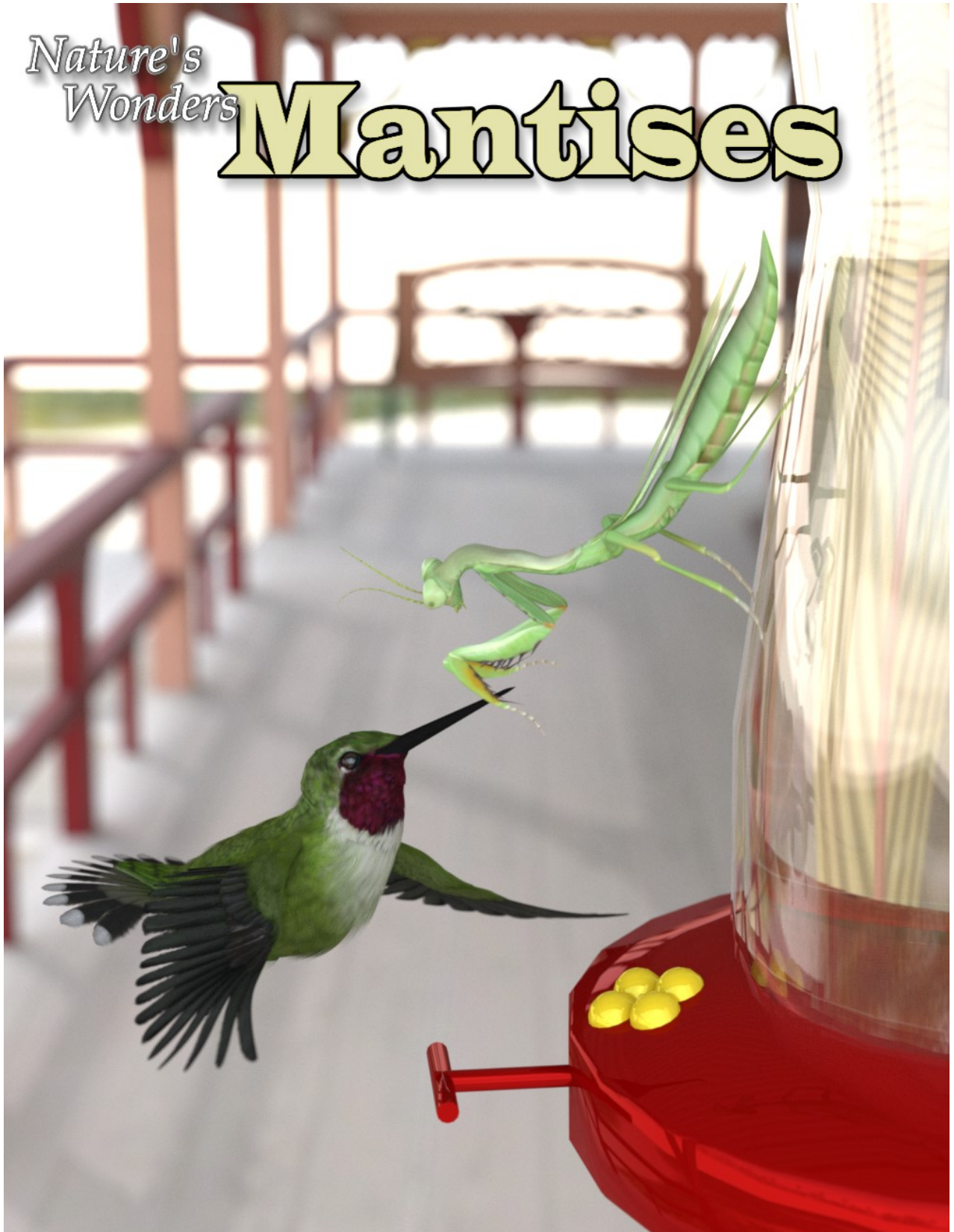


Nature's
Wonders

Mantises



3D model set by Ken Gilliland

Nature's Wonders

Mantises

Manual

Introduction	3
Overview and Use	3
Creating a Mantis	4
Using the Poses	4

Field Guide

About Mantises	5
List of Species	
European Mantis	7
Carolina Mantis	10
Resources, Credits and Thanks	12

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Introduction

Mantises are in the order, *Mantodea*, of insects which contains over 2,400 species in about 460 genera in 33 families. Mantises are distributed worldwide in temperate and tropical habitats. They have triangular heads with bulging eyes supported on flexible necks. Their elongated bodies may or may not have wings, but all Mantises have forelegs that are greatly enlarged and adapted for catching and gripping prey. Their upright posture, while remaining stationary with forearms folded, has led to the common name of “praying” mantis.

Mantises were considered to have supernatural powers by early civilizations, including ancient Greece, ancient Egypt, and Assyria. The female mantis as a “femme fatale” since it is known to kill its mate. Mantises are among the insects most commonly kept as pets.

The Nature’s Wonders Mantises set comes with 2 different species of *Mantidae* (Mantids); the European Mantis of the Eurasia and Africa and the Carolina Mantis of North America. It comes in both Poser and DAZ Studio native versions and support Firefly, 3Delight, Superfly and Iray render engines.

Overview and Use

This set uses a common model to recreate digitally the mantis 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:**
 - **Natures Wonders Mantis Base** - This model is used with all Mantises included in this set. .

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):
 - **Insects/Mantises 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

- ... **Based Models:** This folder has the blank, untextured model(s) used in this set. These models are primarily for users who wish to experiment with poses or customize their own species. When using physical renderers such as Iray and Superfly, SubD should be turned to at least "3". For DAZ Studios 3Delight renders, the SubD must be turned from the "High Resolution" setting to the "Base" setting (otherwise some areas will render incorrectly transparent).

Creating a Specific Mantis using Poser

1. For this example, we'll create the Carolina Mantis.
2. Load Poser, select the FIGURES library and go to the "Animals", "Nature's Wonders" and then the Nature's Wonders Fauna Libraries Insects folder.
3. Go to the Mantises of the World folder and select the Firefly or Superfly sub-folder.
4. Select the Carolina Mantis (or a Mantis of your choice) and load it by clicking the mouse.

Creating a Specific Mantis using DAZ Studio

1. For this example, we'll create the Carolina Mantis.
2. Load DAZ Studio and go to the "Animals", "Nature's Wonders" and then the Nature's Wonders Fauna Libraries Insects folder.
3. Go to the Mantises of the World folder and select the Iray or 3Delight sub-folder.
4. Select the Carolina Mantis (or a Mantis of your choice) and load it by clicking the mouse.

Using the Poses

The poses were designed for the default model. The base or "hip" section of the model is MetaThorax1. Since different individual species may use body scaling, it may alter the expected ground level of the species model. Some adjusting may be necessary (e.g. the "ytran" dial may need to be used to raise or lower the model).

Wings and Torso Bending

There's likely to be some overlap issues with the wings and bending the lower half of the torso. The problem arises from having a bendable torso with a relatively linear appendage such as wings. I've tried to resolve the issue by chopping the wings into 9 or 10 body parts and adding in hidden controls that bend the wings with the torso. It helps, but the more you bend the torso the more likely additional manual corrections will be needed as well.

About Mantises

(from Wikipedia with edits)

The latin name, mantodea, is formed from the Ancient Greek words μάντις (mantis) meaning "prophet", and εἶδος (eidos) meaning "form" or "type". It was coined in 1838 by the German entomologist Hermann Burmeister. The name "mantid" properly refers only to members of the family Mantidae, which was, historically, the only family in the order. The other common name, praying mantis, applied to any species in the order, comes from the typical "prayer-like" posture with folded forelimbs.

Mantises are thought to have evolved from cockroach-like ancestors. The earliest confidently identified mantis fossils date to the Early Cretaceous. Fossils of the group are rare. By 2022, only 37 fossil species have been found. Fossil mantises, including one from Japan with spines on the front legs as in modern mantises, have been found in Cretaceous amber. Most fossils in amber are nymphs; compression fossils (in rock) include adults. Fossil mantises from the Crato Formation in Brazil include the 10 mm (0.39 in) long *Santanmantis axelrodi*, described in 2003. As with today's mantises, the front legs were adapted for catching prey.

They have stereo vision and locate their prey by sight. Their compound eyes contain up to 10,000 ommatidia. A small area at the front called the fovea has greater visual acuity than the rest of the eye, and can produce the high resolution necessary to examine potential prey. The peripheral ommatidia are concerned with perceiving motion. When a moving object is noticed, the head is rapidly rotated to bring the object into the visual field of the fovea. Further motions of the prey are then tracked by movements of the mantis's head so as to keep the image centered on the fovea. The use of stereoscopic vision differs from humans or primates because they specifically utilize this vision for capturing and spotting prey. The eyes are widely spaced and laterally situated, affording a wide binocular field of vision and precise stereoscopic vision at close range. The dark spot on each eye that moves as it rotates its head is a pseudopupil. This occurs because the ommatidia that are viewed "head-on" absorb the incident light, while those to the side reflect it.

As their hunting relies heavily on vision, mantises are primarily diurnal. Many species, however, fly at night, and then may be attracted to artificial lights. They have relatively good night vision. Nocturnal flight is especially important to males in locating less-mobile females by detecting their pheromones. Flying at night exposes mantises to fewer bird predators than diurnal flight would. Many mantises also have an auditory thoracic organ that helps them avoid bats by detecting their echolocation calls and responding evasively.

Mantises are preyed on by vertebrates such as frogs, lizards, and birds, and by invertebrates such as spiders, hornets, and ants. When directly threatened, many mantis species stand tall and spread their forelegs, with their wings fanning out wide. The fanning of the wings makes the mantis seem larger and more threatening, with some species enhancing this effect with bright colors and patterns on their hind wings and inner surfaces of their front legs. If harassment persists, a mantis may strike with its forelegs and attempt to pinch or bite. Generally, mantises protect themselves by camouflage, most species being cryptically colored to resemble foliage or other backgrounds, both to avoid predators and to better snare their prey. Mantises, like stick insects, show rocking behavior in which the insect makes rhythmic, repetitive side-to-side movements. Functions proposed for this behavior include the enhancement of crypsis by means of the resemblance to vegetation moving in the wind.

Sexual cannibalism is common among most predatory species of mantises with about a quarter of male–female encounters result in the male being eaten by the female. Adult males typically outnumber females at first, but their numbers may be fairly equivalent later in the adult stage, possibly because females selectively eat the smaller males.

One of the earliest mantis references is in the ancient Chinese dictionary *Erya*, which gives its attributes in poetry, where it represents courage and fearlessness, and a brief description. Although mantises are rarely mentioned in Ancient Greek sources, a female mantis in threat posture is accurately illustrated on a series of fifth-century BC silver coins, including didrachms, from Metapontum in Lucania. Mantises are a common motif in Luna Polychrome ceramics of pre-Columbian Nicaragua, and are believed to represent a deity or spirit called "Madre Culebra".

In China, two martial art styles have movements and fighting strategies based on those of the mantis.

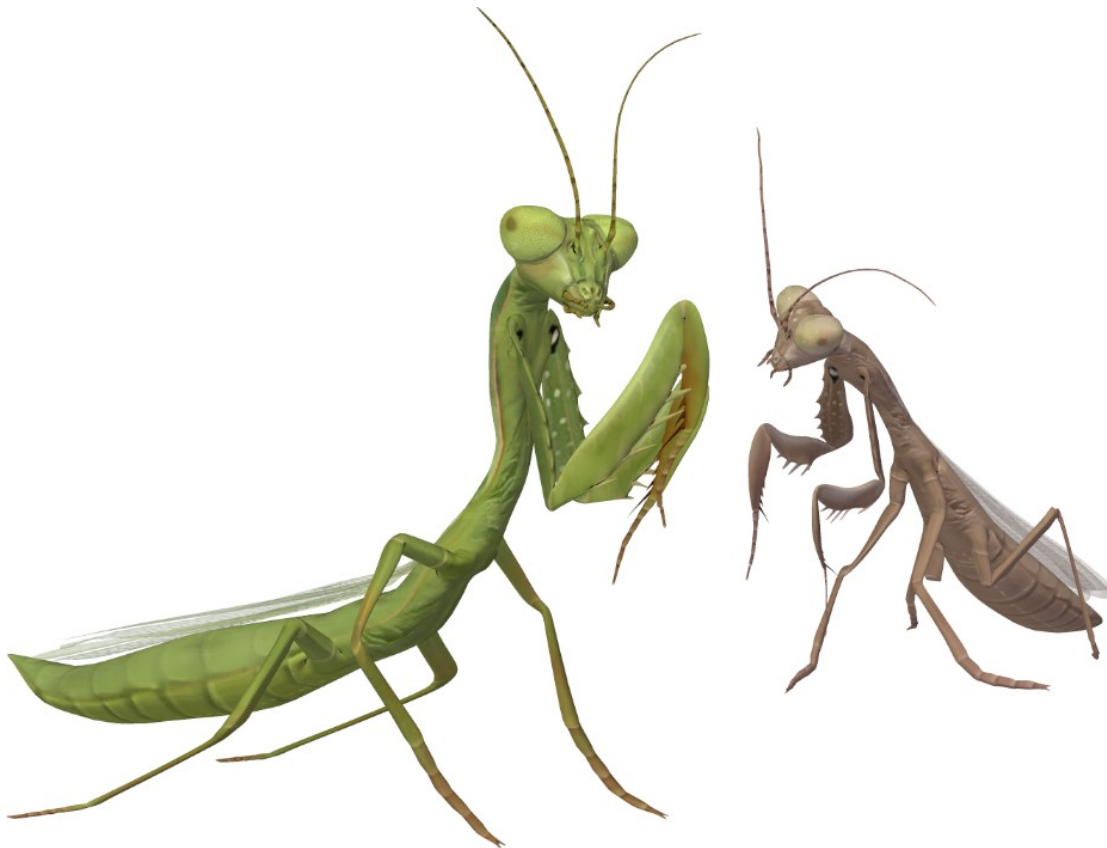
Because the lifespan of a mantis is only about a year, people who want to keep mantises often breed them. About 50 species were kept and bred as pets in the United Kingdom, the Netherlands, and the United States.

European Mantis

Mantis religiosa

The European mantis is a large mantis found in Europe, Asia, and Africa, as well as North America (where they have been introduced). Their common name, “Praying Mantis” is derived from the distinctive posture of the first pair of legs that can be observed in animals in repose and gives the appearance that the insect is praying. Both males and females have elongated bodies with two pairs of wings.

In Germany, this species is listed as “endangered” and has been on their Red List since 1998. It is not supposed to be caught or held as a pet within Germany. At a global level, it is assessed by the IUCN as having a “least concern” status.



Though females are usually larger and heavier than males (70–90 mm versus 60–70 mm), the antennae and the eyes of male animals outsize those of the females. Along with the forward-directed, compound eyes, simple eyes also are found on the head. These three dorsal ocelli are also more pronounced in males than in females.

Males are often found to be more active and agile, whereas females are physically more powerful. Adult females are generally too large and heavy for

their wings to enable a take-off.

They show strong deimatic (threatening) display from very early life stages on. This behavior is used to scare or startle potential predators to give the attacked animals a chance to escape. Its display involves wing spreading and bending



of the raptorial legs to reveal two matched black eye spots with a yellow or white center at the base of the coxae (legs). It makes the animal appear much larger and more of a threat to the attacker. The black eye spots are also a distinct feature for species discrimination of the European mantis. Another unique feature of this species is its mid-line metathoracic ear. This “tympanal auditory organ” is an unpaired structure found on the ventral side of the animal on the metathorax between the third pair of legs. Unlike

other sound processing organs found among different groups of insects, the metathoracic ear has a high sensitivity across high and low frequencies and even ultrasound.

The great variation in the coloration of the European Mantis from different shades of yellow, brown, green, and sometimes black has been the cause of numerous hypotheses and studies for over 100 years. There is no definitive accepted reason for why the variations of the colors or change of them occurs.

The sexual behavior of praying mantids in general is curious, so has received interest from scientists over the last century. The differences between the various species are well known.

Courtship and mating are separated into two steps: Preliminary courtship begins with the first visual contact between the animals and ends with the first physical contact. Copulation begins with physical contact and ends when the spermatophore is deposited.

Instead of just observing them, sexually mature males approach sexually mature females when they see them, but due to the physical superiority of the females, males face certain challenges in doing so. When a female spots a male, she is very likely to attack and kill him. Therefore, males can be observed to be very slow and cautious in their approach; after spotting a female, the male usually freezes and turns his head to look directly at her. Because he has a small depression in the retina of his eyes, he has the most accurate and detailed view of her and can watch every one of her moves. He then proceeds to approach her from behind. Males can be observed to stop as soon as the female turns her head or even moves.

The phenomenon that male mantises are attacked and eaten after, during, and even before copulation is called sexual cannibalism. Eating her mate provides the female with nutrients so she does not have to hunt. She has a prey item available that is bigger than the prey she would be able to catch in the manner she usually hunts.

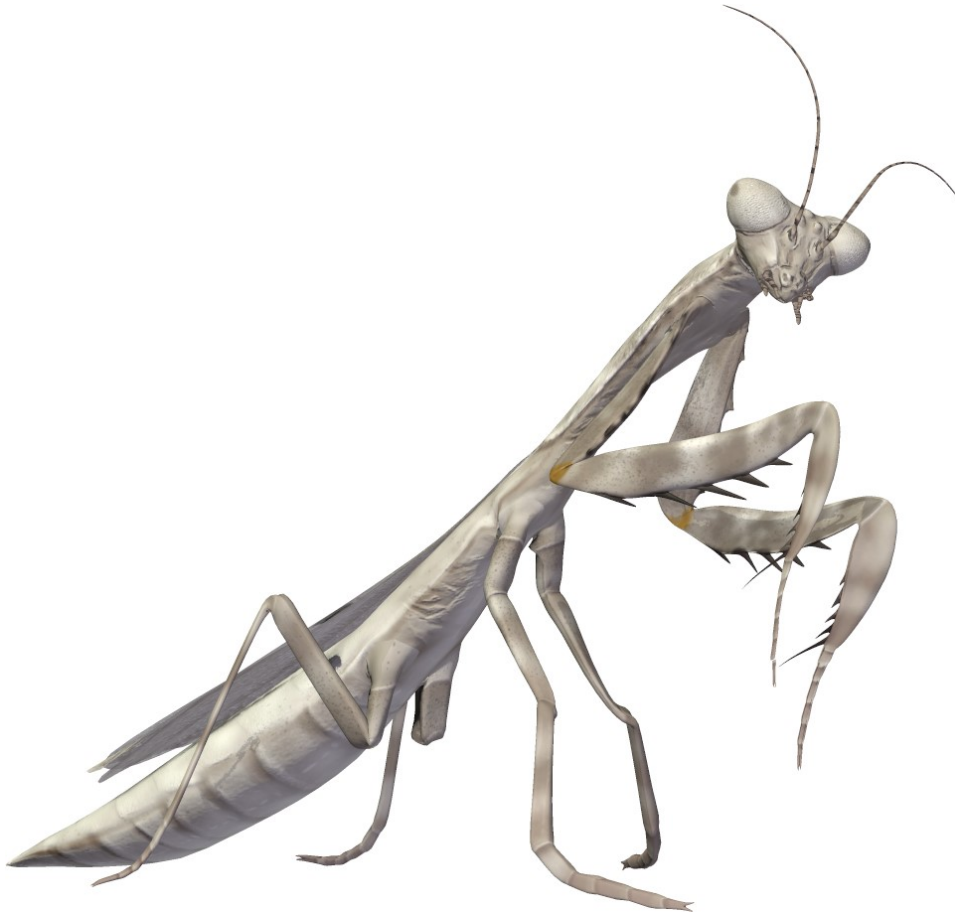
The meal also usually takes place during or shortly after she was fertilized, giving her more resources for the faster production of a large egg sac with large eggs, thus increasing the chance of her offspring to survive. Males have also been known to be more attracted to heavier, well-nourished females for this reason.

At first glance, however, this behaviour does not seem to be very beneficial for the male, since he dies and cannot create more offspring with his genetic material, yet males usually do not mate more than once, anyway. They have a shorter life expectancy than females (7–8 months versus 11–12 months) and since food can begin to become scarce in September and October, the male might starve before he has the chance to mate again.

Carolina mantis

Stagmomantis carolina

It is native to the Americas and can be found from the United States southwards to Brazil. Adult females are 47 to 60 mm (1.9–2.4 inches) in length while adult males are usually about 54 mm (2.1 inches) in length. At the first instar, nymphs are 7–12 mm (0.28–0.47 inches) in length, and as the nymphs age, their abdomens get much longer.



The Carolina mantis has a dusty brown, gray or green color useful as camouflage in certain environments. The Carolina mantis' color varies because the nymphs are able to adjust their color to match the environment they are in at the time of molting. They can adjust their color over each molt, if necessary, until they reach their final molt to adulthood.

*An unusual trait is that its wings only extend three-quarters of the way down the abdomen in mature females; this trait is also seen in the Mediterranean mantis (*Iris oratoria*), which can be distinguished by the large eye-spots on the hind wings (inner wings) of both adult male and female. Both the adult male and female have a dark-colored dot on each of their fore wings (outer wings), which may be partially hidden in a brown or dark color morph individual.*

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. Phasmids of the same species vary considerably, as do all other animals in nature. These Phasmids were created using the correct field markings and the most common similarities.

With the use of one generic model to create dozens of unique Phasmid 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 Phasmids 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 Smith-Micro's Poser and DAZ's DAZ Studio.

Internet Sources:

- **Wikipedia** (<http://www.wikipedia.com>)
- **USMantis** (<https://www.usmantis.com>)
- **North Carolina State University**
(<https://entomology.ces.ncsu.edu/biological-control-information-center/beneficial-predators/carolina-mantid/>)