

3D model set by Ken Gilliland

Worms & Grubs

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Worms & Grubs

Introduction

While earthworms and grubs may seem somewhat similar in appearance, they come from two completely different biological families. Earthworms are soil-dwelling terrestrial invertebrates that belongs to the phylum Annelida and are not considered insects. Grubs, on the other hand, are classified as insects because they are the larval stage of beetles from the superfamily *Scarabaeoidea* or moths from superfamily *Zygaenoidea*. Both earthworms and grubs live underground and can play important roles in the ecosystem by recycling organic material. Grubs, although, can also be considered agricultural pests.

The worms chosen for this set come from the *Lumbricidae* are a family of earthworms. About 33 lumbricid species have become naturalized around the world. This set includes some of the most commonly found earthworms in the world as well as the unique “Giant Earthworm” from the Black Forest. Grubs included are the White Grub (Beetle Larva) and the iconic Witchetty Grub (Moth Larva) of Australia.

This set comes in both Poser and DAZ Studio native versions and support Firefly, Superfly and Iray render engines.

Overview and Use

This set uses a common model to digitally recreate digitally the worm and grub species included in this volume. Each species uses specific morphs from the generic model to single-out its unique features.

- **Models included in this volume:**
 - Nature's Wonders Earthworm Model
 - Nature's Wonders Grub Model

The set is located within the **Animals : Nature's Wonder** folder. Here is where you will find a number of folders, such as **Manuals**, **Resources** and **Fauna Libraries**. Let's look at what is contained in these folders:

- **Fauna Libraries:** This folder holds the actual species and poses for the "premade" fauna. The fauna for this set can be found in the following folder(s):
 - **Annelids / Earthworms of the World**
 - **Insects / Grubs of the World**
- **Manuals:** Contains a link to the online manual for the set.
- **Props:** Contains any props that might be included in the set
- **Resources:** Items in this folder are for creating and customizing your fauna included in the set

Creating a Specific Worm using Poser

1. For this example, we'll create an earthworm.
2. Load Poser, select the FIGURES library and go to the "Animals", "Nature's Wonders" and then the Nature's Wonders Fauna Libraries Annelids folder.
3. Go to the Earthworms of the World folder and select the Firefly or Superfly sub-folder.
4. Select an earthworm and load it by clicking the mouse.

Creating a Specific Worm using DAZ Studio

1. For this example, we'll create an earthworm.
2. Load DAZ Studio and go to the "Animals", "Nature's Wonders" and then the Nature's Wonders Fauna Libraries Annelids folder.
3. Go to the Earthworms of the World folder and select the Iray sub-folder.
4. Select an earthworm and load it by clicking the mouse.

Using the Poses

The poses were designed for the default model. On the worm model, the "hip" section (main parent part) is **Worm** (hip). On the grub model, the "hip section (main parent part) is called **Abdomen**. The poses were designed for the default base model. Since individual species may use different scaling, it may alter the expected ground level of the species model. Some adjusting may be necessary such as using the "ytran" dial to raise or lower the model.

On the **Robin/Worm Pull matched pose set**, the primary characters the pose was designed for was the American Robin (not included; from the original Songbird ReMix set) and the Common Earthworm. Because of sizing (scaling), other birds and species of Earthworm will require some adjust (xyz translation) on the Worm(hip) part of the Earthworm. The bird pose uses a standard songbird bird pose meaning any bird from the Passerine (Perching Birds) section of the bird library will work with some adjustments.

Nature's Wonders

Worms & Grubs

FIELD GUIDE

Annelids

Common Earthworm
Red headed Earthworm
Chestnut Earthworm
Quebec Earthworm
Giant Earthwood

Insects/Grubs

White Grub
Witchetty Grub

About Earthworms

They have multiple hearts: An earthworm has five pairs of aortic arches, often called hearts, that pump blood through its segmented body.

They breathe through their skin: Earthworms lack lungs and absorb oxygen through their moist skin, which is why they need damp soil to survive.

They are light-sensitive: While they have no eyes, they have light-sensitive cells and will burrow deeper to avoid bright light, as it can be harmful.

They are soil engineers: As they burrow and eat, they mix soil layers, aerate the ground, and their castings (poop) are rich in nutrients, improving soil structure and fertility.

They can regenerate body parts: If a worm's tail is cut off, the head section can regrow a new tail, though it won't become two separate worms.

Earthworms are generally good for gardens and agriculture, acting as "ecosystem engineers" by aerating soil, improving drainage, and enriching it with nutrient-rich castings from decomposing organic matter, boosting plant health. However, in some North American forest ecosystems, introduced earthworm species can be destructive, as they consume the vital leaf litter (duff), harming native plants and altering soil structure, making them invasive pests in those specific contexts.

Slang names for earthworms include "dew-worm", "rainworm", "nightcrawler", and "angleworm"

About Grubs

Grubs are the larvae of beetles. They are between 3/4" and 1 1/2" in length, white to grayish with brown heads, and commonly curl into a "C" shape when disturbed.

Grubs are often considered pests because they feed on lawn roots. The peak feeding period occurs in late summer and early fall. This can lead to dead and brown patches in lawns. Also, because they are a valued food source for skunks, raccoons and birds, lawns and garden areas can be furthered damaged by the animal activity looking for them.

Common Earthworm

Lumbricus terrestris

It is a large, reddish worm species thought to be native to Western Europe, now widely distributed around the world. In some areas where it is an introduced species, some people consider it to be a significant pest for out-competing native worms. It is also called the 'Canadian Nightcrawler' or 'Dew Worm'.

It is relatively large, pinkish to reddish-brown in color, generally 110–200 mm (4.3–7.9 in) in length and about 7–10 mm (0.28–0.39 in) in diameter. It has around 120–170 segments. The body is cylindrical in the cross section, except for the broad, flattened posterior section. The head end is dark brown to reddish brown laterally while the dorsal pigmentation fades towards the back.



Redheaded Earthworm

Lumbricus rubellus

It is usually reddish brown or reddish violet, iridescent dorsally, and pale yellow ventrally. They are usually about 25 mm (0.98 in) to 105 mm (4.1 in) in length, with around 95–120 segments. Their native distribution was mainland Europe and the British Isles, but they have currently spread worldwide in suitable habitats.



Chestnut Earthworm

Lumbricus castaneus

It varies from chestnut to violet brown to brown or yellow ventrally, and has an orangish clitellum. They are usually about 30–70 mm long, and have around 82–100 segments. It is found in Europe (including the British Isles) and has been introduced to North America (Canada), South Africa, Australia, and New Zealand.



Quebec Earthworm

Lumbricus festivus

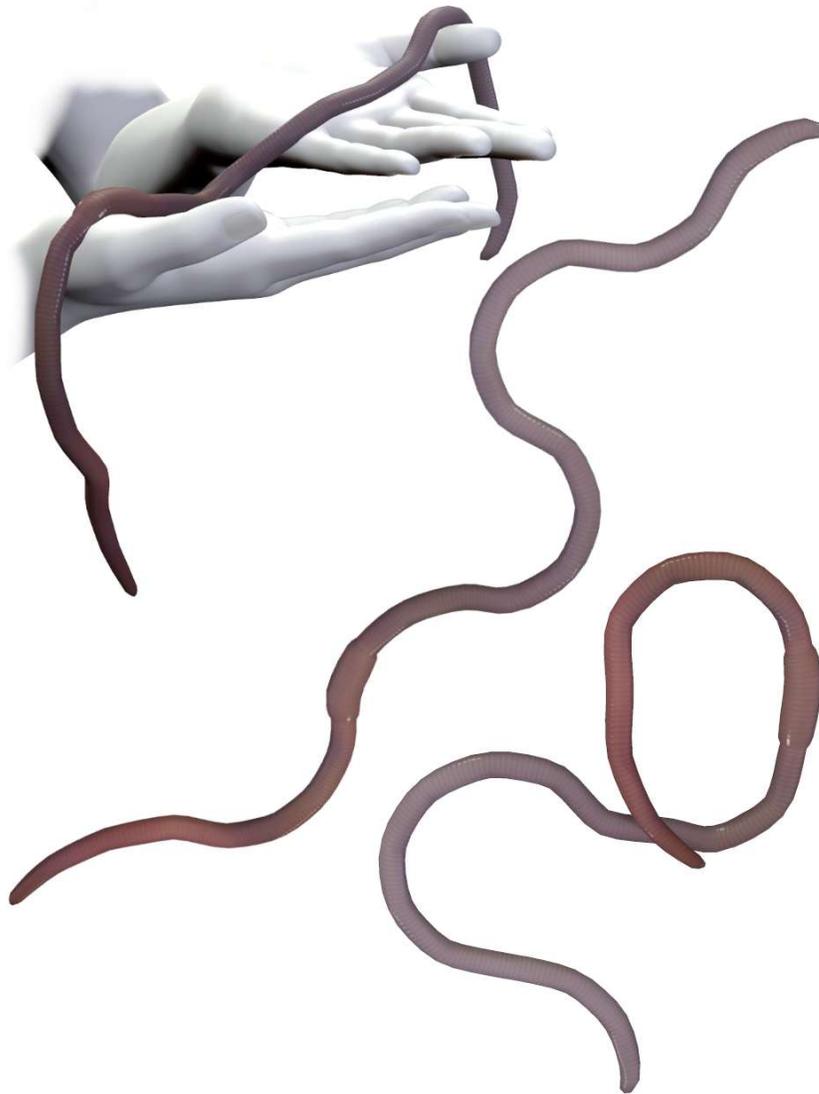
It is not found in large numbers. It is red-brown, lighter ventrally, iridescent dorsally. The body length varies from 48 to 108 mm, with about 100–143 segments. It is restricted primarily to Ireland, the Pyrenees, and the Alps, though it is found in Canada. It is also known sometimes as the 'Ruddy Worm'.



Giant Earthworm

Lumbricus badensis

Its range is restricted to the upper-elevation spruce forests of the Black Forest of southwestern Germany. Up to 60 cm in length, this earthworm is one of the largest European species. It weighs between 25 and 35 g and lives in subterranean tubes which are up to 2.5 m deep. It feeds on organic matter it ingests from the surface and aerates the soil as it moves through it, contributing to the formation of humus. It is prey for foxes and owls. An informational trail about this giant earthworm, the Riesenregenwurm-Erlebnispfad, has been established on Belchen mountain.



White Grub

Scarabaeidae family

White grubs represent a complex of beetle larvae in the family Scarabaeidae that are common pests of agricultural and horticultural crops. Often called scarab beetles, the family consists of over 30,000 species world-wide. The larvae, or grubs, of several species are common pests of turfgrass. These species include the Japanese beetle, masked chafers, European chafer, Asiatic garden beetle, Oriental beetle, June beetle, May/June beetles (several species), and black turfgrass ataenius. White grubs damage a variety of warm- and cool-season grasses while feeding in the soil matrix on organic matter, thatch and plant roots. The distribution of these species overlaps significantly and it is not uncommon to find mixed populations of two or more species at a single location.



Proper identification and basic understanding of the varying life cycles of different white grub species can help turfgrass managers monitor, plan for and manage infestations. White grubs are white, C-shaped insects with a chestnut-colored head and 3 pairs of legs that are clearly visible. Size may vary considerably depending on the species and age, but older larvae will generally range from 0.64-3.8 cm (0.25-1.5 inches) in length. White grubs can be identified to genus or species based on the conformation of the raster pattern. The raster pattern is composed of a series of short hairs and spines on the underside of the tip of the abdomen. The life cycles of these insects can be grouped broadly into three categories (annual, semi-annual and multi-annual) based on the amount of time required to complete development.

Witchetty Grub

Endoxyla leucomochla

*The witchetty grub (also spelled witchety grub or witjuti grub) is a term used in Australia for the large, white, wood-eating larvae of several moths. In particular, it applies to the larvae of the cossid moth (*Endoxyla leucomochla*), which feeds on the roots of the witchetty bush (after which the grubs are named) that is widespread throughout the Northern Territory and also typically found in parts of Western Australia and South Australia, although it is also found elsewhere throughout Australia. The grub grows to about 7 cm (2.8 inches) in size.*



*The term can also apply to larvae of other cossid moths, ghost moths (*Hepialidae*), and longhorn beetles (*Cerambycidae*). The term is used mainly when the larvae are being considered as food. The grub is the most important insect food of the desert and has historically been a staple in the diets of Aboriginal Australians.*

*These grubs live in trees. They can also be found in black wattle trees, and are considered to be the reason why wattles die within 10 to 15 years. The roots of the *Acacia kempeana* shrub are another source of the grubs. When held, as a defense mechanism, the grubs will secrete a brown liquid.*

Special Thanks to...

....my betatesters Alisa and FlintHawk

Species Accuracy and Reference Materials

The author-artist has tried to make these species as accurate to their real-life counterparts as possible. Earthworms and Grubs of the same species vary considerably, as do all other animals in nature. They were created using the correct field markings and the most common similarities.

With the use of one generic model to create dozens of unique Earthworm and Grub species, some give and take is bound to occur. In addition, 3D-models have many technical challenges, which make exact representations difficult, if not impossible. It's best to think of these Earthworms and Grubs represented as resembling the particular species, and they may not, in some cases, be 100% scientifically accurate.

The model and morphs were created using Luxology's Modo. The texture maps were created in Corel's Painter. The model was rigged and materials were created in Bondware's Poser and DAZ's DAZ Studio.

Internet Sources:

- **Wikipedia** (<http://www.wikipedia.com>)
- **Missouri Botanical Garden** (<https://www.missouribotanicalgarden.org>)
- **National Wildlife Federation** (<https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates/Earthworms>)
- **Earthworm Society of Britain** (<https://www.earthwormsoc.org.uk/>)
- **Australian Museum** (<https://australian.museum/learn/teachers/learning/bugwise/witchetty-grubs/>)