MODELING HABITAT SUITABILITY AND HABITAT SELECTION FOR THE GALAPAGOS PINK LAND IGUANA

PhD Student: Marco Gargano *Supervisor*: Prof. Gabriele Gentile *Co-supervisor*: Giuliano Colosimo

36th Cycle - A.Y. 2020/2021

The Galápagos Pink Land Iguana (*Conolophus marthae*) is a species endemic to Wolf Volcano, on Isabela Island, in the Galápagos archipelago, where it is present as a single population on the northwestern slope of the volcano. It was described as a new species only in 2009, based on morphological, genetic and behavioral traits. It is assessed as *Critically Endangered* in the IUCN Red List because of its small population size (N=192; Ne=90.7) and limited distribution (< 25 Km^2). *C.marthae* lives in sintopy with the congeneric *Conolophus subcristatus* that, on Wolf Volcano, occupies both the areas inside and around *C.marthae* habitat. Therefore, the two species could compete for resources and for nesting sites, whose location is still unknown for *C.marthae*.

It is clear that understanding how these two species use their habitats and how they affect each other is fundamental for the conservation of *C.marthae*. Therefore, the main objectives of this research will be: (*i*) producing a habitat suitability model to define the potential distribution of *C.marthae*, (*ii*) forecasting the habitat suitability for the species in the future under climate change conditions, (*iii*) modeling habitat selection by the two species and (*iv*) locating nesting sites for *C.marthae*.

This could be possible thanks to the collection of GPS data from males and females of the two species, using tracking devices developed by University of Tor Vergata researchers. These data will be integrated with environmental, geographical and climatological informations extrapolated using an ensemble approach based on passive remote sensing images (e.g. Landsat, MODIS) and available inventory data, then projected in a GIS (Geographic Information System) contest for the analysis. To produce the habitat suitability model we will use different approaches, i.e. ensemble approaches that require presence and absence data and only presence data approaches. The models will be calibrated using the GPS data and the environmental variables obtained as described above. This will be the starting point to evaluate how the habitat suitability could change under climate change conditions, using dedicated software (e.g. LandClim) to make predictions about habitat future structure and distribution. Then, we will use resource selection functions to evaluate how the two species use their habitat at different spatial and temporal scales and to locate nesting sites for *C.marthae*.

My main hypothesis is that a competition for trophic resources and/or for nesting sites could exist with *C.marthae* that could be more specialized than *C.subcristatus*, in terms of habitat and diet. However, other suitable areas in the archipelago could be found and this will be important to evaluate new opportunities for the conservation of the species, e.g. removing dispersal barriers or establishing new populations in other suitable areas.