

For every species of mammal, 300 arthropod species lurk in the rainforest

December 13 2012



Scarab beetle (*Megasoma elephas*, Dynastinae) in the understory of the San Lorenzo forest. Credit: Thomas Martin, Jean-Philippe Sobczak & Hendrik Dietz, TU Munich

A new study from the rainforests of Panama provides an unprecedented level of detail regarding the diversity and distribution of arthropod species from the soil to the forest canopy. Yves Basset, scientific

coordinator of the CTFS Arthropod Initiative at the Smithsonian Tropical Research Institute, led an international team on Project IBISCA-Panama to sample, sort, catalogue, and finally estimate that a 6,000 hectare forest hosts a total of around 25,000 arthropod species – a figure vastly outnumbering that of better-studied organisms. The study will be published online on Dec. 13 in the journal *Science*.

Most multicellular [species](#) on Earth are [arthropods](#) living in [tropical forests](#). Yet, given the difficulties involved in merely tallying them, we know very little about their exact numbers– even at the scale of a single [forest](#). A massive collaborative effort involving 102 researchers from 21 countries was necessary to collect and identify arthropods from all parts of the rainforest. During 2003-2004, the field team spent an effort of nearly 70 person- or trap-years in sampling the rainforest canopy from a construction crane, inflatable platforms, balloons, climbing ropes through forest layers, as well as crawling along the [forest floor](#) to sift soil, and trap and bait arthropods. During the ensuing eight years, the team sorted and identified 130,000 arthropods, to a total of more than 6,000 species.

By scaling up the diversity values obtained from twelve intensively-sampled sites, the team was able to calculate that the rainforest reserve harbors in excess of 25,000 arthropod species. "This is a high number as it implies that for every species of vascular plant, bird or mammal in this forest, you will find 20, 83 and 312 species of arthropods, respectively," explains Basset. "If we are interested in conserving the [diversity of life](#) on Earth, we should start thinking about how best to conserve arthropods," adds Tomas Roslin from the University of Helsinki, one of 35 co-authors.

"What surprised us the most was that more than half of all species could be found in a single hectare of the forest", said Basset. "This is good news, as it means that to determine the species diversity of a tropical

rainforest, we need not sample gigantic areas: a total of one hectare may suffice to get an idea of regional arthropod richness – provided that this total includes widely spaced plots representative of variation within the forest," said Roslin.

"Another exciting finding was that the diversity of both herbivorous and non-herbivorous arthropods could be accurately predicted from the diversity of plants", says Basset. "By focusing conservation efforts on floristically diverse sites, we may save a large fraction of arthropods under the same umbrella. Further, this strengthens past ideas that we should really be basing estimates of global species richness on the number of plant species," stresses Roslin.

"While we have assigned immense resources to mapping our genes, resolving sub-atomic structures and searching for extra-terrestrial life, we have invested much less in exploring with whom we share the Earth. Why such research should be run on a shoe string budget just escapes me," reflects Basset.

More information: Basset, Y., Cizek, L., Cuénoud, P., Didham, R.K., Guilhaumon, F., Missa, O., Novotny, V., Ødegaard, F., Roslin, T., Schmidl, J., Tishechkin, A.K., Winchester, N.N., Roubik, D.W., Aberlenc, H-P., Barrios, H., Bridle, J.R., Castaño-Meneses, G., Corbara, B., Curletti, G., Duarte da Rocha, W., De Bakker, D., Delabie, J.H.C., Dejean, A., Fagan, L.L., Floren, A., A., Kitching, R.L., Medianero, E., Miller, S.E., Gama de Oliveira, E., Orivel, J., Pollet, M., Rapp, M., Ribeiro, S.P., Roisin, Y., Schmidt, J.B., Sørensen, L., Leponce, M. 2012. Arthropod Diversity in a Tropical Forest. *Science*, Dec 2012.

R. M. May, Tropical arthropod species, more or less? *Science*, 2010, [doi:10.1126/science.1191058](https://doi.org/10.1126/science.1191058)

B.R. Scheffers et al. What we know and don't know about Earth's

missing biodiversity. *T.R.E.E.*, 2012, [doi:10.1016/j.tree.2012.05.008](https://doi.org/10.1016/j.tree.2012.05.008)

Provided by Smithsonian Tropical Research Institute

Citation: For every species of mammal, 300 arthropod species lurk in the rainforest (2012, December 13) retrieved 9 April 2024 from <https://phys.org/news/2012-12-species-mammal-arthropod-lurk-rainforest.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--