

What Dollo's Law means and what it doesn't

The Urth list — 2 messages, 2 voices, 25 Jan 2011

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Dan'I Danehy-Oakes — 25 Jan 2011, 22:12

Let's look at the cetacea for an illustration.

Long, long ago, their ancestors left the ocean, fish becoming amphibians and, ultimately, mammals. They lost the shape of fish, and they lost the ability to "breathe" water (i.e., gills).

Millions of years later, their more recent (but still rather distant) ancestors returned to the ocean, becoming first kind of crocodilian things and finally the sleek dolphins, orcas, and whales we know today.

Note that they have regained the rough shape of fish.

Note also that they have not regained gills.

Dollo's Law applies to the gills, but not the shape. Organisms can adapt to a new environment, even one that resembles an older environment. In so doing, they may develop characteristics that resemble the characteristics their ancestors lost; but they do not regain those precise characteristics.

And so whales must still return to the surface to breathe.

Dan'I Danehy-Oakes

Lee Berman — 26 Jan 2011, 00:27 · follows Dan'I Danehy-Oakes

Dan'I Danehy-Oakes: Let's look at the cetacea for an illustration.

Actually whale vs. fish fins are one of those classic examples of convergent evolution. Fish (ancient and modern) mostly have fins built on a fan-shaped pattern of spiny rays. Whales have built their fins on the mammalian bone pattern and humerus, radius and ulna structures can be found.

Being warm-blooded probably locked whales into being air-breathers. Water has much less dissolved oxygen than can be found in air. All gill-breathing creatures are cold blooded (though certain shark species eat so much and swim so fast that they can raise their body temperature for a short time).

The interesting question to me is...say Earth had a 100 year long flood that killed off all land dwelling animals. After the flood receded, could certain whales colonize the land, their parts reverting back to a land mammal form?

Less interesting is my discussion with Gerry on whether the darker grey humpback whale

population of the arctic ocean could ever end up looking like the lighter grey humpback population of the indian ocean.