

# Why Is The Ground Brown

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Ecologists have long asked, Why is the world green? In other words, why aren't herbivores, such as insects and grazing animals, more successful at eating the world's green leaves, also known as plant biomass?

In the May 2006 issue of American Naturalist, Steven D. Allison (University of California, Irvine) asks the same questions a different way: Why is the ground brown? Why don't the organisms that break down the carbon in the soil consume it all?

Some of the same ecological factors make the world green and the ground brown, especially the carbon in plant material, the role of herbivores and decomposer organisms in consuming that carbon, and the role of predators in eating the consumers of the carbon. As it turns out, as Allison observes, "the chemical structure of soil carbon makes it far more difficult to consume than plant carbon."

There is about three times as much carbon in soil than in plant biomass. In addition, minerals in the soil can block decomposers from feeding on soil carbon. Allison also points out that most decomposers are of relatively small size compared to the animals eating green leaves.

"Instead of digesting material in their guts, decomposers depend on enzymes to partially digest their food sources outside their bodies," Allison explains. "This strategy is a major constraint on the breakdown of soil carbon that helps make the ground brown."

Founded in 1867, The American Naturalist is one of the world's most

renowned, peer-reviewed publications in ecology, evolution, and population and integrative biology research. AN emphasizes sophisticated methodologies and innovative theoretical syntheses--all in an effort to advance the knowledge of organic evolution and other broad biological principles.

Steven D. Allison "Brown ground: a soil carbon analog for the green world hypothesis," *The American Naturalist* 167:5.

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