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Abstracts

Keynote Address

TAKING MEASURE OF EARTH'S MEGADIVERSITY. **T.L. Erwin**, National Museum of Natural History, Smithsonian Institution, Washington DC, 20360, U.S.A.

Climate change through the millennia may have affected residents of the Permian Seas and vertebrates of Pangaea; later, it may have affected dinosaur evolution by terminating non-flying forms just before thinking became one of their traits; it certainly impacted the ranges of many Canadian species of terrestrial arthropods during the Pleistocene. But overall, there are more insects species now than during the Carboniferous, and likely more than at the beginning of the Cretaceous. Climate changes overlaying fractal changes in the architecture of available substrates drive insect evolution and increase in species from the outside, while interactions among the myriad of living forms on earth's substrates drive it from the inside. Biodiversity,whether it be 5, 10 or 30 million species, is at its apogee today in part because of the climate changes of the past. The problem for future insect biodiversity is not climate, but rather the removal of fractal space from the environment through landscape conversion. This needs to be conservation's priority from the insect point of view, not climate change per se, as it is with us.

Symposium: Biodiversity and Climate Change

CHANGES IN INSECT BIODIVERSITY IN RESPONSE TO PLEISTOCENE CLIMATE CHANGE. **Allan C. Ashworth**, Department of Geosciences, North Dakota State University, Fargo, North Dakota, 58105, U.S.A.

At the end of the Pleistocene major climate change in the temperate zones of both the northern and southern hemispheres resulted in the fragmentation of insect populations. Conceptually, isolation of populations might have been expected to have resulted in greater rates of speciation and extinction. The fossil record of Coleoptera, however, indicates that neither speciation nor extinction rates were higher during this time. The response of the Coleoptera was a massive reorganization of communities following extirpation and dispersion. In southern Chile, a region far removed from the great ice sheets of the northern and southern hemispheres, climate change had a profound effect on the beetle fauna. Independent evidence from ice-cores in Antarctica, and pollen records in Chile, indicates that the transition from the glacial to the interglacial climate was rapid, and represented an increase in annual temperature of about 4–5°C. At about 14,000 yr B.P. the glacial fauna, representing moorland habitats, was replaced by the present interglacial fauna, representing forest habitats. The number of Coleoptera species identified in fossil assemblages increased five-fold. The complete transition from a moorland to a forested environment occurred within 1500 years. Changes in biodiversity on a similar scale are documented in the fossil records of Coleoptera faunas that lived marginal to the ice sheets in North America and Europe at the end of the last glaciation. Reorganizations of the fauna, similar to that documented for the end of the last glaciation, occurred repeatedly during the Pleistocene in response to numerous climatic changes. Evidence from older Coleoptera fossil assemblages is that species have been constant during the Pleistocene leading to the speculation that stasis, paradoxically, is promoted by environmental instability.