



Of God and Beetles

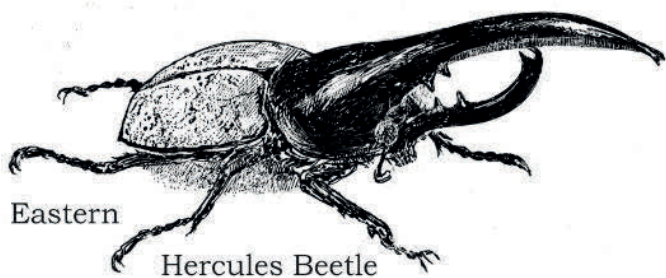
By Eric Dinerstein

Illustration by Trudy Nicholson

One of the most famous conversations about nature and evolution is a reported exchange between the Archbishop of Canterbury and the great evolutionary geneticist J.B.S. Haldane. The Archbishop asked, “What could one conclude as to the nature of the Creator from a study of his creation?” Haldane is said to have answered, “an inordinate fondness for beetles.” The quip is often followed by the explanation: “Because he made so many of them.” The anecdote may be apocryphal, but the number of beetle species is one of those off-the-chart statistics in nature. Currently, entomologists recognize upwards of 350,000 species. To put this in perspective, about one in every four identified species of animal life forms on Earth is a kind of beetle.

That’s a staggering thought. It also prompts several questions: what, for example, would our world be like if there had been 350,000 species of Hominids to appear instead of the 12 or so that have walked the Earth? Would *Homo sapiens* still be the dominant species?

We can only speculate why there haven’t been more species of Hominids and why beetles would be seen as God’s chosen creatures. One explanation is that over the course of evolution, beetles as a group (the Insect order Coleoptera) seem to have experienced very low rates of extinctions; beetle species that appear in the fossil record of the Cretaceous about 65 million years ago (when the dinosaurs disappeared), for example, are recognizable as more or less the same as some modern species. Another explanation is that about that time, a great evolutionary flourish of flowering plants occurred, and beetles took advantage of this proliferation of plants as a source of so many plant parts upon which to feed, from nectar, flowers, seeds, leaves, stems, tree sap, bark, and roots. In addition, many beetle species feed on rotting plant and animal tissues.



Eastern

Hercules Beetle

One such beetle that specializes on the rot of the world is the massive Eastern Hercules beetle. The largest beetle in the eastern United States, it is also called the rhinoceros beetle, because of its prodigious size and horns. The Hercules beetle can grow up to 2.5 inches in length, including the horn. The larvae of this beetle prefer rotting heartwood. In this beetle’s adult form, rotting fruit and tree sap are the preferred diet.

As a biologist of mammalian rhinos, I find some parallels between them and the Rhinoceros (Hercules) beetle quite striking. Both mammalian rhinos and rhino beetles are among the largest of their kind and both eat plant matter and like fruit. In the mammalian version, both males and females possess horns, but horns are lacking in female beetles. However, in both the pachyderms and the beetles, the males fight with their horns (at least the two African species of rhinos do so) in competition for females.

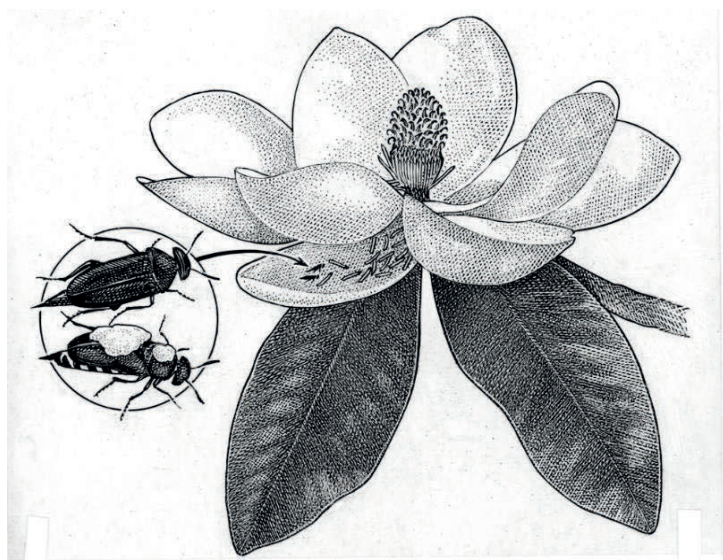
These large beetles form one of the most charismatic species, and we can see some representatives here in Maryland. But if we head to the tropics, that is where beetles truly are a sight to behold. There are beetles that live in the cloud forests of Central America that appear to have been dipped in 24-karat gold or in silver. There are others, like our tiger beetles in the U.S., with flashy metallic paint jobs.

Let’s be honest: most of us would not list beetles as our favorite kind of animal. That’s understandable, especially if you look at those that eat flesh and hair, such as Dermestids, the scariest beetles for museum curators because they can wipe out a collection of bird and mammal skins and specimens, or if you find dung beetles that roll away the dung of elephants or donkeys to be unpleasant or a reminder of the futility of existence.

But consider this fact: of the 250,000 or so flowering plants—near 90% of all things green—the vast majority are pollinated by beetles. So, without the pollination heroics of the Hercules beetle and its vast number of relatives, our Earth would be a stark place indeed.

Let me be more direct: Do you love magnolias? If you are like me, you prefer them to ornamental cherries, and even more so when you realize that some of the magnolia species local gardeners plant are native to our area or a bit further to the southeast. When magnolias, among the oldest of flowering plants, first evolved, there were no butterflies or birds about, so magnolias devised ways to attract a most reliable pollinator—the beetle. The first task was to bring in the beetles, and the magnolias did this by exuding an irresistible fragrance that attracted the ungraceful beetles. But once arrived on the sturdy platforms created by the open flowers, the beetles don’t bother to eat pollen; they

have mouth parts suited for munching on plant tissue. Now you know why magnolias have evolved such thick leathery blossoms, extra padding if you will, to attract beetles that



bump into the male parts of the flowers and become inadvertently dusted in pollen to transport to the next open blossom and achieve fertilization.

Ingenious is what the non-scientist might call it, or what evolutionary biologists name as co-evolution: where an odd couple like the showy magnolia and a non-descript beetle, totally unrelated, can become best friends who rely on each other to survive and where adaptations of one partner trigger responding adaptations in its evolutionary dance partner.

So, not only should we applaud evolution by natural selection, we should shout a hurrah for co-evolution every time we smell the incredible aroma emanating from the giant flower of a southern Magnolia (*Magnolia grandiflora*). Despite our sometime dismissal of or occasional distaste for this beetle or that, there is very good reason to be inordinately fond of them.