

Fossil data plugs gaps in current knowledge, study shows

October 2 2007

Researchers have shown for the first time that fossils can be used as effectively as living species in understanding the complex branching in the evolutionary tree of life.

While many scientists feel that fossils can offer insights from the ancient past, others have been reluctant to use extinct species because the data they offer is often less complete.

Most biologists, for example, have traditionally tried to piece together the evolutionary relationships between species using only the animals that are alive today.

But in research published in journal *Systematic Biology*, scientists from the University of Bath and the Natural History Museum compared the morphological datasets of 45 animal groups, both living (extant) and extinct.

By running a series of analyses they were able to measure how much the family tree of life needed to be altered when data from these extant and extinct species is included or removed.

They found no difference in the impact that the fossil groups made on the family tree compared to extant groups.

"Evolutionary biologists try to reconstruct rapid and deep evolutionary branching events that happened many tens or hundreds of millions of



years ago," said Dr Matthew Wills from the Department of Biology & Biochemistry, who worked with Andrea Cobbett (University of Bath) and Dr Mark Wilkinson (Natural History Museum).

"Unlike living species, fossils offer ancient snapshots of life forms that were around at the time those branching events occurred.

"Also, living species have millions of years 'worth' of change piled on top of this, which can often bury the important signals we need to understand.

"Despite this, detractors have claimed that because fossil data are often less complete, usually just bones, shells and other hard parts, they are likely to muddy the water and make it difficult to find a robust evolutionary tree.

"What our research has done is demonstrate conclusively, and for the first time, that this is not the case.

"We also show that adding just one fossil to an analysis can result in a radically different picture of that group's evolutionary history. The trees constructed without fossils may be oversimplifications, and far from the truth."

Source: University of Bath

Citation: Fossil data plugs gaps in current knowledge, study shows (2007, October 2) retrieved 27 April 2024 from <u>https://phys.org/news/2007-10-fossil-gaps-current-knowledge.html</u>

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