# DUNG BEETLES: WHERE DID ALL THE POO GO?





(1) Two hundred years ago Australian ranchers introduced cattle, sheep and horses to the Australian outback. In a few decades, the ranchers began to realize that these animals were creating a major problem, a big stinky problem. These animals were producing so much manure, also called dung, that the country was threatened with being covered in poo if something wasn't done. Did the farmers get rid of these animals? Did someone build a machine to compost the dung? No. There was a simpler and cheaper alternative. They looked to nature for the answer and they found it; the amazing dung beetle! Dung beetles are beetles whose diets consist either partially or completely of dung. The fancy scientific name for an organism that eats dung is a coprophage; *copro* means excrement or dung and *phage* means eater. In the 1960s, Australia began importing and successfully introducing dung beetles from South Africa and Europe. These little coprophages began feasting on the manure buffet before them and they've been saving Australia from drowning in poo ever since.

(2) Dung beetles can be classified according to how they handle their dung. *Rollers* are dung beetles that roll their dung into a ball and move it to their nest. *Tunnelers* are dung beetles that bury their dung into the earth right under where the dung is located. A third type, the *dwellers*, make matters even easier. They simply decide to live inside the dung so they neither have to roll nor bury their dung. No matter how they handle their dung, all dung beetles lay their eggs inside dung. When the dung beetle larvae hatch, they begin feasting on the dung surrounding them.

(3) Rollers in particular have a very interesting method of moving their ball of dung. They roll their dung ball using their hind legs and walking backwards on their front legs, yet they manage to direct their ball around obstacles and make it to their nest. Dung beetles can actually navigate their environment using the Milky Way to help them orient themselves. No other creature is known to do this.

(4) Some dung beetles are picky eaters. They prefer herbivore dung over omnivore or carnivore dung. Plant material is difficult to

*Large Copper Dung Beetle, photo by Bernard Dupont*

digest, so much of it exits the herbivore digestive tract only partially digested. Thus, a lot of nutrients still remain in the dung making it a good meal for a dung beetle. Meat eaters have more efficient digestive tracts and so their excrement contains much less nutrients. *Onthophagus caenobita* is the only species of dung beetle that has been observed to eat human feces. Not only do dung beetles prefer herbivore dung, some beetles specialize only on certain types of herbivore dung. The native Australian dung beetles were familiar with and liked the dung of Australian animals like the kangaroo. When cattle, sheep and horses were introduced to the continent, the Australian dung beetles weren't very eager to switch to a new type of meal.

(5) These little creatures also have a very strong sense of smell. This is how they are able to find fresh manure the moment it drops to the ground. One researcher found that only 15 minutes after a fresh pile of elephant scat was deposited on the ground, over 4000 dung beetles could be found on the pile.

(6) Pound for pound, the dung beetle holds the record for being the strongest animal in the world. One species, *Onthphagus taurus,* can lift over 1141 times its own body weight. That would be equivalent to a 150 lb human pulling 80 tons, which is the equivalent of six double decker buses full of passengers. This strength comes in handy for rolling big dung balls and for defending them from rivals.

# DUNG BEETLES: WHERE DID ALL THE POO GO?



(7) Dung beetles possess super strength and super smell, they can navigate using the stars and they have saved an entire continent from an environmental disaster. With all of this on their résumé, they seem like good candidates for being the superhero of insects. What do you think life right now would be like without them? Did prehistoric organisms benefit from the dung beetles' superpowers too? The fossil record shows that dung beetles lived at least 30 million years ago. However, since dung beetles are invertebrates lacking a skeleton capable of fossilization, the proof we have of their existence comes from the huge tennis-sized dung ball fossils that prehistoric dung beetles left behind. These mega dung balls came from dung beetles that were cleaning up the poop of the megafauna (giant mammals) long before they were cleaning up our poop.

*Fossilized Dung Balls, photo by Victoria Sánchez*

## Article Questions

1) Besides poo, what other terms used in this article to mean the same thing?

2) Another term for dung eater is _____.

3) What problem did Australia have due to the introduction of so much livestock to their country? How did they solve this problem?

4) Why do dung beetles prefer herbivore dung as opposed to carnivore dung?

5) What do dung beetle larvae eat and how do dung beetles ensure that their offspring have a good supply of this food?

6) What can the dung beetle do that no other organism on Earth can do?

7) What world record does the dung beetle hold?

8) What evidence is there of prehistoric dung beetles?