

## Soil nematodes stored at the Museo de La Plata, Argentina

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### SUMMARY

The dataset of free-living soil nematodes from Colección Helmintológica of Museo de La Plata is presented. There is a large knowledge gap regarding soil nematodes especially in Argentina but also in the Neotropical region and this dataset provides information on this topic. The collection includes more than 850 specimens, organized in 294 lots of nematodes sampled or/and studied by Dr. Eliseo Chaves between 1975 and 2022. The specimens belong to 67 genera, 28 families, eight orders. The dataset is georeferenced and included in the Global Biodiversity Information Facility (GBIF), under the publisher Museo de La Plata (Argentina).

### INTRODUCTION

Nematodes are among the most diverse organisms, in terms of species richness and abundance (Schafer 2016). They are widespread, found in most terrestrial, marine, and freshwater habitats and niches, also found in extreme environments, both as free-living or as symbiotic in a wide kind of associations, parasites of

humans and animals (both vertebrates and invertebrates) and plants (De Ley 2006).

Soil-dwelling nematodes are a dominant component of the soil community, have a central position in the soil food web, and play critical roles in the regulation of biogeochemical cycles and vegetation dynamics, and are an indicator of soil biological activity and disturbance (Devi 2020, van den Hoogen 2020). They are grouped

into five trophic groups according to their feeding habits: bacterivores, fungivores, herbivores, omnivores, and predators (van den Hoogen 2020). As they are involved in the decomposition of organic matter, in the mineralization of nutrients, and are plant parasites, they have economic and phytosanitary importance (Sánchez-Moreno & Talavera 2013).

For the above reasons, it is of great importance to identify and understand the diversity of soil nematodes. The morphological identification of nematodes is time consuming and requires expert knowledge, and molecular identification cannot be applied in all regions due to the limited taxonomic knowledge (Baker et al. 2023). So, specimens stored in biological collections, identified by specialists, have great value that contributes to regional and general knowledge (Pfeiffer et al. 2024).

The scientific collections of extant invertebrates excluding insects of the Museo de La Plata are housed in the División Zoología Invertebrados. Among these, the Colección Helmintológica (MLP-He) includes Platyhelminthes, Nematoda, Nematomorpha and Acanthocephala (Lunaschi et al. 2012). This collection recently received the donation of Dr. Eliseo Chaves, with the soil nematodes studied by him in the Laboratorio de Nematología from the Estación Experimental from Instituto Nacional de Tecnología Agropecuaria (INTA), at Balcarce (Buenos Aires province, Argentina), during a large part of his scientific career (Azpilicueta & Chaves 2013, Brugni & Chaves 1994, Chaves 1990, Chaves & Coomans 1984, Chaves & Torres 2000, 2001, Coomans & Chaves 1995, Coomans et al. 1996, Mondino et al. 2006).

The soil nematodes in the MLP-He were mainly collected by Eliseo Chaves in different types of soil and vegetation cover, mainly in Argentina, but also in other countries. All specimens were identified by E. Chaves, and the five trophic groups are present (van den Hoogen 2020). Also, the collection includes type specimens (ICZN, 1999). The objective of this

contribution is to give access to the data of soil nematodes and their localities. Three of the authors (MAVH, DC, BF) of this contribution are members of the División Zoología Invertebrados of the Museo de La Plata (Argentina), and BF is the curator of the invertebrate collections housed in this Division.

## RESULTS

### Summary statistics

In this work, 294 records of soil nematodes deposited in the Colección Helmintológica from Museo de La Plata (MLP-He) are announced. These records consist of lots and document the presence of more than 850 specimens fixed and mounted on permanent preparations, some preparations with only one specimen, others with many.

The records are mostly from Argentina (281), including some (9) from the Antarctic Peninsula. The collection also has nine records from Uruguay, and from Brazil, Bolivia, Iran, and the USA one record each. Lots from localities in Argentina are mostly from Jujuy and Buenos Aires provinces, although there are records from other 14 provinces in Argentina (Figure 1).

Thirty records are identified at the family level, 263 at the generic level (belonging to 66 different genera) (Figures 2 and 3) and, among them 24 lots at the species level (belonging to 19 different species). Among the specimens identified at species level there are paratypes of six species (i.e. *Ogma comahuensis* Brugni & Chaves, 1994, *Paraxiphidorus heynsi* Coomans & Chaves, 1995, *Paraxiphidorus michelluci* Coomans & Chaves, 1995, *Xiphidorus balcarceanus* Chaves & Coomans, 1984, *Xiphidorus tucumanensis* Coomans & Chaves, 1984, and *Xiphidorus uruguayensis* Coomans, Chaves & De Leon, 1976). The anterior end of some of the paratypes is shown in Figure 4.



Figure 1. Distribution map of the lots in the provinces of Argentina, including the Antarctic Peninsula. The percentages represent the number of lots from each province.

There are four species of free-living nematodes from the Antarctic Peninsula: *Coomansus gerlachei* (de Man, 1904) (predator) collected around roots of *Deschampsia antarctica* Desvaux, at Caleta Cierva, Base Primavera (64° 10' S, 60° 57' W) and Punta Proa, Bahía Paraíso, Costa Danco, Base Brown (64° 53' 43" S, 62° 52' 15" W), collected by M. Leonardi in January 1987, and three species of omnivore nematodes: *Amblydorylaimus*

*isokaryon* (Loof, 1975), *Mesodorylaimus imperator* Loof, 1975 and *Mesodorylaimus signatus* Loof, 1975 collected by E. Mondino in February 2000 around roots of *Sanionia uncinata* (Hedw.) Loeske and *Deschampsia antarctica* Desvaux at Bahía Paraíso, Costa Danco, Base Brown (64° 53' 43" S, 62° 52' 15" W).

Five feeding habits are represented in the soil nematodes stored in the MLP-He collection, being bacterivores and herbivores the most abundant (Figure 5).

### Data set

*Data set name:* Nematodes de suelo de la Colección de Helmintos (MLP-He) - División Zoología Invertebrados.

*Character encoding:* UTF\_8.

*Format name:* csv, comma-separated values.

*Hosted by:* Museo de La Plata, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, Argentina.

*Published by:* the data set is available in Global Biodiversity Information Facility. GBIFUUIID 35a3538d-ecd5-4bc9-859c-349de7e7bf6f.

*Date of publication:* April 17, 2024.

*Metadata last modified:* December 13, 2024.

*Data set language:* English.

*Metadata language:* Spanish.

*License of use:* Creative Commons Attribution Non Commercial (CC-BY-NC 4.0).

*How to cite:* Brusa F, Merlo Alvarez V H (2024). Nematodes de suelo de la Colección de Helmintos (MLP-He) - División Zoología Invertebrados. Version 1.3. Museo de La Plata. Occurrence dataset <https://doi.org/10.15468/uxv5tv> accessed via GBIF.org on 2024-10-04.

*Alternative identifiers:* <https://base.mlp.fcnym.unlp.edu.ar/ipt/resource?r=nematodes>.

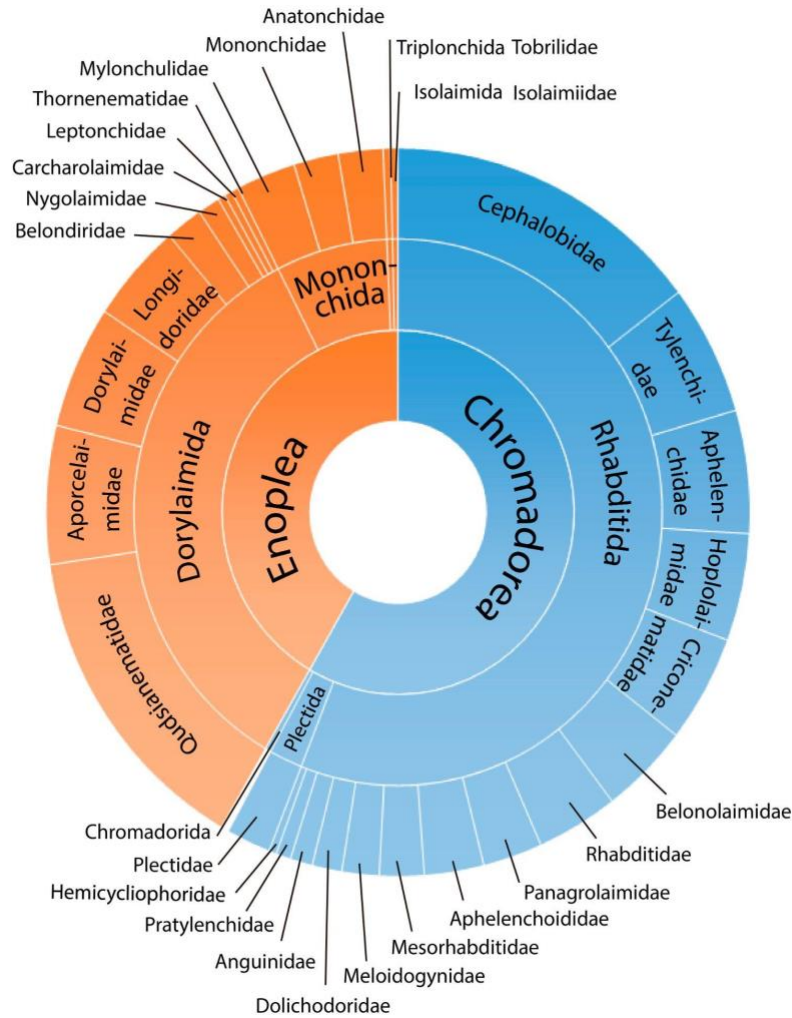


Figure 2. Proportion of soil nematode families represented in the data set stored in the invertebrate collection of Museo de La Plata.

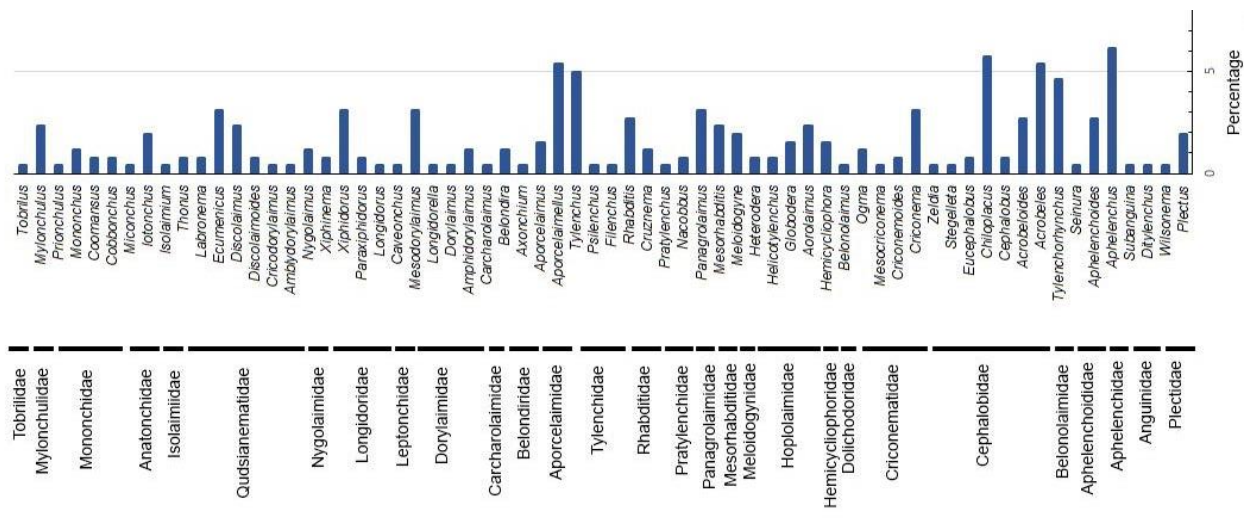


Figure 3. Lots identified at genus level (including those identified at species level) and their family, as a percentage of the total database.

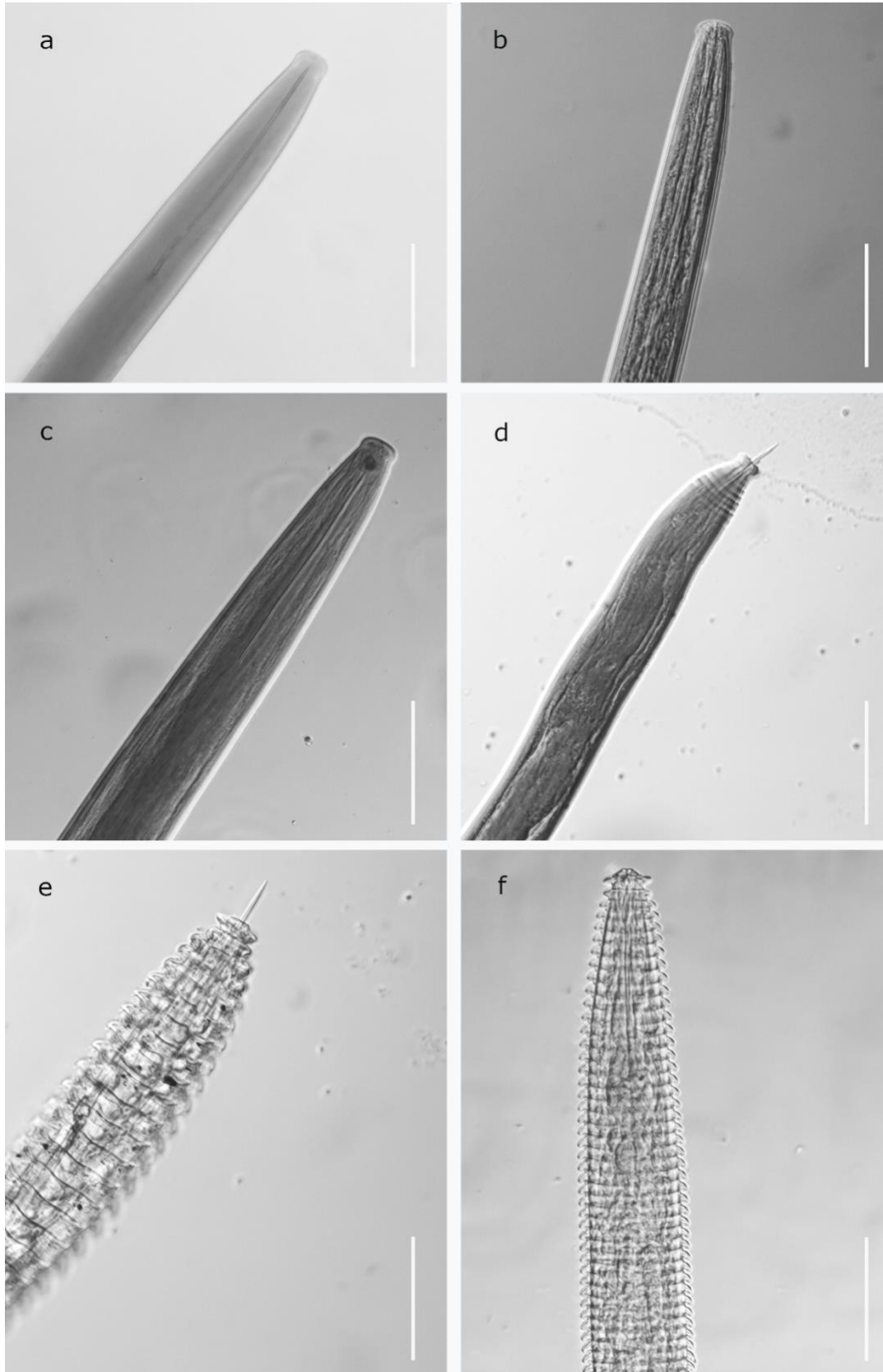


Figure 4. Photograph of the anterior end of the paratypes. a, b: *Xiphidurus balcarceanus* (MLP-He 7776); c, d: *Xiphidurus tucumanensis* (MLP-He 7777); e, f: *Ogma comahuensis* (MLP-He 7781). Scale bars = 500 µm.

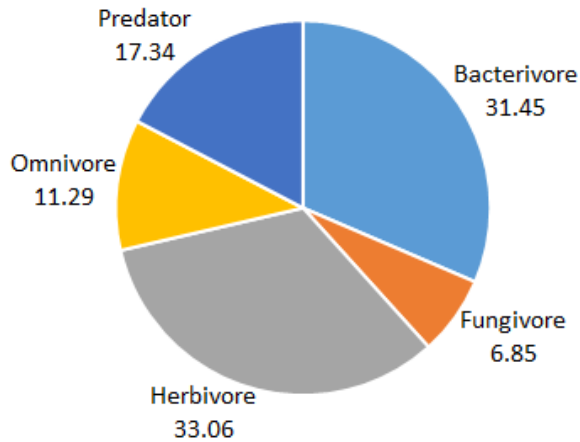


Figure 5. Percentages of representation of the different feed habits of soil nematodes, following the classification of van den Hoogen et al. (2020) and Yeates et al. (1993) (n=248 lots, genera not included in the classification by Yeates et al. (1993) were not considered).

## Management details

*Project title:* Nematodes de suelo de la Colección de Helminthos (MLP-He) - División Zoología Invertebrados.

*Database manager:* Francisco Brusa.

*Temporal coverage (specimens):* Present.

*Temporal coverage (collection formation):* 1975-2022.

*Record basis:* The dataset was created from soil nematodes collected and studied by Dr. Eliseo Chaves who donated them to the Museo de La Plata.

*Sampling methods:* manual.

*Collection name:* Colección Helminológica from Museo de La Plata.

*Collection identifier:* MLP-He.

*Curatorial unit:* lots.

*Specimen preservation method:* whole animals (Canada Balsam).

*Funding grants:* without specific funding to carry out this task.

## Geographic coverage

*General description:* The database contains records from the Neotropical Region, mainly from Argentina and Uruguay, but also from Brazil and Bolivia. There are also records from the Antarctic Peninsula, USA, and Iran.

*Geographic units:* Argentina with many records in the provinces of Jujuy and Buenos Aires. There are also records from Chubut, Córdoba, Entre Ríos, Mendoza, Misiones, Neuquén, Río Negro, San Luis, Santa Cruz, Santa Fe and Tucumán. These records cover all the biogeographic provinces of Argentina.

The records from Uruguay are from the departments of Maldonado and Rocha, and those from Antarctica are from the Base Primavera and Base Brown. There are also records of nematodes from Brazil, Bolivia, USA, and Iran, with only one record for each of these countries.

*Bounding box:* global.

*Sampling design:* The nematodes were collected by Eliseo Chaves from soil samples collected from the mentioned localities. The specimens collected were separated from the soil using the centrifugation and modified flotation method (Caveness & Jensen 1955, Salas et al. 2021), then mounted in Canada balsam and observed under an optical microscope for identification.

*Habitat type:* nematodes are free-living in the soil and associated with roots of cultivated plants such as potatoes, tomatoes, apples, and pears. Some species are parasites of plants.

*Countries:* Argentina (including Antarctica), Uruguay, Brazil, Bolivia, USA and Iran.

*Quality control for geographic data:* The georeferenced records and the published localities in the original publication were checked to match the geographical units used at the level of administrative regions.

## Taxonomic coverage

*General description:* This dataset focused on soil nematodes followed the classification scheme of

Manzanilla-López & Hunt (2012) and Holovachov & Esquivel (2012). According to this scheme, the dataset includes seven orders and 27 families. The most abundant order is Rhabditida (169 lots) followed by Dorylaimida (97 lots).

*Taxon specialists:* Eliseo Chaves.

*Quality control for taxonomic data:* The identification was performed by E. Chaves following Chaves et al. (2019).

*Additional information:* The specimens are referred in published bibliography (Azpilicueta & Chaves 2013, Brugni & Chaves 1994, Chaves 1990, Chaves & Coomans 1984, Chaves & Torres 2000, Chaves & Torres 2001, Coomans & Chaves 1995, Coomans et al. 1996, Mondino et al. 2006).

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## AUTHOR CONTRIBUTIONS

Brusa, F. participated in cataloging specimens, formatting and including the dataset in GBIF, obtaining and editing photographs of the paratypes, analyzing the data, and writing the paper. Merlo Álvarez, V. H., participated in cataloging specimens and editing photographs of the paratypes. Chaves, E., participated in the collection and identification of specimens and in writing parts of the paper. Damborenea, C. participated in drafting parts of the paper, analyzing the data, and writing the paper.

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