DESCRIPTION FOR THE GENERAL PUBLIC

Madagascar is widely regarded one of the most unique islands on our planet. Most celebrated are its extant organisms – plants and animals. In fact, most Madagascar species (probably over 80%) do not occur anywhere else, and this is especially the case for its large and famous radiations such as baobabs and lemurs. This exceptional uniqueness might result from isolation caused by past geological processes. Madagascar is the only large island that has been isolated from land for at least 80 (perhaps over 125 million) years. This very long isolation time has allowed Madagascar's species to evolve in a very unusual way. Research has recently proved that a few the ancestors of currently living organisms, like some iguanas and tortoises, have been on Madagascar since the island was a part of supercontinent, called Gondwana. However, it is also known that most of Madagascar's species are the offspring of organisms that came to Madagascar because of more recent incidental migrations. Our research explores the current biodiversity of an endemic group of colourful moths living on Madagascar, and relates these to past environmental processes and knowledge of the habitat associations and biology of the group.

In this particular research, we focus on a specific group of tiger-moths (Lepidoptera: Erebidae: Arctiinae). There are almost 11000 species of tiger-moths living around the world, while on Madagascar there are 384 species described. Among the target group of spotted tiger-moths locally, the tribe Syntomini, there are 100 species described. None of these species occur anywhere else. Until recently, it seemed likely that they came from a common ancestor that got out of Africa. Our preliminary research suggests that evolution of this group is much more complicated. An interesting and surprising issue showed up during our research. It turned out that there was additionally an opposite colonization – from Madagascar to the continent of Africa.
As a result, this lineage probably got through the Arabian Peninsula and spread in the southern and western Palearctic. Such a phenomenon is extremely rare among invertebrates and was confirmed in only two other cases so far.

The aim of this international project is to explain the various aspects of the evolution, distribution and ecology of this model group of Madagascar spotted tiger-moths. For the first time ever, they will be subjected to a comprehensive research program combining morphological, genetic and biological data and using state-of-art methods of molecular and statistical analysis. Our goal is to analyze carefully selected parts of the nuclear and mitochondrial genome as well as morphology (wing pattern, wing venation, and reproductive organs). The research team will be composed of scientists from Sweden (Lund University) and Great Britain (Natural History Museum in London). We will analyze several hundreds of specimens representing most of the described genera/species.
Our team will use specimens housed in famous European museums (Paris, London, Munich) as well as additional material collected in the field during two new expeditions to Madagascar's rainforests. It is highly probable that during these expeditions we will discover new species – not described before. Also we would like to gain some important data about the distribution, biology and ecological preferences of these moths. With this information, our team hopes to establish which species are most localized or might be endangered and potential protective actions.

During the three years of the project, phylogenetic studies are planned to explain whether the Madagascar Syntomines constitute a monophyletic group (i.e. do they come from a common ancestor that is not shared with mainland representative?). A separate part of research concerns problems related to biology and habitat preferences. Is there an evolutionary trend in the selection of habitats by specific phylogenetic lines? Our scientific tests will be extremely important for understanding the general mechanisms and phenomena responsible for the evolution of Madagascar fauna.

The research topics as well as the tools used in them fit perfectly with current trends in science. The huge interest in the evolution of the unique "biodiversity hotspot" which is Madagascar means that the published results are likely to be well received and shed new light on the subject.