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Newsletter E-mailed to You

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Way to Go, Kathy!

Communications specialist Kathy Keatley Garvey of the UC Davis Department of Entomology was just notified

that she is the recipient of three awards from the international Association for Communication Excellence (ACE), comprised of communicators, educators and information technologists in agriculture, natural resources, and life and human sciences. ACE annually conducts a Critique and Awards (C&A) program that recognizes excellence in communications skills for individuals involved in the public sector – USDA, land-grant universities, state extension service or experiment stations, and international foundations. Kathy sometimes submits entries in the writing and photography classes.

This year she won the gold (first-place) award in the news writing competition; gold (first-place) award in the feature photo category; and the overall Outstanding Professional Skill Award in the photography division. Over the last five years, she's won a total of six gold awards including an overall Outstanding Professional Skill Award in the writing category.

This year the *coup de grace* was one of the world's most appreciated photos – a honey bee trying to leave the scene after stinging me on the wrist (see <http://www.flickr.com/photos/pho-tog/5065414677/>). Usually, the break between the sting and abdomen is clean. Occasionally, intestinal tissue remains attached (as it did this time). The judges are still trying to determine how she was able to arrange the lighting, the camera, the wrist and the bee to get that good a shot. That is our secret! The photo has been picked up and used in all sorts of ways. A person in Iraq even placed his own copyright on it.

Kathy is on the Department of Entomology Awards Committee. The applications, for probably all the awards that have been garnered by our faculty and staff over the last seven years, have Kathy's imprint on them, heavily. Kathy's unrelenting support of me and my work undoubtedly is responsible for the name and picture recognition that I now have throughout the state and across the nation.

Kathy deserves to be thanked for all that she does for us. How to do that? Go to Kathy's blog, Bug Squad (ucanr.org/blogs/bugssquad/), which she updates nightly (even when she's on vacation or ill) to see many interesting short articles and gorgeous photos about insects and the people who study them. She began writing it in August 2008 and the hits now number 2.7 million. Visits to her site makes Kathy's day! Or, go to Kathy's collection of 21,000 photographs on Flickr (see <http://www.flickr.com/photos/pho-tog/>).

Kathy, who shoots for educational purposes only, is one of those rare photographers who will share high resolution photos with you, as long as the photos are not used for commercial purposes, such as selling yarn (which happened). Under

“Sets” (there are more than 250 of them) you even can find the mysterious white-eyed drone honey bee that cannot mate, because it cannot fly, because it is blind.

Honey Bee Colony Health

A book with the above title began being marketed in November of 2011, but copies are just beginning circulate. The book lists 68 “Contributors” (authors), who are research leaders from all over the world. They wrote 21 chapters on various topics that deal with pathogens, parasites, and toxicants (mostly pesticides) that can negatively impact honey bee colonies. In order those chapters are:

1. Honey Bee Health: The Potential Role of Microbes
2. Seasonal Microflora, Especially Winter and Spring
3. Evaluation of Varroa Mite Tolerance in Honey Bees
4. Status of Breeding Practices and Genetic Diversity in Domestic U.S. Honey Bees
5. Global Status of Honey Bee Mites
6. Challenges for Developing Biopesticides against *Varroa*
7. Molecular Forensics for Honey Bee Colonies
8. Honey Bee Viruses and Their Effect on Bee and Colony Health
9. PCR for the Analysis of *Nosema* in Honey Bees
10. *Nosema ceranae* Detection by Microscopy and Antibody Tests

11. Chalkbrood Re-examined
12. Critical Transition Temperature (CTT) of Chalkbrood Fungi and its Significance for Disease Incidence
13. Small Hive Beetle (*Aethina tumida*) Contributions to Colony Losses
14. Pesticides and Honey Bee Toxicity in the United States
15. Cellular Responses in Honey Bees to Non-pathogenic Effects of Pesticides
16. Differences among Fungicides Targeting the Beneficial Fungi Associated with Honey Bee Colonies
17. Fungicides Reduce Symbiotic Fungi in Bee Bread and the Beneficial Fungi in Colonies
18. Interactions between Risk Factors in Honey Bees
19. Understanding the Impact of Honey Bee Disorders on Crop Pollination
20. Calculating and Reporting Managed Honey Bee Colony Losses
21. Conservation of Plant-pollinator Mutualisms

Many chapters contain data and information that we have seen reported at meetings, but could not previously find in print. I would have appreciated more attention to honey bee nutrition, but that was not included, as such. Malnutrition likely plays a very significant role in influencing the susceptibility of the bees to all the above-mentioned problems.

The text is well written, but with noticeable grammatical and typographical

errors that escaped detection. The colored photos and graphics are very nice, but there is quite a bit of “white space” that adds to the page number of this 302 page, fairly expensive, text book (currently \$85.38 on Amazon.com). The format of the book is a bit different, also. Bibliographic references for each chapter are listed, by chapter, after the end of the text in the last chapter, just before the index.

For those of you who wish to delve into details of molecular studies on honey bees, this book is a good place to start. If you wish to better understand the effects of pesticides on honey bees, this is the place to start. European researchers relate many details of their work on sublethal effects of pesticides on honey bees, but they do not implicate pesticides as the leading cause of what we call colony collapse disorder (CCD).

If you wish to brush up on recent findings on honey bee health issues, this is the book to read. If you are hoping to find solutions to all your beekeeping problems, be forewarned that they will not be found in this textbook, since that was not the thrust of this book.

Also of interest is the fact that some chapters include an acknowledgement of funding sources that provided support for developing the information in the texts. The California State Beekeepers’ Association and California Almond Board are mentioned in Chapters 12, 16, and 17 as funding agencies.

Chemicals and Honey Bees

Down the hall from my office, the Cell and Molecular Biology Department has attached a two-part poster to the wall. The posters are covered with inter-related bio-

chemical pathways from living organisms. Even though the posters cover about 6 X 8 feet of wall space, one has to stand very close to the chart to be able to read the tiny details of the myriad pathways. One, or more, of those pathways is a target of practically every antibiotic and pesticide that is used to mitigate disease or pest problems.

Given the complexity of the pathways and associated enzymes that catalyze the reactions, it is no wonder that chemicals directed at certain targets can interfere with other, non-target organisms. Therefore, introducing acaricides to control varroa mites, antibiotics to control bacterial and fungal diseases, essential oils to subdue viruses, or having residues of agricultural plant pest control products in a beehive is going to impact those biochemical pathways. How well honey bee cellular biochemistry adjusts to the contaminants depends upon the chemistry of the pollutants and their doses.

Honey bees can generate enzymes that detoxify some antibiotics and pesticides and flush the residues from their bodies (see Chapters 14 and 15 in the textbook mentioned in the previous article). Sometimes, the poison can be compartmentalized and closed off from the rest of the cellular biochemistry. Another protective mechanism is to have the contaminated cell or cells die, to seal off the toxicant from the rest of the cells. In other cases, protective mechanisms are not adequate to prevent bee death.

Currently, a good deal of effort is being devoted to trying to convince the federal government (EPA) to rescind the registration for use of one of the neonicotinoids, clothianidin. The nitroquinidine neonicotinoids, as a group, are particularly toxic to adult honey bees. Clothianidin is the current target of a petition to revoke registration. The chemical is produced and

sold by Bayer Crop Science. The product was banned for a while in Germany (home of Bayer Crop Science) when the majority of honey bee colonies, a mile or more downwind of a field being planted with clothianidin-coated seeds, died from clothianidin exposure. A similar problem was studied last year in the U.S. During planting of treated seeds, the powder (talcum in the U.S.), used to prevent the seeds from becoming stuck in the planter, escaped into the environment, moved if there was a breeze, and settled down on the soil or plant blossoms at some distance from the agricultural field. If the contaminated bloom is attractive to foraging honey bees, the foragers can carry the contaminated food back to the hive or be killed by the exposure. If bees fly through the contaminated, airborne dust, they can die of acute contact poisoning.

These serious exposure problems can be mitigated short of banning the pesticide. Exposure can be reduced by or eliminated by:

1. Modifying planters to contain the dust with some sort of vacuum and container devices. Then, the trapped powder can be handled as a hazardous waste. If dust leaves the field, it is “drift” according to federal and state laws, making the application illegal. Enforcement and a few heavy fines would solve that problem.
2. Lightly disking or otherwise removing any bee-attractive blossoms from the field before planting. Clothianidin is persistent in the field for days (see Belay[®] label), so nothing attractive to bees should be in the field during, or for at least five days following, application.
3. Plant at night. Honey bees will not be flying at night, unless they are “Zom-bees.” We won’t miss them.

Honey Bees and the Canadian Border

Questions about the legality of moving honey bees over the border between the U.S. and Canada come up every so often. Between Canada and the U.S., we accept queens and bulk bees from Canada, with proper certification. Canada accepts queens from the U.S., with proper certification. Canada also accepts queens and packages from New Zealand, Chile, Australia, and Denmark (specific shipments of queens, only, in the case of Denmark), while the U.S. allows certificated queens into the country from Canada and New Zealand. Honey bees on comb, and used beekeeping equipment, cannot be moved across the U.S./Canadian border in either direction, legally.

This information was provided by Amy Snow, the national veterinarian charged with overseeing the importation of live animals and germplasm into Canada. Amy can be contacted by phone at: (613) 773-7471 or Amy.Snow@inspection.gc.ca.

Canadian Bee Biosecurity

North of our border, beekeepers are being asked to share pretty much the same beekeeping information with their government that Dr. vanEngelsdorp hopes US beekeepers will share with each other. However, the reason behind the Canadian survey has an additional goal: bee Biosecurity in Canada. The following is an article excerpted from the November 2011 edition of *HiveLights*, Vol. 24 (4): 12, published by the Canadian Honey Council.

“Seeking Input on Bee Biosecurity in Canada” submitted by Rod Scarlett, Chief Executive Officer, Canadian Honey Council. The government of Canada, working in partnership with the Canadian Honey Council,

Provincial Apiarists, and the Canadian Association of Professional Apiculturists, in seeking input from the bee industry on disease, pest, and parasite management practices – on farm level biosecurity.

This fall you are invited to participate in a confidential National study of disease, pest, and parasite management practices used by Canadian honey beekeepers. The results of the study will be used to identify potential best practices, gaps or risks, and provide important information to support the development of a Voluntary National Farm Level Biosecurity Standard for the honey beekeeping industry. Your input is required to ensure that this Standard is practical, achievable and relevant in the context of Canadian beekeeping.

“Bees are a major contributor to the health and vitality of agriculture,” said Agriculture Minister Gerry Ritz. “This Government is pleased to support the creation of standards that will contribute to the stability of such an important industry in the agricultural community.”

“The CHC is pleased to participate in this benchmarking exercise for farm biosecurity,” said Heather Clay, Chief Executive Officer, CHC. “The standard is important to help control the spread of bee pests and diseases.”

The standard, which is expected to be released in 2012, will benefit all managed bees in Canada. This standard is being developed in partnership between Agriculture and Agri-Food Canada, the Canadian Food Inspection Agency, the Canadian Honey Council, Provincial Apiarists, and the Canadian Association of Professional Apiculturists.

What is Biosecurity?

Farm level biosecurity refers to “Best Practices” that reduce incidence through prevention and more rapid control of the spread of serious infectious diseases, parasites and introduced insect pests. For beekeepers, farm level biosecurity management practices are designed to minimize the introduction and spread of diseases, parasites and pests to, within and beyond the apiary. This includes storage and processing facilities as well as protecting bees and equipment while in transit. Bee biosecurity also addresses treatment protocols.

For more information on biosecurity, please visit: www.inspection.gc.ca/biosecurity.

For more information on the bee biosecurity standard project, or to provide feedback, please contact the CHC. For additional information: Canadian Food Inspection Agency, Media Relations: 613-773-6600.

Commercial Beekeeping College Program

A new certificate program for commercial beekeepers has begun its first year at Grand Prairie Regional College (GPRC) in Fairview, Alberta, Canada. The goal is to prepare students to become apiary assistants and field supervisors with commercial beekeeping operations, technicians with government agriculture departments and self-employment as beekeepers. Such a program had been previously offered at Fairfield College, also in the same city. The following information is extracted from Vol. 27 (4): 33, Winter 2011 edition of Bee Scene, published by the British Columbia Beekeepers’ Association.

Previously, a beekeeping course was offered at Fairview College, and a total of 271 graduates completed the program between 1981 and 1999. Industry interest and support for the renewal of a beekeeping

program has provided this opportunity for GPRC to develop a program which will meet the future needs of industry and international growth in the bee/honey industry. The program is welcomed by industry and researchers alike.

The program will provide needed training for those wishing to pursue a career in the industry and will provide an avenue for a new generation of producers to enter the industry,” says Steve Pernal, Officer-in-Charge and Research Scientist at Beaverlodge Research Farm. “Together with the recently announced National Honey Bee Diagnostic Laboratory located in Beaverlodge, and building on existing cooperation with “Agriculture & Agri-Food Canada, GPRC is positioning itself as a leading player in training and applied research for the honey bee industry.”

Rodrigo Mendez, the northwest region representative for Alberta Beekeepers, agrees. “The Alberta Beekeepers Commission is looking forward to the new crops of beekeepers trained at GPRC, Fairview. The beekeeping industry in Alberta and Canada has lacked the ability to formally train new beekeepers for many years, says Mendez. “This is a rapidly evolving industry and having this course will give the opportunity for new people with different backgrounds to enter this vibrant industry with new ideas and points of view. This course will re-invigorate the industry and keep Alberta Beekeepers at the forefront of beekeeping.”

Alberta is the third-largest honey producer in North America, with an estimated \$20 million annual contribution to the economy. The Peace Region, long known for its honey production, is quickly becoming an important knowledge and research base in the field of apiculture. International attention on the issue of bee populations is

escalating, and there is an urgency to mitigate the negative impact of colony collapse on world food production. “No bees – we don’t eat,” as the researchers put it.

“The launch of the Commercial Beekeeping Certificate Program by GPRC is a significant step forward in the development of a successful and sustainable bee, honey and pollination industry in Canada. Canadian beekeepers will be the recipients of a more knowledgeable workforce to address the many concerns the industry is now facing,” according to Corey Bacon, Chair of the Canadian Honey Council.

“This program not only fills a clearly established need in North America and beyond, but it adds a key component to the work in bee research and diagnostics which is now being initiated in our region,” says Don Gnatiuk, GPRC President and CEO. “I believe that GPRC, through our partnership with Agriculture and Agri-Foods Canada and the beekeeping industry in Alberta, is poised to establish an apiculture centre of excellence which will be respected throughout the world.”

For more information about the Commercial Beekeeping Certificate Program at GPRC, contact Chris Laue, Dean of Trades, Agriculture and Environment, or visit gprc.ab.ca/programs.

Honey Carbon Footprint

Beekeepers who may have wondered what impact their production and handling of their honey crops may be having on the environment can now calculate estimates of their honey’s carbon footprint. Sonja Brodt, PhD, working with the UC Sustainable Agriculture Research and Education Program, through the Agricultural Sustainability Institute, now has a computer pro-

gram on the Internet to do the calculating for you. I will highlight some of the information in the User Guide, so that you have an idea of what is expected to be included as input. The input is divided into three (cannot be completely separated) areas of 1. Beekeeping activities, 2. Transport of honey from beekeepers to packing facilities, and 3. Packing.

Chapter 1 – Introduction.

Instructions and supporting documentation for the calculations.

Chapter 2 – Description of footprint assessment method.

Chapter 3 – Instructions for navigating calculator

Chapter 4 – Inputs required for Beekeeping and outputs produced from that data by the calculator

A. Feeding – Syrups, patties, honey brewer’s yeast, etc.

B. Pest Control – Limited to *Nosema* and *Varroa*

1. Vegetable grease
2. Apiguard
3. Api-Life VAR
4. Apistan
5. Apitol (not in US)
6. Bayvarol (not in US)
7. CheckMite+
8. Formic acid
9. Oxalic acid (not in US)
10. Lactic acid (not in US)
11. Fumagillin
12. Others

Chapter 5 – Honey Transportation –

Type of trucks and fuels, miles and miles per gallon, total fuel per truck annually

1. Extraction – Electricity, natural gas, propane, gasoline

Chapter 6 – Honey Packaging

1. Bottles and jars: bears, comb in containers, glass, jugs, pails, etc.

2. Drums and totes: 55-gallon and 275-gallon
3. Other packing materials: cardboard, shrink wrap
4. Other materials: Rubber, latex, plastic gloves; or filter paper sheets
5. Energy use: electricity or natural gas

Chapter 7 – Total Results – This is the chapter that explains how to put it all together and see how much carbon was exhausted into the universe do to the production, handling, extraction and packaging of your honey. It might be fun just to see how your system calculates out.

The url to the program is:
<http://asi.ucdavis.edu/sarep/sfr/lifecycleassessments/honey>. On that first page, you will

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see three blue links. The first takes you to the calculator (but tells you to read the guide, first). The second link is to the guide. The third link leads to a technical report about the carbon footprint of honey prepared for the National Honey Board (was not peer reviewed).

Sincerely,



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