**CEUs – New Process**

**Certified Crop Advisor (CCA)**
- Sign in and out of each session you attend.
- Pickup verification sheet at conclusion of each session.
- *Repeat this process for each session, and each day you wish to receive credits.*

**Pest Control Advisor (PCA), Qualified Applicator (QA), Private Applicator (PA)**
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- Pickup verification sheet at conclusion of each session.
- Turn in your scantron at the end of the day at the last session you attend.

*Sign in sheets and verification sheets are located at the back of each session room.*
AGENDA

• **Gabriele Ludwig**, Almond Board of California, moderator
• **Danielle Downey**, Project Apis m.
• **Stacey Smith**, The Keystone Center
• **Val Dolcini**, Pollinator Partnership
PROJECT APIS M.  
YOUR PARTNER  
SUPPORTING BEE HEALTH  

Danielle Downey  
Executive Director, Project Apis m.  
Danielle@projectapism.org  
Almond Board Conference, 2017
TALK OUTLINE

• PAm’s roots: Almonds and Bees
• New Initiatives: research
• Working together, building more partnerships
• Forage Projects:
  - Seeds for Bees
  - Bee & Butterfly Habitat Fund
Project Apis m.
Mission Statement

Project Apis m.’s mission is to fund and direct research to enhance the health and vitality of honey bee colonies while improving crop production.
PAM: NEARLY $7 MILLION INVESTED IN 10 YEARS!
WHERE DOES PAM GET FUNDING?

- Beekeepers
- Growers of pollinated crops
- Corporate Sponsors
- Grants

PAm Leadership

Dan Cummings
Lyle Johnston
Joe Traynor
Joe MacIlvaine
Steve Park
Gene Brandi
Christi Heintz

Pat Heitkam
Brent Barkman
Zac Browning
John Miller
Gordon Wardell
Dave Mendes
Doug Hauke
Gary Shilling

Project Apis m.
PAm: a unique position, for lasting impact.

**Trusted Reputation**
We are the go-to organization in honey bee health research, with an unmatched breadth and depth of experience. We are lean, efficient, and have built connections that create impact.

**Expertise**
The core of our mission is research and biology-supported forage programs. We are the nexus of all stakeholders – beekeepers, growers, researchers, landowners, ag industry, consumers, retailers.

**Relevance**
Our work has many beneficiaries from honeybees and other wildlife to soil and water quality and a wide spectrum of diverse stakeholders.
NEW INITIATIVES, NEW PARTNERS—PAM IS GROWING

- Costco USA
- Costco Canada
- Healthy Hives 2020, Bayer
- National Honey Board
BEES & ALMONDS: SUSTAINABILITY IS KEY!

• PAm has multiple, practical approaches to bee health
• Research on Honey Bee Health to find better solutions  
  - Pests, Pathogens, Parasites, Pesticides, Pasture
• Bees & Almonds: We need each other!  
  - Colony losses are still high, bee health is a risk for all  
  - Our partnership is key for a healthy industry  
  - Tank mix research (Johnson) -> BMP example
• As demand grows, we (beekeepers and growers) must make the system more sustainable to ensure success.  
  - PAm approaches: research & forage
BEES FACE MANY COMPLEX PROBLEMS.

1. Varroa mite- Honey Bee Enemy #1!
2. Pathogens
   - Virus, gut parasites, bacteria, fungus
3. Pesticides
4. Environmental stress
   - Nutrition
   - Habitat/forage loss
WE CAN MITIGATE THOSE PROBLEMS.

1. Varroa mite- Honey Bee Enemy #1!
2. Pathogens
   - Virus, gut parasites, bacteria, fungus
3. Pesticides
4. Environmental stress
   - Nutrition
   - Habitat/forage loss

Project Apis m.
IN ADDITION TO RESEARCH FOCUS, PAM PUT $1 MILLION INTO FORAGE PROJECTS

• Sustain bee health by investing in a landscape that supports them.
• Mitigate bee stressors, improve productivity for beekeepers and growers.
  - Better nutrition makes better pollinators
• Significant resource management benefits in almond orchards
  - Soil improvements: nitrogen, organic matter, compaction, drainage, retention
  - Water retention and conservation
  - Air quality, dust mitigation
• BIG tent with new partners: what honey bees need is also what butterflies, native pollinators, birds & wildlife need.
Strategic solutions where honey bees benefit most.

In the almond orchards of California, bees need food before and after almond bloom.

And, after the busy pollination season, bees summer in the upper Midwest. Here, they replenish and (hopefully!) make honey.
Seeds for Bees
Billy Synk

Working with California growers and beekeepers, we provide free seed mixes maximized for honeybee nutrition & orchard benefits. We offer planting guidance and best practice resources.

A win-win for honey bees, beekeepers, growers, and soil and water quality.

6,000 acres of pollinator habitat planted last year
Bee and Butterfly Habitat Fund

Pete Berthelsen

We support beekeepers and landowners, to plant habitat in agricultural landscapes that no longer support healthy bees in the Upper Midwest. Honey bees benefit, and so do Monarch butterflies, native pollinators, song birds, game birds and wildlife.

These plantings also also benefit soil, air and water quality management.

Did you know?
About 75% of the bees that pollinate crops spend the summer in 8 states.
The Bee & Butterfly Habitat Fund
A Unique Conservation Solution.

15 acres average per landowner

6 year average contract

124 participants & waiting list

7 million milkweed seeds planted

#NOWASTEDLAND
Collaboration the foundation of our efforts, and the path to ensure success.

I suggest supporting organizations that understand the crisis. Project Apis m. stood out as a front-runner.

Shauna Lopez, Corporate Foods Buyer Costco
WATCH PROJECT APIS M. VIDEOS
VISIT OUR TABLE IN POSTER AREA IN EXHIBIT HALL A+B

Seeds for Bees
https://youtu.be/KrVLGFl4l3c
Bee & Butterfly Habitat Fund
5 min: https://youtu.be/rkRPSSyiNhI
10 min: https://youtu.be/WA2mfitKmok
HEALTHY BEES, HEALTHY PEOPLE, HEALTHY PLANET.™
A diverse, collaborative, private-public partnership addressing the multiple factors impacting honey bees
WHY
the Honey Bee Health Coalition?
THE WORLD RELIES ON THE HONEY BEE

Honey Bees Are a Key Component to Sustainable Agriculture, Healthy Diets, the Global Food Supply, and the Economy

A Healthy Diet

1/3 of global food production volume relies on pollinators to some degree

Source: Klein, 2007

80% of flowering plants are pollinated by honey bees and other insects

Source: Calderone, 2012

<table>
<thead>
<tr>
<th>Flowers</th>
<th>Source</th>
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<tbody>
<tr>
<td>Almonds</td>
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<td>Apples</td>
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<td>Broccoli</td>
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<td>Strawberries</td>
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<td>Alfalfa</td>
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*Significant to beef and dairy industries as cattle feed

U.S. Agriculture

$\sim$18 Billion Per year

The amount of dollars of U.S. agricultural production supported by honey bee pollination

Source: USDA

Canadian Agriculture

$\sim$4 Billion

The annual value of honey bee pollination in Canada.

Source: Agriculture and Agri-Food Canada

"The future security of America's food supply depends on healthy honey bees" - Tom Vilsack, Agriculture Secretary
Agriculture, healthy lifestyles, and worldwide food security depend on honey bee health. U.S. overwintering losses for managed honey bees between 2006 and 2015 ranged from approximately 23-36%, compared to a historical rate of overwintering losses of 10-15%.*

*Source: Survey data generated by USDA
Honey Bees Play a Foundational Role in Our Food Value Chain

**MANY STAKEHOLDERS, ONE AGRICULTURE**

- **Producers**
  - Farming
  - Beekeepers, honey producers, and honey bees

- **Agribusinesses**
  - Inputs (seeds, fertilizers, crop chemicals, equipment)
  - Trading
  - Processing

- **Consumers**
  - Shopping
  - Consumption

- **Manufacturers & Brands**
  - Restaurants
  - Consumer brands
  - Retail

- **Researchers, Government Agencies, & Academia**
  - Research, Education, Extension, Regulation
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**.
HONEY BEE HEALTH COALITION:
Many Stakeholders, One Agriculture
WHAT IS THE COALITION?
A collaborative, science-based, cross-sector effort to improve the health of honey bees.

Principles
Cross-sector, collaborative
Recognizes multi-factorial problems
Outcome and solution-oriented
Science-based
WHAT
is the Coalition doing?
BEE HEALTHY ROADMAP

Shares the Coalition’s mission, vision, and strategic goals

Identifies 4 top priorities that need collective action and collaboration

www.honeybeehealthcoalition.org
HONEY BEE HEALTH COALITION PRIORITIES

The Coalition is focusing on accelerating collective impact to improve honey bee health in four key areas.

Nutrition & Forage
Ensure honey bees – especially those in and around production agriculture – have access to a varied and nutritious diet.

Hive Management
Put the best available tools, techniques, and technologies in the hands of beekeepers so they can better manage their hives.

Crop Pest Management
Control crop pests while safeguarding pollinator health.

Outreach, Education and Collaboration
Work together to improve honey bee health; develop outreach materials; and develop future research and demonstration projects.
OVERVIEW OF ACHIEVEMENTS

Recent deliverables

VARROA VIDEOS

Varroacide Screening

VARROA MANAGEMENT RESOURCES

Check out our practical tools for combating Varroa mites!

- Rigorous monitoring of Varroa mite populations
- Practices to deter mite population buildup
- Selection of products that complement hive population dynamics and minimize potential development of mite resistance

BEE HEALTHY ROADMAP

Healthy bees = health for our health planet

NASA, USDA, HONEY BEE HEALTH COALITION

MP3 Symposium Agenda

March 14, 2016

Best management practices (BMPs) to protect honey bees and other pollinators in soybeans

Author: Adam G. Dubois, Honey Bee Health Coalition technical committee

Title suggestions:
- "Helping SoyaHive and Honeybees Grow Together"
- "Optimizing the Bee-friendly Environment in Soybean"

Soybeans are the world’s top-produced oilseed crop. Soybeans were produced on about 84 million acres across the United States in 2013 and 2016. With such a large area of production, the environment around them can play an important role in the health of America’s honey bees.

THE GROWER’S ROLE

ENSURING HONEY BEE HEALTH ON WORKING AGRICULTURAL LANDS

Quick Guide to Reporting a Pesticide-Related Bee Kill Incident

1. Contact your state or local pesticide agency to begin your report. If the agency does not have contact information, contact information is provided or you should contact the nearest extension office or a pest control service.
2. Take photographs of the honey bees and incident area, as well as possible centers containing the bees.
3. Consider collecting any evidence for lab analysis or blowing live plants on which bees are foraging. For more information, contact your state or local pesticide agency.
**FORAGE AND NUTRITION**

**Goal:** Ensure honey bees – especially in and around production agriculture – have access to a varied and nutritious diet throughout their lives

**Activities:**
- Providing recommendations to improve and increase forage in USDA conservation programs
- Engaged in demonstration projects to get forage on the ground
- Conducted beekeeper interviews to identify recommendations for nutrition supplement research and development
- Launched a Nutrition Prize competition to support innovation in the field
HIVE MANAGEMENT

**Goal:** Put the best available tools, techniques, and technologies in the hands of beekeepers so they can better manage their hives

**Activities:**
- Developed a guide to Varroa control methods and accompanying educational videos, and bee club PowerPoint presentation
- Research and testing into new varroacides
- Support of Bee Informed Partnership’s Tech Transfer Teams
CROP PEST CONTROL

Goal: Control crop pests and safeguard pollinator health

Activities
- Developing BMPs for Soybean growers that protect pollinators
- Developing pollinator-focused continuing education module for crop pest consultants and advisors
- Supporting State MP3 conversations by convening a national symposium
- Developed an incident reporting guide for incidental pesticide exposure
Outreach, Education, and Collaboration

**Goal:** Work together to improve honey bee health, develop outreach materials; and develop future research and demonstration projects.

**Activities:**

- Proposed and funded the newly released CAST paper for federal policy makers, “Why Does Bee Health Matter and What We can Do about It”
- Promoting public-private education, communications, outreach, and collaboration across diverse stakeholders, through experiential learning and other platforms
- Develop outreach materials and opportunities
Bee Integrated Demonstration Project
IN SUMMARY

• A Collaborative network of diverse, private and public sector stakeholders to unpack these complex issues and find solutions to honey bee health

• The Honey Bee Health Coalition is engaging a variety of public-private partners throughout agriculture, research, government, and conservation to promote multi-factor solutions for honey bee health.
www.honeybeehealthcoalition.org
ssmith@keystone.org

‘To go fast, go alone. To go far, go together.’
- African Proverb
Issues and Challenges Facing Pollinators

- Val Dolcini, President
The Pollinator Partnership: The Source for Pollinator Action and Information

- Effective Research
- Restoring Habitat
- Protect All Pollinators
- Land Stewardship
- Honest Broker
- Public Outreach
- Policy Advocate
Loss of Pasture
- Habitat loss
- Monocultures
- Urbanization
- Sprawl

Pesticide Misuse
- Prophylactic use
- Monocultures
- Less farming diversity

Pressures of Climate Change
- Mismatch between flower bloom, the landscape, and bee life cycles

Parasites and Pathogens
- Honey bees subject to several diseases
- Honey bee diseases transfer to wild bees

Interaction between pressures
The Challenge: Potential decoupling of pollination services

- Bees emerging earlier in spring than flower and crop blooms.
- Pace of climate change surpasses many species’ abilities to disperse into new environments.
- Loss of habitat, independent of climate change, can reduce dispersal as pollinator and plant populations are fragmented in broad landscape.

*Historical data (1970-present) shows a 40 day shift between blackcurrant crop flowering and the Red mason bee’s (Osmia rufa) spring emergence.*
The Challenge: Climate change affects bee health and nutrition through decreased plant nutrition

- More carbon in the atmosphere has led to decreased plant proteins.
- Poor nutrition linked to disease and pesticide susceptibility, and lower longevity in bees.
- Goldenrod pollen protein, a crucial source of fall bee nutrition, has decreased by one 1/3 since the industrial revolution.
Declines in pollinators, wild and managed, have direct impact on food security.

- Growth in pollinator-dependent crop outpacing growth in managed pollinator (Aizen et al. 2008).
- Wild pollinators enhance fruit set regardless of honeybees (Garibaldi et al. 2013).
- Yield losses w/o pollinators: 25% canola, 40-90% apples, +90% kiwis…
- Native bees are crop insurance, corporate social responsibility and IPM.

Effect of visitations by wild insects or honeybees on fruit set for individual crop systems (Garibaldi et al. 2013)
Competition between Managed and Wild Bees

The Challenge: Keep Honey bees healthy and support the protection of wild pollinators.

- Competition occurs when you have two or more species using the same, limited resource.
- Honey bee advantage: large numbers, generalist foragers and human management.
- Risk of disease transmission from honeybees to wild pollinators is a concern.
- Native bees are diverse, where do we expect competition?
  - Generalists: direct overlap in resource use, e.g., Bumble bees
  - Specialists: lack ability to shift forage activity
Results of our study:

• Difficult to make a universal statement on competition, evidence is mixed.

• Caution placement of honey bees in areas where bumble bees are keystone and known to be vulnerable.

• Careful consideration of honey bee pasturing on natural landscapes that are home to bumble bee species at risk.

• Seasonal selection to minimize potential impacts.

• Improve agricultural land for bees, especially CRP lands.
Management with Integrated Vegetation Management provides superior habitat for pollinators

- Two ROW studies in California:
  - Comparison of managed ROW habitat versus unmanaged natural habitat
  - Comparison of mowing management versus selective herbicide (IVM)
- IVM increases richness and abundance of native bees 2.3x.
- Honeybees recorded in higher numbers on mowed landscapes that have more non-native species.
- ROW management that fosters low-growing flowering plants creates ideal pollinator habitat and reduces mowing and herbicide costs.
ROWs in agricultural areas are an opportunity to benefit utilities and farmers

- ROWs are great opportunity to protect pollinators and increase pollinator services because they are large tracts of land under single management.
- Seeding reclaimed easements within almond growing regions with pollinator seed mixes as part of grower compensation.
Over 600 Bee-Friendly Farmers across North America.

Notable BFFs: Francis Ford Coppola Wineries, Stone Barns Center for Food & Agriculture in the Hudson Valley, Sierra Nevada Brewing

Bee-Friendly Farming Certification demonstrates sustainable practices to your customers and clients.

Simple and easy criteria to meet.

Use the logo on your website, materials, etc.
We thank the Almond Board of California for your support!

www.pollinator.org
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What’s Next

Thursday, December 7 at 12:00 p.m.

• Luncheon Presentation – Hall C

Innovative Plant-Based Foods – An Awesome Future for the California Almond Business
Speakers: John Haugen and Tal Ronnen, Kite Hill

Luncheon is ticketed and is sponsored by Moss Adams