



National Honey Bee Health Survey – Summary of CDA Participation and Results

2011 – 2017

Summary

To gain a better understanding of honey bee health in state Colorado, the CDA has taken part in the National Honey Bee Health Surveyⁱ an initiative sponsored by United States Department of Agriculture, Animal Plant Health Inspection Service (USDA-APHIS) and the Bee Informed Partnership. Colorado has participated in the survey for 4 years; 2011, 2012, 2016 and 2017.

To qualify, participating apiaries must have minimum of 8 hives. A total of 91 apiaries (28% hobby and 71% commercial) have been sampled over the 4 years of survey participation for the following diseases and parasites:

- Viruses vectored by Varroa mite
 - Acute Bee Paralysis Virus
 - Bee Slow Paralysis Virus
 - Varroa Destructor Virus
 - Chronic Bee Paralysis Virus
 - Deformed Wing Virus
 - Israeli Acute Bee Paralysis Virus
- Nosema Disease- *Nosema apis* and *Nosema ceranae*
- Honey bee mite-*Acarapsis woodii*
- Parasitic mite -*Tropilaelaps spp.*
- Varroa mite- *Varroa destructor*

Pollen from 7- 10 hives per year is also sampled for the presence/absence of over 174 pesticides. Colorado has taken samples of qualifying apiaries in 20 of 64 counties based on the protocols required by the National Honeybee Health Survey. Due to the required protocols, apiaries that qualify are biased towards commercial honey production and migrant pollination services, the hobby segment of Colorado's beekeeping community is under represented by this survey.

Survey Methodology



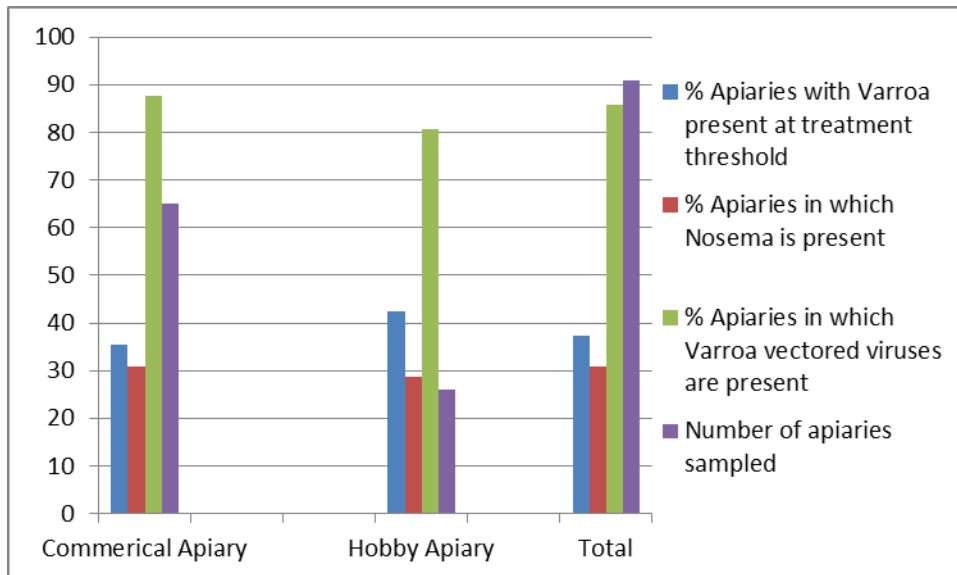
- Number of samples
 - Apiaries sampled for pests and diseases:
 - 2011 - 2012 – Apiary criteria minimum of 8 hives
 - 25 apiaries were sampled
 - 2012 – 13 – Apiary criteria minimum of 8 hives
 - 23 apiaries sampled for Varroa mite; 19 apiaries were sampled for virus and Nosema
 - 2016– Apiary criteria minimum of 4 hives
 - 24 apiaries sampled
 - 2017 – Apiary criteria minimum of 8 hives
 - 18 apiaries sampled
 - Apiaries sampled for possible presence of 174 pesticides
 - total of 26 samples -2011 – 2016
 - results for 2017 & 2018 pending
 - Counties sampled (20)
 - Alamosa, Arapahoe, Bent, Boulder, Chaffee, Denver, Eagle, El Paso, Elbert, Garfield, Jefferson, Kit Carson, Larimer, Las Animas, Montrose, Otero, Pueblo, Rio Grande, Weld.

- Methods –
 - pests and disease
 - 3 composite samples were taken from each apiary
 - Composite sample = combined sub samples from
 - 8 hives (2011 – 2013)
 - Allowed to sample as few as 4 hives to get more participants (2016)
 - 8 hives (2017 – only 14 participants)
 - Sample 1
 - Live honey bee adults (~1200 bees)
 - Sample 2
 - Honey bee adults collected in alcohol (~1200 bees)
 - Sample 3
 - Wash from the brood collected by knocking the frame
 - Pollen or comb for pesticide analysis
 - Allowed 10 hives per survey period (3 grams/hive)
 - Samples shipped priority mail the day they were collected to USDA Bee Research lab in Beltsville MD (bees and brood) or sent to Gastonia, North Carolina (pollen and comb)



Results (2011 – 2013- 2016 - 2017)

Table 1. National Honeybee Health Survey results for Colorado; 2011, 2012, 2016, 2017. Percentage of apiaries testing positive for Varroa mite, Nosema and Varroa vectored viruses. As shown in Table 1, Varroa mite was present above the treatment threshold in 85% of the apiaries sampled (35% of commercial apiaries and 42% of hobby apiaries), Nosema spp. present in 31%, while Varroa vectored viruses were present in over 85% apiaries.



- Varroa mite (91 apiaries sampled)
 - Present in 93% of apiaries sampled
 - All but 6 apiaries had at least 1 Varroa mite detected
 - 35% apiaries at economic threshold (ET) for mitigation
 - Average load of > 3 mites/100 bees considered ET (per National Honey Bee Health Survey)
- Virus vectored by Varroa mites
 - Deformed wing virus
 - 64/91 apiaries – present in 70% of apiaries tested
 - Even if an apiary has Varroa (vector of DWV) under control the virus is often present in bees.
 - Varroa Destructor Virus
 - Started analysis in 2016
 - 57% of all apiaries tested have VDV present.
 - Other viruses
 - Israeli Acute Paralysis Virus – present in 7 apiaries
 - Kashmir Bee Virus (2012-13)- 1 apiary
 - Chronic Bee Paralysis Virus present in 4 apiaries



- Acute Bee Paralysis Virus present in 5 apiaries
- *Nosema* (microsporidium pathogen – fungal- like)
 - 28/91 apiaries – present in 30% of apiaries tested
 - *Nosema ceranae* is the most common species found

Pesticide analysis results

- 26 samples through 2016
- Miticides applied by beekeepers are found more frequently than other pesticides.
- Hobby beekeepers are applying less Varroa controls than Commercial beekeepers

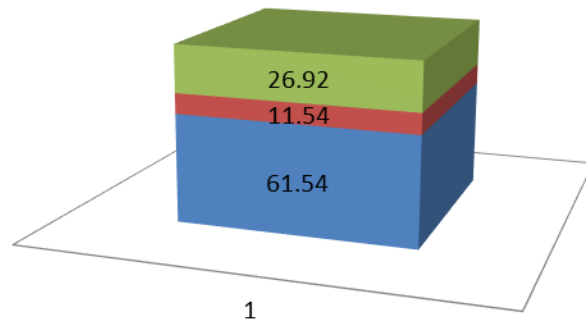
Table 2. National Honey Bee Health Survey, pesticide analysis results for Colorado.

Pesticides* Found in Colorado Hives 2011, 2013, 2016			
Miticides	Insecticides	Fungicides	Herbicides
Fluvalinate (16)**	Prallethrin (2)	4-Hydroxychlorothalonil (2)	Atrazine (3)
DMPF (5)	Chlopyrifos (1)	Carbendazim (2)	Trifluralin (2)
Coumaphos (5)	Cyhalothrin (1)	Pyraclostrobin (1)	Metribuzin (1)
Fenpyroximate (3)	Methoxyfenozide (1)	Floupyram (1)	Diuron (1)
Chlorfenvinphos (2)		Fenbuconazole (1)	
Hexythiazox (1)			
Thymol (2)			
* detection level in parts per billion			
** number of postive samples			



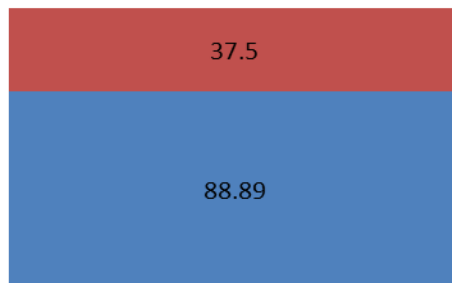
% miticides by sample

■ Commerical ■ Hobby ■ No miticides detected



% Varroa applied controls commercial vs Hobby

■ Commercial ■ Hobby



ⁱ <https://beinformed.org/aphis>

