

PHYLUM PROFILE

Nematoda PHYLUM

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The key factors that make this phylum different than other animals:

Nematodes, or roundworms, are cylindrical, smooth, and unsegmented. Most free-living bodies are less than a millimeter in length and have a fluid-filled cavity called a pseudocoelom (Starr et al., 2016). The epidermis, or skin, is not composed of cells like other animals, but instead is a mass of cellular material and nuclei without separate membranes. Long muscles lie just underneath the epidermis. These muscles are all aligned longitudinally along the inside of the body, so the nematode can only bend its body from side to side, not crawl or lift itself. The muscles are activated by two nerves that run the length of the nematode on both the dorsal (back) and ventral (belly) side. The head of a nematode has a few tiny sense organs, and a mouth opening into a muscular pharynx (throat) where food is pulled in and crushed. This leads into a long simple gut cavity lacking any muscles, and then to an anus near the tip of the body. Food digested in the gut is not distributed by any specialized vascular system, and neither is there a respiratory system for the uptake or distribution of oxygen. Rather, nutrients and waste are distributed in the body cavity, whose contents are regulated by an excretory canal along each side of the body. One species of parasitic nematode can reach 13 meters in length -- it parasitizes the sperm whale (Berkeley, n.d.).

The economic impacts, good or bad, of the organisms in this phylum:

Most of the nematodes in the garden are beneficial to soil and plants, so they save money that might be spent on insecticides. They feed on the organisms that can harm crops, such as bacteria, fungi, and other microscopic organisms. Some gardeners may even use nematodes to

help control the population of insects that are parasitic to plants. Nematodes can help gardeners defend against beetles, caterpillars, cutworms, crown borers, corn rootworms, crane flies, fungus gnats, grubs, and thrips. They will not have an effect on beneficial organisms such as earthworms, plants, animals, or humans, so they are a natural way to defend against pests that's good for the environment. (Gardening Channel, n.d.). But a great many are pests of animals and plants, and others are the cause of serious illness in humans and are therefore very costly.

The ecosystem benefits, good or bad (ways that they benefit or harm the environment and other organisms) that organisms in this phylum provide:

Nematodes live not only in almost every geographic location on Earth, including extreme habitats such as ice and hot springs, as well as living on or in almost every other kind of animal and plant alive today. Free-living nematodes are extremely abundant in soils and sediments, where they feed on bacteria and detritus. Other nematodes are plant parasites and may cause disease in economically important crops. Still others parasitize animals (including humans). Well-known parasitic nematodes include hookworms, pinworms, Guinea worm (genus *Dracunculus*), and intestinal roundworms (genus *Ascaris*) (Berkeley, n.d.).

List specific examples to show the variety of the orders and species in this phylum.

There are more than 15,000 known species, with as many as half a million more unknown species (Berkeley, n.d.). Most are free-living decomposers (Starr, 2016). Species include roundworms, pinworms, heartworms, hookworms, enoplea, soybean cyst nematode, *placentonema gigantissima*, *haemonchus contortus*, *heterorhabditis bacteriophora*, *bursaphelenchus xylophilus*, Guinea worms, intestinal roundworms, and thousands more.

Photo/image examples:



Eophasma jurasicum, a fossilized nematode



Colorized electron micrograph of soybean cyst nematode (*Heterodera* sp.) and egg



Caenorhabditis elegans



Rhabditia



Nippostrongylus brasiliensis



Unidentified *Anisakidae* (Ascaridina: Ascaridoidea)

Pictures from Wikipedia (<https://en.wikipedia.org/wiki/Nematode>)

References List:

Berkeley (n.d.). *Introduction to the Nematoda*. Retrieved April 25, 2021 from

<https://ucmp.berkeley.edu/phyla/ecdysozoa/nematoda.html>

Gardening Channel (n.d.). *Nematodes: Good or Bad in the Garden?* Retrieved April 25, 2016

from <https://www.gardeningchannel.com/nematodes-gardening-explanation/>

Starr, C., Evers, C. A., & Starr, L. (2016). *Biology: Today and Tomorrow with Physiology* (6th ed.). Australia: Cengage Learning.