



ScienceWatch – A Feathered Giant—Bus Sized!

"The largest specimen preserves feathers on the tail, and two smaller specimens preserve feathers over the neck, on the forelimbs, near the pelvis, and even feet." – Xing Xu

The past 15 years have seen an extraordinary evolution in our view of dinosaurs and their relationship to modern birds. Instead of slow, lumbering, cold-blooded reptiles, most scientists now believe that theropod dinosaurs were bipedal, fast-running, warm-blooded, non-flying ancestors of modern birds. Another way to say it is that birds can be thought of as flying dinosaurs.

This remarkable change has come about due, in part, to the unprecedented number of well-preserved fossils coming out of Liaoning Province in China. Many specimens are clearly feathered and even the feathers are well-preserved. In a recent study (<http://hras.org/sw/swmay2012.htm>) scientists found evidence that the feathers of *Microraptor*, a pigeon-sized, four-winged dinosaur were black and iridescent and probably used for sexual display.

Most of the non-avian dinosaurs* discovered so far have been small; even the most famous, *Archaeopteryx*, which lived 150 million years ago, was only 30 cm (1 ft.) long. But now a new discovery dwarfs all previously known examples. *Yutyrannus huali*—beautifully plumaged tyrant—lived about 125 million years ago, 60 million years before its distant descendent *Tyrannosaurus rex*. It was 10 meters (30 ft.) long and weighed 1,400 kg (3,000 lbs.), forty times larger than any previously known feathered dinosaur. Three fossilized skeletons, one adult and two juveniles, each covered in dense, well-preserved filamentous feathers, were found in the rich Liaoning fossil beds. They are described in the April 5, 2012 issue of *Nature*.



The report by a team of paleontologists headed by Xing Xu, Institute of Vertebrate Paleontology and Paleoanthropology, Beijing, China, said the fossils provided the first “direct evidence for the presence of extensively feathered gigantic dinosaurs”, offering “new insights into early feather evolution.”

According to Xu, “*Yutyrannus* dramatically increases the size range for which we have definite evidence of feathers. [It is] possible that feathers were much more widespread, at least among meat-eating dinosaurs, than most scientists would have guessed even a few years ago.” Many scientists believe that even *T. rex* may have had some type of plumage, at least over certain parts of its body. Xu said that, given the huge size of *Y.*

huali, and that the feathers were more like the fuzzy down of a chick, they couldn't possibly have been used for flight and were most likely for insulation. The early Cretaceous when *Y. huali* lived is thought to have been colder than the later part of that period—average temperature of about 10°C (50°F) vs. 18°C (65°F). So the authors speculated that feathers in this case could represent an adaptation to an unusually cold environment. “The size, structure and extent of the feathers suggest that they would have formed a shaggy body covering that would have had at least some insulating function,” said team member Corwin Sullivan.

Was *Yutyrannus* covered in a dark plumage like *Microraptor* or some other hue? Xu said he had taken some feather samples for an analysis similar to that done with *Microraptor* in order to answer this question.

A fuzzy, meat-eating “chick” the size of a bus—could it have been yellow?

Saul Scheinbach

*Non-avian dinosaurs are extinct ancestors of living birds. The latter are now considered “avian dinosaurs” by most paleontologists.