Cophylogeography of ecological replicates: the coevolution and biogeography of Galapagos mockingbirds and their ectoparasites

Results in Brief

Understanding host-parasite co-evolution

Understanding the evolutionary forces shaping the genetic character of host-parasite populations should help EU-funded researchers save a critically endangered mockingbird on the Galapagos Islands archipelagos.

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Ecuador's 16 Galapagos Islands, combining tremendous biodiversity with remote location and isolation, formed an excellent backdrop for the formation of Charles Darwin's theories about the evolution and selection of species.They are now a UNESCO World Heritage Site and Biosphere Reserve and continue to be the focus of extensive research into the evolution of species.

European researchers supported by EU-funding of the Galapagos project studied the co-evolution of the critically endangered Floreana mockingbird with three parasitic species that live off the mockingbird. The focus was on both guiding an effort to reintroduce the mockingbird and more generally on providing insight into geography-dependent structures forming genetic lineages specific to certain islands of the

archipelagos.

Scientists used a novel approach of reconciling phylogenetic histories (historical relationships among organisms or their parts, such as genes) of parasite and host taxonomic groups (seven in total, representing evolutionary ‘distances’) via the genealogical reconstruction Bayesian Evolutionary Analysis Sampling Trees (BEAST) software.

All species studied showed an explicit pattern of geography-dependent structure. In addition, despite clear co-evolutionary history between mockingbird hosts and their three parasites, occasional incongruities were observed and linked to colonisation of newly emerged islands.

Genetic diversity differed among the three species of parasites, attributable to differences in feeding habits, parasite mobility and life strategies.

The finding that genetic sizes of populations, of hosts and geographic area of the islands were interrelated supported the notion that some ecological factors like habitat size affect both parasite and host populations. Thus, information about parasites may be used to extract information about their hosts.

Galapagos research has enhanced understanding of evolutionary forces affecting host-parasite populations colonising new habitats. In addition to their general applicability, results have immediate importance to reintroduction programmes aimed at saving the critically endangered Floreana mockingbird.

Project Information

GALAPAGOS

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