

# Investigating Colony Losses in England and Wales

## Aim

The main aim of this study was to investigate honey bee colony losses in England and Wales in 2007.

## Background

Historically annual colony losses have fluctuated greatly in the UK, with severe weather increasing colony losses. However, the last 7 years have seen a trend of slowly rising colony losses (Figure 1). Bee keepers reported increased colony losses in Spring 2007. The NBU responded by securing funding to investigate all reported colony losses.

## Methods

Bulk bee and larvae samples were collected from over 700 dead or failing colonies across England and Wales. The genetic material was recovered from these samples and tested for a range of pathogens using molecular methods (Table 1). In addition, 10 comb samples from failed colonies were tested for the presence of 90 pesticides and 84 veterinary drugs including imidacloprid.

Table 1 List of organisms tested for as part of the pest and pathogen screen

Organism	Abbreviation
<i>Nosema ceranae</i>	Nc
<i>Nosema apis</i>	Nc
<i>Acarapis woodi</i> (Acarine)	Aw
Deformed wing virus	DWV
Black queen cell virus	BQCV
Kashmir bee virus	KBV
Sacbrood virus	SBV
Acute bee paralysis virus	ABPV
Chronic bee paralysis virus	CBPV
Israeli acute paralysis virus	IAPV
<i>Apis iridescent virus</i>	IV

## Results and conclusions

- The majority of bees from colonies lost in the Spring contained DWV, a virus associated with *Varroa* infestations (Figure 2)
- *Nosema ceranae* was confirmed for the first time in the UK, infecting 37% of colonies collected during the Summer. *Nosema apis* was also present in 14% of these samples
- IAPV, a virus correlated to Colony Collapse Disorder (CCD) in the states, was not present in any of the dead or failing colonies tested
- When found together, DWV and CBPV doubled the risk of bee death and dead bees had twice the number of pathogens as live bees
- Although large individual losses in the Summer were associated with CPBV and *Nosema ceranae* infection (Figure 3), the presence of DWV was consistently the best risk indicator of a weak/lost colony
- No pesticides or veterinary drugs were detected at high levels in the comb samples tested

<http://beebase.csl.gov.uk>

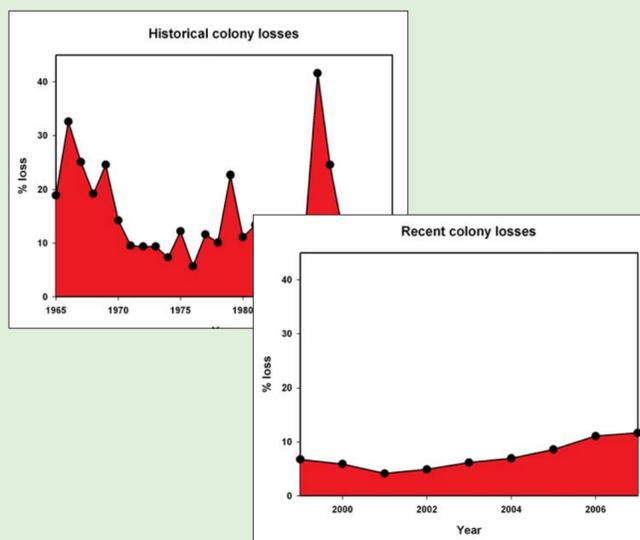


Figure 1. Historical and recent UK colony losses

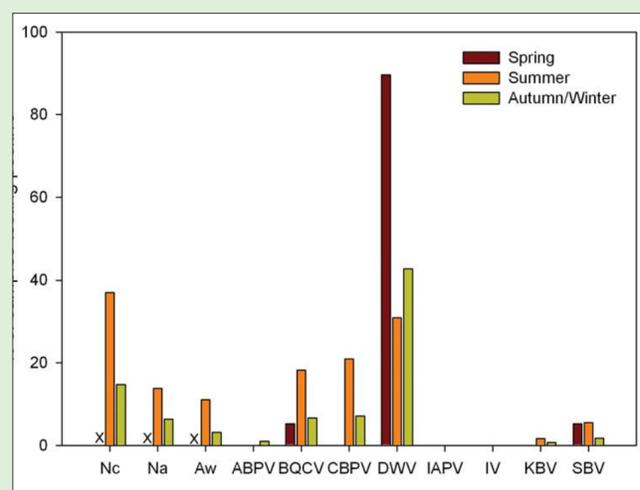


Figure 2. A summary of the percentage of samples testing positive by real-time PCR



Figure 3. Images of bees showing symptoms of CBPV



## Authors

Giles Budge  
g.budge@csl.gov.uk

Ben Jones  
Lynn Laurenson  
Selwyn Wilkins  
Stéphane Pietravalle  
Richard Fussell  
Mike Brown

## Address

Central Science Laboratory,  
Sand Hutton,  
York,  
YO41 1LZ,  
UK.

## Acknowledgement

Defra is gratefully acknowledged for funding this work.



CSL is an Executive Agency of Defra