to demonstrate our "no-paint" woodenware processing. Beekeepers are welcome to bring up to two new untreated deep bodies, with lid and bottom (o.k. a couple of honey supers too) and use the tank to dip their own equipment. The dipped equipment will be wet – so plan your return in the car or truck accordingly - a drop cloth is recommended.
Varroa finding contest - one moderately infested Varroa colony will be available. This is an individual competition. Each beekeeper competitor opens the colony and the time it takes for them to find and show the judge three to five different Varroa mites is recorded (depending on the infestation-level). The beekeeper with the shortest time is the winner.
Beekeeping Olympics – Each local association can field a two-person team. A number of beekeeping tasks will be given to the team (putting on veils, lighting the smoker, finding the queen, finding eggs, finding drones, pointing out pollen, etc). Timing is everything, but points will be deducted if the team causes the colony to alert and sting. The winner becomes the 2006 statewide beekeeping Olympic champion!

July Field Day in Puyallup: More info coming from the planning committee in the next newsletter!

Classified Ads

Shallow supers, in lots of 100, $5.00 each box. Nine frames each with fully drawn comb.
Call Bruce Bowen at 360-422-5146, or 360-961-1793 (cell).

Two used Dadant coveralls, each with zippered veil (metal zipper) and tan woven helmet.
Size Medium: very good condition $45
Size Extra Large: veil needs repair $35
Call Paul at 360-297-6743

Honey Vendor needed for Cle Elum, WA Farmers' Market.
The market is in full swing from now until October. We understand local honey is in short supply right now, so if you can sell honey at our market later in the summer, please contact us! If you have honey right now, please contact us! Our Market is on Saturdays on the grass lot next to "Pioneer" Coffee, from 10 a.m. to 2 p.m. We are on Cle Elum's main street, so we get ALOT of traffic due to our "recreation" location.
Please contact: Cathy Carroll, Market Manager
trademark@iezpc.com
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Bee Yards Created for WSU Queens

On the West side of the state, Tim Bueler, with Bill Markus of Skagit Valley Beekeepers are working with the dean of Skagit Research Station, Dr. Debra Inglis, and the farm and orchard managers to create an apiary sponsored by local beekeeping associations. Dr. Inglis and Bill will get together with the managers to determine the actual apiary site when the weather is a little more cooperative. There should be hives ready for as many as 20 research queens for WSU.

On the East side of the State, Bob Arnold and the Inland Empire Beekeepers created a brand new apiary for WSU queens. There is nothing so nice as brand new equipment and package bees. From the photos below, it looks like everybody had a great time!

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Breeding bees, mite resistance & limitations of bee research

…consumer demand in this area can have a significant role in changing the habits of and the genetic stocks distributed by the commercial industry.

Originally published in the May 2006 issue of Bee Culture "Research Reviewed", re-printed by permission from the author; Dr. Steve Sheppard, Thurber Chair, Dept of Entomology, WSU.

This month, I diverge from the normal format of this column to bring up an issue that has a bearing on the relationship between beekeepers and bee researchers. Within the community of researchers, there are those who, as part of their assignment or avocation, conduct bee research that has a readily discernable "applied" aspect. Thus, a researcher who is working on a novel control measure for a honey bee pest or disease or on an improved field technique to evaluate colony health or honey production would fit this description. Alternatively, scientists who conduct research on the distribution and degree of hybridization among natural populations of honey bees in a distant land or work to unravel biochemical pathways within the physiology of the honey bee also gather data that, ultimately, can be applied to solve challenges faced by beekeepers, although the connection may not be so obvious or immediate. Within the circle of possible projects that a researcher can choose to work on, there will be research topics that strike a chord with some and not other members of the beekeeping community. That is to say, there will be differing opinions on the relative importance of specific topics. In addition, the researcher will have to rank possible research projects in the light of other criteria such as their technical, financial or personal limitations. So far – all of this is straightforward. However, limitations exist even when a specific problem is so prevalent that beekeepers and researchers agree there is a major challenge?

Most beekeepers probably would agree that the negative impact of the parasitic mite Varroa destructor on the colony heath of managed honey bees in the U.S. is one of the greatest challenges facing beekeepers. In contrast, the tracheal mite, Acarapis woodi, while a contributor to colony mortality in some parts of the country, would be considered secondary in importance as a threat. There may be information to be gleaned from thinking about this contrast a bit further. First, as beekeepers, we have allowed tracheal mites to place "pressure" on the honey bee population to a much greater extent than varroa mites. What do I mean by this? Answer the following questions: Out of all the beekeepers you have known within the past decade, how many of them treated one or more times per year for V. destructor (or still do)? How many of them treated one or more times per year for tracheal mites (and still do)? A quick survey will likely show you that some beekeepers within your sphere of acquaintance no longer treat for tracheal mites, while that is likely not the case for V. destructor. If the above scenario is true – then what has been a possible consequence of these actions by beekeepers? Clearly, populations of bees that are susceptible to varroa are still with us and reproducing, thanks to chemical inputs that have kept generations of these bees alive in the face of varroa infestation. On the other hand, the current lassez faire attitude of many beekeepers to tracheal mites suggests that after an initial decade or so of significant population losses, the U.S. honey bee population of today is more resistant to tracheal mites than when the mites appeared in the mid 1980's. The initial heavy losses across the U.S., coupled with the relatively narrow temperature range where menthol treatment is effective, means that selection probably played a role in changing the honey bee population to become more resistant to tracheal mites. Thus, honey bees that were most susceptible to mites were less successful in leaving offspring compared to the more mite-resistant stocks. Indirect evidence for this scenario comes from the historical patterns of tracheal mite / honey bee interactions in Europe. After tracheal mites became established in continental Europe around 1920, there was an initial couple of decades of notable colony losses and published efforts to come up with effective control measures. Interestingly, menthol (in the form of peppermint oil) was also used for tracheal mite control during that time. However, as time passed, European beekeepers became less concerned with these mites until, eventually, they were no longer considered a significant problem. Today most European beekeepers today give little notice to tracheal mites within their apiaries.

So what is it about the varroa mite story that has been different? First, as mentioned above, most beekeepers still actively treat their colonies for V. destructor. The primary legal (and illegal) hard chemicals that are in use have become much less effective due to mite resistance. Unfortunately, the possibility to incorporate colony and mite population cycles (broodless periods, etc.) as part of an overall IPM program to reduce hard chemical use, has been perceived as somewhat remote for important sectors of the beekeeping industry. For example, larger migratory beekeeping operations, such as those that provide pollination for most US agriculture, usually strive to maintain strong populous colonies. Stimulatory feeding to promote brood production at "unusual" times of times of the year ("unusual" relative to the population growth curve of a stationary colony) is a fundamental aspect of the management system. Encouraging high brood productivity throughout much of the year leads to tremendous potential for mite population growth and tremendous pressure on beekeepers to find effective mite control. The economics of the managing large operations also provides incentive to minimize the time input for mite treatments. The majority of package and queen producers find themselves under some of the same pressures, as they strive to produce the maximum number of bees and queens for sale during a limited season. So what does this mean? It means that most of the current honey bee populations in large scale migratory operations and most of the queens and bees being produced by queen producers have come from management systems where miticide use was required to maintain strong colonies. Thus, unlike the situation with tracheal mites, until now there has been

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Breeding bees, mite resistance & limitations of bee research, continued

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little opportunity for selection to change the overall honey bee population in the U.S. to one that is more noticeably resistant to varroa mites.

Does the continued presence of varroa-susceptible honey bees in the U.S. mean there is little hope for the development of mite-tolerant strains? Not entirely…there are several reasons to be optimistic. First, we have good evidence that there exists within A. mellifera the genetic capacity to co-exist with *V. destructor*. Researchers have shown that certain selectable traits, such as SMR (suppression of mite reproduction) can confer tolerance to *V. destructor*. Expression of the SMR trait can be increased in a honey bee population through selective breeding. Prior to these findings, it was known that Africanized honey bees could survive varroa mites without treatment. In fact, mite population levels within infested Brazilian AHB colonies declined in the decade following the initial varroa introduction. Brazilian researchers attributed the change to natural selection favoring greater reproductive success for those colonies that were better able to keep mite populations low. Secondly, reports and advertisements in current US bee journals suggest that some honey bee stocks have already been selected by the bee breeding community to exhibit higher levels of tolerance to varroa mites. Some of these reports cite the use of an initial "survivor stock" selection program with subsequent selection of breeding stock being undertaken without the further use of miticides. Taken together, these could be seen as reasons for optimism that U.S. beekeeping will be able to move away from a reliance on unsustainable chemical programs for mite control. Newer "soft chemical" control measures are becoming readily available and are highly compatible with the use of management tools and genetic resistance. However, there are potential barriers along the road. One of these is the possibility that the beekeeping industry as a whole will not support nor sustain the selection of genetic resistance and, instead, will continue to rely almost exclusively on chemical control of mites. This will be through no malicious intent, rather it will reflect the inability of some beekeepers to find a way to survive economically and keep their bees alive without continuing to apply low-time input chemical controls. The economies of scale for maintaining 10,000 colonies of bees, while perhaps positive for large scale honey production, can also be negative when it limits the "handling time" that can be devoted to monitoring mite populations, making control decisions and performing manipulations at the individual colony level.

So, getting back to the start of this column…what about limitations? Is time and money better spent working on a short term solution (short term because we know mites can rapidly develop resistance) to develop easily applied chemical controls that can kill mites or would it be better to focus on a long term solution such as breeding a honey bee that can survive without mite control chemicals in the post-varroa world we live? Arguably, both of these research directions are "applied", although one might be seen to be a bandage for a serious wound and the other a means to prevent such wounds in the future. Ironically, continued use or overuse of hard chemicals to control mites works contrary to the development of mite-resistant stocks through breeding for the reasons mentioned earlier: primarily, miticide use continues to shore up a susceptible gene pool of honey bees. In fact, perhaps the biggest challenge of the breeding approach, whether in a grant supported university program, a USDA honey bee selection program or an innovative private or commercial effort is the need to make fundamental inroads into the overall managed honey bee population.

If a balance can be found among these issues, it will come through a wider realization among beekeepers that the genetic composition of their bees is of paramount importance. I reckon that dairy farmers, turkey growers and thoroughbred horse owners have known the importance of selective breeding all along. Until now, bee breeders have concentrated on selecting bees for honey production and perhaps rapid colony buildup to suit the needs of their commercial honey producer and pollination consumers. However, it is no longer good enough to buy a queen that can produce a lot of brood and produce a honey crop only when being constantly medicated to survive. It is time to ask your queen supplier what she or he is doing to help the situation. If they are keeping their bees alive for breeding and package production only through the application of home remedies of miticide active ingredients, how well do you expect these bees to perform, unless you too are willing to administer a constant stream of chemical control ? Do you want to continue to keep bees derived from stocks that have no measurable tolerance to varroa mite infestations? A queen producer that strives to incorporate mite resistance into his/her stocks should be supported and those that succeed should be promoted. I guess the final word on this is that consumer demand in this area can have a significant role in changing the habits of and the genetic stocks distributed by the commercial industry.

Master Beekeeper Program, Certification Update

Master Beekeeper Certification Course: Category #5
Name: Enemies of Honeybees
By: Louis A. Matej (Pierce County Beekeepers Association)

Subject: A history and general overall evaluation of the different approaches to control of Varroa Mites (*varroa Destructor*) affecting Honeybees (A*pis Mellifera*) over the years.

PROPOSAL

The history and affects of Varroa Mite infestation in honeybees.
A condensed evaluation of various approaches to the eradication of Varroa Mites.
More recent approved methods for control Varroa mites.
Some ongoing research and potential approaches to the eradication of Varroa Mites including the identification, history, evaluation and potential for use of the fungus *metahizium Anisoplieae* and other fungi as controls for Varroa Mites. The advantages and disadvantages of their use.
Methods used for the detection of Varroa mites.

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Master Beekeeper Program, Certification Update, Continued

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ABSTRACT

Enemies of Honeybees: A history, general overview and evaluation of the different approaches to the control of Varroa Mites (*Varroa destructor*) affecting Honeybees (A*pis mellifera*) over the years..

Over the past years since the advent of the existence and discovery of Varroa Mites in the hives of honeybees, there have been numerous approaches to the treatment and eradication of these mites with varying degree of success. This paper will name and evaluate these approaches from a practical point of view.
We know that Apistan® Strips were approved by the FDA for use and have been relatively successful when used properly, however, since their first use years ago the mites have built up some resistance to Apistan®. I want to study this and see why this happened and to what extent and also to determine future effectiveness of Apistan®.
We also know that Coumaphos is a more recent product which is approved for use, but there have been reports of it's negative affects on queen life and productivity. I want to study this and see how much affect the use of this product has in controlling Varroa Mites and also to what extent the use of it has had on the quality of queens and brood production.
There have also been numerous other products, some approved and not approved, for the control of Varroa Mites. One of these is the use of screened bottom boards. Others are the use of mineral oil and formic acid. I want to evaluate each of these and see what their effects are in the control of mites, safety to the beekeeper and the public and both the quantity and quality of the honey being produced.

The History of Varroa Mite Infestation

Symptoms of Varroa Infestation

Individual bees infested with Varroa mites are harmed in 2 ways. First, by loss of haemolymph, which in itself is very serious. But second, by the puncture wound, which allows infections and other diseases to enter. Even in low infestations, bees suffer weight loss and shortened life. If the bee pupae has a less than 6 mite infestation, the bee will usually reach maturity. The infecting mites, therefore, reach maturity as well. Bees infected with even one mite will lose 6 to 7% of it's adult weight and their lives are shortened by as much as 50%. If the mite infestation is 6 or more, the bee will probably lose 25% of it's weight or in many cases will die and never leave the cell. Thus, the mites will also not reach maturity.
Other damage includes asymmetrical wings, misshapen legs, and shortened abdomens. Drones have a reduced number of spermatozoa, reduced weight, and less flight frequency. In sum, a colony infested with Varroa, if no control measures are taken, will weaken significantly and die. Without beekeeper intervention, there is a 10 to 15% mortality rate in the first year, 20 to 30% mortality rate in the second year, and almost 100% by the third year. A colony with Varroa mites, with no treatment, at most, will not survive more than five years. This is why there are very few if any feral bee colonies left.

History

Ever since the discovery of Varroa, there has been an ongoing, even up to the present, quest to eradicate them from the beehive completely, practically and economically.
Varroa mites belong to the family of arachnids having four pairs of legs. They have point eyes, unlike the normal eyes of most insects, which can only distinguish between light and dark. The mite is oval in shape and looks very similar to the linseed, including the color which is light (younger mites) to dark brown (mature mites). The females are larger and can be seen within the hive, on the bees, or on the bottom boards. The males are found in sealed cells and usually die soon after crawling out.
The ectoparasitic bee mite, Varroa jacobsoni, (later named Varroa destructor), was first discovered in 1904 on Apis indica (Japan,

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Queens, Bees, Honey & Pollination

Master Beekeeper Program, Certification Update, Continued

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the Philippines, Asia, India and China). It wasn't discovered to be present on *Apis mellifera* until 1962 in Hong Kong and in 1963 in the Philippine Islands. With the age of modern ever-increasing speed of air and rail transportation, honey bees were easily transported from one country to another, Prior to 1970, the Mite *Varroa jacobsoni* (later named Varroa Destructor) made it's way with honey bees from Asia into Europe. From there it was transported to Africa. Thus, from there, it finally made it's way to the Western Hemisphere in the early 1970's. Varroa is believed to have arrived in the US around 1987, first being discovered in Minnesota and Florida. It is also believed that these mites may have been present in US hives for about 2 years before being discovered.

Varroa was first found in Europe in Bulgaria in 1971 and in Denmark in 1984. Ireland was the last European country to discover the presence of Varroa.

Along with the beginning of research into searching for a chemical control for this mite, there were some who were beginning a regimen of establishing a genetic means of mite control. Federal and state regulations control the use of all chemicals for the treatment of Varroa infestation in honeybees. Therefore the process of coming up with a legal effective means of control took time. In the mean time, *Varroa destructor* was beginning to take it's toll on the honey bee industry. Losses in bee colonies increased for a number of years prior to the onset of initial chemical miticides. The presence of feral colonies of honeybees declined substantially.

A condensed evaluation of various approaches to the eradication of Varroa Mites

Genetic Control

Ever since the discovery of Varroa, there has been an ongoing, even up to the present, attempt to control the mite through genetic breeding of bees. According to Dr. Michael Burgett, professor of apiculture, Oregon St. University, it is theoretically possible to breed a strain of bees which will, through enhanced grooming, physical removal of the mites or other means, be mite resistant. This is not equivalent to being mite free. It means that these bees demonstrate a higher resistance to mites then other North American lines of bees. He further says that bees do not live in the laboratory and the practicality of maintaining these desired genetic characteristics is limited. This dilution or losing of genetic traits is due to the constant uncontrolled queen honey bee mating and the constant moving of bees on a commercial scale.

Since this article by Dr. Burgett, there have been a number of genetically engineered strains of bees pertaining to be mite free.

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Honey News (from National Honey Board)

Four exciting new honey product concepts, developed through NHB's applied science research programs, will be front and center at NHB's booth at the annual Food Marketing Institute (FMI) Show, May 7-9, 2006, in Chicago, Ill. Show attendees will sample each of the four new products -- non-sticky honey disks, dulce de leche, honey balsamic vinegar and whipped honey topping – all made with 100 percent pure honey as the key or sole ingredient.

- **Non-Sticky Honey Disks:** Perfect as a healthy treat, a sweetener or a throat soother.
- **Dulce de Leche:** A South-American inspiration, this luscious topping uses pure honey as its main sweetener.
- **Honey Balsamic Vinegar:** This product offers the rich flavor or the popular balsamic vinegar with a lightly sweet honey undertone. It contains no sulfites.
- **Whipped Honey Topping:** Made with pure honey, this product takes on the delightful texture of marshmallow cream.

FMI touts its show as the premier global marketplace for food industry leaders. Thousands of supermarket retailers and wholesalers from all over the world attend the show each year.

http://www.fmi.org/events/may/2006/index.cfm

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Honey News, continued

Honey Stix a Hit at Coffee Show; Honey Producer Involvement in Shows Could Lead to Sales Opportunities

Honey stix were a huge hit at NHB's booth at the Specialty Coffee Association of America 18th Annual Conference & Exhibition in Charlotte, N.C., April 7-10. Many of the thousands of show attendees were also able to sample a honey-based Dulce de Leche, whipped honey spread and solid honey wafers at NHB's booth. All of these products are the result of NHB's applied science research effort. The show was attended by coffee shop owners and various other types of companies involved in the coffee industry. It was the first time NHB had participated in this show.

NHB urges honey companies and individual beekeepers to consider participating in similar coffee and tea trade shows, as they represent an opportunity for companies and individuals to sell their products. Such participation could involve exhibiting at shows, or simply attending and circulating product information. Pairing local varietals with a specific type of tea or coffee is one suggested display idea at such shows.

Several shows, sponsored by industry organizations, are held throughout the year at various sites around the United States. For more information visit the following web sites:

Coffee Fest (includes three regional shows)
- http://www.coffeefest.com

Fresh Cup Roadshow (four regional shows)
http://www.freshcuproadshow.com

Specialty Coffee Association of America (SCAA)
- http://www.scaa.org

World Tea Expo
- http://www.worldteaexpo.com

Information also may be obtained by contacting Charlotte Jordan at charlotte@nhb.org or at 800-553-7162.

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These include a Russian and a Yugoslavian strain of honeybees. Also the Ohio Queen Breeders have developed a number of strains of bees containing what they term the SMR gene (Suppression of Mite Reproduction gene).

In a recent article in Bee Culture, Dr. Steve Shepard indicated that 2 research projects done 10 years ago are still very much relevant today. One study found that Africanized Bees shows a much higher resistance to Varroa mites than Carnolian Bees; thus the bee strain plays a very important part in mite resistance. The other study suggested that bees demonstrating a higher degree of bee grooming behavior were more mite resistant and those which had a lower grooming behavior. This shows that if bee breeders can bring onto the market bees which not only have this SMR gene as well as a high grooming behavior, it may be the key to mite eradication.

However, the practically of maintaining the mite resistant traits of these strains of bees is difficult and limited when used by the average commercial and even hobby beekeeper. But I think that if we can saturate the industry with genetically engineered queens and bees, thus reducing cross breeding with queens not having these traits, we would be very much on the way to decreasing mite infestations in bees.

Drone brood

One of the earliest methods for decreasing mite infestation was to destroy capped drone cells. This involves going through all the frames of each hive and destroying drone brood at least every 15 days. As you can see this method proved to be very time consuming. Although this method proved to decrease the number of mites it did not eradicate them entirely in a given hive. So unless this time consuming technique is maintained during the warm months of the year, the Varroa mite problem in each hive would eventually get worse.

Meshed Bottom Boards (anti-Varroa Bottom Boards)

The use of meshed bottom boards has increased over the past few years. The bottom boards consist of a wire mesh instead of a solid wood surface. When mites are removed by the bees or fall from the combs, they fall onto a the bottom board where they may crawl back into the hive or more likely attach themselves to bees entering or leaving the hive. The purpose of meshed bottom boards is to force any falling mite to pass through the mesh and out of the hive. Although this does not solve the problem of mite infestation totally but it has been used effectively in reducing the mite population. This may be all that is needed for survival of a strong hive with a low mite infestation but it would not prevent the mite population to eventually increase. Another important advantage for using meshed bottoms boards in conjunction with chemical miticides is that it reduces the possibility of the mite developing a resistance to the miticide. When mites fall to the bottom after being slightly affected by the miticide and still survive by being brought back into the hive by other bees, there is sufficient time for the mite to pass on an increasing genetic resistance to the miticide. But if the mites fall through the meshed bottom board and do not return to the hive, this tendency is reduced.

Meshed bottom boards have been found to reduce the mite populations up to 25%. In highly infested hives, their use, along with an integrated pest management system involving one or more other mite reducing procedures, including the use of Apistan ® or Coumaphos, will prevent the hive from weakening and increase honey production.

So the use of meshed bottom boards is recommended for reducing mite populations. One consideration which should be mentioned for those using meshed bottoms boards is that they do allow more air into the hives and this is not good during the winter months when cold air will hurt the clustered bees. It is important to prevent this cold air entering the hive by placing a plastic or wooden shield under the mesh in the place where you normally would place a sticky board for capture of mites for counting.

Smoke from Natural Products

Beekeepers routinely use smoke to calm their bees down before opening the hive. Different types of smoke have been studied to be used as a miticide. One of the most talked about smokes is that from Tobacco leaves. It has been found that this smoke

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kills mites. Smoke from many plants have been tested; one paper mentioned 40 plants. Grapefruit leaves, Eucalyptus leaves, and creosote bush leaves are just a few. In some cases 90 to 95% of mites are knocked down off the bees with the use of certain smokes, particularly grapefruit leaves and creosote bush leaves. While the mites are killed using tobacco smoke, the smoke from grapefruit leaves does not kill the mites and if they are not removed or trapped at the bottom, they most likely will return to the hive. Another problem with smoke is that it causes harm to the bees, especially if it is used repeatedly as is necessary for the eradication of mites. The question would be: Does the used of repeated smoking cause more damage to your colony than the benefits it has in reducing mite populations? It would seem the use of smoke is too harsh.
However, it can be used sparingly in an integrated pest management system to help reduce the mite population.

Essential and Aromatic Oils

Ever since the onset of Varroa mites as a destructor of honey bee colonies, beekeepers and researchers have been studying and testing the use of hundreds of essential and aromatic oils as miticides. Some of them have been reasonably effective and others harmful to bees and/or not effective at all. I could not go over all of the essential and aromatic oils studied but I can give you a list of some of them and give you an evaluation, based on research data, concerning a few of the ones thought by some beekeepers over the years to be good miticides. Here is a list of some of the common essential or aromatic oils studied:
Clove Oil, Lavender Oil, Wintergreen Oil, Peppermint Oil, Cinnamon Oil, Rosemary Oil, Tea Tree Oil, Spearmint Oil, Melaleuca Oil, Patchouly Oil, Pennyroyal Oil, Sage Oil, Thyme Oil, Cumin Fruit Oil, Eucalyptus Leaf Oil, Worm Wood Flower Oil, Terpeniol Oil, and Menthol Oil
When Varroa mites feed on the larva which contain essential or aromatic oil, their reproduction is interrupted by preventing the female mites, if the concentration is strong enough for that oil, from laying eggs. At lower concentration, if eggs are laid, the development of the immature mites is delayed. The bees emerge from the cells before the mites mature and thus die.
Some of these oils such as Worm Wood Flower Oil, Clove Oil and Peppermint Oil have given very promising results in at least one study I looked at (Al-Abbadi and Nazar). Others on the list gave less promising results. One of the most important things to remember concerning the use of any of these oils is that a good result is dependent on the fact that two or three applications must be applied per month. And the applications consist of feeding the bees sugar syrup containing the oil. This must be done during the infestation periods in the fall and in the spring. A consistent program of application must be maintained and then a 2 to 4 fold mite death result was reported, as shown in the above mentioned paper, over the control group receiving no treatment. This is very time consuming and it may be very feasible for the average hobbyist with only a few hives, but is not practical for the commercial beekeeper. No adverse effects on the bees have been demonstrated, however, time of application is extremely important and must be done at the right mite infestation level and life cycle of the mite. Other beekeepers and testimonials give very negative results using these oils and were disappointed. These beekeepers used oils for a given period of time using various methods of application after which they applied Apistan® Strips. They found a significant number of dead mites indicating that the oil treatments did not kill the mites adequately. Some research involved the use of mixtures of various oils. One of these is called Api-Life® which has been used in Europe. It consists of a blend of Thymol (76%), eucalyptol (16.4%), menthol (3.8%), and camphor (3.8%). From what I've read there still is much speculation about the use and effectiveness of essential and aromatic oils. The oils examined to date, although they do have some positive outcomes, have not provided consistent control under a range of conditions and therefore do not seem a very good overall miticide when considering the entire bee industry. What is needed is a demonstrated and proven effective and easily applied miticide which all beekeeper can and will use.

Food Grade Mineral Oil (FGMO)

A number of people has tried and tested Food Grade Mineral Oil applied using various methods to control Varroa mites. One of the methods was the use of FGMO/Sugar coated paper strips or waxed paper having FGMO. These were placed on the top and/or bottom boards. The bees would chew the strips and the FGMO would eventually be passed throughout the colony and into the brood. Another method used the same solution of an FGMO/Sugar emulsion coated on 40 inch long Welt Upholstery Cords. Another method incorporated the use of Burgess Propane Insect Fogger dispensing pure FGMO. The use of Food Grade Mineral Oil is inexpensive and very easy to apply, which had great appeal to the average beekeeper. There was a lot of hope for the use of FGMO, and especially it's application using the fogger technique. Some research projects and beekeeper testimonials have stated that the population of Varroa mites in their colonies were controlled significantly by the use of the fogger. However, other research projects and testimonials have indicated that the use of FGMO, while it may decrease the mite population some in some cases, has not proved to be an effective miticide overall. And in some cases it has been reported that the use of FGMO was similar to the control groups, which showed an increase of Varroa mites while at the same time other miticides, such as Coumaphos, which showed a decrease of mite population. This, of course, was before mites developed a resistance to Coumaphos. I will discuss Coumaphos along with it's effectiveness and problems, later on.
So what can we conclude from all these projects and testimonials? FGMO seems to reduce the number of Varroa mites in a colony but personally I cannot conclude from all these results that FGMO is conclusively an overwhelmingly effective miticide since there is so much speculation and differences in results observed and is very labor intensive.

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Thymol, Thyme Oil, Apiguard, and Apilife VAR

Thymol is a natural substance derived from the thyme plant and has been claimed to control Varroa and Tracheal mites as well as Chalkbrood. Thymol based preparations have been studied extensively in the attempt to eradicate Varroa mites without hurting the bees themselves or effecting the honey crop. Various mixtures of Thymol or Thyme oil and Food Grade Mineral Oil have been used. This has been applied either as mixture saturated strips of Upholstery cord placed between the frames or by the fogger (both techniques mentioned above). Pure Thymol crystals themselves have been used as well. Thymol crystals in their pure concentrated form are very toxic not only to humans but also to bees and the use of them directly as a miticide is not safe, even though it has been used in special Thymol trays. Thymol crystals, similar to Menthol Crystals, must be used with care not to handle them without gloves and not to breathe the fumes. The outside temperature must be 59 F for the crystals to work effectively.

Apiguard® is a sophisticated slow release gel matrix containing 50 grams of 25% Thymol in aluminum trays. The manufacturer claims that Thymol in this form kills from 93 to 98% of the Varroa mites.

ApiLife VAR is another product sold in tablets for the control of Varroa mites. It contains a 100 gram mixture of 74.08g of Thymol, 16g of Eucalyptus,, 3.7g Camphor, 3.7g Menthol and the remaining grams are a Vermiculite support. The manufacturer instructs that these tablets are to be broken into 3 or 4 pieces and placed on the top frames of the hive. Again, temperature is important for the proper release of ingredients.

In some evaluations of these products and Thymol in general, the results in killing mites were only moderate and well below what is required to reduce mite populations to levels suitable for bee hive management.. The most detrimental aspect about these two methods is that Thymol is readily absorbed into wax and into honey. Some beekeepers have indicated that the honey from hives treated with Thymol, either as a gel or as crystals, contains a significant amount of Thymol, even if the Thymol was used before honey supers were added or before the honey flow. Therefore it is not recommend for use as a miticide since it's use will affect the honey crop.

As stated above the use of Thyme Oil in conjunction with Food Grade Mineral Oil have been used with the Burgess Propane Insect Fogger. This has shown to be somewhat effective in reducing the population of Varroa mites but it causes an increased bee mortality as well as leaving residual Thymol in the honey. I have not found any studies discussing how Thymol affects the queen and brood production. Thymol has not been recommended for use, mainly because of it's residual presence in honey even if Thymol is removed before the addition of honey supers.

Apitol®

Apitol® is a product for the treatment of Varroa mites which has the chemical cymiazole hydrochloride as it's active ingredient. It is applied by feeding in a sugar syrup. Supposedly it works as a systemic miticide being absorbed in the haemolymph of the bee and thus kills mites as they suck on the haemolymph. It is a somewhat harsh treatment as it recommends that it should not be used on weak colonies. And it also states that in the fall, when it is applied, brood should be destroyed. I did not adequatelquately understand their reasoning for this. This is another chemical treatment and beekeepers are more and more wanting to avoid the use of harsh chemicals in the hive.

Apivar® , Amitraz

Apivar® is a product for the treatment of Varroa mites which has the chemical Amitraz as it's active ingredient. It is applied as an impregnated plastic strip. Initially it was thought to be promising from results in Europe and it was scheduled to be used in the US, but in 1993 it was pulled from consideration for some reason.

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SAVE THE DATE!

THIS YEAR THE 2006 CONVENTION IS IN BELLINGHAM WASHINGTON AND IS SPONSORED BY THE MOUNT BAKER BEEKEEPERS ASSOCIATION.

Thursday, Oct. 12, **2006**, Friday, Oct. 13, 2006 and Saturday, Oct. 14, 2006

FOR ALL YOU FORWARD THINKERS……

OH BOY, ANOTHER DATE!
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Thursday, Oct. 18, **2007**, Friday, Oct. 19, 2007 and Saturday, Oct. 20, 2007

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Bavarol® Strips

Bavarol® Strips are another chemical treatment for Varroa mites. It comes in plastic strips containing the active substance Flumethrin (a Pyrethroid). Four strips are to be used per hive unless the hive is weak; then only two strips are to be used. Bavarol® is manufactured by Bayer and it was a precursor to and eventually replaced by Check-Mite+® Strips which were found to be better for controlling mites and for safety in the hives. Although we later learned that Check-Mite+® also had problems with resistance and absorption into the wax, which caused queen problems.

Oxalic Acid, Lactic Acid

Using Oxalic Acid or Lactic Acid for mite reduction in honey bees requires that the bees are in a broodless or swarm like state as they only are effective against mites that are on the adult bees.

Early in the 1990's the use of Oxalic Acid was tried by some beekeepers, who were experimenting to find a control for Varroa mites. One group used 30 grams of oxalic acid per liter of (50:50) syrup which yields a 3% solution. This is a very weak solution and because of this they were able to spray this solution directly onto the frames of bees but they also used a trickle down treatment. They used a total of 3 to 4 ml. per 10 frames. Treatments must be repeated several times. They compared this treatment with the use of Apitol and Perizin, which are 2 European pesticides similar to Apistan®. In 1994 they experienced a 98.3% mite kill and in 1995 they had a 97.4% mite kill.

Another group used a 3.5% solution and compared their results with Apistan® and Apilife Var and the use of Formic Acid. They also had very good mite kill percentages of Varroa Mites.

It is stated that Lactic Acid is make up in a 15% solution and administered in the same way as stated above for Oxalic Acid. Again, treatments must be repeated.

Oxalic Acid and Lactic Acid found to be effective in reducing the mite population in a hive, but there were be mortalities involves, especially with the direct spray method.

Also, oxalic acid is a very strong acid and it's handling during the dilution stage is very dangerous. Even when applying a 3% solution of Oxalic Acid or a 15% solution of Lactic Acid, safety precautions must be taken

Although Oxalic Acid or Lactic Acid seemed to be equivalent to Formic Acid in the killing of Varroa mites, they had less affect on the killing of Tracheal mites. Also in one study, the survival rate of colonies treated with Formic Acid was higher at 85.7% as compared to 71.4% using Oxalic Acid. For this reason, if a beekeeper wishes to use an organic acid treatment for mites, it is recommend he or she use Formic Acid rather than Oxalic Acid or Lactic Acid. Also, at least in one article read, residual Lactic Acid was present in higher amounts than normal. Just because a substance is naturally present in something (in this case honey), doesn't mean that it is safe when that amount is increased to amounts greater than what is found in nature.

Other Treatments

There are a number of other treatments used over the years for the treatment of Varroa mites which I will just mention here. These have had various affects on the mites as well as many of the problems associated with use of chemicals, resistance, and effects on the honey crop: BeeVar, Folbex, Kramer, Massenheider, Perizin and Vapidifus.

More recent approved methods for controlling Varroa mites

Apistan® (tau-Fluvalinate: (RS)-α-cyano-3-phenoxybenzl N-(2-chloro-α,α,α-trifluoro-ptolyl)-D-valinate)

Apistan® made it's debut in the late 1980's just about the same time Varroa was discovered in the US. Apistan® has proved to be a good miticide when used properly. It contains tau-fluvalinate, a pyrethroid with highly effective miticidal properties when used in a controlled release strip. Some of the reasons Apistan® has been exceptional are the controlled release of the right amount over a specific period, high proven efficacy in just six weeks, long-term control, ease of use, no detectable residue in honey and safe for bees and beekeepers.

However, in the late 1990's, *Varroa destructor* began to become resistance to Apistan®. A number of reasons contributed to this, including the adaptability of the mite, the short life cycle of the mite and the continued use of Apistan® without using other methods of control. Some beekeepers contributed to this resistance by improper use of Apistan®. Some beekeepers prolonged the time of application to extend beyond the recommended period while others didn't use the proper number of strips per hive. Still other left Apistan® in the hives all winter against the recommendations by the manufacturers.

This resistance was discovered by beekeepers when they noticed a large mite kill within 24 hours after applying the newer miticide Coumaphos, after a full course treatment of Apistan®.

Later, with the onset of new chemical miticides, the use of Apistan® was and is still used effectively when used every other year when other methods of control are also used.

Check-Mite+ ® (Coumaphos, Perizin) (O,O-diethyl 0-(3-chloro-4-methyl-2-oxo-2H-l-benzopyran-7-yl) phosphorothioate)

Coumaphos is an organophosphate and is a cholinesterase inhibitor. It was first used in beehives as a miticide in 1993 about 5 or 6 years after the detection of mite resistance to fluvalinates (Apistan ®). The application of Coumaphos as a miticide proved to be very effective. When used properly, (the correct number of strips per hive for the proper duration), it was shown to reduce

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the population of Varroa mites by 95 to 99%. It has saved many thousands of hives of bees from destruction. Some of the initial drawbacks of the use of Coumaphos was the fact that, unlike fluvalinates, it gets absorbed into the wax and wood of the hive and it is much more toxic to humans than fluvalinates. This means that any frame or hive body which has been in contact with Coumaphos could never be used for the storage of honey for human consumption. Those beekeepers who primarily use Western sized honey boxes both for the brood chambers and the honey supers had to mark all their equipment to make sure this separation was maintained. Other problems began to arise with the continued use of Coumaphos. Over a period of time Varroa mites began to build a resistance to Coumaphos. Again, this not only was a result of the normal prolonged use of Coumaphos, but also the improper use of it. Beekeepers who left the strips on for a longer non-approved time accelerated mite resistance. And, like with Apistan®, some beekeepers thought that the longer you put on the strips, the better the kill of Varroa mites. This proved to be fatal for a number of hives, not only because of mite resistance, but also because of the increased accumulation of Coumaphos in the wax and wood. This increased accumulation had a toxic effect on the bees, especially the queen bee. Repeated and prolonged treatment of Coumaphos caused increased accumulation in the queens due to their longer life span and direct repeated contact with the miticide even after the strips were removed. Beekeepers began to hear reports of increased infertility and queen death due to prolonged use of Coumaphos. Thus, there were reports surfacing which described the winter deaths of hives full of honey but without any bees.

With all these subsequent drawbacks to Coumaphos, is can still be used effectively when used in an integrated pest management program using a yearly or bi-yearly alternately treatments of fluvalinate, Coumaphos, and other proven mite treatments.

Some ongoing research and potential approaches to the eradication of Varroa Mites including the identification, history, evaluation and potential for use of the fungus *metahizium Anisoplieae* and other fungi as controls for Varroa Mites. The advantages and disadvantages of their use.

Formic Acid

The studying of Formic Acid as a miticide is still ongoing. Long term effects of Formic Acid on the mites, bees (specifically the queen), wax and honey are still not known. Formic Acid has been used much more than Oxalic Acid or other organic acids for the treatment of Varroa mites mainly because it has a higher kill rate but also, more importantly, it also kills Tracheal mites significantly whereas Oxalic Acid and other miticides have little affect on them. Because of it's very dangerous nature both to bees and humans, approval in the US to use Formic Acid was very slow in coming. Even so, beginning in 1994 there were beekeepers in other countries as well as some in the US who have been using this method for years. The most used method was the application of 250 ml. of a 65% solution of Formic Acid to a absorbent shop towel inside a zip lock plastic bag which had slits cut into it and which was placed on the top of the colony using a ½ inch spacer for ventilation. This was placed in the hive for 30 days.

Beekeepers not using Formic Acid properly have caused much damage to their hives and also to themselves. Proper safety precautions must be maintained and a respirator must be used to avoid breathing the corrosive fumes. Since the average beekeeper was not able to do this routinely and safeguards could not be guaranteed, the FDA would not approve it's use. Companies have tried to invent a way of applying Formic Acid which could be used by all beekeepers safety. A gel pad was found to be a good way of distributing Formic Acid, however, it still needed to be used properly.

Recently, in 2004, Formic Acid has been totally approved in most states in the US under 3 different forms. The one I will discuss here is the Mite-Away II™ pads. The Mite-Away II™ pad contains 250 ml of 65% food grade Formic Acid soaked into a fiber board pad inside a perforated plastic pouch. When this pad first made it debut, it was not available to the average beekeeper because it was only sold in very large bulk quantities. But by the spring of 2005 it was available in packs of 10. Studies have shown that this pad must be used with a 1 ½ inch spacer between the pad and top frames of the hive. The treatment period is 21 days. Otherwise the circulation of fumes will not be distributed to all frames and the pad will be too close to the top bars causing an increased be mortality. I have read that the use of this pad will cause some bee deaths, but the number of deaths is well lower than the deaths resulting from Varroa and Tracheal mites.

Overall the use of Formic Acid pads is a good way to reduce mite populations when used alone. However, it doesn't meet the needs of beekeepers who do not want to use any chemical treatment in their hives. But for the present it seems to be the best treatment not only because of it's effectiveness, but also because the mites are unable to build any resistance to Formic Acid.

Fungus

The use of fungus is a relatively new area of research for treatment of mites in a bee colony. Many of us are very aware of the use of fungus to prevent the spread of the Gypsy Moth and it's defoliation and destruction of trees. With this same idea in mind, a number of scientists are experimenting with the possibility of using a fungus to control mites in the honeybee colony. One of the benefits of using a biological miticide would be many, including the prevention of the mite from building a resistance to the miticide. Another benefit is that fact that it works on both Varroa and Tracheal mites. The most studied fungus is *Metarhizium anisopliae*, however since 2000, different fungi have been studied, such as *Hirsutella thompsonii*. Scientist used plastic strips coated with spores of this fungus. They placed them in hives and it is stated that in 5 to 10 minutes all the bees in

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the hive were exposed to the spores. Within 3 to 5 days most of the mites were dead while having no affect on the bees or brood. The kill takes a little longer than Apistan or Coumaphos but with comparable results. James, et al, stated that fungus populations will die out once Varroa mites are killed and therefore treatments will have to be made once a year.

Research in the area of fungus as miticides is very new and ongoing. One study by James, et. al., will be completed in 2006 and we will know more about the potential use of fungus to kill mites. Some of the things they will be working on is how many spores to use initially, how long will the treatment last, and what effects, if any, will the fungus have on the bees, brood, and honey crop. There are also a number of strains of these fungi which are being considered.

Methods for the Detection of Varroa Mites

Ether Roll

The most widely used technique of the detection of Varroa mites involves shaking 300 to 500 bees (1/4 to 1/3 pint) from the center frame of the brood nest into a pint jar. Using automotive ether, spray for about 2 seconds onto the bees. Close the jar and shake vigorously for 10 to 15 seconds. Then roll slowly. Mites can be seen stuck to the jar's interior. Some say this is not the best method as it is only 30 to 50% efficient and it is very sloppy. Furthermore the bees all die and ether is dangerous.

Powdered Sugar Shake

If you do not want to kill the bees, this method will give you the same results as the ether technique. The bees are put into a pint jar as stated above. The jar is covered with a cut round piece of Number 8 hardware mesh. About 1 tsp to 1TBS is added to the pint jar containing the bees. The jar is inverted and gently shaken to dislodge any mites that are on the bees. The sugar and mites fall onto a piece of white paper. You can count the number of mites. You can also further separate the sugar from the mites by using another jar fitted with a fine mesh. This method should yield 70 to 90% of the mites.

Sticky Board or Paper

Place a sheet of white paper coated with cooking oil (such as Pam®) on the hive bottom and cover with a #8 mesh screen. Check the paper daily to count the mites. You may have to replace this frequently as debris will build up on the bottom board. Alternately, you can purchase a Sticky Board which will do the same thing.

You can accelerate the number of mites dropping onto the paper by using a miticide such as Apistan® or Check-Mite+®.

Shake and Wash Technique

Shake ¼ to ½ pint of bees from the brood nest into a jar. Cover with 75% isopropyl alcohol and shake this gently for 15 to 30 minutes (you can use a shaker). Pour the contents onto a coarse sieve and vertically agitate in alcohol for 60 seconds. Then strain the alcohol wash through a fine mesh cloth to recover the mites. Return the bees to the pint jar and preserve with alcohol. Later, pour the bees into a pan and count them. You will also recover additional mites.

Conclusion

As you can see Varroa mites have had a very big impact on the beekeeping industry ever since they were first detected and first started killing honey bee colonies.

You can also see that there have been numerous attempts to control Varroa mites over the years. There were so many different chemicals, biological techniques, non-chemical methods, beekeeper practices and beekeeping equipment implemented.

Some of the chemical and pesticides have not been approved for various reasons and others are approved but come with very important and specific instructions for protection of the bees, the beekeepers, and the general public who will consume products from the hives.

The most important thing to remember when using any of these methods or techniques is to follow the laws, restrictions, instructions and recommendations that come with the use of each one of them. Some are not legal and others, while legal, must be used correctly. As you can see, when not used correctly, as in the case of Apistan® and Check-Mite+®, mite resistance was accelerated.

We are still looking for a very inexpensive, practical, easily applied, and safe method for the control of Varroa mites. We have made very good progress but there is still much work to do in this area.

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PESTICIDES APPROVED TO CONTROL OR SUPPRESS SMALL HIVE BEETLES, TRACHEAL MITES, AND/OR VARROA MITES IN HONEY BEE COLONIES

Active Ingredient (formulation)	Product Name	Pests Controlled or Suppressed	Status
Coumaphos (strip)	*CheckMite+ Bee Hive Pest Control Strip*	*Small hive beetle, Varroa mite*	*Approved in Washington*
Fluvalinate (strip)	*Zoecon Apistan Anti-Varroa Mite Strip*	*Varroa mite*	*Approved in Washington*
Formic acid (pad)	*Mite Away II Single Application Formic Acid Pad*	*Tracheal mite, Varroa mite*	*Approved in Washington*
Menthol (crystals)	*Mite-a-thol Menthol*	*Tracheal mite*	*Approved in Washington*
Sucrose octanoate esters (liquid)	*Sucrocide*	*Varroa mite*	*Approved in Washington*
Thymol (gel)	*Apiguard*	*Varroa mite*	*Approved in Washington*
Thymol + eucalyptus oil (tablet)	*Api Life VAR*	*Varroa mite*	*Approved in Washington*

- Coumaphos – An emergency exemption was granted by EPA on 2/23/2006.
- Thymol + eucalyptus oil – An emergency exemption was granted by EPA on 3/15/2006.

PESTICIDES APPROVED TO CONTROL SMALL HIVE BEETLES IN HONEY BEE APIARIES

Active Ingredient (formulation)	Product Name	Pests Controlled or Suppressed	Status
Permethrin (liquid)	*Y-Tex Gardstar 40% EC Livestock and Premise Insecticide*	*Small hive beetle*	*Approved in Washington*

- Permethrin – Apply to area in front of hive or before placement of hives in apiary. Do not apply directly to honey bee colonies.

Please contact Erik Johansen in Olympia at (360) 902-2078 or e-mail ***ejohansen@agr.wa.gov*** if you have any questions.

Rev. 3/21/2006

Calling All Beekeepers!

The Washington State Beekeepers Association Invites You to Attend
Our 4rd Annual Field Day

Saturday, June 24 at WSU in Pullman, Washington

First, please join us Friday evening at 7 p.m. for a complimentary wine and cheese social!

The Saturday programs consist of 4 sessions lasting about 1 hour starting at 8:30 am, with lunch in the middle. At 3 pm we will have a new event called the Beekeeping Olympics.

Topics at Pullman:

- Varroa treatments available to the beekeeper, Hygienic Behavior Assessment, Drone marking and clipping and the Varroa finding contest.
- Gloveless beekeeping, colony handling, awareness of bee behavior, colony growth dynamics, swarm control and making splits.
- Honey bee biology and physiology lectures; microscope lab with form and function demos (stings, pollen collecting structure, wing hooks, proboscis, male genital structure, antenna cleaner, etc.); walk through and intro to Apis Molecular Systematics Laboratory and research projects.
- AFB demonstration, Disease talks and posters, AFB treatments, woodenware dipping, equipment demonstrations and tour of lab.

Last event of the day is Beekeeping Olympics.

The cost for an individual is $10, or you & your family for $20!
Please join us for lunch on Saturday. We will be serving grilled hamburgers with all the trimmings, salad side dishes, soft drink of your choice, and hand-dipped ice cream sundaes for dessert. Price of each meal is $10.00.

PRE-REGISTRATION IS REQUIRED!

Register for the Pullman Field Day by June 11.

As you can see, we have a full day's activities planned, and we don't want to waste time standing in line on Saturday to register! **Fill out the form below and include your check made out to WSBA, send to: WSBA, P.O. Box 1331, Kingston, WA 98346-1331**. We will send you a full schedule of events for the weekend along with maps and suggested accommodations (motel & RV).

Name: _____

Address: _____

City: _____ State _____ Zip _____

Registration Fee: $_____ (One person $10, family $20)

Lunch: $10 X _____ = $_____ (number of meals)

Total included $_____

Will you be attending the Friday Wine & Cheese Social? (circle one) Yes No

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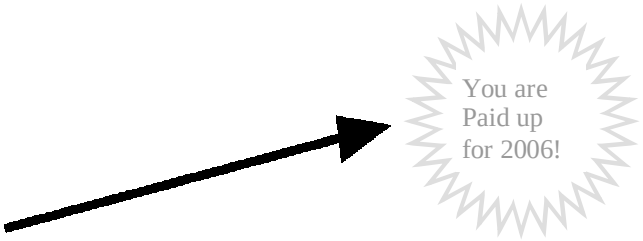

If this newsletter has a bright **ORANGE DOT**, then you need to pay dues for 2006!!

P. Lundy
Washington State Beekeepers Association
Newsletter Editor
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