

# Florissant Fossil Beds

## Fossil Insects

National Park Service  
U.S. Department of the Interior



Florissant Fossil Beds  
National Monument  
Colorado



Relatives of insects were the first life forms to live on land. Insects are the most numerous and diverse animals on the planet, but they are rare as fossils. The Florissant fossil beds contain an exceptional diversity and abundance of fossil insects, including more than 1,500 different species.

### Why study insects?

In order to understand Florissant's fossil insects, we need to know about the diversity, ecology, and life cycles of modern insects. Three out of four kinds of animals are insects. There are twice as many species of flies (Diptera) as there are of all vertebrates (fishes, birds, reptiles, amphibians, and mammals). Insects live on every continent and play major roles in every ecosystem: they pollinate flowers, eat plants, decompose dead matter, and provide food for many other animals. Some insects spend part of their lifecycle as parasites, usually on other insects but occasionally on vertebrates.

Fossil insects show how ecosystems have changed and moved over time. By tracing living species back to their fossil ancestors, scientists can propose explanations for the diversity and geographic distribution of insect groups alive today.

### Why are fossil insects so rare?

Most bodies decay, erode, or are scavenged before they can become fossils. Softer body material is more fragile, so it is less likely to preserve. Teeth and animals with a thick cuticle (hard covering) like beetles are more common as fossils than soft-bodied animals like spiders. Even the most fragile animals can fossilize, however. The gentle lake environment of Florissant in the late Eocene, 34 million years ago, led to the preservation of the delicate insects that lived then.



Fossil butterflies (Lepidoptera) are very rare. *Prodryas persephone* (top left, life size) is one of the best examples ever found. *Vanessa* (the painted lady), a close relative, still flies at Florissant (top right). Their caterpillars love to eat thistles like this native Colorado species (*Cirsium*) (bottom).

### Are fossil insects the same species as living ones?

Almost all of the insect species found as fossils at Florissant became extinct in the 34 million years since they were buried. Descendants and relatives of these species survive today, however, and many still live in Colorado. Insects evolve more slowly than many other organisms do, and many Florissant fossil insects look nearly identical to their living relatives. Fossil insects from older deposits look more different.



Tsetse fly (UCM-66281)

"Fossil insects offer an extraordinary opportunity... throwing so much light on the evolution and migrations of insects, and therefore of prime importance for the understanding of the modern fauna."

T.D.A. Cockerell, 1937

Flies help maintain balance in the environment. Some are scavengers who eat dead matter and recycle nutrients. Others, like this dance fly, are predators. Still other flies pollinate flowers.

Dance fly (fossil)  
(Diptera: Empididae)  
UCM-18637



Insects are the most numerous animal pollinators on Earth. Tens of thousands of species of beetles, wasps, flies, and other insects carry pollen among flowers. Bees pollinate three quarters of all fruits, nuts, and vegetables grown in the United States!

Sweat bee (fossil)  
(Hymenoptera: Halictidae)  
UCM-19164



Many insects, like this damselfly, live in water as larvae. Some are "indicator species," which only survive in conditions of high water quality. Biologists count the number and kind

of insects and other invertebrates to monitor the health of streams and rivers.



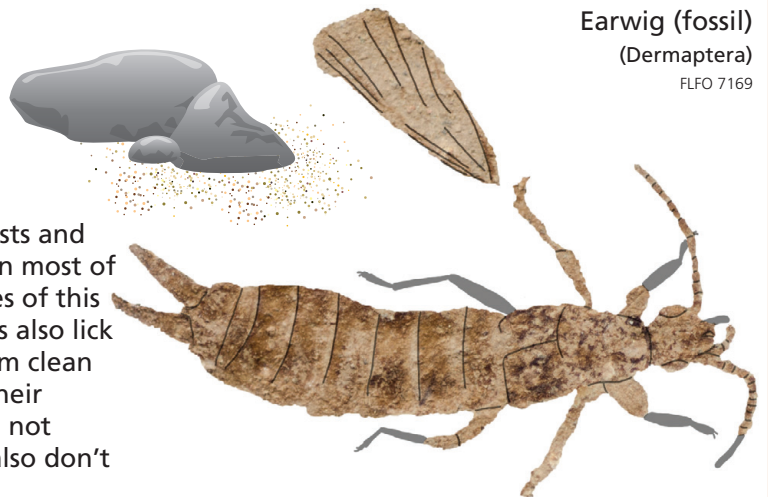
Damselfly larva (fossil)  
(Odonata: Zygoptera)  
FLFO 9764

Scarab Beetle  
(fossil)



Beetles are one of the most common insects found as fossils. Their thick, hard cuticle (outer covering) protects them in life from drying out or being attacked by predators. The cuticle also protects their bodies during fossilization.

Earwig (fossil)  
(Dermaptera)  
FLFO 7169



Fossil insect pictures on this page are **four times larger than life size.**

Female earwigs dig nests and guard their offspring in most of the nearly 2,000 species of this group. Mother earwigs also lick their eggs to keep them clean of mold. Contrary to their name, these insects do not attack ears, and they also don't bite and can't sting.

### Where can I see more fossil insects?

Anyone can access the database of photographs and records for the several thousand insect and plant fossils from Florissant that have been included in publications (web address at right). Also, Florissant Fossil Beds National Monument is a participating institution in the Fossil Insect Collaborative. This National Science Foundation sponsored group is adding tens of thousands of fossil insect records from Florissant and other locations to the Integrated Digitized Biocollections database ([idigbio.org/portal](http://idigbio.org/portal)).

Fossil Insect Collaborative website  
[iDigPaleo.org](http://iDigPaleo.org)

Florissant Fossil Beds specimen database  
<https://fffo-search.colorado.edu/>