Re-defining the Concept of Model Species:

An Experimental Approach on a Range of Marine Animals

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A□STRACT

Scientific research extensively uses model organisms to address biological, ecological and evolutionary issues. Research employs a limited variety of organisms, ranging from bacteria to complex meta□oans, to ans□er scientific □uestions and investigate natural aspects. □ e define “Model Organisms” this small fraction of the biological biodiversity. Generally, they are a simplified tractable system used to study larger scientific □uestions and to ans□er complex problems. Researchers expect that results obtained through experiments on these MOs □ ill be applicable to other, more complex, organisms, or to complex communities and ecosystems. Model organisms are sometimes a scarcely representative sample of the global physiological, biochemical and genetic biodiversity and the ans□ers that they can provide could not be easily applicable and transferred to other species. This Ph.D. thesis aims at re□defining the concept of “model species” on an ob□ective point of vie□ . I analysed a standard range of common characteristics that can describe and rank selected model organisms on the basis of their uni□ue features, advantages and disadvantages. I have taken into consideration various “practical” features, such as si□e and feeding, their reproduction and the optimi□ation of the culture techni□ues□their use in some scientific fields, such as chemical ecology, stress responses and apoptosis, and the availability of molecular tools and se□uenced genomes. A set of laboratory analyses □ as applied to test the po□ er of selected species to ans□er our □uestions and an arbitrary score □ as assigned to each species for each parameter according to our results and to the data available in scientific literature. The information collected □ as used to ob□ectively rank the considered model organisms, for improving future experimental approaches and indicate a possible strategy to choose ade□uate models for selected research.