Spatio-Temporal distribution of the bathyal Shark species of Antalya Bay, Eastern Mediterranean

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Aim of the study: The present study examines, for the first time, the assemblage of demersal sharks along the depth gradient from 200 to 900 m on the bathyal ground of the Antalya Bay in the North Levant (i.e. Turkish Mediterranean Sea) and analyzes the variations in their distribution, diversity and dominance by depth and season.

Material and Methods: Samples were collected during the monthly surveys from July 2010 to June 2011, with the R\V "*Akdeniz Su*", and sampling area was divided in seven bathymetric strata (200-900 m: 100 m interval). A standard otter-trawl was used. For each haul, sharks were sorted by species and, species abundance (n) and biomass (kg) data were noted. The parameters number and weight of the species for swept area (km^{-2}), the species abundance (D, number of individuals/km^{-2}), species biomass (BI, kg/km^{-2}), the abundance of recruits (D_R, number of juvenile/km^{-2}), adults (D_A, number of adults/km^{-2}) and mature (D_M, number of matures/km^{-2}) indices were standardized using the software AdriaMed Trawl Information System (ATrIS; Gramolini et al., 2005) for each haul. The maps of distributions of these indices were drawn with Surfer 12. Significant tendency in indices by the depth stratum and season were tested using a non-parametric correlation (Spearman) analysis. Shark assemblages in bathyal grounds were compared using univariate and multivariatetechniques. Univariate techniques were performed using SPSS version 17.0 (SPSS, 2008). The null hypothesis of no difference in abundance and in biomass between stratums and seasons was tested with the 2-factor analysis of variance (MANOVA). Prior to analysis, the data were square root transformed and the assumption of the homogeneity of variance was tested by Levene's test.

Results:A total of 13 734 shark individuals belonging to 8 species from 7 families was collected over the 87 hauls, having a total duration of 121 hours and covering a total sampling area of 9.565 km^{-2}. *Etmopterus spinax* was the dominant species with 10 659 individuals. Second dominant species,*Scyliorhinus canicula,* ranged from 300 to 899 m. The distribution of *Galeus melastomus* was similar with *E. spinax* (300-899 m). *S. blainvillei* (n:218) ranging from 200 to 699 was collected on the upper slope (<500 m) with 85%, and on the lower (≥500 m) with 15%. According to the results of two-way MANOVA, while stratum was a significant parameter for D, BI and TL of the four species, season was not significant parameter ($p < 0.05$). TL of the species increased in parallel with depth ($p < 0.01$).Depth was negatively correlated with D and BI values of *S. canicula* but positively with BI value of *G. Melastemus* ($p < 0.01$).Depth was negatively correlated with juveniles of *E.spinax* and *G.melastomus* and positively with the adults in terms of abundance ($p < 0.01$).While DR and DM of *S. canicula* decreased in paralel with depth ($p < 0.01$), Depth was not corraleted with DR and DM of *S. blanvelli* ($p > 0.5$).

Keywords: Shark, *Etmopterus spinax*, *Scyliorhinus canicula*, *Galeus melastomus*, *Squalus blainvillei*, Antalya Bay.