

Using morphological characters to estimate geographic variation in the Mediterranean bath sponge *Spongia officinalis* and assess the taxonomic validity of its associated morphotypes

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Sponges are basal metazoans characterized by notable morphological plasticity. The morphologic diversity deriving from this plasticity has often caused controversies regarding the taxonomy of certain poriferan taxa, but has seldom been examined at a geographical scale. Herein we examine morphometrically the common Mediterranean bath sponge *Spongia officinalis* (accounting both traditionally recognized morphotypes “mollissima” and “adriatica”), in order to investigate implications for taxonomy and assess the potential role of geographic division in morphological variation. For this purpose, we analyzed 21 morphologic characters for 60 individuals collected from 11 geographic locations in the Eastern and Western Mediterranean (Aegean Sea, Gulf of Marseille and Alboran Sea). Characters were related to both the external morphology (e.g. size, color, pore dimensions and distribution) and the skeletal structure (e.g. primary and secondary fiber dimensions, type and abundance of inclusions); their diversity among morphotypes and locations was estimated with standard statistical methods (regression, ANOVA, MDS). Our results showed that morphologic characters were unable to clearly discriminate between the morphotypes of *S. officinalis*, confirming the recent molecular findings that suggested a taxonomic uniformity of the species along its Mediterranean distribution. Hence, the types “mollissima” and “adriatica” should be regarded as two extremities of the species’ intrinsic morphologic diversity, with intermediate types commonly observed, at least in the Aegean. Contrastingly, the majority of quantitative morphologic characters exhibited significant variation among geographic locations and individuals –in accordance to expectations for a morphologically plastic organism–, thus suggesting a putative influence of environmental variation to the observed phenotypic traits.