

## PROPOSAL OF FINAL PROJECT

year 2021–2022

**Research group or lab:**

**Institution:** Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals

**Supervisor(s):** Antigoni Kaliontzopoulou, Marcos Roca-Cusachs

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**Title of the project:** Quantification of the morphological disparity of the family Pentatomidae (Hemiptera: Heteroptera) using geometric morphometrics.

**Tasks:** The student will be responsible of making high-resolution photographs of specimens of representative species of stink bugs already available in the collection of M. Roca-Cusachs and the CRBA; then she/he/they will digitize landmarks on these photographs to quantify body shape, repeating the digitizing procedure on a subset of photographs to evaluate measurement error; and finally, she/he/they will perform a thorough statistical analysis of the obtained size and shape data, in light of the molecular phylogeny of the group, to describe patterns of morphological variation and test specific hypotheses (see project description). Ultimately, the student is expected to produce a scientific publication based on the data at hand.

**Physical work address:** Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals

**Training requirements:**

**Description of the project:**

The family Pentatomidae (stink bugs), commonly known for their particular shapes, characteristic colours and their bad smell when handled, is a monophyletic group recognized by phylogenetic techniques and with well-recognizable synapomorphies. The molecular phylogeny of the group was published recently, revealing that the morphological characters traditionally used for classification, both at the subfamily and tribal level, do not agree with the phylogenetic position of these clades, suggesting that extensive morphological adaptation and convergence may have occurred. Interestingly, both the overall shape of the body and that of specific structures exhibit extensive variability across species, which has never been quantified. The aim of this project is to develop a new protocol using geometric morphometric techniques to quantify body shape variation in different species of stink bugs that will allow: 1) to quantify morphological disparity within the family; 2) to examine if the representatives of the clades previously established by means of molecular phylogeny also cluster together morphologically, i.e. to examine the contribution of phylogenetic relatedness in shaping morphological patterns; 3) to establish the evolution of homologous characters both within the family and

within some selected groups; 4) To examine the contribution of environmental factors, like habitat use and diet, in shaping morphological patterns using phylogenetic comparative methods.

**Comments:**