Sept/Oct 2007

Newsletter E-mailed to You

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sub ucdavisbeenews Eric Mussen
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Impressions of Apimondia 2007, Melbourne, by Sue Cobey

Apimondia, attended by bee researchers and beekeepers from all over the world, hosts a wealth of information and large diversity of topics. You can learn as much from conversations and discussions in the hallways as is presented in the talks. I was fortunate to participate and here, give some thoughts and impressions.

Overall, the major concern focused on bee health and the complex of issues that affect this. These include environment change to the mysteries of disappearing and high loss of colonies.

A symposium on CCD was well attended, with standing room only. Jeff Pettis, from the USDA Beltsville Lab., gave an excellent overview emphasizing the complexity of the issue stating the problem is multi-factorial. Several talks were illustrated with pictures of bees flying off with suitcases. The presentations that followed were just as inconclusive in regards to a major cause or prevention. No major single factor was

implicated, despite the recent press on Israeli Acute Paralysis Virus (IAPV) and *Nosema*

ceranae, the two new "wild cards" of the mystery. The session remained inconclusive beyond agreeing that the problem is complex and multi-factorial, with stress playing a major role.

With fingers pointed at Australian package bees as a potential source of IAPV, the just released controversial Science paper on CCD created a buzz in the hallways. Rumors suggested the US borders would close to the Aussie package bees. Or, that it was too late as the virus was well spread and the economics of almond pollination would keep shipments moving.

Despite CCD, *Varroa* seems to still hold the title of being the major threat to beekeeping. The general opinion - If we could gain control of this pest, maybe the impact of these other pathogens would not be so severe and debilitating to colonies.

In contrast to this, Mike Alsop reported that both the feral and commercial honey bee populations in South Africa have developed resistance to *Varroa*. Chemical treatments have not and are not used. Resistance/tolerance was accomplished in a relatively short period of time through natural selection: *Apis mellifera capensis* in 3 to 4 years and *Apis mellifera scutellata* in 5 to 7 years. No large scale colony collapse was observed, although during the leading front of *Varroa* infestations (introduced in 1997), some colonies died and exhibited the usual symptoms of PMS and DWV.

Note that these African bee populations are large, genetically diverse, migratory and basically unmanaged, providing advantages over our managed European bees. Have our management practices and arsenal of chemical controls propagated susceptible bees and created "super mites"? High colony losses have resulted in decreasing the gene pool. As a result, have we lost some of the raw tools for selection?

Commercial beekeepers in South Africa catch swarms to fill their boxes. African subspecies of honey bees are known to carry traits that confer resistance to *Varroa*. Inherent behavioral factors play a significant role, including hygienic behavior and their short post capping periods. Consequently, Alsop reported that *Varroa* has a low rate of reproduction (60% of mites fail to reproduce). His message is, "Live & Let Die", allow the bees to develop natural tolerance/resistance without our "help".

Interestingly, Marla Spivak notes that to "fix" hygienic behavior in a population requires 3 to 5 years. A major factor is getting this trait into the drones used for natural mating in queen production. Several Minnesota producers, selecting for hygienic behavior to reduce pests and disease, have accomplished this and eliminated chalkbrood and AFB from their operations.

Managed hives seem to be under increasing stress, worldwide: changing climates, the widespread movement of honey bees, and their pests and pathogens play a role. The loss of forage and increasing development of land, exposure to pesticides, both in the environment and use inside colonies, contribute. Honey bees are known to have a weak immune system. These stressors make bees more vulnerable to pathogens and their constantly changing variants, which seem to become more virulent.

There is need for stronger support of honey bee research, and the media blitz of CCD is helping to push this effort. European researchers recognized this need ten years ago and founded The European Working Group to focus on the impact of *Varroa*. Dr Antonio Nanneti stated in his talk that this group currently consists of 66 members from 22 countries. Their purpose is to coordinate research on *Varroa*, provide

information to beekeepers and create a scientific network on IPM. The group plans to expand to include new members with different expertise to broaden the research scope, including pathology and environmental issues. More information and reports can be found at: http://www.alp.admin.ch/themen/00502/00567/index.html?lang=en.

Interest in bee breeding is finally being given attention as a long term solution to the current beekeeping challenges. The spread of honey bee pests and diseases, and their resistance to chemical controls, give new urgency to this need. The sequencing of the honey bee genome and advances in molecular technologies will change the future of bee breeding. With the ability to identify the structure and function of specific genes, we may learn innovative ways to control parasitic mites and diseases.

A symposium on Instrumental Insemination & Bee Breeding, which I chaired, was timely and well received. I gave an overview with emphasis on the performance of II queens, summarized in this newsletter. Here are some highlights of this session.

Ralph Büchler presented an update of the German Carnica Stock Improvement Project showing that mite development and hygienic behavior are highly heritable and genetically correlated. Colonies are initially evaluated for performance, development of infestations, and hygienic behavior. Select colonies are placed in isolation without treatment and subject to heavy *Varroa* pressure. From these, breeders are selected. The results provide a solid basis to effectively select for *Varroa* tolerance within the German Carnica population. Semen from this stock is being incorporated into the New World Carniolan program.

A. m. carnica in Slovenia, a country where it is indigenous, is the focus of their national beekeeping association. Aleš Gregorc gave an overview of the selection program which includes morphological and behavioral traits including: temperament, productivity, and *Varroa* resistance. Analysis of mitochondrial and nuclear DNA indicates this stock is a major source of this indigenous subspecies.

Irfan Kandemir presented a project to preserve and propagate *A. m. caucasica* in Turkey. Efforts to identify and maintain this subspecies in an isolated region within its geographic boundaries are supported by a program of selection and propagation. Local area beekeepers are being educated as a part of a rural development project. Considering this race is not well represented in the US, it is a source of stock we are looking at for potential importation.

This meeting offered a good opportunity to learn about programs abroad involved in selecting for *Varroa* resistance/tolerance. The CSBA funded project to import semen from European stocks is designed to enhance genetic diversity and increase resistance to *Varroa* in our domestic stocks. In this effort, care must be taken to prevent the importation of honey bee pathogens, especially in consideration of the current challenges we are facing. Limiting importation to semen reduces risk, although virus remains a question that needs to be addressed.

Another highlight of this session was Tom Glenn's presentation of Glenn Apiaries, describing the methods used in his and Suki's unique operation with the annual production of 2,000 instrumentally inseminated queens. Record keeping and tight scheduling are essential. Despite technical problems with some of his photos, Tom was cool and gave an informative presentation. This type of specialized operation is essential to our future and needs to become a common aspect of commercial beekeeping.

Stock maintenance is very labor intensive. A practical method of long term storage of honey bee germplasm, eggs and sperm, is needed. Cecilia Andere from Argentina, presented her work evaluating honey bee semen quality, observing motility, concentration and viability. Her work shows that drone quality varies and suggests this can be improved with selection.

And of course, springtime in Melbourne was a pleasure. The occasional drizzle of rain was a pleasant change from the dry heat of the CA summer. If you took an excursion out of the city, kangaroos with young in their pouches, could be seen grazing at dusk and dawn in the countryside. Spotting a Koala in a eucalyptus tree was a special event, as their numbers are sadly decreasing due to a new outbreak of disease.

Up coming Apimondia Events:

A special interest Apimondia Symposium, focused on the theme, Bee Breeding and Instrumental Insemination, will be held Oct 15^{th} -19^{th}, 2008 in Nuevo Vallarta, Nayarit, Mexico.

Apimondia 2009 will be held in Montpellier, France.
Apimondia 2011 will be held in Buenos Aires, Argentina.

DVD Wins Gold Medal At Apimondia 2007

Instrumental Insemination of Honey Bee Queens With Susan Cobey

The DVD, Instrumental Insemination Of Honey Bee Queens by Susan Cobey, won a Gold Medal at Apimondia in Melbourne.

This 30 minute, instructional DVD, is bilingual in English and Spanish. It is designed to provide easy visualization of the insemination procedure. Each step in the process is described and demonstrated.

The goal is to encourage beekeepers to use instrumental insemination to maintain and select for important characteristics of their bees. With the current challenges facing the beekeeping industry, this is becoming a necessity. Controlled mating is an essential step of stock improvement.

The procedure is presented in step by step detail and sectioned in chapters for easy review and quick reference. The chapters include: preparations of queens and drones; equipment choices; eversion of the drone; semen collection; positioning the queen; opening the queen, featuring various sting hooks and forceps; bypassing the valve-fold; insemination of the queen; marking and clipping the queen; dissection of the spermatheca; and short term storage semen.

The DVD also covers queen introduction methods, reviews studies of queen performance compared to naturally mated queens and highlights the advantages of being able to make a wide range of specific crosses.

The chapters conclude with a summary of important points. Trouble shooting sections are devoted to potential problem areas, such as: testing the maturity of drones; avoiding mucus during semen collection; and bypassing the valve-fold of the queen. Packed with detail, this DVD is an excellent teaching tool for self-learning, provides a review for polishing techniques, and will enhance lectures and demonstrations.
Spring classes in the technique will be offered annually at the Harry Laidlaw Honey Bee Research Facility at University of California, Davis. (Cont.)

California State Beekeepers' Association
118th Annual Convention
November 12-16, 2007
Harrah's, S. Lake Tahoe
15 Highway 50
Stateline, Nevada
1-800-HARRAHS
www.harrahstahoe.com

You really have to "be on the ball" this year to take advantage of the monetary specials offered by the Association and the hotel. If you pre-register promptly with Patti Johnson, the convention will cost $80 for the primary member and $45 for additional family members, as long as Patti receives the payment by October 30, 2007. After that (or at the door) the registration fees increase to $120 for the primary member and $60 for each additional member attending. When you register for the convention, don't forget to pay your association dues. The old membership year expires October 31, 2007. A pre-registration form is available at: www.californiastatebeekeepers.com.

Harrah's is offering two choices of rooms: the closer rooms at Harrah's at $89 plus tax per night, or across the street in Harvey's newly refurbished Mountain Tower for $59 plus tax per night (room prices will nearly double after those special mid-week rates – such as the next Friday and Saturday nights). It would be a good idea to reserve your room well in advance. The "**World Series of Poker**" is scheduled for that same week at Harvey's. To take advantage of the reduced room rates, you must make your reservations, at **1-800-455-4770**, on or before Monday, October 29th. When you make your reservation, be sure to ask for **Group Code S11BEE**. Check In is at 4:00 PM and Check Out is at 12:00 Noon.

2007 Tentative Convention Program

Monday, November 12

3:00 PM	Board of Director's Meeting

Tuesday, November 13

8:00 AM	Registration and Exhibits Open
8:30	Opening Ceremonies
10:00	**Exhibitors'/Beverage Break**
10:20	Exhibitor Introduction/Door Prizes
10:30	Key Note Speaker – **A.G. Kawamura**, California Secretary of Agriculture
11:00	"CA Almond Board," "Project *Apis m*," and "FHCS" – **Dan Cummings**, Chico, CA
11:30	"Honey: The Science of Nature's Perfect Food" – **Ron Fessendum**, Committee For Promotion of Honey Health
12:00 Noon	**Lunch**
1:30 PM	"Honey Bee Colony Size & Composition as Factors in Almond Pollination" – **Frank Eischen**
	"Overwintering Nutritionally Stressed Honey Bee Colonies Infested with *Varroa destructor*"
2:15	"Compromise between CA Citrus Mutual and CA Beekeepers? – **Gene Brandi**

2:45	"Dealing with the Media" Panel Discussion – **Gene Brandi, Orin Johnson, Eric Mussen, John Miller**
3:30	**Exhibitors'/Beverage Break**
3:50	Exhibitor Introduction/Door Prizes
4:00	"Continuing Education Credits, Pesticide Applicator Permits" – **Larry Lima**
4:15	"CCD Update" Panel Discussion **– Jerry Bromenshenk, Jay Evans, Eric Mussen, Jamie Ellis**
6:30-8:00	New Members' Reception

Wednesday, November 14

7:00-9:00 AM	Sioux Honey Breakfast
8:00	Registration and Exhibits Open
9:00	"Nutrition, Worker Longevity, and Colony Growth and Survival" – **Gloria DeGrandi-Hoffman**
9:45	"Nutrition, Immunity, and Disease Resistance in Honey Bees" – **Jay Evans**
10:30	**Exhibitors'/Beverage Break**
10:45	Exhibitor Introduction/Door Prizes
11:00	"New Tools for Bee Management and Improved Pollination" – **Jerry Bromenshenk**
11:45	"TBA"
12:00 Noon	**Research Luncheon**: "Effects of Parasites on Honey Bee Pollination Efficacy" – **Amanda Ellis**, Florida Department of Agriculture
2:00 PM	**Auction**
4:00	Free Time
7:30	**Research Committee Meeting**

Thursday, November 15

8:00 AM	Registration/Exhibits Open/Start Silent Auction
8:30	CSBA Annual Business meeting
10:30	**Exhibitors'/Beverage Break**
10:45	Exhibitor's Introduction/Door Prizes
10:55	"American Beekeeping Federation Report"
11:15	"American Honey Producers' Association Report" – **Jerry Brown**
11:35	"National Honey Board Report" – **Bruce Boynton**
12:00 Noon	**Lunch**
1:00 PM	Exhibits Close
1:30	"TBA" – **John Miller**
2:00	"TBA" – **Eric Mussen**
2:45	"Honey Bee Research at the University of Florida: What it Means to You" – **Jamie Ellis**
3:30	"Harry Laidlaw Honey Bee Research Endowed Fund" – **Rich Engel** "Honey Bee Research Facility Update" – **Sue Cobey**
4:00	"UC Davis Honey Bee Stock Improvement Program" – **Sue Cobey**
4:45	TBA
6:30	Social Hour – No Host Bar and Silent Auction
7:30	**Annual Banquet, Awards and Auction**

Friday, November 16

8:00 AM	CSBA Board of Directors' Breakfast Meeting

(Cont.) The DVD is available, USD $35, $40 for international orders, from:

Honey Bee Insemination Service
P.O. Box 73581
Davis, CA. 95617

Do II queens perform as well as NM queens?

By Sue Cobey

Do II queens perform as well as NM queens? Commonly accepted and more widely used in Europe, instrumentally inseminated queens are erroneously considered inferior.
A review of comparison studies in Apidologie 38 (2007) 390-410, by Susan Cobey addresses this question in attempt to dispel the myth.

Instrumental insemination is a reliable method to control honey bee mating, providing an essential tool for research and stock improvement. Review of studies from 1946 to the present compare colony performance and factors affecting queen performance.

Comparison studies measured various aspects of queen performance including: colony productivity, queen longevity and sperm storage. The studies are categorized into three groups: Group I includes six studies showing equal performance of instrumentally inseminated queens (IIQs) and naturally mated queens (NMQs); Group II includes seven studies showing higher performance of IIQs; Group III includes one study showing higher performance of NMQs.

A review of factors affecting queen performance conclusively show that the treatment of queens has a significant influence. The Group III findings can be attributed to the different treatment of queens. IIQs in Groups I and II were inseminated at an age ranging from 5 to 12 days and given semen dosages ranging from 8 to 12 µl. These queens were introduced into nucleus colonies or package bees with no or minimal banking (individually caged in queenless colonies). In the Group III study, IIQs were inseminated when 2 to 3 weeks old and confined to cages in bank colonies for another 2 to 3 weeks before introduction. Those queens were given two small semen doses of 2.7µl. The IIQs were caged and shipped at the start of egg laying, then introduced into large colonies or package bees.

The low sperm counts and lower rates of production and survival of IIQs in Group III can be attributed to the methodology used. Queens inseminated past their prime receptive mating age store significantly less sperm. Confinement to cages after insemination also reduces the efficiency of sperm storage and often subjects queens to injury by aggressive worker bees.

Queens undergo dramatic physiological changes in preparation for egg laying. Many factors influence the rate of these changes and affect performance. Queens inseminated at a young age, allowed free movement, and attended well by worker bees, mate with more drones and store more sperm.

Two minor differences were observed between IIQs and NMQs: a wider range in the time of onset of oviposition and slower queen pheromone development can increase the difficulty of introducing IIQs. However, proper beekeeping management practices clearly minimize these discrepancies, which disappear when queens become established.

Other factors, in control of the beekeeper, such as the treatment and handling of semen, influence queen performance. Beekeeping practices can enhance or inhibit queen performance. With proper treatment, equivalent performance of IIQs and NMQs is clearly demonstrated. This review should give beekeepers confidence in the use of instrumental insemination and insight into the methodology to improve queen performance.

Small Hive Beetle Trap – Partially fill with vegetable oil and hang between top bars of frames in top box. Soon to be available in full box and nuc box sizes from Dadant & Sons.

Sincerely,

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