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Effects of breakwater deployment on the life-history traits of the caramote prawn penaeus kerathurus (forskål, 1775) in the adriatic sea

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Abstract

A century ago, in the Adriatic Sea, *Penaeus kerathurus* was a rare species without interest for the local fishers. Its abundance has been in continuous increase in the last 30 years, in countertendency with a general decrease of fisheries resources. Besides the expression of the meridionalization phenomenon, some authors have hypothesized this change is generated by synergic action of multiple factors. Thus installation of breakwaters, to prevent coastal erosion, resulted in extension of suitable nursery grounds with enhanced recruitment of post-larvae, and seasonal trawling ban delays recruitment of juveniles into the fishery. The aim of this study was to verify if the extensive construction of breakwaters along the western Adriatic coast, since the late Fifties of the past century, could affect the life-history traits of caramote prawn. Samplings were carried out, with an experimental beam-trawl, from July 2013 to September 2014, in an area protected by breakwaters and additional samplings were carried out in areas without breakwaters and again in summer 2016 and 2018. Water temperature was recorded at each sampling. Results evidenced a high density of juvenile caramote prawns within the protected area in summer, with maxima of 0.36 and 1.15 ind/m^2, respectively in August 2013 and August 2018, whereas almost zero specimens were caught in areas not protected with breakwaters. This is a strong indication that the narrow strip of shallow artificial “lagunar habitat” created by breakwaters, acts as a suitable nursery area for *P. kerathurus*. Machine learning techniques highlighted the correlation of relative abundance of juveniles in these nurseries with environmental parameters. In particular, random forest analysis indicated the photoperiod as the most important independent variable; regression tree clearly depicts this relationship, showing also how the water temperature, the second most important variable, explains the sharp decrease in density at the autumn offshore migration.

Keywords

Breakwaters, Penaeus kerathurus, Life-history traits , Adriatic Sea