Collections of Entomopathogenic Nematodes and Associated Bacteria for Biological Control of insect pests

Sylvie Pagès, Yascim Kamel, Aymeric Antoine-Lorquin, Jean Claude Ogier, Sophie Gaudriault, Alain Givaudan

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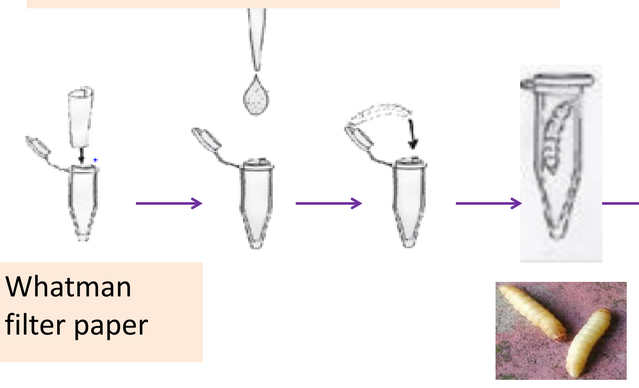
Since 1999, a collection of living entomopathogenic nematodes (EPNs) of *Steinernema* and *Heterorhabditis* genera has been maintained in the DGIMI laboratory, in Montpellier (France). This repository of EPN species, sourced from soils of international origin, is regularly updated with new isolates. Each new nematobacterial pair is characterized in terms of taxonomy, pathology on different insects and description of the associated microbiota. To ensure traceability, we have created a database for EPNs and associated bacteria, each isolate being characterized by a passport (origin, experimental results, bibliography…).

Methodology for reproducing infective juvenile (IJs) nematodes in laboratory before storage for several months

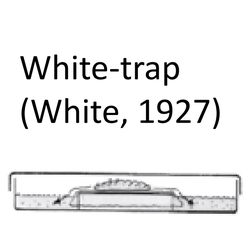
IJs in 200 µl of Ringer solution



Whatman filter paper

Galleria mellonella larvae

Emergence from the insect cadaver 2 or 3 weeks post mortem

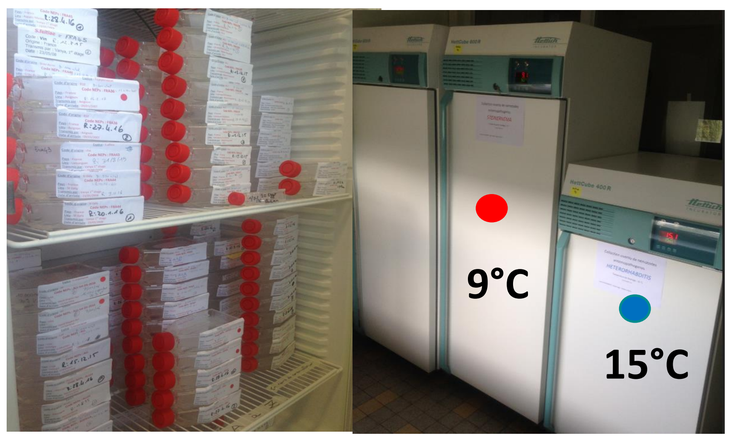


White-trap (White, 1927)

New IJs are stored in 80 mL of Ringer medium supplemented with formaldehyde (Kaya & Stock, 1997)

Storage

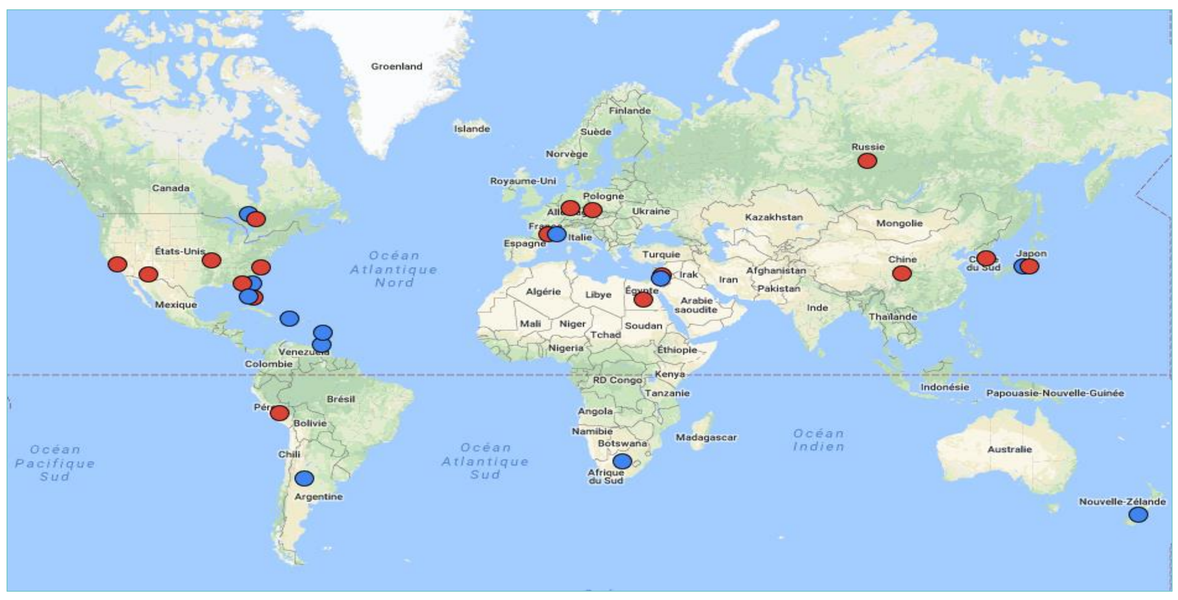
- *Heterorhabditis*: 9 months
- *Steinernema*: 4 to 6 months

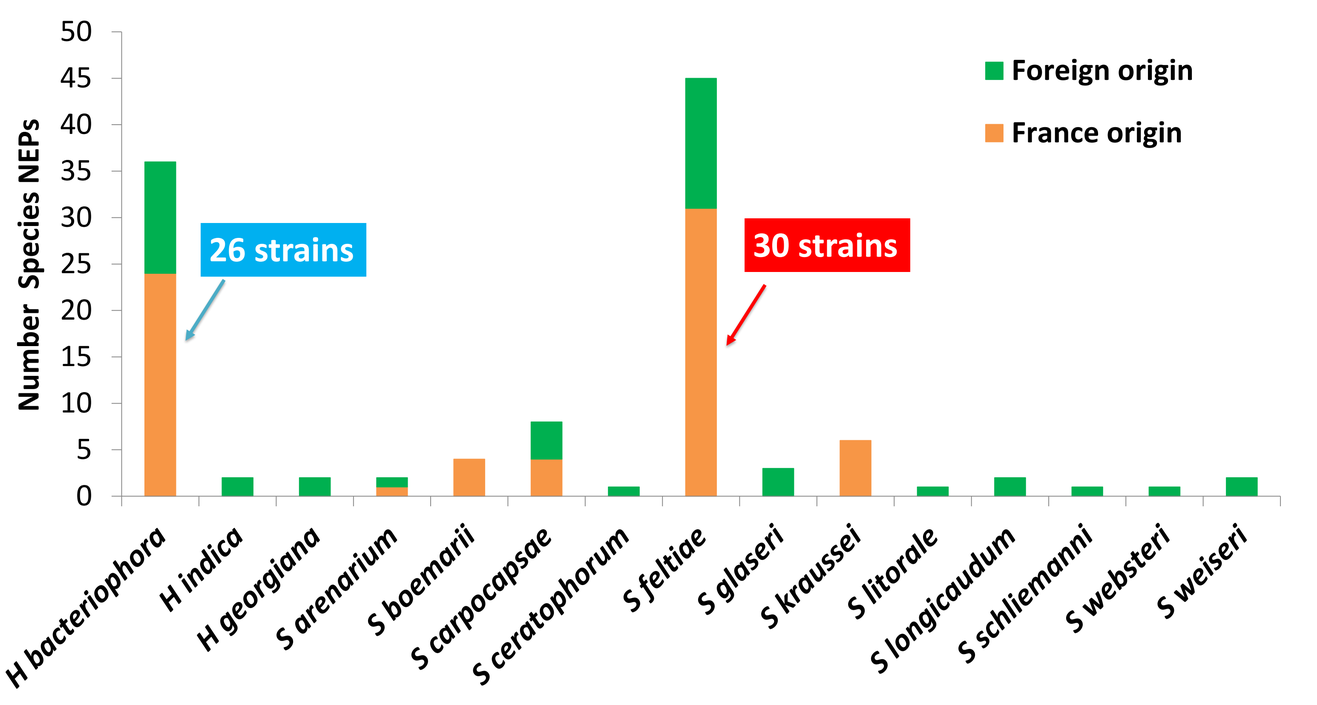


Geographical distribution of EPNs: EPN strains originate from France, as well as from across Europe and beyond, representing 15 countries. At present, 116 strains are kept alive in the laboratory. Each strain is renewed on larvae of insects (*Galleria mellonella*), every 4 to 9 months, depending of the specie, in order to preserve their pathogenicity.

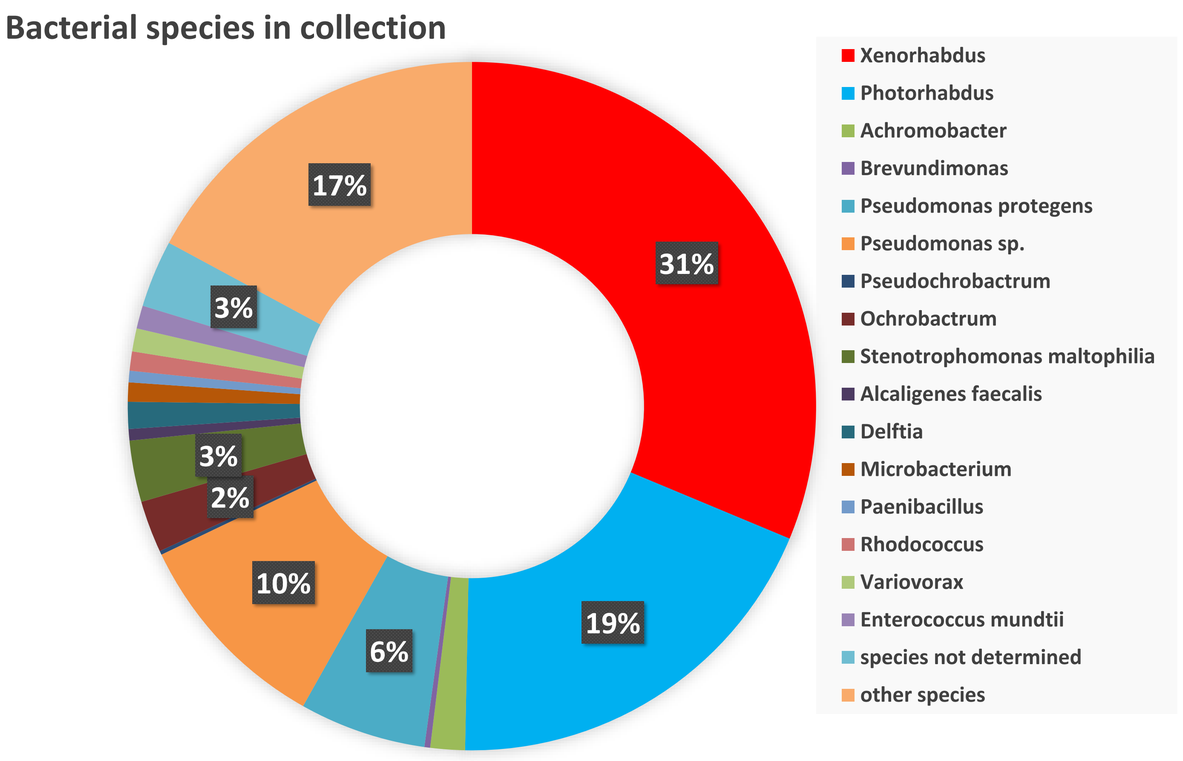
Global distribution

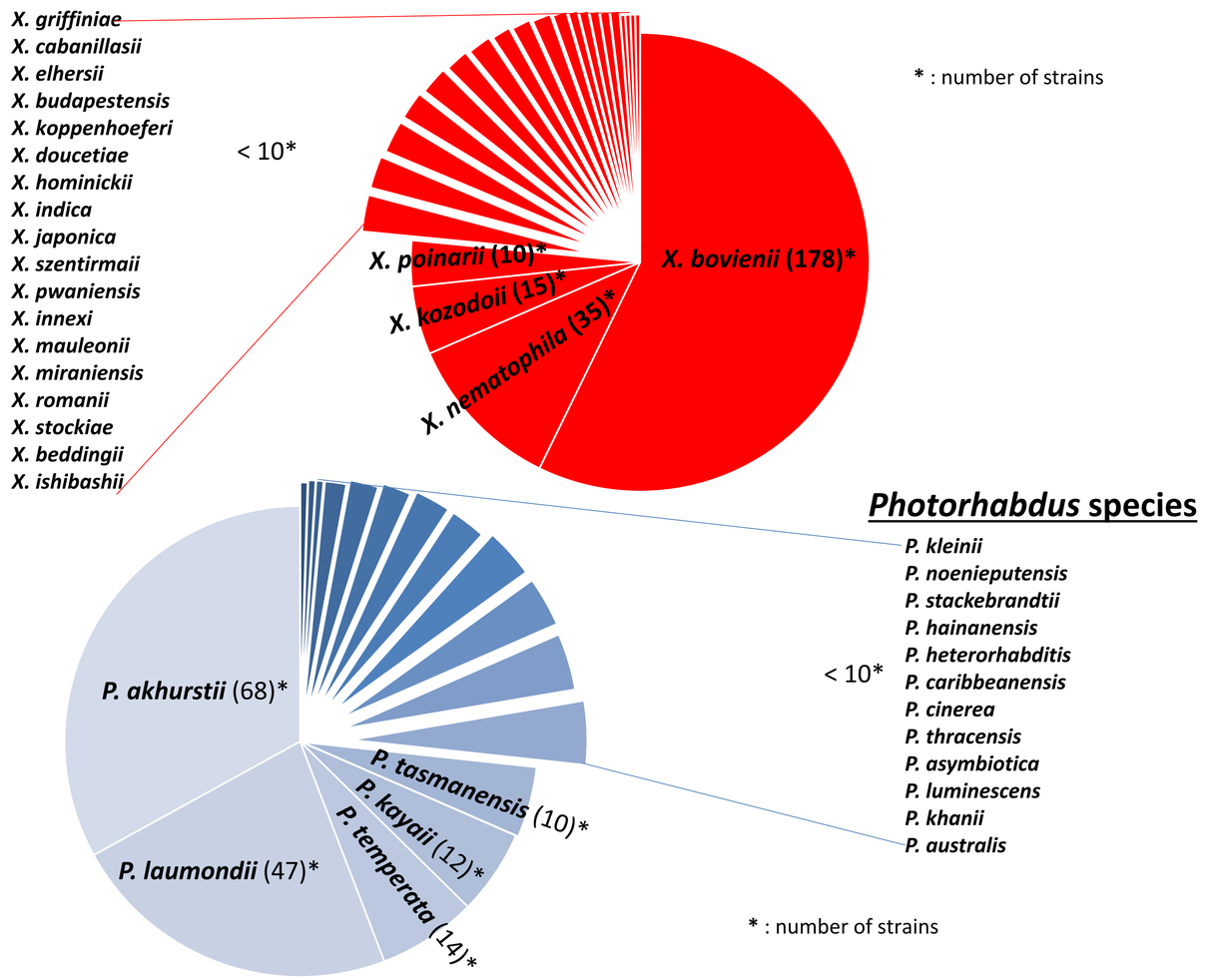
- *Heterorhabditis*: 3 species: 42 strains
- *Steinernema*: 12 species: 70 strains





Bacterial species in collection: Historically, the lab has been a reference in the field of taxonomy and phylogeny of *Xenorhabdus* and *Photorhabdus*, bacteria associated with EPNs. Today, more than 1200 strains are stored in the collection. It also includes strains of the frequently associated microbiota (FAM) of EPNs (Ogier, Pagès et al; Microbiome, 2020). Since 2016, the collection has been affiliated with the environmental pillar of the Agronomic Resource Center for Research https://www.brc4env.fr/BRCs-and-collections/Invertebrates/Nematodes/Entomopathogenic-nematodes





Database EPNs and Bacteria: By implementing a PostgreSQL database with phpPgAdmin in 2021, we have improved our organization's ability to effectively manage and analyze strain-related data. By using a centralized database, we can store all strain data in one place, it easy to manage and access. Finally, a structured database is crucial for maintaining traceability and ensuring data integrality.

Centre Montpellier-Occitanie

EPN 100th Anniversary congress, Logroño, La Rioja, Spain
April, 2024

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