Diplodocus with feathers? Why we should take fuzzy sauropods seriously

MIKE TAYLOR - The idea of feathered sauropods - long-necked dinosaurs like Diplodocus - may seem pretty outlandish. Actually, it's been floating around for a while - though more often in pubs after conferences than in the technical literature.

The idea goes back at least to 1994, when the palaeoartist Greg Paul illustrated a hypotethic hatchling, straight from its egg and as cute as Littlefoot from The Land Before Time, with a covering of fine down.

There's very solid evidence for feathers in theropods, the two-legged meat-eating cousins of sauropods. There are lots of beautiful specimens that preserve feathers, or at least primitive filament-like 'protofeathers'.

These fossils represent many different theropod groups. There's even a nine-metre-long feathered tyrannosaur, which at 1.5 tonnes weighed ten times as much as any living bird. Whatever debate there used to be about feathered theropods, it's over. They had feathers, and the naked raptors of Jurassic Park are just plain wrong.

But things aren't nearly so clear-cut for sauropods. There are no known sauropod fossils that preserve feathers – not even the proto-feathers that are often found on the less bird-like theropods. There are a few patches of fossilised sauropod skin – not many, as skin doesn't easily fossilise – but they all show the same thing: pebbly, non-overlapping scales.

So is it case closed? Not quite. Lots of animals have different kinds of covering on different parts of their bodies. Chickens have scaly legs, but feathers elsewhere. Elephants are mostly naked, but have tufts of hair on their tails. (It's amusing to imagine sauropods with flamboyant tufts of brightly coloured feathers sprouting from the tips of their tails.)

For that matter, we humans have a pretty funny distribution of hair on our bodies. No future palaeontologist, looking at fossilised skin from a human elbow, would guess that we have hair in our armpits.

So we don't have firm evidence that sauropods didn't have feathers; but what reason do we have to think that they did? The answer lies in phylogenetic bracketing. As the Ukrainian biologist Theodosius Dobzhansky said, “nothing in biology makes sense except in the light of evolution”, and to understand sauropods properly, we need to understand who they are related to – in other words, where they fit in the phylogeny, or evolutionary tree.

Sauropods' nearest relatives are the theropods, which we know had feathers. But that's not enough to let us draw conclusions about sauropods, as feathers might have evolved within the theropod group. We need to look at the next closest relatives as well – and that is the third great group of dinosaurs, the ornithischians, which include Triceratops and Edmontosaurus.

Only a few years ago, scientists thought that the ornithischians had naked skin, but that changed in 2009 when a tiny fuzzy ornithischian called Tianyulong was announced. Here's why this is important for sauropods: if theropods and ornithischians both had protofeathers, then it's most likely that they inherited them from their common ancestor.
Dr. Mike Taylor is a computer programmer in his day-job, and a Research Associate at the University of Bristol. He has the luxury of working almost exclusively on sauropods, the most impressive and inspiring of all dinosaurs.

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