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# Discovery and characterisation of viral biocontrol candidates: viromics contribution to plant protection

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Lisa Claude  
Marie Frayssinet  
Mylène Ogliastro



## Context

The European legislation to ban many pesticides has led to increased demand for alternatives, including the use of viruses as biocontrol agents, which first requires knowledge of their diversity.

## Objectives

Our objectives were to discover insect viral resources, and explore their potential for biocontrol.

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Luciana Galetto  
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## Methods

We collected  
**3 major agricultural pests**  
and their host-plants  
from **agricultural ecosystems**  
located in France and Italy.

We processed  
**~1000 samples**, of pooled or  
unpooled individuals,  
by **viromics\*** coupled to  
an **automated pipeline\*\***  
for virus identification.

\* The term viromics designates the study of viral communities through the without *a priori* detection and characterization of virus genome sequences.

Our complete virion-associated nucleic acids (VANA) metagenomic protocol

is available at:



\*\* The NearVANA pipeline, developed by Aymeric Antoine-Lorquin,

is available at:



**226 virus species**

comprising insect viruses, bacteriophages and diet contaminants (plant and fungus viruses)

124 (55%) partial coding sequences

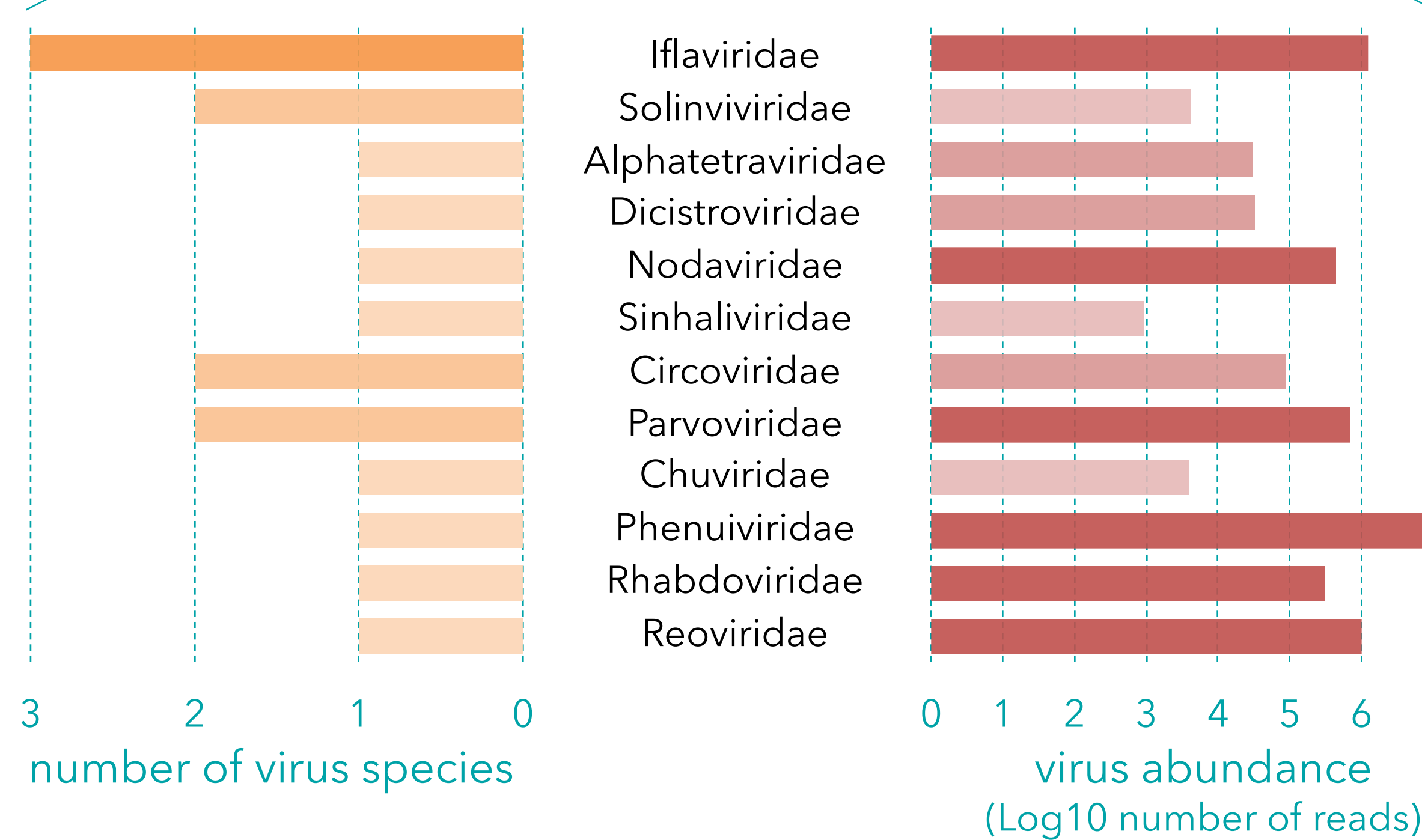
102 (45%) **complete coding sequences**

**22 insect virus species**

5 already described

**17 novel species...**

...classified into **12 families**



## Results

We revealed a **high diversity** of viruses associated with insect pests:

We detected **54 families of viruses**.

We could classify some of those viruses into **236 virus species\***.

We reconstructed the complete coding sequence of **58 novel species**, including **17 insect viruses**, 26 plant viruses and 12 bacteriophages.

We also showed **disparities** in insect viruses prevalence and abundance, which are potentially linked to their **host range**.

\* According to the International Committee on Taxonomy of Viruses (ICTV) standards

## Conclusion & Perspectives

We discovered insect viruses in 3 major agricultural pests.

The characterisation of these viruses (*i.e.* spatio-temporal distribution and phylogenetic analyses) is ongoing.

Their impacts on insect pests will be investigated in future studies.



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