APIMONDIA SCANDINAVIA 2025
SWEDEN | DENMARK | NORWAY

PP-605 [Bee Health]

BeeNet

Monitoraggio ambientale con le api

APIMONDIA SCANDINAVIA 2025 SWEDEN | DENMARK | NORWAY 23-27 SEPTEMBER COPENHAGEN

MONITORING THE HONEY BEE PATHOGENS IN THE AGRICULTURAL ENVIRONMENT: RESULTS FROM THE BEENET PROJECT

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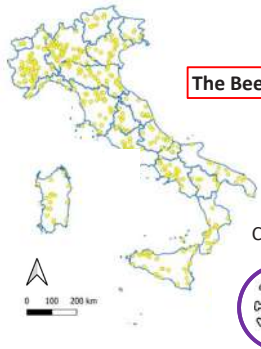


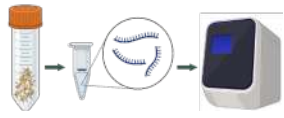
The BeeNet project aims to evaluate the quality of the Italian agroecosystem through honey bees and wild bees

The monitoring started in 2021 and will end in 2024, for a total of 3 years.
The monitoring involves all of the twenty Italian regions, using sedentary apiaries of 3 colonies
In total, a network with 360 apiaries was monitored

SAMPLING

Colony was monitored 4 times per year: March, June, September and November
Sampling forager bees

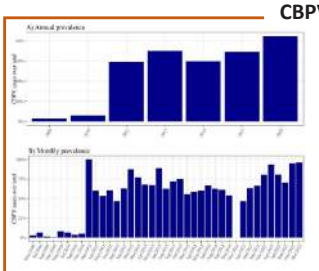
Viruses: DWV,-A, DWV-B, ABPV, CBPV, KBV, IAPV and BQCV
Microsporidia: *N. ceranae*
Trypanosomatids: *Lotmaria passim, Crithidia mellificae* and *C. bombi*



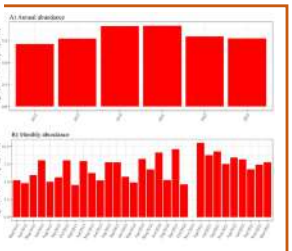
RESULTS

IAPV, *C. mellificae* and *C. bombi* were not detected in the investigated Italian apiaries across the monitoring

CBPV

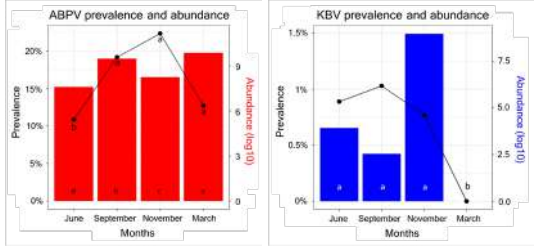


The annual trend showed low **CBPV** values until 2012 (4.3%). From the spring of 2012, there was a steep rise in prevalence values that reached minimum values in the winter of 2014. The prevalence reached the maximum during 2024 (84.7%) from 2021 to 2023.



The **CBPV** annual abundance trend showed a rise in the average copy number of the pathogen culminating in 2014 (1.65×10^{9}) to stabilise until 2021 (1.77×10^{9}). From 2022 (1.08×10^{8}) to 2023 (6.11×10^{7}) an evident abundance decline was noted.

ABPV & KBV



ABPV was the most prevalent virus (16.7%), whereas **KBV** was detected sporadically (0.7% national prevalence).

ABPV and **KBV** had an average national abundance of 5.9×10^{6} and 2.4×10^{5} viral copies per bee, respectively.

L. passim

L. passim average national abundance was 2.2×10^{3} in the 1st year and 1.6×10^{6} in the 2nd year, with no significant variations.

L. passim prevalence was higher in June and March of the 1st year compared to the same months of the 2nd year.

A peak of ***L. passim*** prevalence occurred in November in the 2nd year.

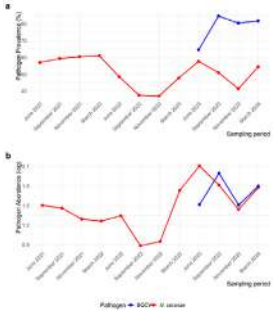
N. ceranae & BQCV

A weak positive correlation was found between ***N. ceranae*** and **BQCV** abundances.

Prevalence and abundance were higher in NorthWest: ***N. ceranae*** (58.2%; 8.7×10^{7}), **BQCV** (25.8%; 5.1×10^{4}).

The second year showed the lowest prevalence and abundance of ***N. ceranae.***

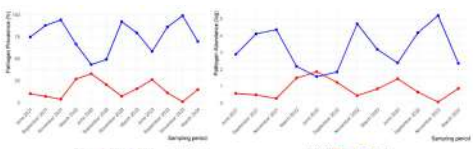
N. ceranae peak was detected in June 2023 (57.6%; 5.2×10^{8}), while BQCV in September 2023 (85.2%; 9.6×10^{4}).



DWV-A & DWV-B

DWV-B was consistently the dominant variant (73.7%) compared to **DWV-A** (14.9%).

In the second year, **DWV-B** prevalence declined (65.4%), while **DWV-A** increased (19.2%), but overall trends returned to initial levels in the third year.



Viral loads differed strongly between variants, with **DWV-A** showing a much higher mean abundance (3.37×10^{11}) than **DWV-B** (2.59×10^{8}). Over time, **DWV-B** abundance remained stable, whereas **DWV-A** declined markedly, reaching 2.88×10^{8} in the third year.

CONCLUSION

This monitoring represents the first comprehensive investigation conducted in Italy on the occurrence of main honey bee pathogens across agroecosystems.

Each investigated pathogen showed specific seasonality, linked not only to the pathogens' epidemiology but also to regional variations, beekeeping techniques and land uses.

The study emphasises the importance of ongoing monitoring and suggests future research should consider environmental and human-related factors, as well as space-time modelling, to better understand and predict the pathogens' distribution not only in the apiaries but also in the environment.

BeeNet 2019-2025 (Italian National Fund under FEASR 2014-2020 by the MASAF "Ministero dell'agricoltura, della sovranità alimentare e delle foreste" to the CREA "Consiglio per la Ricerca in agricoltura e l'analisi dell'economia agraria")

https://beenet.crea.gov.it/

PP-605 [Bee Health]
Monitoring the honey bee pathogens in the agricultural environment: Results from the BeeNet project

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Monitoring the health of the agricultural environment is a relevant issue for EU and rural development policies. The BeeNet project aimed to assess the health of the Italian agroecosystem by monitoring 363 sites with honey bee colonies over three years, covering the entire national territory. From June 2021 to March 2024, foragers were sampled four times per year to evaluate the presence and abundance of main pathogens (DWV, KBV, ABPV, IAPV, CBPV, BQCV, SBV, Nosema ceranae, Lotmaria passim, Crithidia mellificae, and C. bombi) using molecular assays. DWV was the most prevalent and abundant pathogen, followed by BQCV, CBPV, and N. ceranae. DWV-B was the most frequently detected variant, surpassing DWV-A, and aligning with previously observed patterns. The BQCV prevalence yielded unexpected results, as it emerged as the second most abundant virus, infecting colonies without displaying clear seasonal or geographical trends. CBPV infection outbreaks were irregular across seasons, with spring and autumn identified as the most susceptible periods. Over the years, the CBPV infection risk has increased, transitioning from initially low-risk areas to high-risk zones with heterogeneous values. N. ceranae was detected throughout the country without specific geographical trends, with abundance peaks occurring in late summer. ABPV infections were recorded in late summer and autumn, particularly in Italian regions at the northern and southern extremes. KBV was detected sporadically, while none of the samples tested positive for IAPV. SBV was the least prevalent virus detected, likely due to its primary impact on brood rather than adult bees. The highest prevalence was observed in central and southern regions. None of the samples tested positive for C. mellificae or C. bombi, while L. passim was detected at low prevalence. Similarly, no significant seasonal or geographical trends in the prevalence or abundance of trypanosomatids were observed. During the project, the same pathogens were found in wild bees, providing new insights into the epidemiological status of managed honey bee colonies across Italy. Assessing the bee health status is crucial not only for helping beekeepers maintain the well-being of their colonies but also for protecting pollinator populations, contributing to environmental quality and sustainability.