



Pôster – Ecologia e Conservação

Effects of population connectivity on individual fitness: a case-study on pea crabs associated to sand dollars

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Landscape ecology utilizes connectivity metrics as a fundamental measurement for modelling and analyzing the spatial dynamics of populations. Many natural populations are organized as metapopulations although this concept is mostly related to landscape fragmentation and habitat loss by anthropogenic effects. Those populations are maintained by migration patterns of the individuals, therefore, population structure and reproductive patterns persist because of the balance between immigration and emigration rates. However, little is known about how physical and biological properties of the connectivity matrix, usually a secondary and impoverished environment, affect the stability of populations and the performance of the individuals. This study approaches this issue in a particularly tractable system: pea crabs distributed on sand dollars, the latter working as discrete habitat patches separated by distances that can be easily covered by SCUBA diving. In the first phase of the study, we constructed distribution maps of the sand dollars and their pea crab guests along the São Sebastião channel, in different sampling areas of São Sebastião and Ilhabela. From these maps we ran analysis of the connectivity between habitat patches and on crab populations to identify the degree of aggregation, and the effects of habitat connectivity on the formation of reproductive units of the crabs. Also, in each sampling area we collected sediment samples that compose the matrix for granulometry and organic matter content analysis, and we measured the predation potential of each area by field experimentation, to investigate the composition, quality and predation risk of the matrix that could influence the migration rates of the crabs. In a second phase, the larval release rate of each combination of adult crabs found on sand dollars will be estimated in the laboratory to assess individual fitness. The analyses of these data will allow to (i) identify the environmental variables that most likely contribute to crab connectivity, (ii) assess how connectivity may influence crab clustering in sand-dollars (number of individuals and sex ratio), and (iii) understand how connectivity may ultimately affect crab per capita reproductive value. We also planned to conduct a secondary laboratory experiment in which the environmental variables identified above are manipulated to (iv) verify whether correlational evidence truly reflect cause-effect relationships. The preliminary results have shown that the sand dollars are randomly distributed in each area sampled, but the crab populations show a more clustered distribution and form reproductive units on patches closer to each other. We also verified high predation potential on the matrix that could lead to reduced migration rates and the consequent colonization of nearest patches.

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