

USDA

National Honey Bee Pest and Disease Survey



Objectives

- Surveillance of potentially invasive pests and pathogens
 - *Tropilaelaps*, *Apis cerana*, Slow Bee Paralysis Virus



Objectives

Geographical distribution of existing threats:

Samples collected for:

- ☐ Pests and diseases

Nosema spore counts

Varroa loads

Varroa Destructor Virus (VDV)

and 6 others

- ☐ Pesticides

200 known pesticides

Visually inspected for:

- ☐ Viruses and Pests

AFB, EFB, Hive Beetle



Methods

- 9 Apiaries (split over 3 regions)
 - Kenai/Homer
 - Anchorage/Matsu
 - Fairbanks
- 4 Colonies Sampled per Apiary
 - Composite Samples
- 3 Sampling Methods
 - Alcohol “Wet” Sample
 - Live Bee Sample
 - *Tropilaelaps* “Bump” Sample



Sample types

Includes:

Bump test

Alcohol sample

Live bee box

Wax sample

Pre-sampling survey

Target:

Tropilaelaps (exotic mite)

Apis cerana (exotic bee)

Varroa loads (mite)

Nosema spores (not species specific)

Viruses

Lake Sinai virus-2 (LSV-2)

Acute bee paralysis virus (ABPV)

Chronic bee paralysis virus (CBPV)

Deformed wing virus (DWV)

Kashmir bee virus (KBV)

Israeli acute paralysis virus (IAPV)

Varroa Destructor Virus (VDV-1)

Pesticides (200 targets)

Demographics and management info



Methods

*Select frame



*Collect ¼ cup of bees



Methods

- Live bee box tests for:
 - Lake Sinai virus-2 (LSV-2)
 - Acute bee paralysis virus (ABPV)
 - Chronic bee paralysis virus (CBPV)
 - Deformed wing virus (DWV)
 - Kashmir bee virus (KBV)
 - Israeli acute paralysis virus (IAPV)
 - *Varroa Destructor* Virus (VDV-1)



Methods

- Alcohol sample
 - *Apis cerana* (exotic bee)
 - Varroa loads (mites)
 - *Nosema* counts (spores)



Methods

- Bump sample
 - Tropilaelaps (exotic mite)

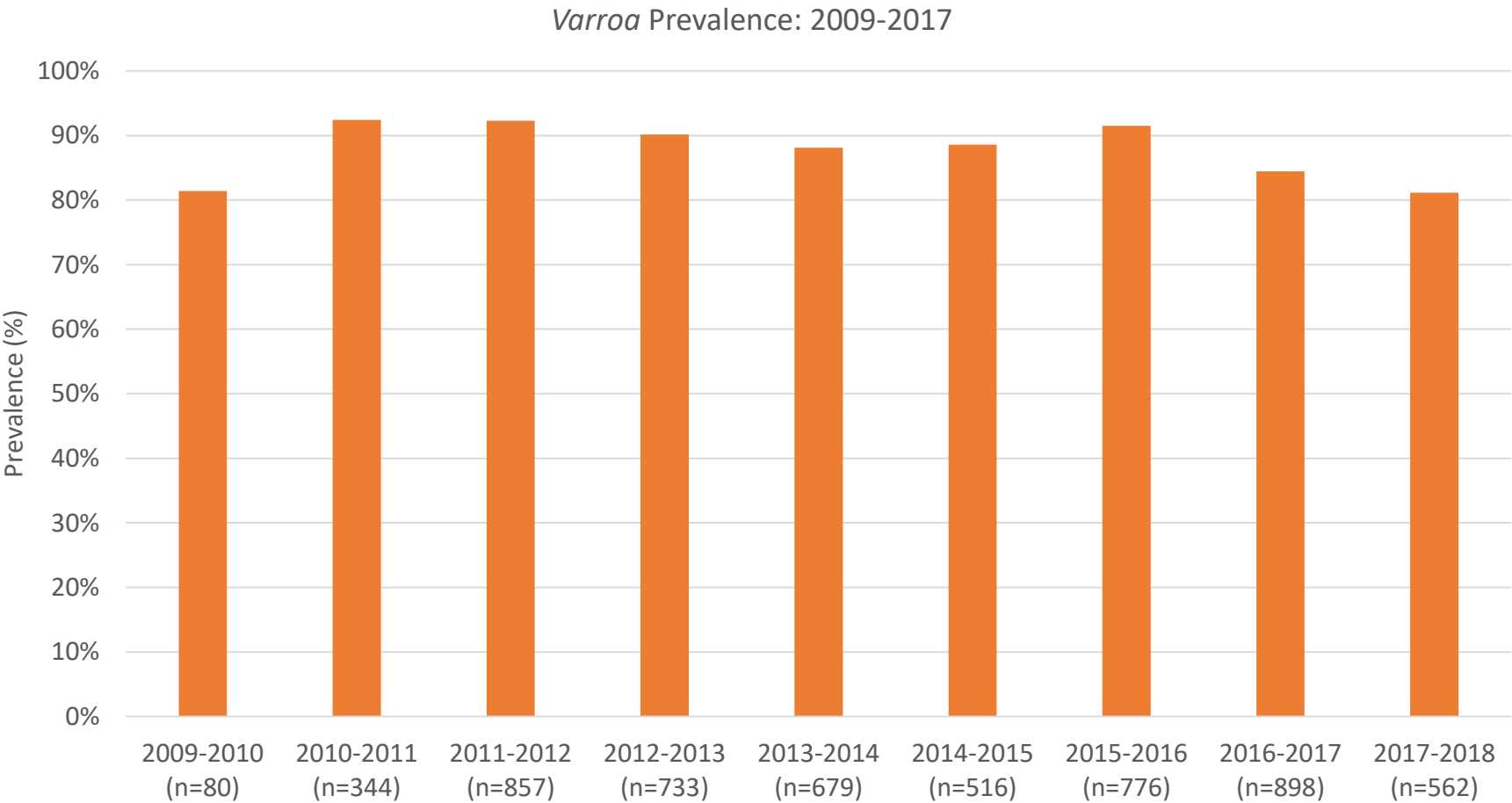


So what did
we learn?

Are Alaska
Honey Bees
Healthy?



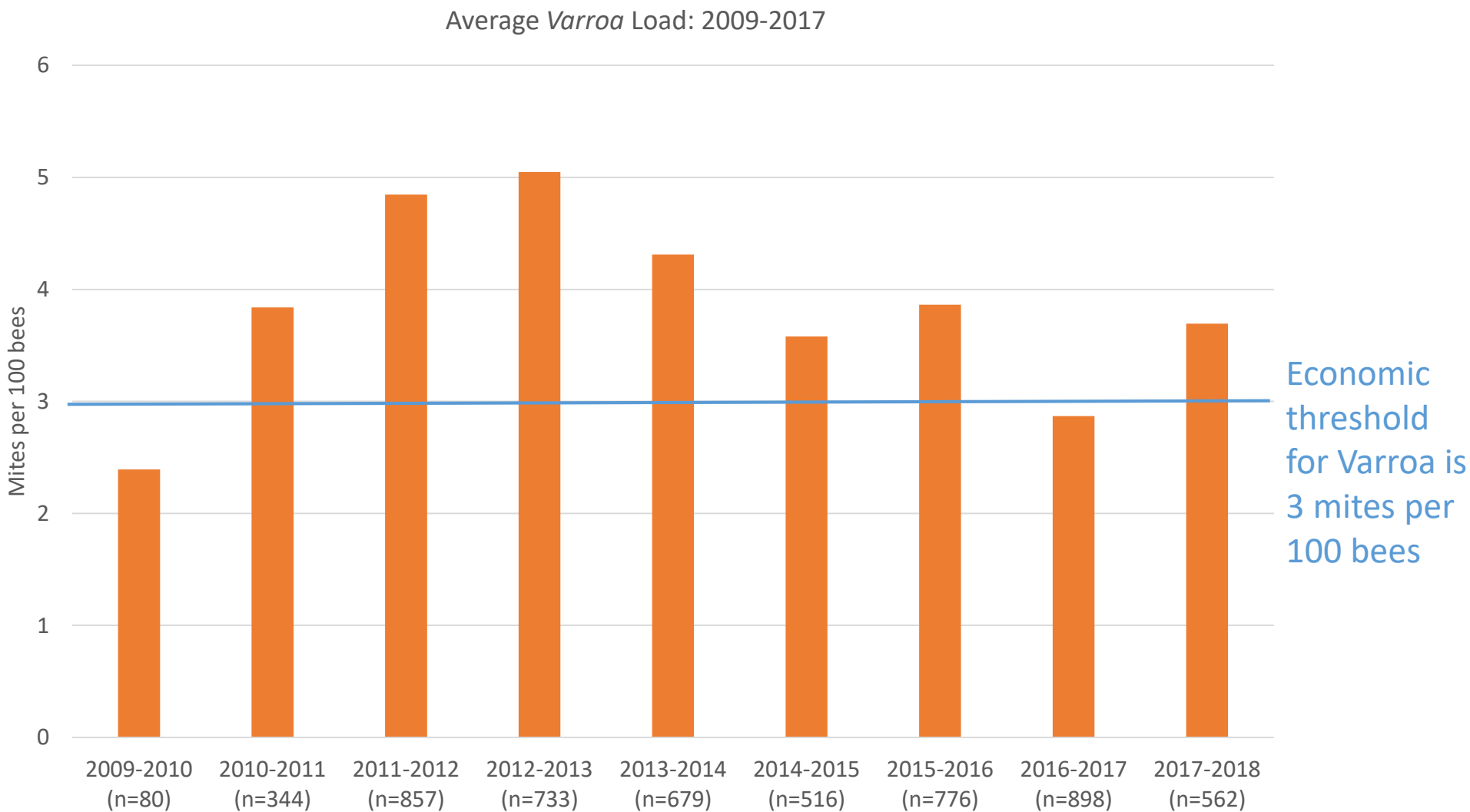
Varroa Prevalence by year



Varroa was found in 80% of the bee yards sampled in Alaska



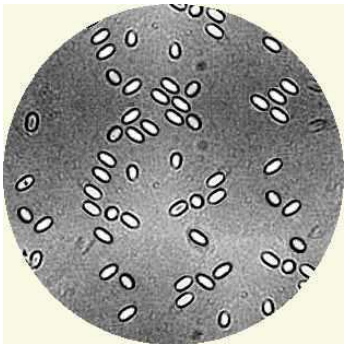
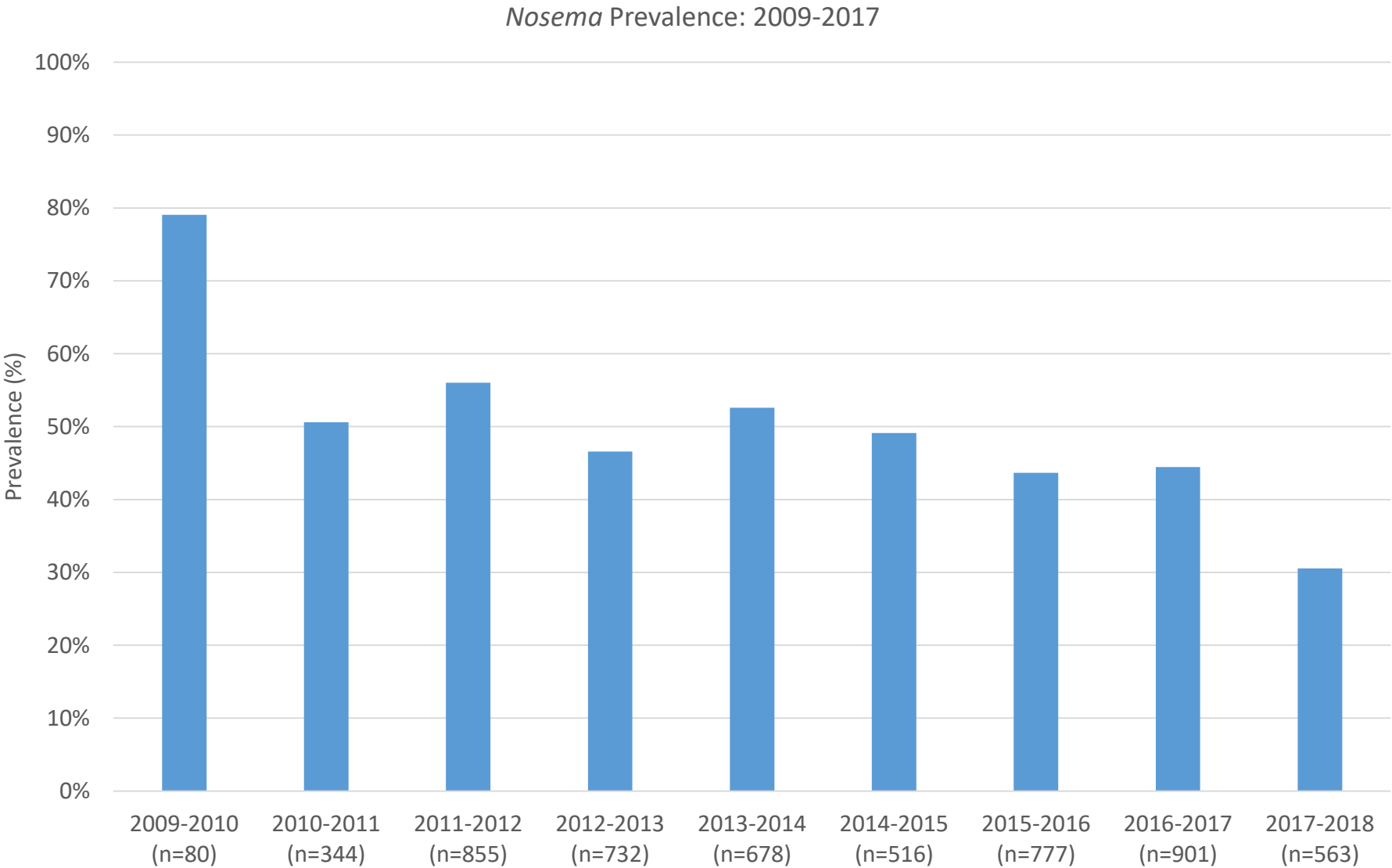
Average *Varroa* Load by year



The average mite load in Alaska was 1.2 mites per 100 bees

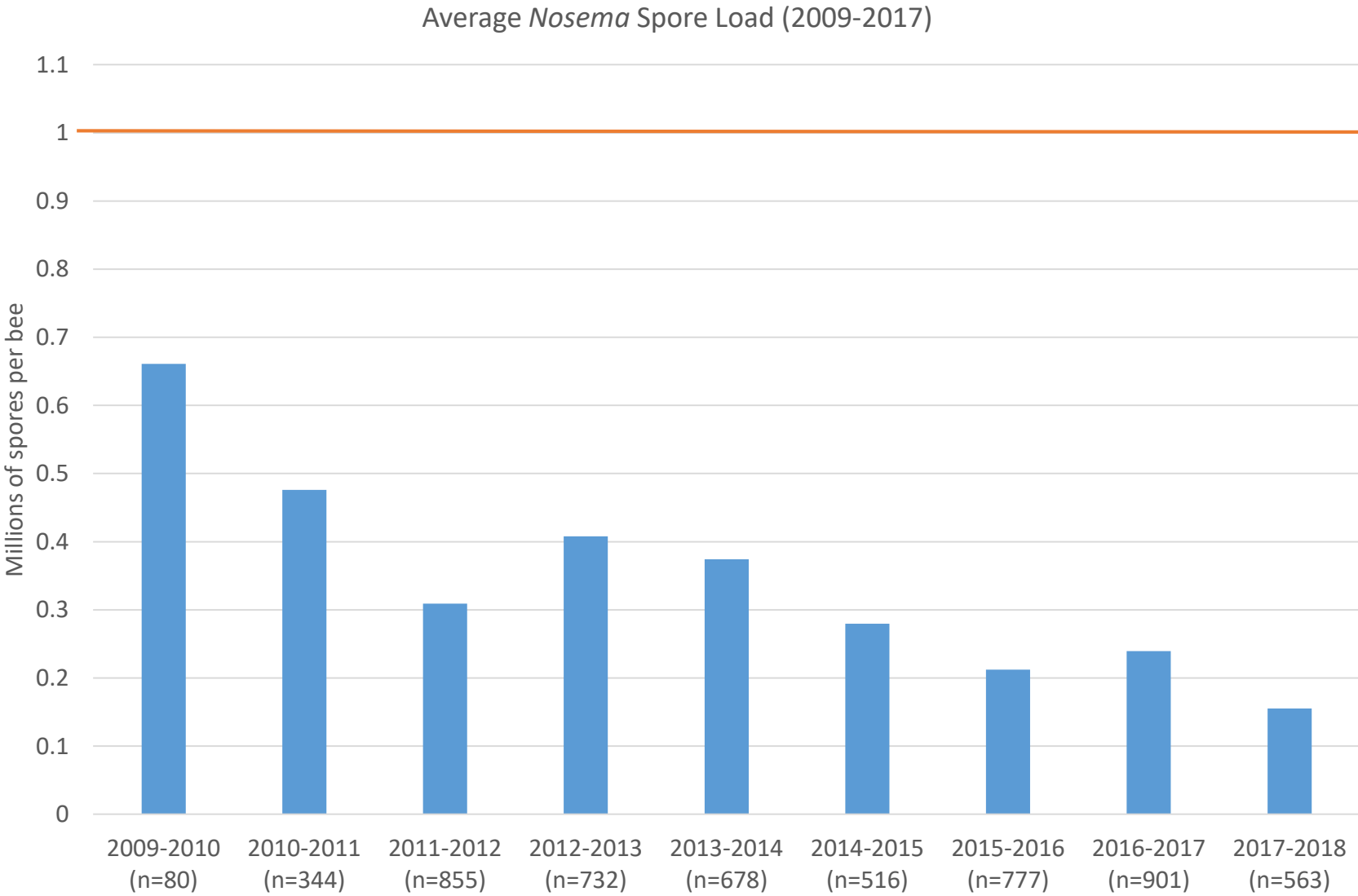


Nosema Prevalence by year

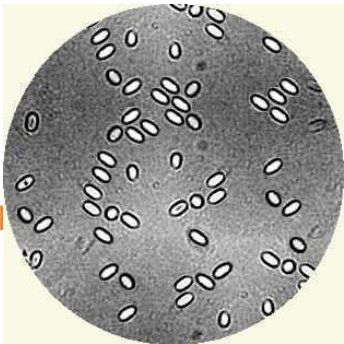


Nosema was found in 90% of the bee yards sampled in Alaska

Average *Nosema* Load by year



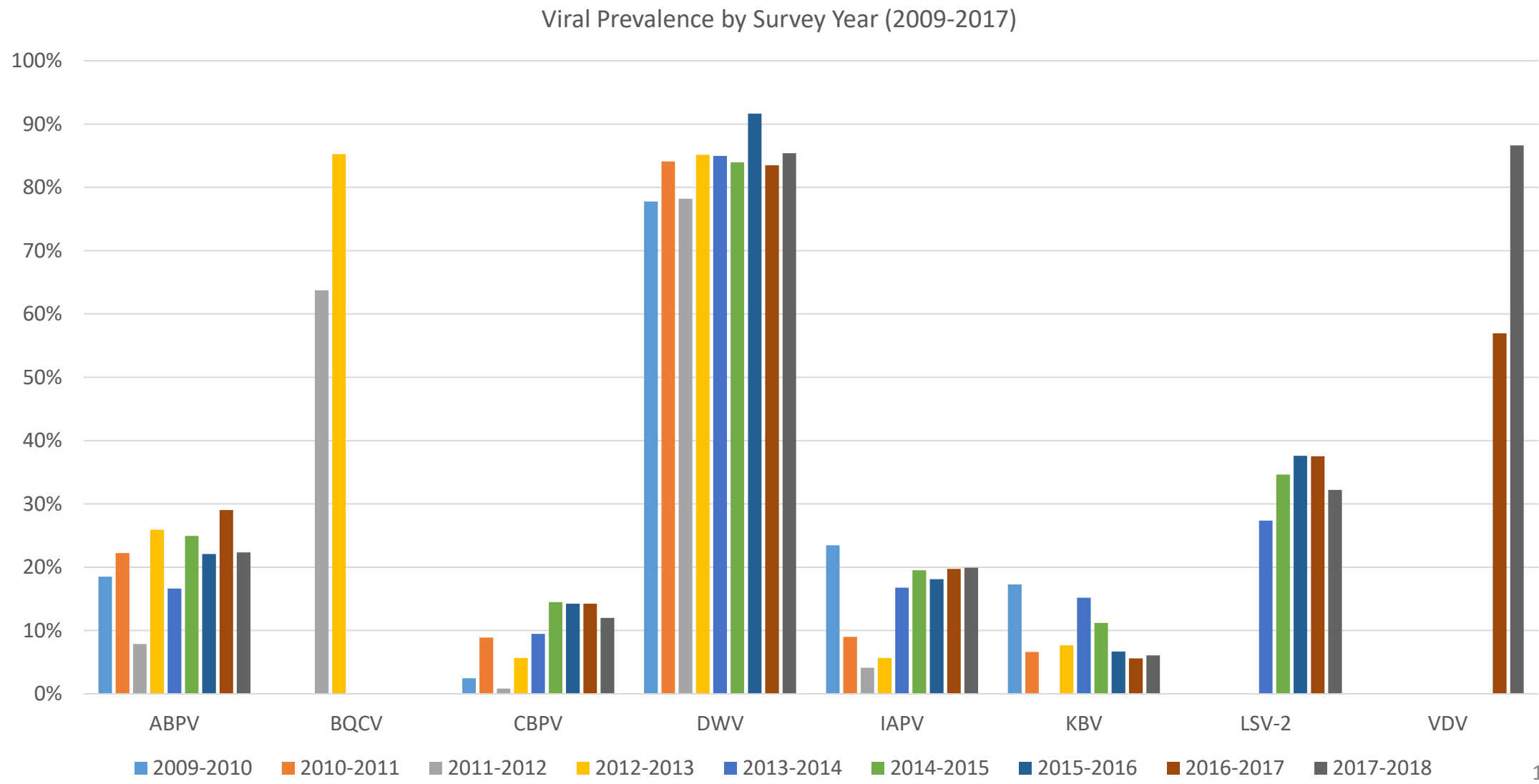
Economic threshold for nosema is 1 million spores per bee



The average spore load in Alaska was 0.7 millions of spores per bee



Viral Prevalence over the years



Chronic Bee Paralysis Virus (CBPV)

- Rare, occurring in 15% of US bee yards
- In Alaska we found it in only 1 yard (10%)
- Visual symptoms: Black shiny bees, dead bees at entrance
- Colony death



Deformed Wing Virus (DWV)

- Very common, found in 90% of beekeeping operations
- In Alaska we found it 3 bee yards, 30%
- Visual symptoms: Crumpled mal-formed wings, bees can't fly ≠ honey
- Directly linked to Varroa infestations



Lake Sinai Virus (LSV-2)

- Found in 35% of US honey bee operations
- In Alaska we found it in 4 bee yards (40%)
- Spread from bee to bee by food, and also by Varroa
- Correlated with Nosema

Varroa Destructor Virus (VDV)

- Very common, found in 60% of beekeeping operations
- In Alaska, we found VDV in all yards we visited (100%)
- Researchers believe that VDV is a recombinant form of Deformed Wing Virus (DWV), and they are closely related in visual symptoms and mode of action

Visual Diagnostics

- Sacbrood found in 60% (6 out of 10 bee yards)
- Chalkbrood found in 20% (2 out of 10 bee yards)
- European Foul Brood in 20% (2 out of 10 bee yards)
- American Foul Brood in 10% (1 out of 10 bee yards)

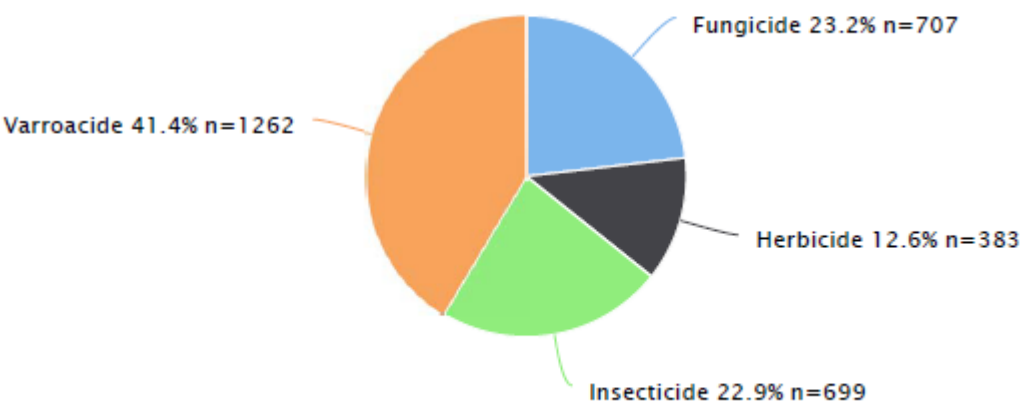
- No detection of small hive beetle, wax moth or parasitic mite syndrome.

Pesticides

2011-2016

Overall Distribution of Categories of Pesticides in National Survey Bee Bread Samples (n=1078)

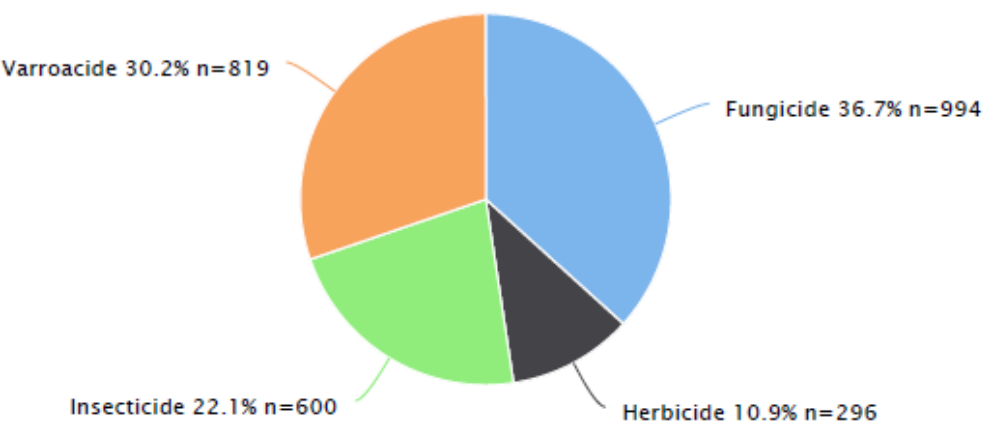
Each sample can be positive for multiple pesticides, therefore a higher number of detections per category than samples is possible.



2017

Overall Distribution of Categories of Pesticides in National Survey Wax Samples (n=174)

Each sample can be positive for multiple pesticides, therefore a higher number of detections per category than samples is possible.



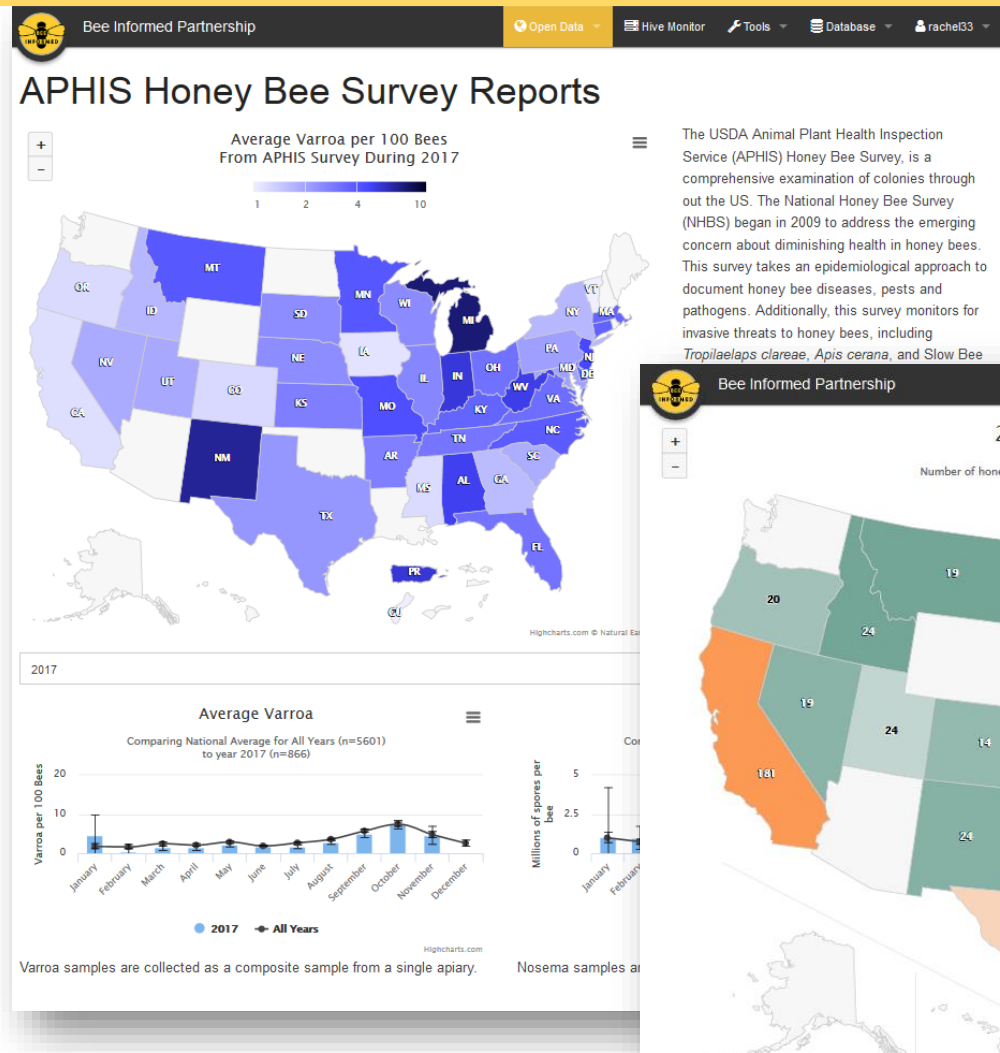
Explore the data online

All of this information is also available online!

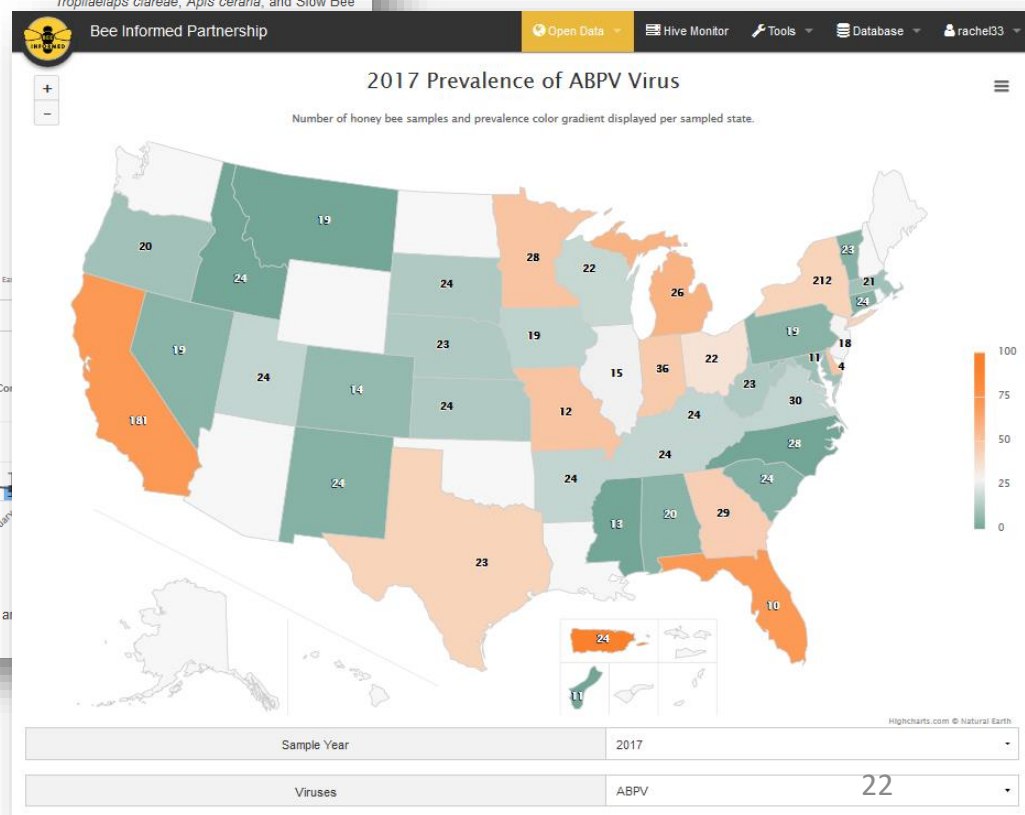
Go to:

bip2.beeinformed.org

State Reports



Virus Heat Map!



Acknowledgements

- Robyn Rose, Josie Ryan USDA APHIS
- USDA ARS Honey Bee Lab in Beltsville, MD
- University of Maryland (UMd) Honey Bee Lab
- Rachel Anna Fahey and Andrew Garavito
- Janice Chumley, UAF, AK Cooperative Extension
- Myself and Jaquelyn Schade at AK Division of Agriculture
- And all the bees and keepers that participated 😊



What is the Alaska Division of Agriculture's Role in protecting Honey Bee Health?

- Laws and Regulations
- Registration
- What more can be done?
 - Honey Bee Survey
 - Training and education



Questions?

Mia Kirk
Alaska Division of Agriculture
907-745-8735
Mia.Kirk@alaska.gov