

CHRONIC BEE PARALYSIS VIRUS

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Introduction

Definition of Chronic Bee Paralysis Virus (CBPV)

Disease first described by Felix Toumanoff in 1947 but the virus was identified by Leslie Bailey at Rothamsted Research Station UK in 1963 (1)

CBPV is a significant viral disease affecting adult honey bees and can be a major contributor to colony losses worldwide.

It is not only a disease of honey bees but also of other insects such as ants



Overview of CBPV

Viral disease primarily affecting adult honey bees

Causes paralysis, abnormal behavior, and mortality

Found worldwide in managed and wild bee populations

Has been reported in ants (*Formica rufa*, *Camponotus vagus*) and that ants may act as a reservoir.

Visual: Image of healthy bees versus CBPV-infected bees.



Taxonomy and Virology

Family: CBPV is unique and does not fit neatly into many common bee virus groups

Genome:

Positive-sense single-stranded RNA virus

Bipartite genome (RNA 1 and RNA 2)

Structure and replication characteristics can be found at ref (3)



Transmission

Routes of transmission

Direct contact between bees

Contaminated hive materials

Risk factors

Colony overcrowding and apiary overcrowding

Drifting and robbing

Stress from other pathogens and parasites esp Varroa destructor

Poor nutrition

Confinement in bad weather

Detection of Chronic bee paralysis virus (CBPV) is reported for the first time in two species of ants (*Camponotus vagus* and *Formica rufa*)..." (2)

CBPV has been detected in *Varroa destructor*, suggesting that the mite may contribute to virus spread, although definitive proof of Varroa-mediated transmission remains limited.(3)

Clinical Signs and Symptoms

symptoms

Type 1 Syndrome

Trembling and paralysis

Inability to fly

Crawling bees near hive entrance

Mortality increase large numbers of dead and dying bees

Visual: Photographs showing both syndromes.



Type 2 Syndrome

Hairless, shiny
black
appearance

Darkened
abdomen

Rejection by
nestmates



Both types usually appear
together





Pathogenesis

Viral entry and replication

Effects on nervous system and tissues

Development of paralysis symptoms

Progression from infection to death

Flowchart: Infection → Replication → Neurological impairment →
Clinical signs → Mortality



Diagnosis

Field diagnosis

Observation of symptoms

Colony inspection

Laboratory diagnosis

RT-PCR

Quantitative PCR (qPCR)

Molecular confirmation

Differential diagnosis

Pesticide poisoning

Other viral diseases

Starvation and stress-related disorders



Economic and Ecological Impact

Reduced colony strength

Worker bee mortality

Lower honey production

Pollination losses

Impact on agricultural productivity

Visual: Infographic linking bee health to crop production.

Management and Control

Good Beekeeping Practices

Regular hive inspections

Adequate nutrition

Avoid overcrowding

Replace heavily affected combs

Biosecurity Measures

Disinfection of equipment

Isolation of affected colonies

Prevent movement of infected bees

Parasite Management

Control of Varroa mites



Current Research and Future Directions

Molecular epidemiology

Host immune responses

Improved diagnostics

Breeding for disease-resistant honey bee stocks

Development of novel antiviral approaches



Conclusion

Key Takeaways

CBPV is an important viral disease of adult honey bees.

It causes paralysis, abnormal behavior, and colony weakening.

Early diagnosis and good management practices are essential.

Continued research is needed to improve prevention and control.

References

1. Bailey, L., Gibbs, A.J., & Woods, R.D. (1963).
Two viruses from adult honey bees (*Apis mellifera* Linnaeus).
Virology, 21(3), 390–395.
DOI: 10.1016/0042-6822(63)90200-9
2. Celle O, Blanchard P, Olivier V, Schurr F, Cougoule N, Faucon JP, Ribière M.
Detection of Chronic bee paralysis virus (CBPV) genome and its replicative RNA
form in various hosts and possible ways of spread. *Virus Research*.
2008;133(2):280–284. DOI: 10.1016/j.virusres.2007.12.011.[1][2]
3. https://ingenetix.com/en/product/veterinary/DVEV04213_chronic-bee-paralysis-virus/?application=veterinary&pathogens=virus&_page=1&listAll=1

Include recent scientific sources such as:
World Organisation for Animal Health guidelines
Research articles from journals like:
Journal of Invertebrate Pathology

- 
- **WHAT IT IS**
 - **WHAT CAUSES IT**
 - **HOW IT IS TRANSMITTED**
 - **WHAT IT DOES TO THE BEES**
 - **PERSONAL EXPERIENCE - CASE STUDY**

WHAT IT IS

Highly infectious disease of the nervous system of insects (not just honey bees)

Caused by a virus of the same name

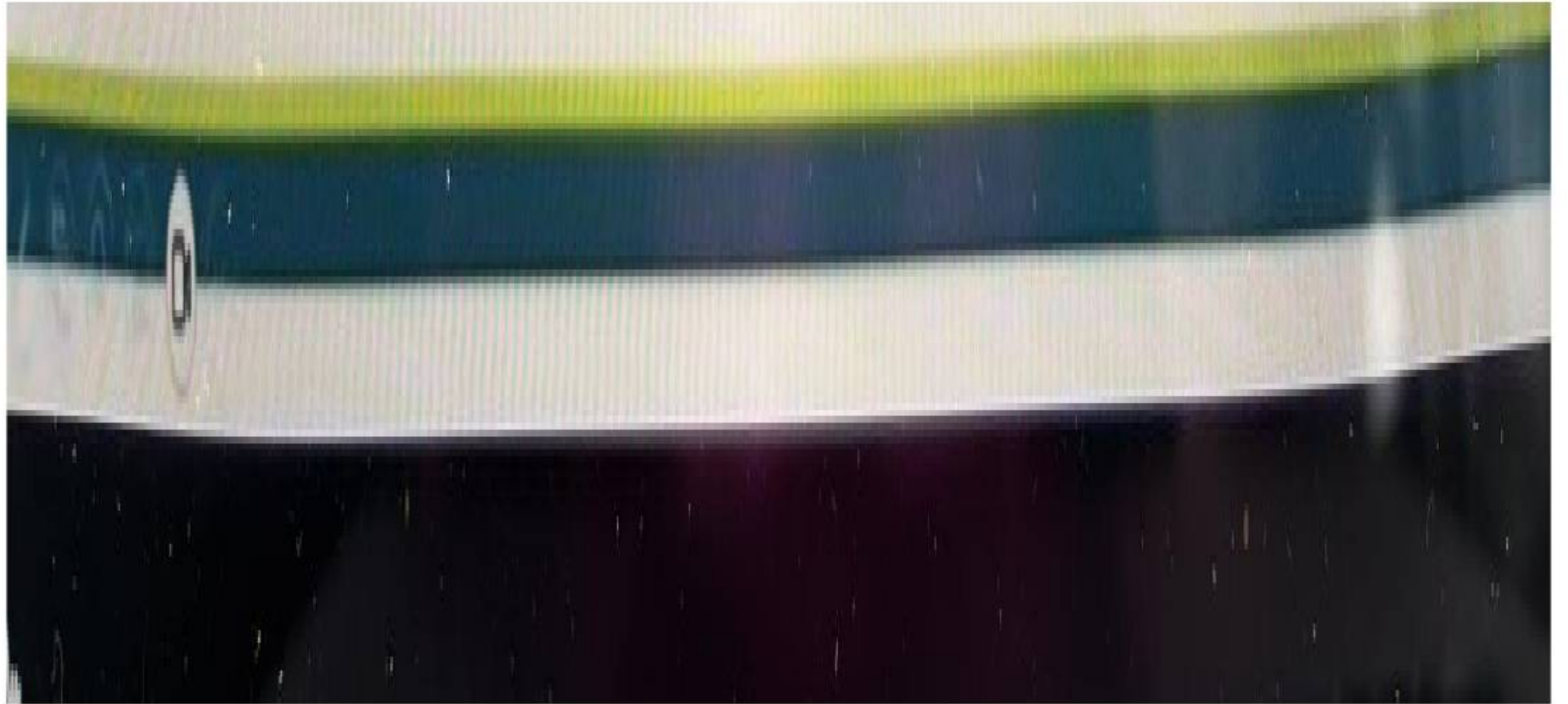
Worse in crowded colonies

Transmitted by direct contact, in trophallaxis, nibbling and orally in faeces

Passed to other colonies through drifting, robbing & mating

Affects queen and drones

Dead bees are still very infectious Not related to Varroa or



Signs

Sign 1

Shivering, trembling, shaking

Crawling on top bars, repeated movements

Bloated abdomens

Unable to fly

Don't react to smoke

**Dead & dying bees on ground and
hive floor**

**Occasionally poo stains on
brood box**



Sign 2

Black shiny hairless bodies

Nibbled wings

Can fly in early stages

Fighting with guard bees

Black robber disease

**Dead & dying bees on ground
and floor**

Queen superseded



Transmission

Adult bee to bee

Mechanical - bees rubbing against each other

Oral/faecal

Transovarial - from the queen

Injection - biting and nibbling

Not in brood

Not in comb

Not in honey or pollen

Same pathogen, same disease

Type 2 in later stages

Made worse by lack of pollen

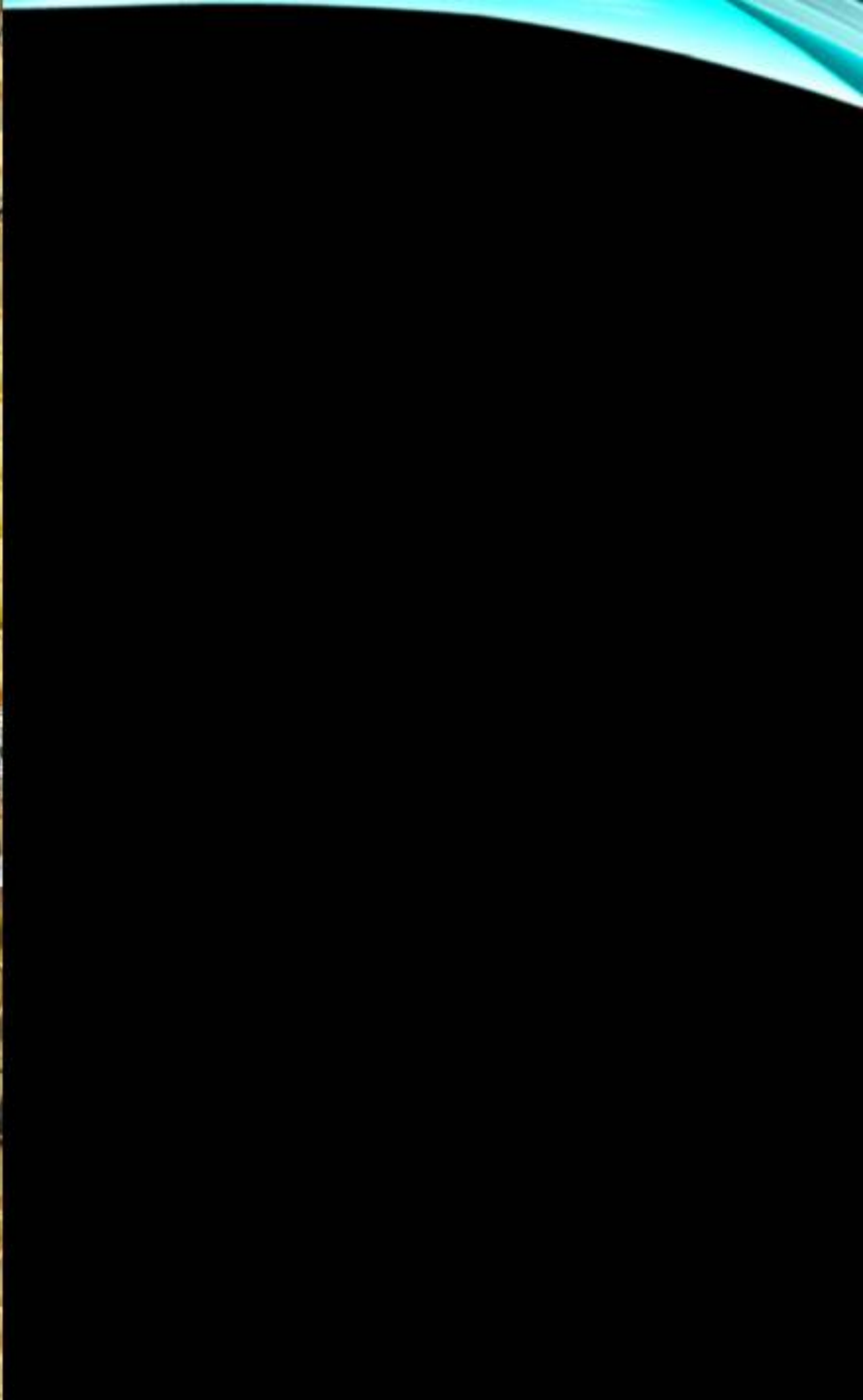
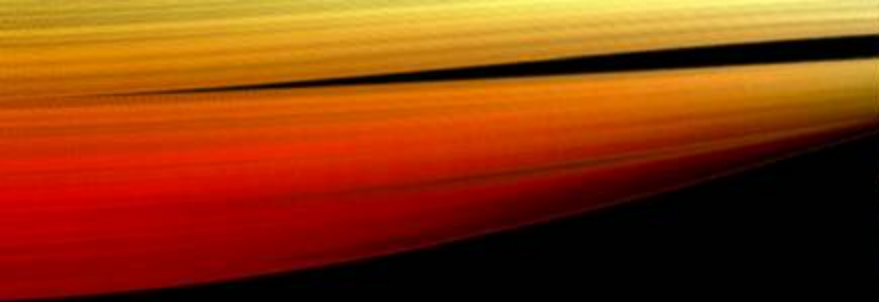
Very young bees are most susceptible

1/3 of all colonies have virus but can be s

48% chance of recovery*

On increase in England









(A)



(B)

CASE STUDY - HONEY PRODUCING COLONY n° FH8 2023

Normal spring build-up

April - varroa test alcohol wash >1%

April - new queen n°7/22

May - 2 supers of spring honey extracted

Mid June had 7 frames of brood 10 seams of bees and 2 supers

Noticed dead bees on ground and fighting at the entrance

ACTIONS TAKEN

Moved to isolated position

Removed and burnt all dead and dying bees

New clean floor

Empty super to keep unaffected bees separate from dead & dying

New frames of drawn comb checkerboarded with older frames

Feeder thin syrup and pollen supplement

Colony appeared to recover

@24kg honey not extracted, left for bees

2024

April -tested for varroa - < 1%

May- Bailey comb change

July - tested for varroa - 3%

Removed 4 supers for extraction, left 1 for bees

Treated for varroa Formic Pro

September- tested for nosema - negative

September- stimulative feeding for queen to lay winter bees

30 September - 7 seams of bees + 4 frames capped stores + 1full super

7 December - treated for varroa - Oxalic Acid by GasVap

2025

April - Slow spring build-up

Varroa test by C02 >1%

Nosema test negative

New queen n° 11/24

May - Bees fighting at entrance

Dead bees on ground

Bees in brood box shivering

No queen

Single supersedure cell

DECISION POINTS

- **Treat as in 2023 but add separating brood and young bees with separate entrance.**
- **48% chance of success if action taken quickly.**
- **Risk infecting other colonies by foragers and drones mating**
- **Euthanise for the greater good of my and other beekeepers' apiaries, and any free-living colonies in the area.**

QUESTION

What would you do?

SUMMARY

Highly infectious, deadly virus disease affecting the brain and nervous system.

Dead bees still transmit the virus.

Two types are different stages of the disease

Worse in strong overcrowded colonies.

48% Chance of recovery

May come back at a later date

Euthanasia is one option, but decision is agonising



Reference

**Prof Giles Budge
University of Newcastle
BBKA Lecture 2025**

<https://shorturl.at/OKIPk>

The image features a solid black background. At the top, there is a decorative border consisting of several overlapping, wavy bands of color. From left to right, these bands transition through shades of yellow, orange, red, and finally into a bright cyan or light blue on the far right. The text "ANY QUESTIONS ?" is centered horizontally in the middle of the black area.

ANY QUESTIONS ?