



Warm Times Mean More Bugs

Fossils Show Insects Thrive in Heat

By Susan Conova
 ABCNEWS.com

June 25 — Why is the world green with plants?

If bugs had their way, they would devour all the plants on Earth, transforming our planet from a lovely blue-green orb to a blue-brown blob. Fortunately, plants fight back with deadly and foul-tasting chemicals.

“Only 10 to 20 percent of a plant’s leaves are eaten,” says Phyllis Coley, professor of plant-insect biology at the University of Utah.



These circular patterns were left by long-ago relatives of the fairy moth shown here. By examining fossil leaves that have been munched on, scientists can see how busy ancient insects were. (Photo: Peter Wilf. Fairy moth courtesy of Cornell University.)

To keep insects at bay, plants manufacture a huge array of chemical defenses. We tap these chemical cocktails for medicines to treat everything from headaches to leukemia.

This is no minor battle: Plants and the bugs that eat them make up half of all life on Earth.

Most of these bug-battling chemicals are found in the tropics, where plants produce more defenses yet still suffer greater predation than their temperate cousins.

Scientists believe that the warm and wet climate in the tropics fuels this escalation in warfare, but haven’t been able to test the idea. In today’s issue of *Science*, researchers report the results of an innovative test using 55-million-year-old bug-bitten leaves to show that bugs eat more plants during global warming.

Determining if insects’ appetites are related to climate hasn’t been easy. Climate and latitude are inextricably linked; if you change climate, you change latitude, and vice versa.

Time Travel

To examine climate change apart from latitude, the scientists sort of time traveled to delve into Earth’s history. “Only with

SUMMARY

A look at the fossil record during a global warming spell shows plants suffer more predation from insects.

“Does global warming affect diversity? The answer is yes, but this paper does not predict how this will happen.”

Peter Wilf, National Museum of Natural History

WEB LINK

[National Museum of Natural History](#)

[SEARCH](#)[ABC.com](#)[THE CENTURY](#)[EMAIL
ABCNEWS.com](#)[SEND PAGE TO
A FRIEND](#)[TOOLS AND
HELPERS](#)

the fossil record can you do what we did,” says Peter Wilf, a paleobotanist at the Smithsonian’s National Museum of Natural History and one of the paper’s authors.

The study is unique because they’re trying to reconstruct past interactions between bugs and plants. “Nobody’s really done that before,” comments Coley.

The authors time-traveled in southwestern Wyoming to keep latitude constant, and collected fossil leaves from the vastly different climates of the Paleocene (56 million years ago) and the Eocene (53 million years ago). In those 3 million years, the average temperature in Wyoming increased by 13 degrees Fahrenheit, and the area was transformed from a cool region with maples and other deciduous trees to a hothouse swamp with more evergreens.

Back then, forests covered Antarctica, palm trees were plentiful in Alaska, and mammals evolved into the forms we know today.

Written in Stone

The leaf fossils “look astonishingly like leaves you find on the forest floor today,” says Wilf. Except they’ve turned to stone.

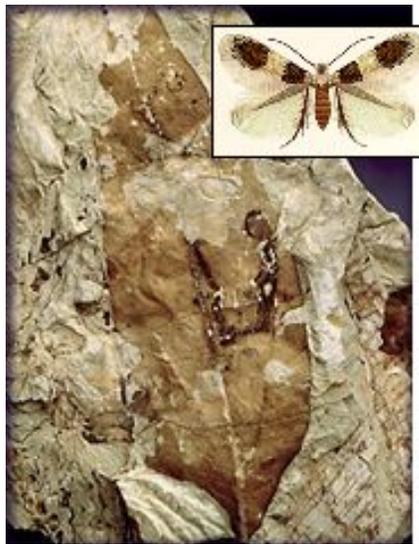
Wilf and co-author Conrad Labandeira, assistant curator of fossil arthropods at the Smithsonian Institution, measured the number and types of bug bites on the fossil leaves. Bites ranged from unpatterned holes to holes made from piercing and sucking and snake-like mining trails. Each plant in the warmer Eocene had more bites, and more types of bites, than plants in the cooler Eocene.

Does this mean your garden will get gobbled when the Earth starts warming up from our fuel consumption? Wilf cautions against such a conclusion.

“The global warming we will be facing will occur in 100 years instead of hundreds of thousands,” Wilf says. “Does global warming affect diversity? The answer is yes, but this paper does not predict how this will happen.”

Instead, Coley says, the study confirms our observations of today’s world where bugs fight with plants more fiercely in the tropics than in temperate zones.

Now if they can just figure out how to keep those damned bugs off our tomato plants. ■



A larval ancestor of this modern species of *Stigmella* left its mark on this leaf. Three million years of warming meant a change in vegetation — and an onslaught of insects. (Peter Wilf)

SEARCH ABCNEWS.com FOR MORE ON...