

By: Sachin 2008, Science Editor

[World's Most Powerful Creature and Better Food for Humans](#)

The secret of color change induced by humidity

Which is the most powerful creature in the world? You may think of the largest beasts, like elephants or whales, but the Hercules Beetle, one of the largest beetles in the world, can pull a weight up to 850 times its own weight. Can you imagine a lion dragging a 180-tonne blue whale? But the creature has even more tricks up its sleeve. One is color-changing. A new study published in the "New Journal of Physics" and made by a team at the University of Namur, in Belgium, has investigated the structure of the protective elytra of these beetles, a step forward in the development of "intelligent materials." The elytra of the Hercules Beetle can shift from green to black with the increasing humidity of the atmosphere. A scanning electronic microscope (now able to create 3-D images of minuscule structures) determined the structure causing the color change and a spectrophotometer revealed how light reacted to this structure. In dry conditions, the action of the light caused the green color of the elytra, but water infiltration through the widely-open porous layers impairs the interferences, determining the black coloration. This giant beetle inhabits the South American rainforests (Columbia, Venezuela, Peru, Ecuador, Bolivia, and Brazil) and scientists have been trying to explain the meaning of these color changes. The most plausible theory is that it offers a camouflage: nights are more humid, and a black color gives a better protection. Some believe the beetles absorb more heat from the environment this way, during the cooler nights. "The sort of structural behavior displayed by the Hercules Beetle could be an important property for 'intelligent' materials.' Such materials could be put to work as humidity sensors. This could be useful for example in food processing plants to monitor the moisture level," said co-author Marie Rassart. The Hercules Beetle (*Dynastes hercules*) can reach 6.75 in (17 cm) in length, it is bulky and has a long rhino-like horn. Such a beetle can drag a wood piece of tens of kilograms! At a weight of 60g, this beetle is as large as a mouse.