

Biologists study carrion fly DNA to derive mammalian diversity

January 9 2013, by Bob Yirka



Close-up of the head of *Calliphora vomitoria*. Credit: Wikipedia.

(Phys.org)—A research team from Germany has found a new way to study animal diversity in the wild – capture carrion flies and analyze the DNA found in their digestive tracks. The team discovered the new technique, they write in their paper published in *Molecular Ecology*, as part of a study that involved capturing a large number of carrion flies in two remote locations looking for evidence of anthrax.

Cataloging [plants and animals](#) that live in certain areas helps scientists better understand how ecological systems work. Some areas, however, are far more difficult to study than others. Whether because they cover vast areas, are mountainous or have dense foliage, tracking animals particularly, is difficult at best. This new discovery allows researchers to

take advantage of several types of carrion insects' ability to find and feed on decaying meat to make the process easier. As they do so, tiny bits of the DNA from those animals they feed on remain for a period in their digestive tracts. Thus, to garner a small sample of fauna in a given area, all researchers need do is lay out some meat as bait, capture the flies that gather and study their guts.

In their study, the researchers set out bait traps in two remote locations – Kirindy Reserve in Madagascar and Taï National Park in Côte d'Ivoire (Ivory Coast). In so doing they found [mammalian DNA](#) bits in roughly 40 percent of those carrion flies captured. In sequencing the DNA, they were able to identify a total of 16 different [mammal species](#) from the Ivory Coast site and 4 from the site in Madagascar.

The team reports that the quality of the DNA they found varies, from small bits to strands that are several hundred [base pairs](#) long – but taken as a whole, the samples provide a more accurate picture than has been found using other techniques such as through extraction from droppings. Because of that it appears this new method of studying [animal diversity](#) in a region is likely to become a very important tool for researchers going forward. Humans very rarely come across carcasses in the wild, thus the inevitable deaths of creatures that live there goes unnoted. With this new technique however, that will change as insects that capture their DNA if only for a short while, can be used as a sort of recording device.

More information: Carrion fly-derived DNA as a tool for comprehensive and cost-effective assessment of mammalian biodiversity, *Molecular Ecology*, DOI: 10.1111/mec.12183

Abstract

Large-scale monitoring schemes are essential in assessing global mammalian biodiversity, and in this framework, leeches have recently been promoted as an indirect source of DNA from terrestrial mammal

species. Carrion feeding flies are ubiquitous and can be expected to feed on many vertebrate carcasses. Hence, we tested whether fly-derived DNA analysis may also serve as a novel tool for mammalian diversity surveys. We screened DNA extracted from 201 carrion flies collected in tropical habitats of Côte d'Ivoire and Madagascar for mammal DNA using multiple PCR systems and retrieved DNA sequences from a diverse set of species (22 in Côte d'Ivoire, four in Madagascar) exploiting distinct forest strata and displaying a broad range of body sizes. Deep sequencing of amplicons generated from pools of flies performed equally well as individual sequencing approaches. We conclude that the analysis of fly-derived DNA can be implemented in a very rapid and cost-effective manner and will give a relatively unbiased picture of local mammal diversity. Carrion flies therefore represent an extraordinary and thus far unexploited resource of mammal DNA, which will probably prove useful for future inventories of wild mammal communities.

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