

National Honey Bee Pests and Diseases Survey: Questions and Answers

Why should the public care about honey bees?

Bee pollination is responsible for \$15+ billion nationwide in added crop value and is particularly important for specialty crops such as almonds and other nuts, berries, fruits, vegetables, and seed crops. While there are native pollinators, honey bees can be managed in much larger numbers for the immense scale of pollination that US agriculture requires. As an example, in California, the almond crop alone requires almost 2.7 million colonies for the 1.4 million acres, which represents almost all of the honey bees in the United States.

Why conduct the honey bee health survey?

Pollination-based agriculture is expanding to feed our growing population faster than pollinators can be provided. This means honey bee colonies are transported across the nation by truck to meet the growing pollination demand. It is imperative to our national food supply to monitor and assess the threats to this extensive pollination force. The primary goal of the national survey is to survey exotic pests and pathogens that could further stress colonies and add to colony loss.

In concert with invasive surveillance, this survey further provides a baseline of national colony health. Current stressors, such as reduction of forage, new pathogens and pests, pesticide use, and multiple pollination events, take a toll on honey bee colonies. The spread to the United States of *Varroa* mites is arguably the most crippling pest to challenge colonies and beekeepers alike. The national survey is a major step in searching for these and other factors that are affecting the health of the apiculture industry in the United States.

This survey is sponsored by the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) in collaboration with the USDA Agricultural Research Service (ARS) and is primarily geared at establishing the absence of *Apis cerana* and the parasitic mite *Tropilaelaps* in the United States. To maximize the information gained from this survey effort, samples will be analyzed for other diseases and parasites known to be present in the United States.

DATA QUESTIONS:

How will the resulting data be stored and used in the future?

The National Honey Bee Pests and Diseases Survey data is stored in a comprehensive database on honey bee health. The data are securely stored to protect individual results but will permit giving temporal and geographic context to future disease diagnosis results. These data have been and currently are made available to honey bee researchers who are interested in looking at disease trends in the United States and correlations with crops, pesticide use, management practices, etc.

Physical samples are archived for long-term storage so that researchers can go back in time to resolve the introduction of a new virus, such as was done with deformed wing virus (DWV-B) and *Apis mellifera* Solinivirus-1 (AmSV-1), or to determine any correlations with *Varroa* mites, physiological changes, climate patterns and events, etc., where evidence was perhaps not obvious at the time. Archived

samples provide a window into the past that helps us identify risk factors, especially when we have loss data to accompany the disease data.

Why does the survey now include longitudinal sampling?

The apiary inspections and diagnostics offer a snapshot of the health of the colonies at a specific time of the year. This data acts as a comparative baseline of pest and pathogen loads and allows us to place sample results in seasonal context. This allows us to know if a certain disease load is abnormally high or about normal for a particular time of year.

One limitation of our general sampling data set is that samples were not taken at the same rate every month of the year. For example, we cannot sample bees in northern states during the winter. Also, since we did not sample the same colonies more than once a season, we did not know how disease loads change in managed colonies over the production season. This is important because if we did know how disease load changed in colonies, and if those changes happened in a consistent way, we could begin to predict future disease problems and give beekeepers advice on preventive management.

In an attempt to collect data which will eventually permit us to predict future colony health conditions based on infield sampling, we need to sample the same colony twice over the season. This approach is called longitudinal sampling. It requires that a set of state samples be collected from colonies twice: once early in the season (May/June) and once again towards the end of the season (September/October).

Longitudinal sampling is a gold standard in health studies. The data obtained, over several years, would permit us to estimate fall bee health based on early summer sampling.

What data is gained by longitudinal data collection?

Longitudinal data collection will provide new insights into colony health. In addition to getting information on the prevalence (frequency) and load of pests and diseases. This means that we will be able to investigate factors associated with a change in health status, rather than the mere presence of the health issue.

Can I access raw data?

Currently, we do not allow general access to raw data. If you are a state apiary inspector and would like to have this data for your state records, or a honey bee scientist who would like to conduct a research project, please contact us. Summarized honey bee disease data can be downloaded from the [online data portal](#) webpage.

FOR PARTICIPATING BEEKEEPERS:

How many samples will be collected?

Each state participating in the survey will take 24 samples. Eight hives will be selected for sampling within each apiary. Once all the samples from an apiary are collected, they are packed and shipped to the University of Maryland (UMD) Honey Bee Research lab in College Park, Maryland or the Washington State Department of Agriculture (WSDA) Plant Pathology & Molecular Diagnostics Laboratory for analysis.

Who will collect the samples?

State and County cooperators collect samples using standardized collection protocols. This ensures uniform sample collection, consistent analysis, and a verifiable chain of custody for the samples. The sample collector will schedule a visit with beekeepers and will provide them with information on the collection and when individual apiary results will be sent.

Are beekeepers required to complete a survey for the sampling?

No, but participating beekeepers are encouraged to fill out an [online survey](#) for their sampled apiary. The intent of this survey is to relate management practices to the results of your disease sampling, especially in the 90 days prior to your sample collection. Linking management practices (including treatment, feed, etc.) can help researchers determine if there is a relationship with increased pests/pathogens. Gathering as much data as possible will help us tease out those relationships.

Why did the survey switch from (bee bread to wax/wax to bee bread) sampling for pesticide analysis?

Bee bread analyses are preferred for identifying immediate or current pesticide exposure events; however, wax pesticide residues are more indicative of long-term exposure. The survey will switch from one type of sample to the other periodically to capture both exposure routes in honey bees.

When and how do I get my sample results?

Samples will be processed in the order they are received. To preserve privacy, sample results will be emailed directly to participating beekeepers, the apiary specialist, the state survey coordinator, the State Plant Regulatory Official, and the State Plant Health Director. Beekeepers participating in this survey receive a summary report from UMD 4 - 6 months after sampling. It is likely that you will receive a partial report prior to the summary report as we are able to process *Varroa*, *Nosema*, and *Tropilaelaps* quicker than the viral diagnostics. This report provides information on the average level of *Nosema*, viruses, and *Varroa* loads in an apiary. This report also includes the visual screening results for exotic honey bee species or subspecies such as the *Apis ceranae* and the *Tropilaelaps* mite. Annual reports summarizing results will be posted on the internet at the website locations listed above.

Why does it take so long to get my results?

The testing process takes a few months to complete due to the complicated nature of the processing. Although timely turnaround is our priority, these reports are not intended to be real-time, actionable results for beekeepers.

Varroa, *Nosema*, and *Tropilaelaps* diagnostic microscopy samples are processed relatively quickly after arriving at the UMD lab. Molecular testing requires much more time and is more labor intensive. Live bee samples are flash frozen to -80°C upon arriving at the lab, preserving the delicate viral RNA for future testing. Testing occurs in batches and samples may need to be rerun due to the rigorous nature of the testing. Sending in samples early in the season helps prevent backlogs.

Pesticide samples, processed off site by the USDA Agricultural Marketing Service (AMS), have the longest turnaround time. In an effort to get states and beekeepers their pest and pathogen results quickly; pesticide reports are sent separately.

Is the survey voluntary?

Yes, states and beekeepers voluntarily participate in the survey.

What is the benefit of participating?

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A beekeeper participating in this survey will receive a summary report on the average apiary level of *Nosema*, virus, and *Varroa* loads in their sampled apiary. If their apiary was sampled for pesticides, they will receive a comprehensive report of all the pesticides detected in their sample as well as the pesticide loads in parts per billion. This provides a valuable snapshot in time of the relative health of their colonies. These results can be shared within regional beekeeping groups. Additionally, the data are used to develop a baseline of both regional and national honey bee health metrics as well as surveillance of possible invasive exotic threats.

What if I do not participate?

Beekeeper help is needed and appreciated. Participation is voluntary.

Is there a charge for the sampling?

No. APHIS is funding the collection and analysis of the samples.

FOR PARTICIPATING STATES:

What if we do not get funding in time for spring sampling?

Sampling kits are sent to participating states in the early spring to allow time for spring sampling. If funding is needed but is not received in time, a pre-award may be possible. The cooperator should discuss this option with the Authorized Departmental Officer's Designated Representative (ADODR) of their agreement.

Is there a specific honey bee accomplishment template?

Cooperators may use the [standard accomplishment report](#) and customize as appropriate. For further guidance and/or examples of customized accomplishment reports, contact Josie Ryan, the National Operations Manager at: josie.k.ryan@usda.gov.

When will the kits arrive?

Ideally, kits will arrive by the first of April.

What if my state would like to participate but we do not have an apiary program?

For states wanting to be sampled but not able to collect samples, please contact Josie Ryan, the National Operations Manager at: josie.k.ryan@usda.gov.

Where should I look for sampling procedures?

For answers to questions about protocols, sampling, shipping, project plans, *Tropilaelaps* information sheets, etc., please go to the [APHIS Survey of Honey Bee Pests and Diseases](#) website.

For pest and pathogen sampling: https://www.youtube.com/watch?v=MZ_a6BJEGmI

For wax pesticide sampling: <https://www.youtube.com/watch?v=Znv2Bs9ZrjM>

Who should I contact for more information?

Contact USDA APHIS at HoneyBeeSurvey@usda.gov.

If you have questions about the protocol or logistics, please contact Rachel Fahey at nhbs@umd.edu.