APPLYING GENERALIZED ADDITIVE MODELS TO STUDY THE SOMATIC GROWTH AND REPRODUCTIVE EVOLUTION OF THE SEA URCHIN *PARACENTROTUS LIVIDUS* (LAMARCK, 1816)

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Sea urchin, *P. lividus* (Lamarck, 1816), is an echinoderm of great commercial interest and very common along the Atlantic and Mediterranean seaboards of Europe and Africa. The commercial interest of this equinoderm is based on making use of the species' gonads or reproductive organs. The main objective of this work is to study the somatic growth and reproductive evolution of this species along its life cycle, through the possible dependence of the gonad yield on size and age (and their interaction), at three different sites in the Galician coast (NW Spain). To this aim, the use of a Generalized Additive Model (GAM; Hastie and Tibshirani, 1990) including surface-by-factor interactions is suggested to assess this relationship in a flexible way. The local scoring algorithm based on local linear kernel smoothers was used to estimate the model. Bootstrap-based procedures are proposed for implementation of statistical tests to ascertain if the effect of size-by-age on the gonad yield varies across the different sites considered. The smoothing parameters are automatically selected using the cross-validation technique. Given the high computational cost involved, binning techniques were used to speed up computation in the estimation and testing processes.