

# EARTHWORMS



Weed and worms in an alkaline plot.

**EARTHWORMS:**  
Beneficials or pests?  
Part one of a report by  
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**E**ARTHWORMS are found in a wide range of habitats throughout the world, having adapted to many different soil types as well as to lakes and streams. Earthworms - often called nightcrawlers, garden worms, red worms or, simply, worms - are a valuable resource to many people.

They provide bait for fishing, a source of protein for food, and most importantly, they

play a unique and important role in conditioning the soil.

With the advent of chemical pest control, however, earthworms have become non-target recipients of many pesticides.

Some of the most effective pesticides are broad spectrum

in action, and they may inadvertently harm earthworms and other beneficial soil organisms.

Earthworms belong to the phylum Annelida and the class Oligochaeta, which consists of over 7,000 species. Their bodies are long and tube-like, tapering at both ends and ranging in length from one to six inches.

Another characteristic of the phylum Annelida is a segmented body, including an enlargement of several segments to produce the clitellum, a glandular organ used for reproduction.

Earthworms are hermaphroditic and homosexual, and thus they may function as either a male or a female during reproduction. Self-fertilization does not occur.

Although one acre of soil may hold up to eight million earthworms, most people pay little attention to these productive and beneficial animals.

They mostly go unnoticed from day to day, unless a heavy rain forces them to the surface of the soil, an angler needs some bait, or their casts disrupt a game of golf.

#### Builders of Soil

Earthworms benefit the soil in many ways primarily due to the physical and chemical effects of their casts and burrows. Earthworm casts, consisting of waste excreted after feeding, are composed mostly of soil mixed with digested plant residues.

Casts modify soil structure by breaking larger soil particles into finer granules. As plant materials and soil passes through an earthworm's digestive system, its gizzard

breaks down the particles into smaller fragments.

These fragments, once excreted, are further decomposed by other worms and microorganisms. Earthworm casts can contribute up to 50 per cent of the soil aggregates in some soils.

Cast production is most abundant in spring and autumn when earthworms inhabit surface layers of the soil. During this time, 20 casts per square foot of soil surface are not uncommon, and as much as 40 pounds of casts per 1000 square feet per year have been recorded.

Under conditions of extreme temperatures or moisture stress during summer and winter, earthworms migrate downward into subsoil horizons.

#### Soil Fertility Enhanced

Earthworms are also important to the nutrient availability of the soil. As they feed, they deposit digested organic matter and minerals along their burrows in the form of casts, a rich source of nutrients placed in close proximity to the plant's roots growing through the burrows.

Comparative analyses of casts and surrounding soil have shown that casts contain five times more nitrogen, seven times more phosphorus, 11 times more potassium, three times more exchangeable magnesium, and one-and-one-half times more calcium.

In soils populated by earthworms, accelerated decomposition of organic matter and an increase in available nitrogen results in greater numbers of nitrogen-fixing bacteria.

Phosphorus availability also increase, due to earthworms' ingestion of phosphate rock particles and the consequent movement down burrows of phosphorus-containing casts.

Furthermore, an abundance of earthworms means an abundance of decomposed organic matter - decomposition is limited only by the amount of material available, not by earthworms' capacity to ingest plant material.

Read July's issue for Part 2.

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