History of flies takes flight

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(PhysOrg.com) -- A Simon Fraser University biologist's fly research fill out a global tree of life map of all living organisms, even though he retired from SFU three years ago.

Professor emeritus Andrew Beckenbach is one of 25 international scientists who have used nuclear and mitochondrial (controls cellular energy production) genomic sequencing and morphological information to plug gaps in the 250-million-year history of Diptera.

Characterized by a single pair of wings in the middle of their body and flight -stabilizing knobbed structures, Diptera is an order of insects known as true flies.

Published in the March 14 online edition of Proceedings of the National Academy of Sciences, the researchers' map of flies' evolutionary history is part of a large-scale effort to place all living organisms into a comprehensive tree of life. The embellished evolutionary map will further scientific understanding of how human health and the environment are evolving in light of global forces such as climate change.

"Flies comprise 7.5 per cent of all described species and they have a substantial impact on our society as pests, pollinators and vectors of disease," explains Beckenbach, now living in Silver City, New Mexico.

"A number of model organisms are flies. Much of our early understanding of genetics came from the study of fruit flies.

Understanding the place of flies in the overall scheme of things may be useful in understanding how the features discovered in these model organisms may relate to the rest of living things."

Scientists hope to become the proverbial fly on the wall and learn the species' secrets to survival when they take a closer look at Beckenbach's and his colleagues' key findings. "Flies do not appear to have suffered much during several mass extinction events," says Beckenbach.

"We found that they not only survived the most recent event 65 million years ago, prior to modern humans, which wiped out all dinosaurs, except birds, but they actually flourished during those times.

Our paper notes that flies have undergone at least three episodes of species radiation. The most recent expansion, which started about 65 million years ago, gave rise to what we consider to be modern flies, including for example house and fruit flies."

More information: Episodic radiations in the fly tree of life, *PNAS*, Published online before print March 14, 2011, doi: 10.1073/pnas.1012675108

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