

February 2015

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**W.A.S.**



**Journal**

**Journal of the Western Apicultural Society of North America**

### **First Dr. Eric Mussen Distinguished Service Award**

*Director of Pollination Programs for Project Apis m, Meg Ribotto, was the recipient of the California State Beekeepers Dr. Eric Mussen Distinguished Service Award at their 125th Annual Convention in Valencia, CA.*

*In 2010, Meg launched the first comprehensive Best Management Practices program for honey bees.*

*This was followed by the initiation of the "Seed for Bees" project to build better bee health through improved nutrition. Using a combination of traditional and social media and by personally working with landowners, Meg put 2,500 acres of seed in the ground for bee habitat in 2013. Her efforts this year produced nearly 3,000 acres of bee forage. Total plantings for these two years exceed \$.25 million in seed to help honey bees.*

*Meg is editor of the California Bee Times, the PAM newsletter and Almond Facts Bee Box.*



# Western Apicultural Society of North America

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## President's Message

By Beth Conrey, WAS President

I am writing this on the plane as I head back from the American Beekeeping Federation (ABF) conference in Anaheim, CA. The chosen venue was Disneyland. The venue selection brought out a lot of younger beekeepers with their families in tow and over 900! beekeepers registered for the conference. There were lots of lessons learned by this novice with respect to conference planning and organization. The ABF did a terrific job and Tim Tucker, Gene Brandi and the entire planning crew are to be commended.

I flew the red-eye out of Denver on Wednesday morning and arrived, sadly, for the standing ovation at the conclusion of the keynote speech by Dr. Jim Frazier. I am awaiting the release of the video/audio on the speech as it was so well received by the attendees. It was "the buzz" for the rest of the conference!

Though I missed the keynote, I was present for many terrific talks delivered by passionate folks from all over the country. Particular favorites of mine were Clint

Walker III on the growth dynamics and goal setting of his highly successful Texas operation, Walker Honey Farm and Dancing Bee Winery; Greg Hannaford, of Tulsa Urban Bees on brand development; former American Honey Queen, Emily Brown on her marketing strategy for her 50-hive operation in Scottsdale, Arizona. To me, these creative and energetic beekeepers represent the future of the beekeeping industry as they successfully navigate the sideliners beekeeping waters.

I was in attendance as a speaker myself, delivering a talk entitled "Making the City Pretty—Creating an Urban Oasis for Pollinators". The public is really interested in the plight of pollinators right now. They want to know what they can do to help! Making the City Pretty tells them how. It is a thorough presentation on how to engage urban dwellers in forage enhancement at their homes, their workplaces, their places of worship, their schools and universities as well as their roadsides and medians. The presentation explains the benefits of pollinator friendly plantings; details methods of engagement; suggests partnerships that can help projects succeed and outlines possible funding sources for such projects. Of course, urban forage must necessarily be accompanied by a decrease in pesticide use—two birds with one stone!

The conference team has been assembled and I am pleased to introduce them to you.

First Vice-President is Don Studinski. He will be in charge of the overall conference with particular focus on the first two days of Healthy Bee. Here is his bio: Don Studinski, dba Honeybee Keep, is a permaculture enthusiast and member of the board of directors at Living Systems Institute (LSI) where he applies permaculture philosophy to beekeeping. Honeybee Keep manages Colorado's first Certified Naturally Grown (CNG) apiaries. As a beekeeping mentor, Don provides advice and counsel for students throughout the United States, teaches classes and performs public speaking. He writes extensively about beekeeping on his own website and for a variety of others, including Selene River Press, Bee Culture, Peak Prosperity and Honeybee Haven. Published 9/21/2014, Don is the author of *Beekeeping Mentor In A Book*.

Dr. Ron Fessenden will be coordinating the Saturday open-to-the-public event "Bee Healthy". Here is his bio: Ron Fessenden, MD, MPH is a retired medical doctor. Dr. Fessenden received his MD from the University of Kansas School of Medicine in 1970 and his Masters in Public Health from the University of Hawaii School of Public Health in 1982. For the past six years he has been researching, writing and speaking at over 40 conferences and events in the United States and Canada about the health benefits of honey. He has written and published four books in The Honey Revolution series, including *Feed Your Brain First* (2013) and *The New Honey Revolution* (2014). Dr. Fessenden and his wife, Joyce, reside in Colorado Springs, CO.

Leslie Ellis is our marketing and promotion maven. Here is her bio: Leslie Ellis is a Denver-based keeper of two beehives (legal limit). She started with gusto in 2011, becoming a beekeeper in the Spring, filming a documentary about backyard beekeepers in the Fall, and launching a beekeeping club for women (Women Who Bee) in the Winter. The film, *BEE PEOPLE*, was debuted in the film festival circuit in 2013-2014, and went mainstream as a DVD in August of 2014. When not working with honeybees and the beekeeping community, she's a technical writer and owner of Ellis Edits Inc. Her website, *Translation-Please.com* serves as a resource to people in the cable, satellite, and broadband industries. In short, she's a seasoned "tech translator," at it for 25 years and counting.

Do you have complementary skills to work with this group? Give me a holler and we'll get you on the team.

Just in! The NCAA college football schedule has been posted and the Oregon Ducks will be playing the CU Buffaloes on Saturday, October 3rd in Boulder! I will be delighted to play the spread with any Duck fans!

# The Honey Bee Health Coalition

*Reprinted from the California State newsletter*

The Honey Bee Health Coalition, comprised of more than 30 organizations and agencies from across food, agriculture, government and conservation, released Bee Healthy last fall, a roadmap to improve honey bee health through collective action that will accomplish more than any one group can achieve on its own. Facing unacceptable declines in honey bee health, the Coalition's Bee Healthy Roadmap lays out specific priorities and actions that it will take to reverse these declines and improve the health of honey bees and other pollinators. The Roadmap also provides a framework for ongoing collaboration, inviting anyone with a vested interest in honey bee health to work together to achieve its vision of Healthy Honey Bees, Healthy People, Healthy Planet.

The Coalition establishes a science-based platform for cross-industry coordination on four priority areas.

"The Bee Healthy Roadmap lays out a specific set of priorities through which the Coalition will achieve its core mission," said Dennis vanEngelsdorp, Assistant Professor at the University of Maryland's Department of Entomology and a member of the Coalition's Steering Committee. "By collaboratively implementing solutions through partnerships across food, agriculture, government, and conservation partners," he continued, "we can achieve a healthy population of honey bees and healthy populations of native and managed pollinators, productive agriculture systems, and thriving ecosystems."

The Coalition is committed to developing explicit goals, milestones and metrics to measure improvements in honey bee health. Knowing that the Coalition can't improve honey bee health on its own, the Bee Healthy Roadmap identifies four priority areas that need immediate and consistent action from partners across the landscape. These include improving Hive Management, Forage & Nutrition, Crop Pest Management, and Cross-Industry Education, Outreach and Coordination. For each priority, the Bee Healthy Roadmap sets out specific actions the Coalition and its members will take and invites others to join forces or take steps on their own to improve pollinator health.

Improving honey bee health takes better management, technology, and innovation backed by science.

## HIVE MANAGEMENT

"The Coalition is actively working to address major challenges to honey bee health, including poor nutrition and the need to protect bee health while controlling crop pests. One of the biggest threats is the Varroa destructor mite and even the best beekeepers could use help controlling it," said George Hansen, Past President of the American Beekeeping Federation and a member of the Coalition's Steering Committee and its Hive Management Working Group. "The Bee Healthy Roadmap invests in gathering and then transferring specific know-how and technologies to beekeepers to improve hive monitoring and training to control varroa mites and other pests and pathogens."

The Coalition also identified gaps in existing hive management research and will promote science-based innovations to close those gaps, including the development and registration of new products to address the varroa mite.

In 2014 and 2015 the Coalition will help increase funding for "tech transfer teams" to go into the field and collect data and directly monitor bee health while also providing beekeepers with important information to inform management practices. The Coalition will also undertake the creation of a best practices guide for beekeepers for managing varroa mites.

## FORAGE & NUTRITION

"Bees, like most species, need a healthy, diverse habitat for their foraging diet," said Peter Berthelsen, Director of Habitat Partnerships for Pheasants Forever, Inc., a member of the Coalition's Steering Committee and Forage & Nutrition Working Group. "Which is why the Bee Healthy Roadmap focuses on building strategies to promote improved nutrition





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for honey bees through several important initiatives that can also benefit a broad range of other species' foraging and habitat needs." The Bee Healthy Roadmap calls for the development of high-quality, bee-friendly landscapes in places and seasons when bees can most use them — like flowers planted on transportation corridors or in and around farms, ranches and other production agriculture areas. Nutritional requirements vary from region to region, so the Coalition will begin this year by identifying strategies for meeting forage and nutrition needs in the agricultural lands of the American Upper Midwest and will later identify strategies in other regions of North America. The Coalition has also begun work to identify and promote the planting of bee-healthy forage along transportation corridors and rights-of-way and will continue to look at other opportunities for forage in private and public lands. The Coalition will also encourage the development of supplemental nutrition options for bees and the planting of bee-friendly cover crops. All of these solutions aim to create win-win solutions for bees, other species, agriculture producers, and other land owners.

### MANAGING CROP PESTS

"To feed a hungry planet we need to simultaneously manage agricultural pests while ensuring the health of bees and native pollinators," said Gregory Sekulic, Agronomy Specialist at Canola Council of Canada and a member of the Coalition's Crop Pest Management Working Group. "This Roadmap lays out plans for promoting crop- and product-specific pest management practices that enable us to do both."

To achieve this goal the Coalition will work to accelerate the adoption and use of the best known crop pest management practices, also known as Best Management Practices (BMPs). These BMPs include promoting and improving communication and coordination between beekeepers and producers to avoid honey bee losses, and also promoting better understanding and reporting of incidents of honey bee losses that impact bee health when they do occur.

### CROSS-INDUSTRY COLLABORATION

"The Coalition itself is a cross-sector collaborative platform and the success of our efforts depends on effective communication, outreach, and education across all stakeholders," said Bill Kuckuck, Executive Vice President and Chief Operating Officer for CropLife America and a member of the Coalition's Steering Committee and Outreach, Education and Communication Working Group. "That's why the Bee Healthy Roadmap lays out specific plans for improving collaboration and communication throughout the food chain and with the general public."



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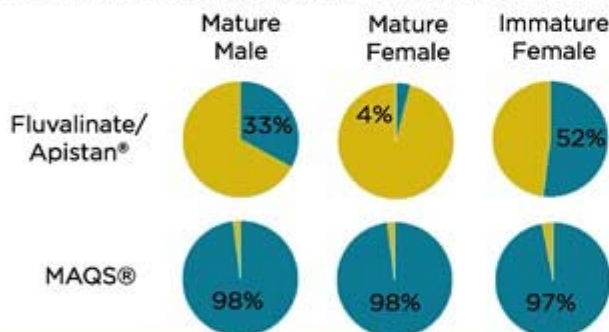
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1. S. Wending, Varroa destructor (Anderson et Trueman, 2000), a ectoparasite mites de l'abeille TAME Apis mellifera Linnaeus, 1758 REVUE bibliographique ET CONTRIBUTION TO L'Etude SA Reproduction, THESE Pour le Doctorat Veterinaire, 2012  
2. Winter Colony Health Assessment After Using Mite Away® Quick Strip (MAQS®) as a Control for Varroa Mites in the Fall of 2009 Alison Van Allen, Janet Tam and Melanie Kempers -



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- 2000 Fletcher Miller (Alaska)
- 2001 Mike Burgett (Oregon)
- 2002 Eric Mussen (California)
- 2003 Jaquie Bunse (British Columbia)
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- 2005 Steve Sheppard (Washington)
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- 2007 Diana Sammataro (Arizona)
- 2008 Mark Pitcher (British Columbia)
- 2009 Eric Mussen (California)
- 2010 Dewey Caron (Oregon)
- 2011 Jenny Bach (Hawaii)
- 2012 James K. Smith (Washington)
- 2013 Melanie Kirby (New Mexico)
- 2014 Jerry Bromenshenk (Montana)
- 2015 Beth Conrey (Colorado)

The Coalition is building a set of tools to support and accelerate adoption of best practices and technologies to promote understanding across stakeholders.

In all of its efforts, the Coalition emphasizes the need for partners to join together in taking collective action that will achieve more than any one partner can accomplish on its own.

“The Coalition’s Bee Healthy Roadmap is very ambitious,” said The Keystone Center’s Julie Shapiro, the Coalition’s facilitator, “but by building off of the excellent collaboration among Coalition members to date, and with the help and support of new partners, we can achieve our goal of substantially improving honey bee health.”

To get involved in the Coalition or to learn how you can take action, please visit [www.honeybeehealthcoalition.org](http://www.honeybeehealthcoalition.org).

## **ABOUT THE HONEY BEE HEALTH COALITION**

The Honey Bee Health Coalition brings together beekeepers, growers, researchers, government agencies, agribusinesses, conservation groups, manufacturers and brands, and other key partners to improve the health of honey bees and other pollinators. Our mission is to collaboratively implement solutions that will help to achieve a healthy population of honey bees while also supporting healthy populations of native and managed pollinators in the context of productive agricultural systems and thriving ecosystems. The Coalition is focusing on accelerating collective impact to improve honey bee health in four key areas: forage and nutrition, hive management, crop pest management, and communications, outreach and education.

Through its unique network of private and public sector members, the Coalition fosters new partnerships, leverages existing efforts and expertise, and incubates and implements new solutions. The Coalition brings its diverse resources to bear in promoting communication, coordination, collaboration, and investment to strategically and substantively improve honey bee health in North America.

Coalition members currently include Agricultural Retailers Association, Almond Board of California, American Beekeeping Federation, American Honey Producers Association, American Seed Trade Association, Bayer CropScience, Browning Honey Company, Canadian Honey Council, Canola Council of Canada, CropLife America, CropLife Canada, Ducks Unlimited, DuPont, Eastern Missouri Beekeepers Association, Land O’Lakes, Inc., Florida Fruit and Vegetable Association, Monsanto Company, Oregon State Beekeepers Association, National Association of State Departments of Agriculture, National Corn Growers Association, Pheasants Forever, Pollinator Stewardship Council, Project Apis m., Saint Louis Zoo’s WildCare Institute Center for Native Pollinator Conservation, Syngenta, Unilever, United Soybean Board, University of Maryland’s Department of Entomology, U.S. Canola Association, and Western Apicultural Society. The Coalition also includes ex officio participation from U.S. Department of Agriculture and U.S. Environmental Protection Agency.

## **ABOUT THE KEYSTONE CENTER**

The Honey Bee Health Coalition is facilitated by The Keystone Center, an independent, non-profit organization specializing in collaborative decision-making processes for agriculture, environment, education, energy, and health policy.

The Western Apicultural Society Board of Directors voted at its September meeting in Missoula, Montana to become a member of this important enterprise. Dr. Dewey Caron was appointed the WAS representative on the Coalition. He attended the fall meeting in Minneapolis at the end of October and will be reporting in the next issue.

**8 February 2015**



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The 'WAS Conference with a Difference' kicked off with the 2nd International Workshop on Hive and Bee Monitoring, an exciting day given over to playing with all the high tech equipment and methods being devised to help our bees back to health and prosperity. During the planning stage, organizer Dr. Jerry Bromenshenk considered this would result in limited attendance by only the geek squad who were already familiar with the territory and wanting to see what everyone else had done since the first workshop was held. Imagine his surprise when virtually every registrant for the week signed on for the workshop as well! Oh, there were a few who commented part way through the day that "this is way over my head", but mostly that was qualified with "but it is really exciting to hear about what is coming".

In the following pages you will find short summaries of some of the presentations on Day 1, with comments by Dr. Malcolm T. Sanford (University of Florida, retired). His summaries on the Workshop appeared in American Bee Journal in the December issue, and on the WAS Conference in the January issue. Thanks to Malcolm and to Joe Graham at ABJ for allowing me to use this material. Over to Dr. Sanford ....

The workshop on hive monitoring brought together a group of highly trained folks interested in finding the keys to looking at honey bee behavior and colony management without physically manipulating the colony. Physical inspection often inserts error into the observations. It features the activities of a number of different entities, many using a traditional technology, the scale hive, in innovative ways.

Leading off was **Jerry Hayes**, ex-bee inspector in Florida and now Monsanto Corporation's Honey Bee health Lead at the newly-formed Bio-Direct Business unit. He discussed how scale hives are used in the company's research on honey bee health in a number of areas. (See page 15).

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## "Not your grandfather's bee conference"

~ Day 1 ~

### 2nd International Workshop on Hive and Bee Monitoring

Look for the 2014 WAS conference presentations in the next (May) issue of the Journal

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Hayes was followed by **Alwyn Smith** of Paladin Engineering, also using scale hives (so-called "smart hives") in relation to research by Bayer Corporation's newly-formed Bee Care Center in North Carolina.

Mr. Smith would be the first of several to mention the obvious to attendees: "honey bees are not cows!" It's relatively easy to do research on cattle, which can be corralled and closely observed throughout their life. Not so for honey bees that forage up to a mile radius from their colony, with the majority of their activities hidden from view inside a wooden box.

The list of things that have to be looked at, according to Mr. Smith, include not only what he called "low hanging fruit" (weight, temperature, humidity), but also specialized activity, much more difficult to analyze.

These include specific noises (acoustics), thermal outputs of both adults and brood, individual bee trips in and out of the colony (bee counting) and subtle effects of pheromones. Creative measurements of these can answer many of the perennial questions asked by beekeepers over the years: Is the queen alive or dead? Where is the queen? When is the nectar flow? Where do workers go? What do they do? How healthy is the colony in general? Based on what parameters?

From my perspective, a star of the show had to be the current monitoring efforts of an outfit calling itself "Arnia". Arnia is the Italian word for beehive. The company was formed by **Dr. Huw Evans** and his wife in England and Italy, with specific objectives as noted on their website (<http://arnia.co.uk>).

The Arnia system sports a delightful user interface and marks the first commercially available, complete system to be marketed at relatively low cost to small-scale and backyard beekeepers - a basic set of sensors (e.g. hive weight, temperature, relative humidity, bee sound) and cellular communications. How many beekeepers would like to receive a text message notifying them that their supers are full, or a colony has gone queenless, needs winter feed, was knocked down or blown over, perhaps stolen? (See Dr. Evans article on page 16)



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is rapidly building. Initiatives not prominently featured at the event include those by commercial beekeeping supply outlets like Swienty and Mann Lake Supply, as well as Bee Alert Technology (Dr. Jerry Bromenshenk's company). The latter is targeting large-scale applications for beekeepers in the US.

An example of the use of the Arnia system was provided by **Robert McCreery** of the Dromore Beekeepers Association in Northern Ireland. Their Journeymen Hive Monitoring is considered a cornerstone of "Strategy for the Sustainability of the Honey Bee", a program of Ireland's Department of Agriculture and Rural Development, initiated in 2011.

Other activities mentioned by Mr. McCreery include a distributed pollinator study, categorizing pollen diversity and analyzing flowering times (phenology). Of utmost importance is its use in schools and educational institutions, as well as in the field of what is being called "citizen science", where beekeepers themselves become an integral part of the research team. (See Robert McCreery's presentation on page 20)

"Citizen science" was pioneered by Dr. Bromenshenk in his early studies using bees as environmental monitors of air quality in the Pacific Northwest.

**Dr. Wayne Esais**, recently retired from NASA's Goddard Space Center discussed the origins of his citizen science project, which began in 2006 when he farmed out some hive scales to beekeepers around the US. Now called HoneyBeeNet, this is reaching a network of beekeepers that continues to actively gather data. The genesis of this initiative is spelled out in a NASA blog post....

"By combining hive weight changes with space satellite data that reveal vegetation change on the ground, along with other data going back to the 1920s, he has found that the timing of spring nectar flows has undergone extraordinary change.

'Each year, the nectar flow comes about a half-day earlier on average,' says Esais. 'In total, since the 1970s, it has moved forward by about a month in Maryland.'

Warming of the climate continues to be the focus of Dr. Esais' efforts, which have delivered some intriguing conclusions. The role of "invasive" species is now being looked at from different perspectives. Could these plants be a godsend if native species can't survive in the region they originally adapted to? A comparison of trees as major nectar plants in the northeast vs. plants in other areas brings into focus regional differences in bee forage.

Another hive monitoring approach mentioned is **Hive Tracks**, "a powerful computer application accessed through any internet browser from a laptop, desktop, iPad, iPhone or other type of smart phone with internet access" according to its website. Both Hive Tracks and HoneyBeeNet differ from Arnia in a crucial way: neither is real time, remote monitoring, relying instead on a beekeeper physically visiting the bee yard and collecting data from individual colonies. (See more at [www.hivetracks.com](http://www.hivetracks.com))

**Dr. William G. Meikle** of the USDA's Carl Hayden Bee Research Center in Arizona discussed his projects in hive monitoring. Again, they relate to questions beekeepers routinely have, including how fast do bees consume food? what is the best way to measure adult populations? and how long does it take a colony to recover from beekeeper manipulations? (See Dr. Meikle's summary on page 21)

Two conclusions from the work by Drs. Esais and Meikle above and confirmed by other studies, stand out in this reporter's mind: 1) it is apparent it takes about a full day for a colony to recover from a "normal" beekeeping inspection (hive manipulation); and 2) Africanized Honey Bees (AHB) may not have moved from their initial border crossing in Texas eastward because they appear to require at least two nectar flows during the course of the year.

Most beekeepers and others generally conclude that manipulating a colony is a benign activity. Knowing that it can disorganize a hive for an extended period of time, reducing productivity, might be an important timing consideration.

**Robert Seccomb** of Bee Alert Technology presented information on how acoustical scanning (sound monitoring) using a form of computer intelligence called Artificial Neural Networks (ANNs) for data processing to provide insights into honey bee behavior (mimicking the way neural networks work in the human central nervous system).

Acoustical monitoring, combined with ANNs for data analysis, was used by Mr. Seccomb to determine the presence of chemical warfare agents for the US Army, then expanded under a USDA award to detect bee pests such as varroa mites and diseases, including foulbrood, nosema and CCD. Now under a new USDA SBIR project it is being employed to determine when pesticide exposures occur and how they affect colonies. (See Robert Seccomb's summary on page 22)

**Scott Debnam and Colin Henderson**, University of Montana, provided information on using LIDAR to locate bees in the field. As opposed to RADAR, which uses radio waves, LIDAR uses light from lasers.

Honey bees are notoriously difficult to keep track of in the field. Various tags and transmitters have been used...however, these all require catching and attaching something to the bees, plus expensive, sophisticated equipment. However, LIDAR recognizes bee size, movement and wing beat frequency without the need to handle any specific insect.

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LIDAR is now being used to study bee movements in various habitats and for optimizing pollination strategies. It can place the location of any detected bee with extremely good resolution (down to a few centimeters). The classic application is Bee Alert Technology's use for locating plastic land mines.

LIDAR is a logical offshoot from the pioneering work using RADAR to look at drone congregation areas in Arizona. **Dr. Gerry Loper**, retired from the USDA Tucson Bee Lab, showed his ground-breaking video of work done in the 1980s. (See Dr. Loper's presentation summary on page 23).

**Dr. Jerry Bromenshenk** anchored the Bee Alert Technology presentation with his discussion of using RFID (Radio Frequency IDentification) chips for security and infra-red imaging of colonies to assess population size and condition.

Bee Alert Technology and Batelle Pacific National Laboratories, put the first RFID tracking tag on a honey bee more than a decade ago. The Batelle team went on to develop many of the RFID tags currently used in identifying and tracking a wide array of items, and Bee Alert, in 2006, began offering RFID chips to mark beehives for theft protection and recovery. Dr. Bromenshenk's current research indicates that RFID technology is better utilized to improve hive efficiency and productivity rather than simply to prevent theft.

Infra red (IR) technology (heat detection) uses have proliferated in beekeeping, including looking at wintering in sheds, checking queen cells for viability, and determining the condition of outdoor colonies in all kinds of weather.

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Queen cells from tested Saskatraz breeders (\$20). Closed population mated breeder queens (\$300), out crossed breeder queens (\$100) Saskatraz stock carrying VSH trait also available as queen cells, in Saskatraz hybrids and breeder queens in 2015.

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*Dr. Malcolm Sanford & Dr. Jerry Bromenshenk take a break*

An end-of-day panel discussion (including all the day's speakers) concentrated on business planning and where funds might come from for research and practical projects. The power of developing partnerships was emphasized by all the panelists especially those at the University of Montana in the business college. The example of Bee Alert Technology came up again and again. Dr. Bromenshenk is arguably the only faculty member in the bee research arena at a major university to have supported himself on "soft money". In short, he has had to earn his living by writing grant applications rather than the more usual way faculty members are paid, via a tax-payer supported salary. In future, it may become a model of sorts as more academicians and others look toward outside funding for honey bee projects dedicated to transferring technologies from the research laboratory to the market place.

Many of the afore-mentioned technologies were on view during the conference and ensuing workshops. There appears to be a potentially large, world-wide market for such technologies.

# Honey Bee Diseases, Pests and Predators or “What is This ... and Now What Do I Do” - Jerry Hayes, Monsanto

Honey Bees have become domesticated animals to some extent because of the impact of Varroa mites and the constant need to control and reduce their breeding populations in managed honey bee colonies. Honey bees have always had opportunistic virus, bacteria, yeasts/fungi, and more recently mites and other insects individually or in synergistic combinations using honey bee life stages as a source of reproductive success. Beekeeping is a visual sport. Being able to visually compare conditions within a honey bee colony for adult, workers, drones, queens and developing brood of all castes is a learned skill that comes from practice with success and failure.

AFB, EFB, Nosema and their control are based on correct identification and labeled treatment options. There are at least two dozen, and growing, viruses that have been reported to infect honey bees. Most honey bee viruses do not cause noticeable symptoms. Confusing disease-like conditions from wax moth, small hive beetle larva, starvation and tracheal mites present constant pressure and beekeeper identification skill to ameliorate. Varroa destructor mites are the #1 enemy of managed honey bee colonies of *Apis mellifera* in many parts of the world. Varroa is found as a 'good' parasite, if you will, on its original host *Apis cerana* in Asia. Good, meaning it doesn't kill its host and the host doesn't kill it totally. On our European genetically based honey bees that are unadapted and have not developed a relationship with Varroa over the millennia this very large mite is a bad parasite as it can kill its new host directly and indirectly. Control measures that were given to beekeepers have been pesticides that beekeepers introduce into the honey bee colony in order to try to control a little 'bug' on a bigger 'bug'.

Combine all of the negative pest, pathogen and parasite inputs and a serious decline in honey bee health is many times seen with the inaccurate name of Colony Collapse Disorder or CCD. CCD is possibly a convergence of 1) stress ie. poor nutrition, transportation of colonies, beekeeper management or lack thereof. 2) Varroa 3) pathogens such as AFB, EFB fungus, viruses and 4) pesticides, primarily in-hive Varroa treatments.

Our goal as beekeepers is healthy bees and strong colonies. If it were easy everybody would be doing it. But, they aren't so that leaves it up to you.

## Quantitative Analytical Tools for Honey Bee Health Assessment

Honey bee health, in the past, could only be ascertained by physically and visually dismantling, to some degree, an individual honey bee hive to observe the colony status. This has been described as the Almond Growers Method or AGM. The AGM method is subjective, has high variability, is affected by environmental conditions, analytical tests are rarely performed, Varroa destructor and Nosema levels not routinely tested for and slightly different methods are used in different locations resulting in the loss of the possibility to compare method data.

In multiple trials across the US a more robust analytical method to assess colony status has been developed to tie into future research of honey bee health control field trials. 1) Hive strength is established by photographing frames of bees, using honey bee and brood counting software which results in an objective and consistent quantification of colony strength for higher quality data. 2) Cellular transmitting scales to monitor changes in hive weight as well as foraging activity. 3) Weather monitoring to correlate between hive strength and weather changes. 4) Pathogen analysis using molecular tools to quantitate pathogen load and activity of viruses and nosema. 5) Varroa populations within the colony.



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## "Wide-scale scientific experiments can be conducted by beekeepers"

*Dr. Huw Evans, Arnia (England and Italy)*

I have been keeping bees for over 15 years. For me it has always been an ideal mix between a science and a craft. I remember returning from a particularly nasty swarm inspection, the bees were busy and did not want to be disturbed. On return from the hives, with my arms 'warm' from stings, I remember contemplating that in this day and age if a surgeon can replace a valve in your heart via a vein in your leg surely we can find out what is happening inside a bee hive without having to take it to bits.

I am an electronic engineer by trade, my wife a biologist, so together in 2009 we setup Arnia, a research and development company that designs and sells beehive monitoring equipment. Arnia is the Italian word for beehive. We set up an experiment recording the sounds from bee hives while doing regular physical inspections so we could correlate any changes in sound with changes in colony behaviour; to date we have over 30 Tbytes of acoustic data. We also measured other physical parameters such as temperature, humidity and hive weight.

We quickly discovered that hive acoustics fell into two distinct categories. The first we call 'smoke and mirrors' in which you try to associate a colony condition to a specific acoustic signature. In this area we have seen evidence of swarm preparation and health issues such as Varroa and Nosema. We are currently working with acoustic experts and universities around the world to improve these recognition algorithms. To the best of my knowledge, as yet there is no reliable recognition algorithm that works across bee breed and various hive types. The second category are things like flight noise, fanning as the bees process their nectar, even the overall sound level in the hive is a good indication of colony strength. These parameters are far more straightforward to measure.

Arnia has now been producing hive monitors for over four years, we have sold hundreds of monitors in 14 different countries. We employ four full time members of staff who are all beekeepers as it's vital that everyone understands what we are doing and why we do it. The basic hive monitor covers acoustics, temperature and humidity. A hive scale is placed under the hive, the rectangular doughnut design maintains ventilation while allowing debris to fall. Data from the monitors is sent back to the user interface via a Gateway Unit which also monitors weather conditions at the apiary.

The key to any hive monitoring system is an intuitive user interface. This allows our users to check the status of their hive from any Internet enabled device. The beekeeper can watch the colonies build in the spring, map nectar flow, even map daily flight activity. Furthermore, there is a system of alerts for when its time to add or remove a super, if the colony becomes broodless, if the bees are being robbed by other bees. A security feature informs the beekeeper if their hive is being stolen or if it falls over during a windy night.

From a bee researchers perspective the monitors bring a non-intrusive, reliable and consistent way to regularly and simultaneously gather data; this provides a scalable solution ideal for wide scale field trials. Furthermore, features that are attractive to beekeepers help both recruit and maintain their participation in such trials. The monitors also bring a 'black box' solution to otherwise 'mysterious' colony failure.

Recent threats to honeybees have been well documented; reports from governments in the USA, UK and Europe are unanimous in their opinion that more field data on bees is required to fill knowledge gaps and better understand the complex issues surrounding bee health. The trouble is, bees do nothing invariably. Ours don't, anyway! I guess bee health is a multi parameter thing and us beekeepers are only one of those parameters. Arnia is therefore planning a large citizen science bee research project involving the general public, beekeepers and large corporations that will produce free data for leading bee research groups

Our aim is to improve understanding of the multiple factors affecting bee health and how they map across wide geographical areas. Monitoring on a wide scale provides buffers to deviations encountered on smaller scale data samples while helping to identify subtle trends. We propose to distribute a minimum of 1000 hive monitors to beekeepers across Europe and the USA, funded through corporate sponsorship and Crowd Funding. In return for receiving the monitors





beekeepers will carry out a prescribed hive inspection regime and enter key data into the monitoring user interface. All data generated from the project will be available free to all bee researchers and shared with the Bee Informed partnership.

This provides a wealth of incredibly useful data through a single universal interface that can be used to analyse bee welfare in different habitats (urban, rural etc.), different climatic regions, compare different management practices/treatments and their impact on bees, while collating inspection data such as Varroa counts. Furthermore, bees are remarkable sentinels of the environment. A single colony can thoroughly sample an area of up to 10 km<sup>2</sup> ideal for an array of bio monitoring studies. Climate change, changes in land use and practices, environmental pollution are just some of the potential applications. A study by Dr Wayne Esais of NASA has identified a major shift in time of flowering in Maryland over a number of years just using data on nectar flow as measured by change in hive weight.

The ultimate application of electronic bee hive monitoring will evolve with use over time, but already we have a system that is which helps beekeepers on a daily basis. For information about buying Arnia equipment or our sponsorship of the large network of monitors, please contact [sales@arnia.co.uk](mailto:sales@arnia.co.uk) for more information.



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# Bee-loved plants of Montana

By Kris Csorosz & Kelly Chadwick, University of Montana

bee-loved (bē luvd') adj.  
delicious, appealing, alluring, tasty, scrumptious, delectable,  
luscious, tempting, seductive, dearly loved by bees



Hello Bee Lovers. Please use the following links to view our presentation to the Western Apicultural Society Conference in Missoula last September. They may be downloaded, saved, or shared.

• <http://1drv.ms/1piTpuS> - a PDF file which launches in Word Online.

• <http://1drv.ms/1v19s13> - a PowerPoint file which launches in PowerPoint On-Line (it takes some time).

## #1 Rose milkweed (*Asclepias incarnata*)

Bees are the principle pillars of the pollinator world. They eat only pollen and nectar and are totally dependent on flowers. There are 25,000–30,000 species of bees in the world. In Montana, there are 4,000 known species.

## #2 Purple coneflower (*Echinacea purpurea*)

The relationship between plants and honey bees is based on what each has to offer the other. Plants offer honey bees food in the form of pollen and nectar. Bees offer plants genetic fitness and successful reproduction.

On each foraging trip, an individual bee tends to forage on one particular flower species. Movement from plant to plant of the same species favors cross-pollination resulting in greater genetic variation, which often results in stronger, more vigorous plant offspring.

## #3 Shrubby penstemon (*Penstemon fruticosus*)

Healthy habitats equal healthy bees. Create honey bee friendly landscapes by planting large patches of each plant species for foraging efficiency and good garden design.

## #4 South side of the University Center gardens on the University of Montana campus.

Plant a variety of flowering species with abundant pollen and nectar. A correct mix of plant species that bloom throughout the growing season will provide a continuous source of nectar and pollen.

18 February 2015

**#5 Joe Pye weed (*Eupatorium fistulosum*-syn. *Eutrochium fistulosum*)**

Flowers should consistently bloom in the garden throughout the growing season. Choose plants with long blooming cycles and plants with successive blooms. An easy plant mix would consist of nine species: three blooming early in the season, three in mid-season and three in late season which fills in gaps in the nectar flow.

**#6 and #7 Blue bachelor buttons (*Centaurea cyana*) and yellow mustard species**

Flower shape and color lure bees from a distance. Scent provides the enticement to land. Bees are attracted to brightly colored blues, yellows, a mixture of the two, bright white and a portion of the UV spectrum. They see red as gray, or as the absence of color.

**#8 White penstemon (*Penstemon albidus*)**

Many flowers have scent guides, contrasting ultraviolet guide patterns (invisible to us) or visible nectar guides to act as directional markers. These guides help the bees quickly locate the nectar source in the flower's center.

**#9 Crested Beardtongue (*Penstemon eriantherus*)**

Flower shapes that are attractive to honey bees are:

- flat or shallow single flowers (poppies, daisy-like flowers)
- tubular shaped with nectar at base of the tube (*Penstemon*, honeysuckle)
- landing platforms where a bee can land before it enters the flower (foxglove, *Penstemon*, pea and mint family)

- bilaterally symmetrical with one side of the flower a mirror image of the other (mints, borage, viola).

**#10 Garden chives (*Allium schoenoprasum*)**

Garden chives, in the onion family, are honey bee attractive. This spring blooming perennial repeat blooms through the season into fall. Chives are native to Europe, Asia, and North America, including Montana.

**#11 Borage (*Borage officinalis*)**

Borage is a medicinal plant with edible flowers and leaves. This summer and fall-blooming, self-seeding annual is rich in nectar. Borage honey is slow to crystallize, very sweet and a clear to bluish color.

**#12 Winter savory (*Satureja montana*)**

Plants in the aster and mint families are often bee favorites. Winter savory is a late summer and fall blooming perennial herb, and is one of many bee favorites in the mint family, along with lemon balm, oregano, thyme, garden sage, hyssop and lavender.

*Photos by Ken Stolz (#s 2,3,4,6,7,10,11,12) / Kelly Chadwick (#s 1,5,8, & 9)*



# Journeyman hive monitoring

Robert McCreery, Dromore Beekeepers, Northern Ireland

This presentation outlines a project originating in October 2013 involving the establishment of a research group spanning a range of beekeepers throughout Northern Ireland. Funding was sourced through a competitive "habitat improvement" process managed by Environment Link on behalf of Department of Environment in Northern Ireland.

Dromore Beekeepers Association was established and constituted in 1984. Its objectives include the education of beekeepers and newcomers to the craft, bee disease diagnosis, demonstrations, publications, environmental improvements, and mutual support. Environmental improvements previously undertaken include the establishment of an association apiary in a local ring fort (rath) and significant bee breeding programmes in support of the Irish Black Bee.

In recent years bees and beekeeping in Ireland has suffered greatly from the Varroa mite, which has decimated our natural feral colonies and made life extremely difficult for beekeepers in terms of maintaining colony health. In recognition of this the association, which is one of twelve affiliated with the Ulster Beekeeping Association, runs a number of courses each year through the auspices of FIBKA (the Federation of Irish Beekeeper Associations). Courses have been run in association with the Department Of Agriculture-owned Greenmount Agricultural Campus as part of their short course syllabus.

Proposals for the project included "citizen science" type pollen analysis by members of the group. All have achieved senior "Federation of Irish Beekeeping Senior Examinations" and this project was identified as a way of putting into practice and improving on the learning already achieved. It was also envisaged that this would enhance school biodiversity and IT studies at Dromore High School, a school of scientific excellence with which the Association has built a long term partnership and on whose premises the association meets.

In essence, the project included the installation of monitoring equipment within four hives across each of eight locations to determine the hive temperature, humidity, brood temperature, hive acoustics, weight, and apiary weather conditions. Data on local forage sources will be made available to the group and disseminated to all on a password restricted web portal enabling access both to our own beekeepers, the school and others, for monitoring the status of hives, and pollen sources locally from any internet enabled device.

Data available is informing Dromore beekeepers in all aspects of bee husbandry, including the state throughout the winter months, spring build up, brood state, and will form an essential stepping stone for improvement and advancement of beekeeping knowledge in Northern Ireland. Monitoring graphs are being incorporated in education packs to improve on the Educational program currently available.

Initial outputs from monitoring software have demonstrated significant differences in the timing of honey flows at locations within twenty miles of each other, together with differing pollen loads across sites assessed. In terms of lessons learned it is clear that;

- Distributed studies of this sort can be successful where those involved are chosen carefully and preferably have demonstrated a technical or scientific interest in bees or involvement in group studies. We were fortunate that in our case a readymade team was established having conducted group studies previously.

- Where equipment when purchased is well supported not only in terms of fault replacement but where necessary with setup and advice at individual beekeeper level. Some may not be technical and have an inbuilt reservation to reading manuals etc.

- It is preferable that the hives used are set aside for the purpose rather than being migrated, as set up across sites can be extremely difficult.

- Focus or study group approaches are required as protocols must be agreed in advance and research of work already undertaken in respect of the study topic is required.

Future plans involve more managerial and disease analysis type studies, treatment regime efficacies, Black Bee Improvement, and hive type comparisons. In essence the project has sought to create building blocks which will change attitudes to our environment. Inevitably, looking after our bees will have an impact on the flora and fauna we wish to promote, and this in turn will inform changes in regional DARD (Department of Agriculture and Regional Development) bee health strategy and other support mechanisms.



# Interpreting continuous hive weight and temperature

*Dr. William G. Meikle, Carl Hayden Bee Research Center, USDA-ARS, Tucson, Arizona*

Continuous weight monitoring is not in any sense new. Gates (1914) and Hambleton (1925) recorded hourly weight data from bee hives placed on mechanical balances kept in open sheds. These workers put together teams of colleagues or grad students to record weight 24/7 for weeks on end. Their data look, not unsurprisingly, a lot like typical data we get today. Because of the lack of electronic computers, calculating even descriptive statistics was time-consuming, and many procedures for inferential statistics had not even been developed yet. Thus, it is not surprising that these pioneers did not take analyses further than noting diurnal patterns and attributing these (correctly) mostly to forager activity and water gain and loss. Much effort was made to correlate weather factors, such as temperature or hours of sunshine, with hive gain and loss in an effort to develop a predictive model.

Part of our work at the Carl Hayden Bee Research Center involves examining continuous data for patterns, and comparing the data to hive phenology with the same purpose as the early workers - to correlate aspects of those patterns with colony growth and activity. Weight data itself is a very useful place to start. Even without further analysis the change in hive weight is a useful thing to know, for timing honey harvesting or detecting a dying colony. We have focused on the within-day weight changes. We have found that the size of the within-day amplitude of sine curves fit to that data is directly proportional to the population of adult bees, but only during a nectar flow. Outside of a nectar flow, the sinusoidal pattern is poor and the amplitude independent of the adult bee population.

Within-day weight changes have previously been shown useful in determining forager activity and swarming. Recently, foragers from one of our monitored hives was (inadvertently) exposed to something toxic. Large numbers of bees were found at the entrance of that one hive, but not its neighbors. While this "bee kill" (we were unable to determine the cause of death but these bees are free to forage in urban gardens and it is not unlikely a residence or business had treated a garden where these bees were foraging) did not change overall hive weight very much at all, it greatly affected the within-day data because most of the bees that died were foragers. It was thus easily detected in the weight data.

Continuous temperature data can be treated the same way as hive weight data. Temperature is different in a fundamental way from weight data in that while a hive has one weight value at a given point in time, each point in space within the hive has a temperature value. The temperature of a given point is largely influenced by two things: its proximity to the exterior, and its proximity to the center of the brood mass. We are most interested in bee-influenced effects. If we consider the data in the same way as weight data, we divide the data into the running average temperature and the within-day, detrended variation. Average temperature is a good indicator of brood - as long as it is significantly different from the exterior temperature. Fitting the same kinds of curves to the within-day data, we found that temperature amplitude, that is, how much the temperature varies within a day, to be strongly related to the presence of brood. Thus, variation in weight and temperature data can provide important information about hive activity, growth, acute factors such as bee kills, and brood status.



*Drs. Meikle and Loper, presently and formerly with the Carl Hayden Bee Lab in Tucson, Arizona, catch up between sessions.*



# Acoustic scanning of colonies to detect exposures to pesticides

Robert Seccomb, Bee Alert Technology, Inc, Missoula, Montana

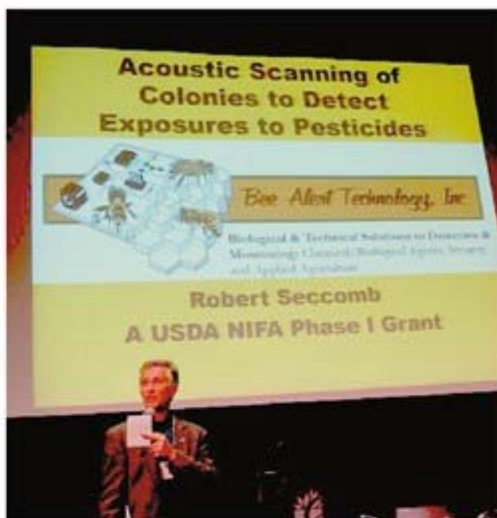
Neonicotinoids are a hot button topic these days among bee keepers. Like any other kind of pesticide, improper use can kill bee colonies. In 2004, under a US Army contract, Bee Alert discovered that the sounds bees make changes once exposed to toxicants, and that change can be measured and used to determine not only the level of exposure, but in some cases even the type of toxicant. Under that contract advanced multivariate statistics were used in data processing.

In 2007 Bee Alert received a Phase I from the USDA to expand this idea to acoustically detect other non-pesticide stressors, specifically the Varroa mite. The intent was to produce a small hand held device designed to listen to a bee colony and determine if they were infected with mites. By the end of Phase II we created the Honey Bee Acoustic Scanner (HAS) which detects varroa, ceranae, CCD, queenlessness, Africanized and hive beetle infestations. Instead of using advanced statistical analysis, the HAS uses a form of machine intelligence, the Artificial Neural Network. ANNs are good at recognizing and categorizing patterns.

Current work on an always on, remote reporting pesticide exposure device is being funded by another USDA Phase I grant. In this work we are focusing on acoustic detection of acute and chronic exposures of clothianidan. To that end we have been exposing mini nucleus colonies to lethal and sub-lethal doses of clothianidan and recording pre-exposure and 1 hour increments post-exposure for 72 hours. Preliminary results are encouraging, with obvious frequency and amplitude shifts 10 hours after exposure (for chronic exposure) and ANN training/testing showing up to 90% accuracy on detection.

When all the recording and analysis is complete, the HAS will be updated with a new library of pesticide detection algorithms, and the hive mounted unit will regularly record and report via satellite any pesticide exposure events. To quote our USDA proposal:

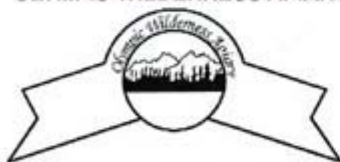
"This technology could revolutionize beekeeping and the use of neonicotinoids in the U.S. Any migratory beekeeper would like such a unit in each bee yard, particularly if it linked in with an anti-tamper system and health monitor. Additionally, the autonomous system would be a useful tool for pesticide developers/distributors. Finally, federal agencies such as the EPA may be interested in using this monitoring system to locate and track pesticide incidents."



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"Honeybees are the backbone of agriculture"

# The use of RADAR to locate and define honey bee drone flight to – and in – Drone Congregation Areas

*Dr. Gerry Loper, Tucson, Arizona Bee Lab (retired)*

For over 120 years, there have been anecdotal reports that in the spring, honey bee drones can be heard in definite locations and always in those same locations year after year. Three main questions - still unanswered - are:

1. Where are these areas (in relation to the apiaries)?
2. Why are they at these specific locations?
3. Can we “create” them artificially?

What do we know about these “DCAs”? Honey bee drones leave their colonies in the afternoon about 30 minutes before any virgin queens would leave for their mating flights. It seems that initially, virgin queens “find” the drones, but we also know that queen pheromones are highly attractive to drones so that once in or near the DCA, the drones “find” the queen and she typically mates with 15 to 20 drones.

Since the discovery of the chemistry of the most abundant queen pheromone (9-ODA) in the early 1960s, attempts have been made to discover the location of DCAs and even to attempt to “create” a DCA. Many studies in the U.S., Germany, Austria, and South Africa have documented the location of European honey bee DCAs and also in the Far East, the DCAs of other species of honey bees. These were all accomplished using queen pheromones that were either live queens or 9-ODA on lures being elevated by balloons or kites.

Studies using RADAR to locate DCAs began near Lawrence, Kansas. (in collaboration with Dr. Orley Taylor) but used primarily in Tucson, Arizona, using a RADAR unit designed and built by USDA Agricultural Engineer Wayne Wolf.

In the spring seasons of 1988-90, we located the fly-ways and DCAs near an apiary in the Avra Valley, about 30 miles west of Tucson. Individual drones as well as literally hundreds of drones were “seen” on the RADAR screen and their behavior documented by still and movie film. Distinct flyways and DCAs were formed every afternoon (and in the same locations every year) and their locations were related to vegetational features.

In this essentially flat desert area, the flyways formed along lines of trees growing next to features where water accumulates, allowing short trees to grow. One tree line along a usually dry “wash” extended for several miles – as did the drone flyway. Along the flyway, some additional vegetational features would occur and the flyway would branch, some drones going along the original tree line and others going off to establish a different flyway.

Often at these and other “branch points”, DCAs would form where the drones flew higher to “collect” in basically circular groups flying up to 160 feet vs. the flyway height of 20-30 feet. Several miles of flyways and up to 28 DCAs were located. Again, these were at the same locations year after year.

These were the first and, as far as I know, the only DCA studies to be published using RADAR successfully. Now, however, there is a new technology – LIDAR (Light Detection and Ranging) – that has been shown to be able to detect honey bees in flight at similar or greater ranges and is much more portable and provides data that can be immediately (via computer) enumerated and located on a GIS map of the area under study, as recently reported by Dr. Jerry Bromenshenk of the University of Montana.

As to the idea of “creating” a DCA, in 1992 I reported preliminary data that some DCAs exist over areas of “magnetic anomalies” - that is, where the earth’s magnetic field changes significantly but in small local areas. Where these “anomalies” happened to be under a flyway, a DCA formed. Could it be that once flyways are located, artificial magnetic anomalies could be generated (by a battery attached to a copper coil)?

With the development of new technology, we can discuss the possibility that LIDAR instruments may be able to do an even better job of documenting where both drones and queens go on their mating flights – and also enabling tests of ideas on how to “create” a DCA.

*Drones flying into a net with lure in the top*





**Feb 6 - 7: New Mexico Beekeepers Association Annual Meeting**, Kosmos Performance Space, 1715 5th St, Albuquerque. Guest speaker Marla Spivak. For more information, visit [www.nmbeekeepers.org](http://www.nmbeekeepers.org).

**Feb 27 - 28: Nevada Beekeepers' Conference**. Among the speakers are Randy Oliver and Michele Colopy. Info <http://www.masonvalleybeekeepers.org/2015-beekeepers-conference.html> or contact Debbie Gilmore at [dgilmore88@yahoo.com](mailto:dgilmore88@yahoo.com).

**Feb 27 - Mar 1: 8th Annual Organic Beekeepers Chemical-Free Conference**, YMCA Triangle Y Ranch Camp and Retreat Center, Oracle AZ. Info Dee Lusby 520-398-2474 evenings.

**Apr 4: Intermediate Beekeeping class** starting Apr 4 and continuing for four consecutive Saturdays from 0900

- 12 noon at the Allan Hancock College Solvang Center, Room 1. Register online at [www.hancockcollege.edu](http://www.hancockcollege.edu) ; For more information call 805-922-6966, ext. 3209.

**Sept 15 - 20: 44th Apimondia Congress**, Daejeon, South Korea. Info <http://www.apimondia.org>.

**Oct 1 - 3: 2015 Western Apicultural Society Annual Conference**, Boulder, Colorado. Watch the Journal and website for developments.

For more Beekeepers' Calendar of Events items, visit the Global Beekeeping Calendar, courtesy of the Florida Beekeepers Association & Malcolm Sanford at [http://www.my.calendars.net/bee\\_culture](http://www.my.calendars.net/bee_culture)



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# Regional News

## ALBERTA - Bob Keenan

The Calgary and District Beekeepers Association includes mainly hobbyists and a few commercial beekeepers operating in Central and Southern Alberta. Club meetings are monthly from January to December and besides outreach activities such as "Aggie Days" at the Calgary Stampede and a couple of local fall fairs, honey shows and social events, meetings present information either requested by members and/or of use to the members from selected speakers. Several such presentations were: Integrated Pest Management Workshop; Bees, canola & neonicotinoids; Beeswax harvesting, clarifying & crafting; Spring and fall management practices. We also bulk order package bees from New Zealand and encourage new members to attend beginner courses offered by Alberta Agriculture.

Late in 2014 the Alberta Government issued a notice requiring all beekeepers to apply for a "Premises Identification Number" (PID No), required if a beekeeper wants to purchase medication for their bees. This registration is part of the Government's Traceability Program.

"Western Producer" on Dec. 12th presented Statistics Canada numbers on Alberta Honey Production & Bee Colonies:

	2010	2012	2014
Beekeepers	769	883	930
Colonies	266,000	278,400	282,000
Honey Production (millions of lbs.)	34.5	38.0	34.4

Ozone sterilization is being studied by a tech-transfer group in Ontario to sterilize honey boxes, frames and honey combs to kill insects and disease pests and reduce pesticide residues. Another researcher in Ontario is using bee genetics to study hygienics and grooming behavior.

As a result of our tour at WAS in Santa Fe, my wife and I built two top bar hives based on Les Crowder's plans. Started with a package of N.Z. bees in each and were well pleased with a small initial harvest of honey. These hives are presently "winterized" for inspection in the spring.

## BRITISH COLUMBIA - No report

## SASKATCHEWAN - Doreen Bradshaw

2014 was certainly a challenging one for beekeepers in Saskatchewan. However, the outcome at season's end was somewhat surprising as production was just short of average! Cold weather, excessive rain and lack of sunshine was the norm. July was the only month of normal sunshine and the bees took full advantage of it.

Saskatchewan undertook a couple of research projects that were of interest to beekeepers in the province.

First: Mapping the hive internal and outdoor external temperature over the 2013 - 2014 winter months - a very cold winter and a real test of the bee's resilience. Results indicated that even at -40 on the exterior, inside was at 9.8C/50F.

Second: A research project on longevity of worker bees - a time consuming project in counting bees and observing many hive activities during this period. Approximately 75 hives were monitored every 12 days, April to late October. There were some interesting results, such as the need for the hive to have brood as late as possible in the fall to come through the winter in good shape, re-queening on a regular basis, and some management practices that proved to be successful. Another project this past summer undertook "Best re-queening techniques".

Hives generally went into winter with a good food supply and to date the winter has been mild. Hopefully, the good weather continues and enables a great start to 2015 beekeeping.

## ALASKA - Dr. Joe Carson

Hello from Alaska. I've just returned from the California meetings of the ABF and AHPA.

Alaska has had a mild winter with limited snow. Current conditions are above freezing with rain/wet snow - poor conditions for honey bees to winter in. We prefer lots of snow and colder temperatures for insulation and moisture control.

This summer was very wet. Torrential thunder storms and rain. Hardest rain I have seen in the last 20+ years juxtaposed to three years ago where we could not get a drop of rain most all summer!

The number of new hobby beekeepers seems to be slowing but the number of packages being sold in the state is steady to slightly increasing. The Fairbanks area has seen a reduction in sideliners to commercial beekeepers and the hobbyist sector is growing at a slow rate. South Central Alaska which includes the Anchorage and MatSu Boroughs is holding steady based on the number of packages sold. The percentage of beekeepers who attempt to overwinter is growing slightly but the vast majority of beekeepers do not overwinter.

I see a few adventurous beekeepers continue to order 5# packages and hope for the bees to survive in the Bush of Alaska. There is no club or mentor in most Bush communities (which are off the road system) to answer questions or do hive checks so the isolated beekeeper is basically on his own to succeed or fail.

Swarm calls from local government agencies seem to be slowing down. Perhaps the beekeepers are starting to get a handle on swarm indicators.

The price of honey is holding steady at \$13.00 - \$16.00 per pound. We saw prices hit \$18.00 in Fairbanks in August as there was very little honey pulled due to extreme wet conditions and poor foraging.

More snow would improve conditions immensely for hive survivability. Wet, mild winters are not conducive to high spring survival rates in the Alaska beehive.

A personal observation: most of our customers prefer or want or demand glass containers for their honey. Almost everyone asks "is this local honey", and they want to know the specific area where your hives are located. "Buzz words" we often hear are: heated?, filtered?, sugar?, chemicals?, treatments?, and finally, the million dollar question, "do you have any honey comb"? There seems to be no end to the demand for comb honey (not chunk honey).

Personal care items are selling well. Lip balms, lotions, balms and propolis products do very well in the local store. An Alaska lip balm is the highest selling lip balm at the Ted Stevens International Airport in Anchorage according to the store purchasing agent.

### ARIZONA - Zack Funke

2014 was a good year for beekeepers in Arizona. We had ample precipitation to encourage longer and more significant blooms of native buckwheat, mesquite, wildflowers, and other cacti. Beekeepers in Florence have reported larger honey crops than 2013.

Honey sales and demand remains strong and more beekeepers are selling their wares at markets around Phoenix. The market I sell my honey at now has three beekeepers including myself directly selling their honey to the public.

In the valley of Phoenix the cooler weather starting in November encourages bees to stay indoors more and consume the stores built up through October. No harvests have been made since mid October from my hives. This season we plan to place bees amongst 25 grapefruit trees then move next door to 25 orange trees. Blooms and swarms will start up in mid February so swarm traps and equipment are being assembled and repaired for the 2015 season.

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## CALIFORNIA - Archie Mitchell

**Santa Barbara Beekeepers Association 'Sweet Start' Internship Program** - The Sweet Start internship program, targeting "at risk" youths and instructed by Master Bee Keeper Paul Cronshaw, has graduated 4 interns.

The vision of Sweet Start is to provide students with quality coaching and job training that will give them experience and confidence for a future career path. Students willing to make a commitment to themselves, the bees and the community receive pre-job training and apply for internships. Those selected are matched with a mentor and learn the unique art of beekeeping. Interns work in teams to create a business and marketing plan and sell honey products at local farmers markets. All interns are compensated, as they would be in the job market, for their training and work. Proceeds from product sales support Sweet Start interns in successive years. Sweet Start graduates are offered continued support through scholarships and career mentoring.

**Lompoc Valley Beekeepers Association "Save the Bees" Project** - The Lompoc Valley Beekeepers Association received a \$4,000 grant from the Fund of Santa Barbara to continue efforts towards helping save the honeybees by educating the public regarding the plight of bees and what can be done to help.

The Lompoc Valley Beekeepers Association and the Lompoc Bird, Bee and Butterfly Sanctuary, recently joined with the Bee Buffer Project to help create honeybee habitat on a 40 acre parcel of farmland just outside the city of Lompoc. The project's goal is to positively influence 6,000 acres for honeybee habitat within two states, California and North Carolina, by helping farmers help honeybees. Through the honeybee habitat created by the Bee Buffer Project, honeybees will have increased access to essential resources.

Each landowner involved in this project must agree to leave the bee buffer intact for 3-5 years. Farmers benefit from the additional pollination services the bees will provide as well as the protection to water and soil the buffer will provide.

The Bee Buffer Project is a partnership between the Pollinator Partnership and the Burt's Bees Greater Good Foundation. Their overall goal is to create honeybee forage sites and impact 10,000 acres by 2020, in California and North Carolina. For more information regarding the project visit: [www.beebuffer.com](http://www.beebuffer.com) or contact Mary Byrne: [mb@pollinator.org](mailto:mb@pollinator.org)

## COLORADO - No report

In lieu of the regular Colorado state report, keep an eye on Beth Conrey's Presidential reports as the 2015 WAS conference heats up.

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## HAWAII - Dr. Ethel Villalobos & Danielle Downey

The beekeeping industry in Hawaii has suffered from the introduction of Varroa on two islands (Oahu 2007 and Big Island 2008) and the small hive beetle, introduced in 2010, is now statewide. Bee health issues are a serious concern as these pests and Nosema species are all tropically adapted. Hawaii's bees typically rear brood year-round and make honey year-round, with the third highest per-hive average in the nation (75lbs). Hawaii conditions are also ideal for bee pests and parasites, so pressure is high.

In spite of these recent bee health concerns, the beekeeping industry in Hawaii is still growing and the large queen producers have adapted to cope with these issues. Hawaiian queens still contribute 25% of the queens used on the mainland USA and 75% of those used in Canada.

Vigilance is high to prevent spreading Varroa to any of Hawaii's other islands, including biosecurity measures, annual surveys, and education/outreach efforts throughout the state. Efforts are primarily by the Hawaii Department of Agriculture, and the University of Hawaii at Manoa Honeybee Project, both created after Varroa detection in Hawaii.

Courses and demonstrations are offered to teach new beekeepers, raise the level of beekeeping and bee health knowledge, and also to teach sustainable practices like pest management and queen rearing (since queens cannot be imported to Varroa-free islands). A breeding program in its third year on Big Island selects for Varroa-resistant bees in over 250 colonies, with the goal of reducing or eliminating the need to use chemical controls.

There is also strong interest from the public, including backyard growers, farm managers, and extension agents in learning about bees and bee friendly habitats. The sudden loss of feral bees on some islands, due to Varroa introduction, has created a pollinator void that is being felt by agricultural producers. Farmer workshops and the establishment of teaching apiaries are also an important new development supported through collaborations between UH Manoa Honeybee Project and the Hawaii Department of Agriculture.

Research projects at UH Manoa and Hawaii Dept of Ag focus on genetic diversity, reproductive health, crop pollination, pesticide residues and bee friendly habitat, parasite and pest control, and pathogen loads; often comparing populations with and without Varroa mite pressures.

## IDAHO - Sherry Olsen-Frank

### Inaugural status of Idaho's sideliner & hobbyist beekeepers - 2014

Idaho's sideliner and hobbyist beekeepers are represented by four active beekeeping organizations across the state.

1. The Beekeepers of Southeast Idaho/Upper Snake River Beekeepers (Idaho Falls) list 244 members on their Facebook page.

2. Pocatello hosts a loosely organized group of approximately 50 individuals and meets one or two times per year. The group participates in a spring-time nuc-making workshop with 75-100 participants at 2J Honey Farms.

3. The Magic Valley Beekeepers meet every other month in the Twin Falls area, frequently at Tubbs Berry Farm.

4. The Treasure Valley Beekeepers Club counts over 200 dues-paying members across Southwest Idaho and Eastern Oregon. The TVBC supports an active web presence with 1) a site at [www.idabees.org](http://www.idabees.org), offering local monthly recommendations on best management practices and 2) contributions to a club FaceBook page. Regular monthly meetings and a commitment to beekeeping education are the TVBC's hallmarks. In 2014, club members taught four "Introduction to Beekeeping" classes through the local school district, plus provided members with 10 separate education sessions, outside of scheduled meetings,



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focusing on hive component construction, queen cell installation and Varroa mite management. Seventeen members of the TVBC actively participate in the Oregon State University Master Beekeepers Program. Throughout the remainder of the season, club members also established and maintained four beehives at Boise City's Foothills Learning Center, staffed a very active booth at the Western Idaho State Fair, and participated in the Idaho Botanical Garden's annual "Bug Day," where the emphasis is on introducing local kids to the magic of entomology.

In the spring, working in cooperation with Honeygold Corp and Noyes Apiaries, two prominent Treasure Valley queen production operations, the TVBC distributed approximately 200 Washington State University Program queen cells to club members. The TVBC is especially grateful for the WSU Program queen support received through Dr. Steve Sheppard and Dr. Brandon Hopkins.



Kim Flottum in Idaho

The summer's highlight was a five-day span in August, when Kim Flottum, Bee Culture Magazine editor, arrived in town and led a local celebration themed on National Honey Bee Day. Kim delivered five different educational programs between venues at the Western Idaho State Fair, Boise City's Foothills Learning Center and before a full house at Boise State University. In addition to his education sessions, Kim participated in a "Pub Swarm" one fine evening through downtown Boise, headlined the first Annual TVBC Summer Picnic, and ceremoniously rang the opening bell at Boise's Saturday Farmer's Market.

Closing out 2014, the TVBC was indeed fortunate to be able to host Randy Oliver for a full afternoon of solid beekeeping tips and advice: "All Oliver - All Afternoon!" Randy delivered his wit and wisdom to a full house and put the cap on a great year for the TVBC.

5. In Northern Idaho, the majority of the hobbyist/sideliners participate in the Inland Empire Beekeepers Association in Washington State.

## MONTANA - No report

Looks like the Montanans burned themselves out putting on that fantastic conference back in September as no report has been received from them for this issue.



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## NEW MEXICO - Jessie Brown

Greetings from New Mexico. 2014 brought a new concern for beekeepers and some great educational opportunities.

In the area of bee health, Dr. Carol Sutherland, the State Entomologist for the NM Department of Agriculture confirmed the first incidence of small hive beetle (SHB) in New Mexico. Although SHB is capable of long distance migration and is found in locations throughout Texas, it is unknown if this introduction was a result of natural migration or the accidental introduction from a package of bees, infested frames or hives. The beekeeper is unaware of any activities that may have introduced SHB into his hives. At this point it appears the infested hives are strong and are doing a good job of reducing the numbers of SHB.

In the area of education, 2014 was the inaugural year for the Certified Beekeepers Program. Offered through the New Mexico Beekeepers Association in cooperation with the City of Albuquerque, this comprehensive program provides quality education on backyard beekeeping in the context of responsible urban farming. Classes are taught by recognized, expert New Mexico beekeepers and include supervised, hands-on lessons, using top bar and Langstroth honeybee hives.

We had many great speakers and educators visit the State of New Mexico, including Dr. Lawrence John Connor, along with Dr. Mark Carroll, presented by the NM Beekeepers Association. The Rocky Mountain Survivor Queenbee Cooperative brought in Dr. Tom Seeley and Dr. Juliana Posada-Rangel for the North to South New Mexico Pollinator Benefit Lecture Series. Here's to another hopeful year of healthy bees.

## NEVADA - Debbie Gilmore

Nevada continues to have two active beekeeping clubs – Northern Nevada Beekeepers and Mason Valley Beekeepers. Beekeepers from all parts of Nevada, Northern California, Oregon, and Washington participated in the 4th Annual Beekeepers' Conference and plans are underway for the 5th Annual Beekeepers Conference to be held February 27 and 28, 2015, in Yerington, Nevada, which will feature Randy Oliver and Michele Colopy.

Mason Valley beekeepers participated in the First Annual Nevada Governor's Conference on Agriculture in November. Partnerships were initiated with University of Nevada Reno's Department of Agriculture, Farm Services Agency, Natural Resource Conservation Services, and local producers requiring pollinating services. Nevada beekeepers were invited to participate in current and potential research projects with Nevada Department of Agriculture and ARS and with the University of Nevada, Reno's Department of Agriculture.

In July 2014, Mason Valley beekeepers hosted researcher, Michael Wilson, Ph.D., from University of Minnesota's Department of Entomology's Bee Lab. His research is on propolis and the source of the propolis in Northern Nevada. Propolis samples were collected from area apiaries and plant samples were collected from those areas. In the evening, Dr. Wilson gave a presentation in Yerington, Nevada, on propolis and his research project.

Meetings are being scheduled with local, state and federal agencies; farmers and beekeepers with the assistance of Michele Colopy, in promoting pollinator habitat in the Walker River Basin.

The majority of Nevada continues to be in severe, extreme or exceptional drought conditions. Honey production is reported down from the previous year by most beekeepers in the area.



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## OREGON - Dewey Caron

Attendance was exceptionally large for the OSBA Annual Meeting, held at Seaside Oregon, November 6-8. Speakers included Dennis vanEngelsdorp, Marla Spivak, Kim Flottum, students and faculty from OSU and WSU, Oregon MBers Judy Scher and Lynn Royce, commercial beekeeper George Hansen and Old Sol beekeeper/queen raiser John Jacobs. The Pacific Northwest tech team presented a great overview of their first year surveying 18 collaborating beekeepers.

Contributions were approved for both WSU and OSU research programs. New officers include a new treasurer/vice president Harry Vanderpool. Paul Andersen continues in a third year as president.

A legislative task force, headed by OSU Bee Specialist Ramesh Sagili has developed recommendations for improving bee health that should spur the Oregon legislature toward some pollinator protection legislation this season. Another task force on genetically modified crops may do likewise. The Oregon Department of Agriculture has developed in their pesticide lab a screening procedure that should help with analysis of potential culprits for sudden bee kills.

In Jackson County, on the California border, a local initiative to ban GMO crops is on hold while the court takes up the challenge of two Roundup-Ready alfalfa growers challenging the requirement that they destroy their alfalfa by June. On a plus side, the Oregon Tax Court appeal of landowners hosting bee colonies was upheld, reaffirming bees have pasture forage rights as livestock and landowners providing apiary sites are rightly entitled to tax assessment relief when their land is left for bees as forage territory.

## UTAH - Al Chubak

Utah currently has approximately 2000 registered beekeepers, with the majority in three counties: Salt Lake County, Davis County and Utah County. There are more than a dozen clubs which meet on a regular basis, with beginning beekeeping as a focus. A number of outlets are in place to provide equipment and some minimal degree of bee care training. Not all cities in Utah allow beekeeping; many have regulations of some-kind. The Utah Department of Food and Drug has an excellent web presence and is leading by example (<http://ag.utah.gov/plants-pests/beekeeping.html>).

I fervently encourage clubs to devote a bit of each class to disease identification. In 2013 the USDA took an offensive in Utah against American Foulbrood (AFB). Eight cases of AFB were found in 2014 in four counties. A specialist was brought in to document, inspect, test and destroy cases locally. Dr. Sandra Burdett with Brigham Young University has also aided in identification of cases in the quest for a phage able to eradicate AFB spores. USDA at Utah State has successfully developed an ozone application that cleans equipment, wax, frames, and honey, while still on pallets.



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Africanized honey bees (AHB) were detected several years back in southern Utah and have been successfully isolated to Iron, Kane and Washington counties in the southwest corner. Bait hives are set throughout the areas in question. It appears the bees are attempting to migrate via the valley verses mountain range. A notable death in the news this year was due to bee stings, but was not due to AHB but a queenless colony with an inexperienced beekeeper who had unknown allergic issues. Sadly, it was misrepresented in the media.

Hive theft is becoming more common. Complete loss or removal/replacement of selected frames seem to be the options.

Beekeeping has gained favor with the trending public, with record numbers of packages being sold each year. Equally exciting is the record number of swarms each spring! It is obvious that new hobbyists have minimal skills in hiving and retaining their bees. As a result I am solicited daily for opinions. This spring my focus was to educate rather than distribute full-size equipment. Instead of selling new full-size kits, I tested the waters by distributing mini hives with two mini frames of drawn comb, nurse bees, larva and eggs. The first lesson – care for their bees and rear their own queen. The youngest was four and oldest was early 80s. All except one raised a new queen on their first try. The one that failed was replaced and succeeded on the second attempt. Robbing in fall was a universal threat to these small colonies, solved by relocating away from large colonies or closing the robbed hive for a day and placing an unprotected "pavlov's feeder" with minimal feed nearby. The robbing bees quickly chose the unprotected sugars and continued for days once depleted.

Knowing how to raise your own queen, or having a source for a queen (or capped queen cell) if needed, seemed to be the critical factor in most bee yards. Using the mini hive with baited, melted dark comb seemed to work well for swarm luring/bait hives.

#### WASHINGTON - Jim & Cyndi Smith

Greetings from Washington State! It has been an interesting year here full of unusual weather, wind storms and wild fires. The spring/early summer was cooler in some areas, normal in others then the heat hit fast, hard and long across the state leading to such dry conditions there were wild fires everywhere and whole areas were devastated, taking with it acres of forage. Insurance has covered the winter feeding and fundraising was done to help with reseeding over the burned area but the reality is there is a huge question mark as to how to feed and maintain the hives over the upcoming year.

Overall there was low honey production across the state, some better than others but none great and all lower than normal. Hopefully the coming year will be non-eventful with a much better honey production cycle!

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The advertisement features a central honeycomb graphic composed of several hexagonal cells. Each cell contains a different image related to beekeeping: a beehive, a bear-shaped honey jar, a beekeeper in a full protective suit, a white plastic jug of sugar water, a glass jar of honey, a wooden beehive, and a landscape with a beehive. The background of the entire advertisement is a vibrant field of colorful wildflowers. The text 'We're here to serve YOU ... all year long!' is written in a mix of cursive and bold, sans-serif fonts at the top. The Miller Bee Supply logo is in the bottom left, and contact information is in the bottom right.



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