

## *Dynastes hercules* (Hercules Beetle)

Order: Coleoptera (Beetles)

Class: Insecta (Insects)

Phylum: Arthropoda (Arthropods)



**Fig. 1.** Hercules beetle, *Dynastes hercules* (male and female).

[<http://museum.unl.edu/research/entomology/Guide/Scarabaeoidea/Scarabaeidae/Dynastinae/Dynastinae-Tribes/Dynastini/Dynastes/D-hercules/Dhercules.html>, downloaded 1 March 2015]

**TRAITS.** *Dynastes hercules* is one of the largest beetles and is sexually dimorphic; the females lack the horns that are present in males, which arise from the thorax and head (Fig. 1). The thoracic horn is longer than the cephalic (head) horn. Males are 78-188mm in length inclusive of their horns; females are approximately 68mm in length, though they are larger bodied (Kulikowski, 2014). Males have a black head with the elytra (hard front wings creating a husk protecting the abdomen) shades of green, brown or black, while the bodies of females are entirely dark brown (Fig. 2). The male changes colour with humidity; at low humidity the elytra are yellow or olive green, but at high humidity they are black, due to changed light refraction. The hercules beetle is capable of flight, though they are not as efficient at flying as other insects. The body of the juvenile (larva) is pale yellow with lateral black spots, with a black head.

**DISTRIBUTION.** Populations are native to the Lesser Antilles and Trinidad and Tobago, the east and west of the Andes, as well as the tropics of Central and South America (Neotropical)

(Fig. 3). Hercules beetles are prevalent in montane and lowland rainforests from the Pacific Ocean and as far as the Amazon in Brazil (Moore, 2006).

**HABITAT AND ACTIVITY.** The hercules beetle inhabits montane and tropical rainforests. The larvae reside in decaying wood which is provided from fallen trees. Adults are seen hiding in the vegetation and the forest floor under moist leaf-litter. The fallen leaves and logs allow the massive beetle to hide and avoid predators during the day. Like most insects, adults are focused on mating, of which males are highly competitive. The beetle is nocturnal and forages at night for fallen tropical fruits. Their larvae feed on rotting wood and decaying plant matter, with a focus on growth and development. Adults are most abundant during the rainy season and actively burrow, being documented during nights of dense fog and rain. The adult beetles are herbivores (frugivorous) and feed commonly on rotting fruits such as bananas and mangoes. The juveniles feed on decaying plant matter and rotting wood (lignivorous).

**POPULATION ECOLOGY.** *Dynastes hercules* beetles are solitary, with males being territorial in nature during mating season. The density of larvae is expected to be much greater upon hatching and would decrease upon predation (this value would depend on the predation and survival rate). The egg of *D. hercules* incubates for approximately 30 days before the larva emerges, then grows through several moults (Fig. 4) for 12-18 months before the pupating stage (Fig. 5), which lasts 2-3 months. The adult beetle, having emerged from the pupa, can live up to 8-12 months, giving the beetle an overall average lifespan of about 3 years.

**REPRODUCTION.** Females are egg-laying (oviparous) and lay up to 100 eggs in the ground or in dead wood. Larvae undergo a series of stages in which they grow and moult their skin to accommodate more growth. Reproduction is strictly sexual with high degrees of male competition, with females initiating sexual contact by the use of pheromones. A male upon receiving the chemical stimulus, would search for the female. Males vying for the right to mate with the female engage in fights with their horns. They attempt to grab and pin their rival between the cephalic and thoracic horns and raise them up as high as possible and throw them down. This can occur several times until one male retreats, in defeat. The successful male would then copulate with the female. The beetles have a polygynandrous (promiscuous) relationship, where males and females only partner temporarily for the act of mating. The mating season for these beetles typically occurs during a time of heavy rainfall; the rainy season (from July to December). A male or female is sexually mature at 15-22 months, with females having an average gestation period of 30 days. Beyond egg-laying, there is no parental care for larvae; however the eggs are typically laid in decaying wood or grounds close to the decaying wood so that the larvae need not travel far for sources of nutrients. Females thus invest in developing the eggs before laying.

**BEHAVIOUR.** The adult *Dynastes hercules* beetle emits a foul odour to discourage predators from eating it. They are also capable of making a hissing sound when disturbed or picked up, which is generated by stridulating (rubbing) their abdomen against their elytra and serves as a warning. There is also the option of flying away from the predator. Males are very aggressive to other males during mating season.

**APPLIED ECOLOGY.** The IUCN previously listed this species as endangered, however currently the conservation status of this beetle is unknown, due to the fact that the nature of its habitat and the fluctuations of population density has not been extensively studied. There are,

however, threats to its habitat (rainforest biome) in terms of climate change and deforestation due to human activity. This therefore can affect the population of hercules beetles in the rainforest biome. These beetles are also quite popular for beetle enthusiasts, as they are sold in Japan and the world over as pets. Hercules beetles do not harmfully affect humans; in fact, they positively contribute to biodegradation and cycling of nutrients in ecosystems.

#### REFERENCES

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Posted online: 2015



**Fig. 2.** Dorsal view of hercules beetles, male and female.

[<http://museum.unl.edu/research/entomology/Guide/Scarabaeoidea/Scarabaeidae/Dynastinae/Dynastinae-Tribes/Dynastini/Dynastes/D-hercules/Dhercules.html>, downloaded 1 March 2015]



**Fig. 3.** Distribution of the hercules beetle, *Dynastes hercules*.

[<http://museum.unl.edu/research/entomology/Guide/Scarabaeoidea/Scarabaeidae/Dynastinae/Dynastinae-Tribes/Dynastini/Dynastes/D-hercules/Dhercules.html>, downloaded 1 March 2015]



**Fig. 4.** Larva of *Dynastes hercules*

[<http://museum.unl.edu/research/entomology/Newsletter/Scarabs69.pdf>, downloaded 1 March 2015]



**Fig. 5.** Pupa of *Dynastes hercules*

[<http://museum.unl.edu/research/entomology/Newsletter/Scarabs69.pdf>, downloaded 1 March 2015]

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