

Earthworms and Roses

By Robert B. Martin, Jr.

(ED: This article was originally published in 2002. The author has recently updated the material.)

There are over 3,000 species of earthworms in the world, all of which have the familiar earthworm appearance. Their bodies have many similar looking segments with a glandular organ, called the clitellum, near the middle. The most important to rosarians is the night crawler, *Lumbricus terrestris*, one of the largest of the earthworms.

The night crawler is common throughout the Southwest, and appears in almost any moist soil that is loose enough to burrow through and that has sufficient organic matter on which to feed. The worms seek levels in the soil that best suit their needs. As soil dries out they move deeper, but when the soil becomes water-logged, earthworms emerge from the soil to escape drowning. Because of their preference for loose moist soil, as well as their dislike of heat, earthworms are much less prevalent in the Arizona desert. But with an understanding of their nature, they can be encouraged to populate our gardens.

Earthworms follow a well-defined yearly cycle. The cycle starts in the fall. At that time, most of the earthworms are young. With the advent of wet, cool weather, they become extremely active physically. During damp, cool nights, and occasionally on wet cloudy days too, they come out of their burrows to seek new areas to inhabit. Within a few hours of a night, they may migrate a considerable number of feet. With dawn, they disappear into the ground but the tracks they leave in the soft ground are evidence of their nocturnal meanderings.

This high level of physical activity normally continues throughout the fall, winter and spring. During this period, the young earthworms mature and more eggs are laid. The heat of the summer slows down their activity considerably and large numbers die. This process can be slowed by using compost and mulch to keep the soil cool.

Earthworms thrive best on organic debris that contain a high percentage of nitrogen. This growth is encouraged through the addition of organics and mulch. Water is also a major necessity of earthworms as they contain about 80% water by weight and lose about 15% per day. If moisture is not available they will dig deep into the soil to find it.

Earthworms are capable of burrowing with considerable speed, especially in loose soil. Consequently earthworms are one of the most effective agents for loosening and aerating the soil. This is of particular importance in Southwest soils that have a high clay content. The intake of water by soil is dependent for the most part on the presence of extraneous channels. Earthworms are highly effective in making such channels. Earthworms form an interconnected web of channels that allow water to penetrate quickly throughout the soil.

Earthworms and Roses (con't)

Earthworm burrows also make passageways for the rose roots to grow. The worms perforate the topsoil especially and gradually penetrate the subsoil, opening it for root growth. Research has shown that earthworms introduced into uniformly packed soil completely altered the uniformity of the packed soil cores and significant preferential movement of nitrates occurred in these columns.

Also important is the granulation of the soil which earthworms bring about. This is accomplished by their production of castings from the soil and organic debris that they eat. As the soil becomes granulated with castings, it gets looser and looser.

Earthworms affect the ability of soil to supply nutrients by taking organic debris from the surface and incorporating it into the topsoil. They digest the debris and excrete in their castings the nutrients they do not need. These castings are deposited in their channels throughout the topsoil and some even in the subsoil. So distributed through the root zone, the castings constitute a source of nutrients for roses. The richness of the castings depends on the kind of organic debris and mineral soil that the earthworms have for food.

Earthworm castings are clearly visible in any soil inhabited by earthworms. During damp seasons of the year, cast production is especially prolific. At that time, castings are even deposited on the surface of the ground. However, there are always many more castings underground than there are on top.

A worm casting is a biologically active mound containing thousands of bacteria, enzymes, and remnants of plant materials and animal manures that were not digested by the earthworm. An important component of this dark mass is humus. Humus is a complicated material formed during the breakdown of organic matter. One of its components, humic acid, provides many binding sites for plant nutrients, such as calcium, iron, potassium, sulfur and phosphorus.

It has been demonstrated that earthworm castings contain about five times the nitrate, seven times the available phosphorous, three times the exchangeable magnesium, eleven times the potassium and 1.5 times the calcium as regular soil. . Research has also shown that microbial activity in worm castings is 10 to 20 times higher than in the soil and organic matter that the worm ingests.

Another effect is that the casts are always more neutral (closer to pH 7) than the surrounding soil. This helps neutralize the acids or alkali that may be present in the soil thereby optimizing the pH for the root development of the plant.

Because of their benefits, both earthworms and their castings are available for purchase commercially. However there is little reason to do so. A soil that is hospitable to earthworms will attract them naturally and the purchase of castings is an expensive way to get what earthworms provide for free. A better expenditure of money would be in the purchase and application of organic mulching materials to create a hospitable environment for these useful creatures. If you feed them they will come.