New research publications. This list generated by search of NLM (National Library of Medicine) records using PubMed MeSH (Medical Subject Headings) term: "**Beekeeping**"

Kaku NG, Jankauski MA, Doyle BF, Collins CJ, Flenniken ML**. Inapparent virus infections differentially affect honey bee flight.** Sci Adv. 2025 Aug 8;11(32):eadw8382. doi: 10.1126/sciadv.adw8382.

Abstract: Honey bee colony deaths are associated with viruses, which frequently do not cause morphological symptoms in adult bees. To assess the impact of these inapparent infections, we measured flight performance as a proxy for honey bee health. We hypothesized that deformed wing virus (DWV) and/or sacbrood virus (SBV) would reduce flight performance and that coinfections would have compounding, negative impacts. We identified virus-specific effects; bees with DWV flew shorter distances at slower speeds, whereas bees with SBV flew greater distances at higher speeds. Bees with high virus loads expressed more heat shock protein 90, and SBV-infected bees expressed more octopamine β-2 receptor (Oβ-2R). Oβ-2R binds octopamine, a "fight or flight" molecule, stimulating metabolic activity, neuromuscular transmission, and movement. To examine relationships between virus infection, octopamine, and flight, we compared the flight performance of DWV-infected bees with octopamine treatment and demonstrated that octopamine negated DWV-associated flight impairment. These findings have organismal-, colony-, and ecosystem-level implications.

Plain Language Summary: This study looks at how two viruses, Deformed Wing Virus (DWV) and Sacbrood Virus (SBV), affect honey bee flight ability. While these viruses often don't show visible symptoms in the bees, they still impact how well the bees fly. The researchers found that bees infected with DWV flew shorter distances and more slowly, while bees infected with SBV actually flew further and faster. Bees with higher virus levels had more stress-related proteins in their bodies.

This is Open Access article.

New research publications. This list generated by search of NLM (National Library of Medicine) records using PubMed MeSH (Medical Subject Headings) term: "**Beekeeping**"

Silva, D., Becerra, F., Salazar, S. et al. **Deformed wing virus–induced changes in honey bee reception and preference for pollen scents.** Apidologie 56, 71 (2025). https://doi.org/10.1007/s13592-025-01196-7

Abstract: Honey bees (*Apis mellifera* L.) play a crucial role in pollination, and their olfactory system is essential for food collection and source selection. This study evaluates how the deformed wing virus (DWV), particularly its variant A, affects the olfactory sensitivity and behavioral responses of bees (10 to 20 days old) to volatile compounds from different pollen sources. We collected and analyzed the volatile fractions of three types of pollen (polyfloral and two monofloral) using dynamic HeadSpace and gas chromatography–mass spectrometry (GC–MS). The chemical analysis revealed differences in volatile compound profiles among the pollen types, including the presence of benzaldehyde, lilac alcohol, and 1–4 cineole, which are known to impact honey bee olfaction. Behavioral assays using a Y-olfactometer showed that while non-inoculated bees (N-DWV) responded to the aromas of all pollens in higher proportions, DWV-inoculated bees (I-DWV) exhibited significant reductions in behavioral responses. Specifically, I-DWV bees showed lower response rates, and a higher proportion of non-responding individuals compared to N-DWV bees. Notably, I-DWV bees were more attracted to the aroma of *Eucryphia cordifolia* when exposed simultaneously to the aroma of *Rubus ulmifolius*. This preference may be related to specific volatiles emitted by *E. cordifolia* that signal higher nutritional or medicinal value. Future analyses focused on the antiviral activity of this pollen could help clarify whether such attraction is associated with adaptive mechanisms against viral infection. Additionally, electrophysiological recordings indicated that DWV-A infection decreases olfactory sensitivity, particularly in response to complex odors. This decline in olfactory function and behavioral preferences could compromise foraging efficiency and overall colony health. These findings highlight the impact of DWV-A on honey bee sensory and behavioral processes, raising concerns about broader implications for colony survival and pollination services.

Plain Language Summary: This study looks at how the Deformed Wing Virus (DWV) variant A affects honey bees' sense of smell and how they react to different pollen aromas. Bees use their sense of smell to find food, and the research tested how DWV infected bees responded to the scents of various pollen types. They found that the infected bees showed much weaker reactions, and more infected bees didn't respond at all to the scents.

This is not an Open Access article.

New research publications. This list generated by search of NLM (National Library of Medicine) records using PubMed MeSH (Medical Subject Headings) term: "**Beekeeping**"

Liolios V, Tananaki C, Kanelis D, Rodopoulou MA, Papadopoulou F. **Volatile Profile of 16 Unifloral Pollen Taxa Collected by Honey Bees (Apis mellifera L.).** Insects. 2025 Jun 26;16(7):668. doi: 10.3390/insects16070668. PMID: 40725300; PMCID: PMC12295184.

Abstract: Bee pollen's aroma combined with other floral components serve various purposes, including attracting pollinators and signaling the availability of food sources. The present study aimed to comparatively analyze the volatile profiles of unifloral pollen taxa. Bee pollen loads were collected using pollen traps and sorted based on their botanical origin, determined by color and pollen grain morphology. The separated pollen samples were analyzed using a Purge & Trap/GC-MS system, identifying the volatile profiles of pollen from 16 plant species. The analysis revealed distinguished differences in the total volatile organic compounds (VOCs) among the various pollen species. Notably, the pollen from *Erica manipuliflora*, *Papaver rhoeas*, and *Sisymbrium irio* contained the highest number of VOCs, with 54, 51, and 42 substances detected, respectively. Certain volatile compounds appeared to correlate with increased bee visitation. For instance, 4-methyl-5-nonanone was uniquely found in *E. manipuliflora* pollen, while isothiocyanate compounds were exclusively present in species of the Brassicaceae family. Therefore, given the significant impact of VOCs on honey bees' preferences, it is essential to consider not only the nutritional value of bee pollen when evaluating its beekeeping value, but also its aroma profile.

Plain Language Summary: This study looked at the scents of pollen from different plants. The goal was to see how the smell of pollen might attract bees and signal where food is available. Researchers analyzed the volatile compounds and found pollens from autumn heather, red poppy, and rocket mustard, had more complex smells. Some of the compounds in these pollens were attractive to bees.

This is Open Access article.

New research publications. This list generated by search of NLM (National Library of Medicine) records using PubMed MeSH (Medical Subject Headings) term: "**Beekeeping**"

Kim H, You E, Cha J, Lee SH, Kim YH. **Toxicity of Consecutive Treatments Combining Synthetic and Organic Miticides to Nurse Bees of *Apis mellifera*.** Insects. 2025 Jun 24;16(7):657. doi: 10.3390/insects16070657. PMID: 40725289; PMCID: PMC12294837.

Abstract: *Varroa destructor*, an ectoparasitic mite of honey bees, is a major contributor to global colony declines. To manage infestations, beekeepers frequently apply both synthetic and organic miticides-sometimes in combination. While much attention has been given to foragers' pesticide exposure, nurse bees are also at risk due to direct miticide contact and prolonged exposure to residuals in hive matrices. Despite this, little is known about the effects of sequential miticide applications on nurse bees. In this study, we evaluated the toxicities of single and pairwise consecutive applications of three synthetic miticides (fluvalinate, coumaphos, and amitraz) and two organic miticides (formic acid and oxalic acid) at field-realistic concentrations. Miticides were topically applied to nurse bees with 24 h between consecutive treatments. Synthetic miticides caused minimal mortality, while both organic miticides-especially formic acid-significantly reduced survivorship. Consecutive treatments generally produced mortality rates comparable to that of the corresponding organic miticide alone, indicating that observed toxicities were primarily driven by the organic agents. Notably, the fluvalinate-formic acid combination induced no significant adverse effects. These findings highlight the need for caution when using miticides in combination and support the development of safer application strategies to protect vulnerable in-hive bee populations.

Plain Language Summary: The researchers tested the effects of single and two consecutive applications of three synthetic miticides (fluvalinate, coumaphos, and amitraz) and two organic miticides (formic acid and oxalic acid). They found that synthetic miticides caused little harm, but organic miticides, especially formic acid, significantly reduced bee survival. When miticides were used in combination, the mortality rate was mostly similar to using the organic miticide alone, suggesting that the harmful effects were primarily due to the organic chemicals. These results may be important because we often think that organic miticides are less harmful than synthetic.

This is an Open Access article.

New research publications. This list generated by search of NLM (National Library of Medicine) records using PubMed MeSH (Medical Subject Headings) term: "**Beekeeping**"

Kulyukin VA, Kulyukin AV, Meikle WG. **Discrete Time Series Forecasting in Non-Invasive Monitoring of Managed Honey Bee Colonies: Part II: Are Hive Weight and In-Hive Temperature Seasonal and Colony-Specific?** Sensors (Basel). 2025 Jul 10;25(14):4319. doi: 10.3390/s25144319. PMID: 40732446; PMCID: PMC12299814.

Abstract: We explored the stationarity, trend, and seasonality of the hive weight and in-hive temperature of ten managed honey bee (*Apis mellifera*) colonies at a research apiary of the Carl Hayden Bee Research Center in Tucson, Arizona, USA. The hives were monitored with electronic scales and in-hive temperature sensors from June to October 2022. The weight and temperature were recorded every five minutes around the clock. The collected data were curated into 2160 timestamped weight and 2160 timestamped temperature observations. We performed a systematic autoregressive integrated moving average (ARIMA) time series analysis to answer three fundamental questions: (a) Does seasonality matter in the ARIMA forecasting of hive weight and in-hive temperature? (b) To what extent do the best forecasters of one hive generalize to other hives? and (c) Which time series type (i.e., hive weight or in-hive temperature) is better predictable? Our principal findings were as follows: (1) The hive weight and in-hive temperature series were not white noise, were not normally distributed, and, for most hives, were not difference- or trend-stationary; (2) Seasonality matters, in that seasonal ARIMA (SARIMA) forecasters outperformed their ARIMA counterparts on the curated dataset; (3) The best hive weight and in-hive temperature forecasters of the ten monitored colonies appeared to be colony-specific; (4) The accuracy of the hive weight forecasts was consistently higher than that of the in-hive temperature forecasts; (5) The weight and temperature forecasts exhibited common qualitative patterns.

Plain Language Summary: This study looked at the weight and temperature inside ten honey bee hives at a research facility in Tucson, Arizona, from June to October 2022. The hives were monitored with sensors that recorded data every five minutes. The researchers used a statistical method called ARIMA to try predicting/forecasting what will happen with the hive. The predictions were short term and forecasting models could not be trained on one hive to predict what will happen to another hive. They hope the data they collected will help to develop a precision forecasting tool in the future.

This is an Open Access article.