

Who are we sharing the planet with? Millions less species than previously thought

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(PhysOrg.com) -- New calculations reveal that the number of species on Earth is likely to be in the order of several million rather than 10's of millions. The findings, from a University of Melbourne-led study, are based on a new method of estimating tropical insect species -- the largest and one of the most difficult groups on the planet to study -- having significant implications for conservation efforts.

The study's lead author, Dr Andrew Hamilton from The University of Melbourne's School of Land and Environment, said he was driven to more accurately calculate [species](#) numbers because humans were more certain of the number of stars in our galaxy, than fellow species on their own planet.

“Our understanding of species numbers has been clouded by one group of organisms, tropical [arthropods](#), which include insects, spiders, [mites](#) and similar organisms. Estimates for this group have ranged from a few million up to 100 million,” says Dr Hamilton.

Dr Hamilton and a team of international researchers have applied probability modelling techniques (models often used in financial risk estimates) to data from numerous previous studies. They found that there is a 90% chance that there is somewhere between 2 and 7 million tropical arthropod species, with a best estimate of 3.7 million.

With the addition of approximately 50,000 vertebrates (birds, mammals, amphibians and reptiles), 400,000 plants and possibly 1.3 million other

organisms (mostly microorganisms, but excluding the bacteria for which we know very little about), this leaves us with a best estimate of around 5.5 million species with whom we share planet Earth. Furthermore, the study found that there is less than a 0.001% chance that the often-quoted value of at least 30 million total species is true.

“Our study is significant in this the International Year of Biodiversity, giving us a more realistic starting point for estimating extinction rates—a profound hurdle in [conservation biology](#). Extinction rates are typically estimated through knowing the area of habitat that has been lost, but to know how many species have been lost, we need to know how many were present in the first place. Obviously, if we are starting with less species, we may be worse off than we thought, and also be reducing the complexity of ecosystems even faster,” says Dr Hamilton.

“The findings also mean that in spite of 250 years of taxonomic research, around 70% of arthropods await description.”

“Many scientists have redone the calculations using different values and arrived at wildly different answers. Our work reran the same calculations, which use various inputs, such as the number of beetle species in the canopy of a typical rainforest tree, but accounted for uncertainty relating to these inputs and, therefore, uncertainty in the final estimation how many species there are.”

The study will be published in the current edition of the international journal *The American Naturalist*.

Provided by University of Melbourne

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