

Insectivorous Birds Annually Consume As Much Energy As New York City



GrrlScientist Contributor ⓘ

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Globally, birds are critically important for providing humans with valuable economic and ecosystem services by consuming billions of harmful crop-eating insects



Fledgling blue tit (*Cyanistes caeruleus*) eating beetle larva provided by its parent in Shrewsbury, UK.
(Credit: Maurice Baker) MAURICE BAKER

A recently published study by an international group of zoologists finds that insectivorous birds, which represent roughly half of all living bird species, are

important consumers of harmful insects that eat our food crops and spread disease.

The researchers came to this conclusion after they extracted data from 103 previously published experimental studies that reported the volume of arthropod prey consumed by birds. Arthropods comprise the taxonomic phylum, Euarthropoda, which includes insects and arachnids, as well as crustaceans (lobsters, shrimps, crabs and their relatives) and myriapods (which include millipedes, centipedes and the like).

Those reference studies were conducted earlier by many different research teams in seven main types of habitats in different parts of the world. This meta-analysis used basic mathematics to quantify the global ecological importance of birds to humans by keeping harmful plant-eating insects under control.

Based on their analysis, lead author, zoologist Martin Nyffeler, a senior lecturer and research fellow at the [University of Basel](#), and his collaborators estimated that globally, birds consume somewhere between 400 and 500 million tons of arthropods per year -- although, they note, it's probably closer to the lower end of this estimated range.

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Other insectivorous vertebrates, such as primates, bats, shrews, hedgehogs, frogs, salamanders, and lizards, are valuable, but less effective, enemies of plant-eating insects because their influence is restricted to particular habitat types rather than being global in scale.

“Only a few other predator groups -- such as spiders and entomophagous insects (including, in particular, predaceous ants) -- can keep up with the insectivorous birds in their capacity to suppress plant-eating insect populations on a global scale,” Dr. Nyffeler pointed out.

The global spider community is estimated to consume between 441 and 881 million tons of arthropods annually, according to a previous study led by Dr. Nyffeler (ref).

The [Food and Agriculture Organization of the United Nations](#) (FAO) estimates that people eat a similar amount of meat and fish annually (ref). (It's not clear how many, if any, arthropods might be included in that estimate.)

Dr. Nyffeler and his colleagues estimate that this amount of arthropods corresponds to an energy consumption of approximately 2.7×10^{18} Joules of energy per year.

“The global population of insectivorous birds annually consumes as much energy as a megacity the size of New York,” Dr. Nyffeler said in a press release. “They get this energy by capturing billions of potentially harmful herbivorous insects and other arthropods.”



A house sparrow (*Passer domesticus*) fledgling eating beetle larvae provided by its mother.
(Credit: Maurice Baker.) MAURICE BAKER

This is especially true during the breeding season, when birds' diets may change from, say, seeds, to herbivorous insects -- particularly beetles, flies, aphids, wasps, caterpillars, and grasshoppers -- as well as spiders, which are protein- and fat-rich morsels that meet nestlings' intense energetic demands essential for supporting their dramatic growth rates.

"The estimates presented in this paper emphasize the ecological and economic importance of insectivorous birds in suppressing potentially harmful insect pests on a global scale -- especially in forested areas," Dr. Nyffeler pointed out.

Dr. Nyffeler and his colleagues found that the biggest overall contribution is made by forest birds, which eat more than 70% (more than 300 million tons) of arthropods per year, whilst birds living in other habitat types, such as savannas, grasslands, agricultural croplands, deserts and the Arctic tundra, are less significant consumers of arthropods (roughly 110 million tons or more per year).

By dining on plant-eating insects, "birds -- in concert with other natural enemies such as spiders and ants -- contribute to natural insect pest suppression resulting in reduced herbivore damage," Dr. Nyffeler said.

Yet, even as birds provide critically important economic and ecosystem services by suppressing potentially harmful insect pests on a global scale, birds get no thanks from people.

"Birds are an endangered class of animals because they are heavily threatened by factors such as afforestation, intensification of agriculture, spread of systemic pesticides, predation by domestic cats, collisions with man-made structures, light pollution and climate change," Dr. Nyffeler elaborated. "If these global threats cannot soon be resolved, we must fear that the vital ecosystem services that birds provide -- such as the suppression of insect pests -- will be lost."

Source:

Martin Nyffeler, Çağan H. Şekercioğlu, and Christopher J. Whelan (2018).

Insectivorous birds consume an estimated 400–500 million tons of prey annually, *The Science of Nature*, **105**:47 | doi:[10.1007/s00114-018-1571-z](https://doi.org/10.1007/s00114-018-1571-z)

Also cited:

Martin Nyffeler and Klaus Birkhofer (2017). **An estimated 400–800 million tons of prey are annually killed by the global spider community**, *The Science of Nature*, **104**:30 | doi:[10.1007/s00114-017-1440-1](https://doi.org/10.1007/s00114-017-1440-1)

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