

Enchytraeids¹

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INTRODUCTION: A large number of soil and root samples submitted from Florida nurseries yield small to very large populations of small white worms 5-15 mm long (Fig. 1) usually associated with the roots of diseased plants. Almost all of the worms identified are in the family Enchytraeidae which contains in excess of 600 species. Only the genus *Enchytraeus* Henle, 1837 has been detected in Florida samples. Herein the worms will be referred to as "Enchytraeids." The questions asked most often when enchytraeids are sent in are "Are these worms damaging plants? If so, how can I control them?"

CLASSIFICATION: The worms are placed in the kingdom: Animalia; Phylum: Annelida; Class: Chaetopoda; Order: Oligochaeta; Family: Enchytraeidae (Dash 1990).

GEOGRAPHIC DISTRIBUTION: Enchytraeids prefer north temperate zones, but have a worldwide distribution. They reach new adjacent areas by self migration. They are transported long distances carried by man, in infested soil, and plants in commerce (Stephenson 1930).

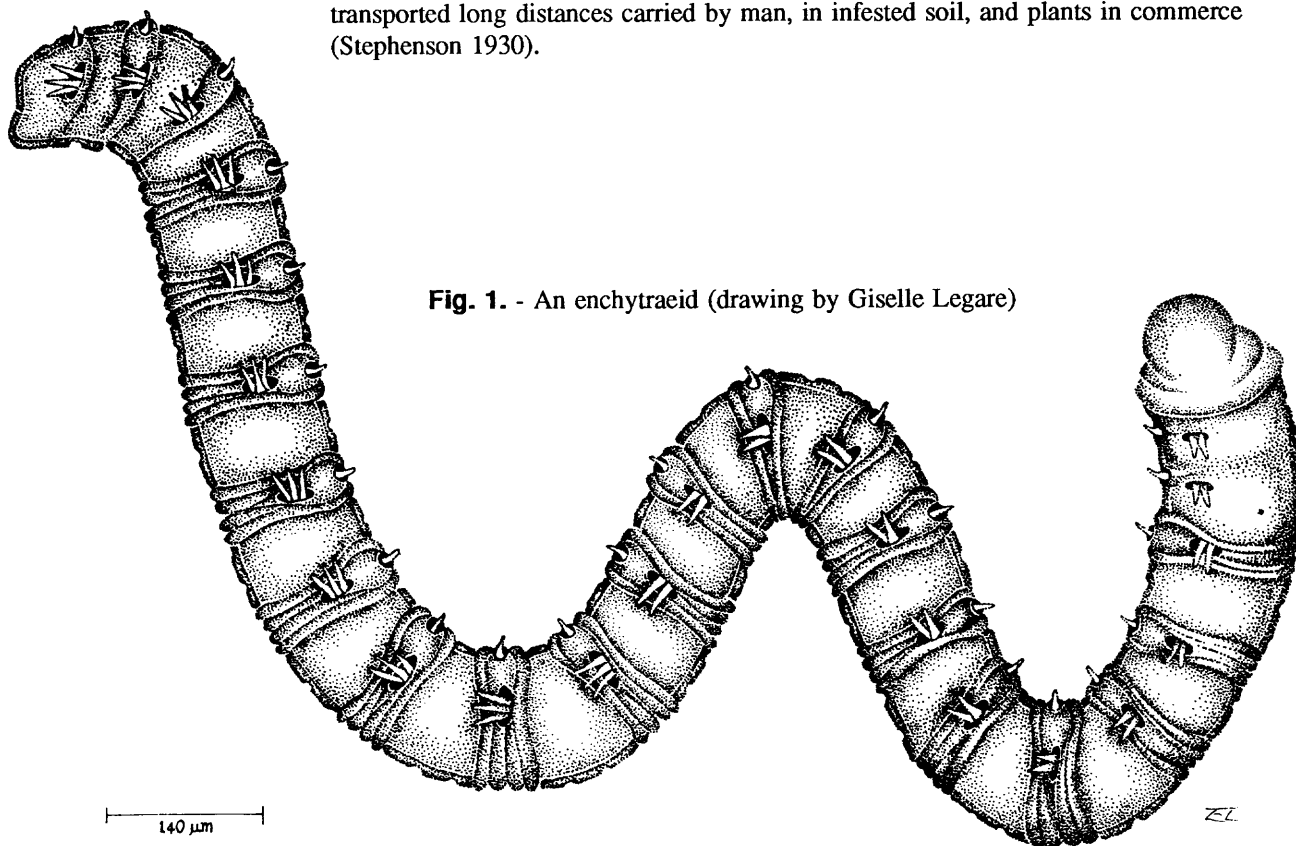


Fig. 1. - An enchytraeid (drawing by Giselle Legare)

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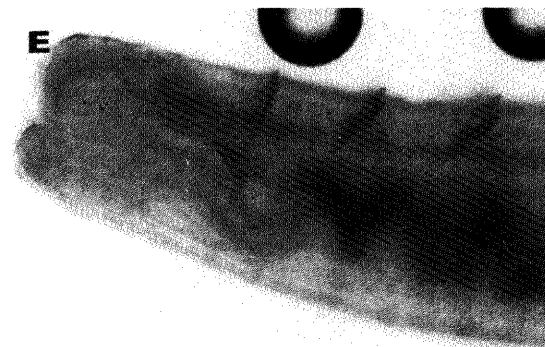
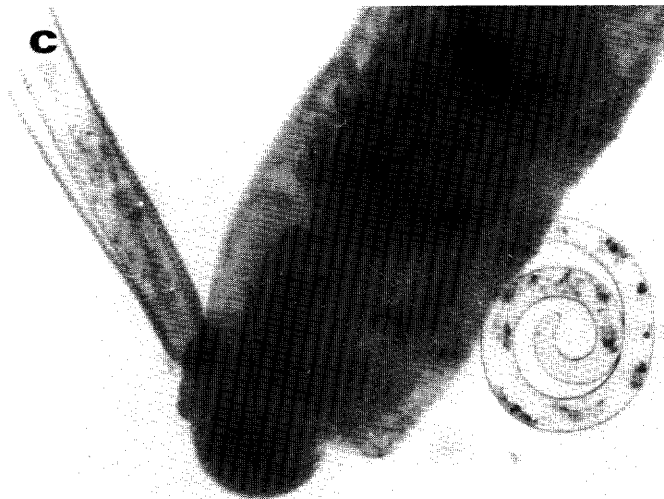
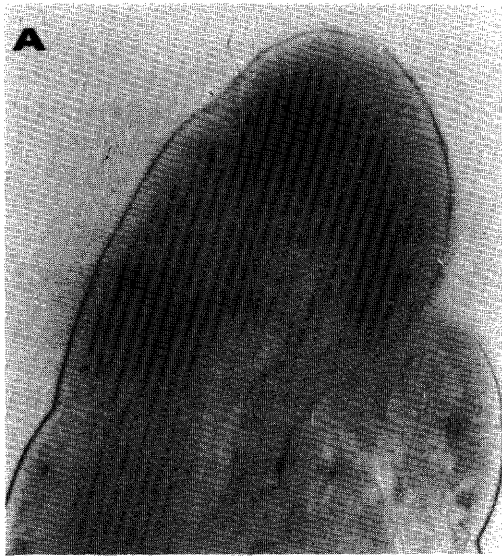


Fig. 2. Enchytraeids: A. An enchytraeid prostomium (head). B. Very young enchytraeid with nematodes. C. Anterior body of enchytraeid next to sheath nematode *Hemicycliophora* sp.(above), and spiral nematode *Helicotylenchus* sp. D. Enchytraeid in egg. E. Enchytraeid posterior. F. *Radiophyra* sp., a protozoan that inhabits enchytraeids, emerging from an enchytraeid. G. A dying enchytraeid.

CHARACTERIZATION: Except for their small size, enchytraeids resemble the large common earthworm used for fishing. The worms are coelomate, segmented, usually white with, in most cases, 4 bundles of setae per segment (Dash 1990). A mouth (head pore) is located on the ventral surface just posterior to the prostomium (head), (Fig. 2-A). A mouth cavity is followed by a pharynx, esophagus, intestine, periproct, and anus. A clitellum, when present, covers 2-4 segments (Dash 1990; Stephenson 1930). Excretion is accomplished by nephridia in each segment. Respiration occurs via the body wall. Reproduction may be sexual, hermaphroditic, asexual by fragmentation, or by parthogenesis. Six to 48 eggs (Fig. 2-D) are laid singly in the soil (Dash 1990; Kuhnelt 1961). Movement is serpentine or peristaltic. When death approaches, the body constricts at segments resembling a string of beads (Fig. 2-G) (Stephenson 1930). The size of enchytraeids compared to nematodes is shown (Fig. 2-B,C).

HABITAT: Enchytraeids prefer acid soil rich in organic matter (Dash 1990). They are most abundant in the top 10-cm soil layer in the root tangle area. They are usually absent from thick, loamy or poorly aerated wet soils (Kuhnelt 1961). Enchytraeids must have water to survive, and have problems withstanding drought conditions (Stephenson 1930). They have been found in crab gills, urine, saliva, caves, and in sewers where they have inhibited the sewage process by their numbers (Stephenson 1930).

POPULATION DYNAMICS: In some areas in Alaska, enchytraeids comprised 36-92% of the total microfaunal mass (Dash 1990). The number of enchytraeids per square meter varies from 5,000 in a garden, 8,000 in a fir forest, and 80,000 in a meadow (Stephenson 1930).

HABIT: Enchytraeids have a feeble sense of smell, are negatively galvanotactic, sensitive to vibrations, and light negative (Sims and Gerard 1985; Stephenson 1930). Enchytraeids have not responded to sound from the piano, bassoon, whistle, or shouts (Stephenson 1930).

LIFE CYCLE: A total life cycle time takes from 68-261 days at a temperature of 1.5-25.5° C (Dash 1990).

NUTRITION: Principal food source for enchytraeids is dead plant residues. Large quantities of fungal mycelium produced by fungi such as *Cladosporium*, *Calluna*, *Penicillium*, *Rhizopus*, and *Trichoderma* are also ingested. Algae, bacteria, silica, locust ova, and nematodes are also consumed. In pot tests, adding enchytraeids to soil has cured nematode-infected plants (Kuhnelt 1961). Enchytraeids are not known to feed on living higher plant tissue. They have been associated with many diseased plant roots in our work place; however, it is almost always severely rotted roots with a severe bacterial infection (Dash 1990; Stephenson 1930).

TEMPERATURE: Enchytraeids tolerate a maximum high temperature of 36° C. They survive in ice and have been found in snow at 5,200 feet above sea level.

NATURAL ENEMIES: Enchytraeids have been attacked by maggots, nematodes, and rotifers (Stephenson 1930). A protozoan, *Radiophyra* sp., has emerged from a number of Florida enchytraeids (Fig. 2-F).

BENEFICIAL ASPECTS: Soil modification and breakdown has been attributed to these worms. It has been reported (Mavor 1962) that enchytraeids are often used to feed small animals in aquaria and terraria. To summarize, enchytraeids are ubiquitous small white worms found in numerous soil and root samples. Enchytraeids are not known to damage higher plants. A control for these worms would not be warranted.

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