

Connectivity of the big blue octopus (*Octopus cyanea*, Gray 1849) between the eastern and western coast of Madagascar

Van Caster Nathalie, Ratsimbazafy Hajaniaina Andrianavalonarivo and Kochzius Marc

Marine Biology, Ecology and Biodiversity, Vrije Universiteit Brussel (VUB), Pleinlaan 2, 1050 Brussels, Belgium

E-mail: nathalie.laurence.van.caster@vub.be

Among the coastal communities in Madagascar the fishery for *Octopus cyanea* in coral reefs is one of the three most important activities in term of economic value. In the coastal communities of Madagascar there are few alternatives to marine resource extraction. This economic exploitation of *O. cyanea* has increased the local value of the fishery and transformed a formerly traditional fishery predestined to local consumption into an export-driven fishery. This dramatic increase of fishery raised rates of exploitation and concerns over sustainability. A way to protect this species against overfishing and manage vulnerable marine ecosystems is to introduce marine protected areas (MPAs). An important factor that should be considered when implying MPA networks is gene flow among populations along the coast of Madagascar. *Octopus cyanea* is fished mostly in shallow reefs among the coast, where it is vulnerable and an easy prey for fishers. It is only when female individuals reach maturity that they migrate from shallow reef into deeper subtidal areas for spawning. The planktonic larvae move into the water column for one to two months, and dispersal is thought to be wide ranging. Larvae are thought to travel up to several hundred kilometres with ocean currents. These findings predict a high connectivity among different populations of *O. cyanea*. Connectivity can be determined using genetic markers such as mitochondrial DNA and microsatellites. In this study, the population genetic structure of *O. cyanea* will be studied in order to investigate connectivity among populations, because such information is crucial for the setup of MPAs along the coastal areas of Madagascar. Cytochrome C oxidase subunit-1 (COI) will be used as DNA marker. DNA barcoding will be used to confirm the identification of *O. cyanea* individuals in the samples. Samples from five different sites from the west, north and east coast of Madagascar will be analysed. Samples from the western and eastern coast will be compared with each other and with the samples from the northern coast of the island. In total 88 tissue samples of individuals of *Octopus cyanea* were collected at five different sites. They were preserved in at least 95% ethanol, after collection in field. DNA was extracted using a E.Z.N.A.® Tissue DNA kit. PCR will be conducted using universal primer and COI will be used to analyse the genetic difference between the specimens found on each side of the island. The aim of this study is to provide an answer on the following questions: Is there gene flow between populations on the west and east coast of Madagascar? It is expected that the result of this study will provide baseline data for the conservation and management of *O. cyanea*.

Keywords: big blue octopus; *Octopus cyanea*; Madagascar