ENVIRONMENTAL PREFERENCES OF BIGEYE TUNA (*Thunnus obesus*) IN THE NORTHERN INDIAN OCEAN USING REMOTE SENSING AND FISHERIES LOGBOOK DATA

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Enhancing the fishing efficiency of Bigeye tuna (BYT) has become vital due to its' low catch rate around Sri Lankan marine waters. Insight into the environmental preferences of BYT is important to predict potential fishing grounds, thereby ensuring the expected catch in a short time. Hence, this study aimed to examine the environmental preferences of BYT practised by longline fisheries in the northern Indian Ocean. The fishing data for the longline fishery during 2016-2019 in Sri Lanka were collected. Environmental parameters such as sea surface temperature (SST), sea surface chlorophyll (SSC), secchi disk depth (ZSD), mixed layer depth (MLD), sea surface salinity (SSS), sea surface height (SSH), thermocline depth (THD), and eddy kinetic energy (EKE) were obtained from remote sensing and ocean observation data of the Copernicus Marine Service. A Generalised Additive Model (GAM) was fitted to describe the relationships between environmental parameters and catch per unit effort (CPUE) of BYT. One-way ANOVA test was conducted to determine the effects of the lunar cycle on CPUE of BYT, and revealed that there is no significant difference ($p>0.05$) of CPUE with the lunar cycle. The results of GAM showed that the relationships between CPUE and the individual environmental parameters tested are significant ($p<0.05$). The highest percentage of deviance explained (DE) showed SSH (5.19%), followed by SSC, ZSD, SSC, ZSD, THD, EKE, SST, SSS, MLD. The strongest relationship was observed in combination of SSH, SSC, SST, SSS, EKE with CPUE (7.88% DE). The higher CPUE of BYT were observed in the areas where tested parameters SSH, SSC, SST, SSS, PSU and EKE varied between 30-60 cm, 0-1 mg m^{-3}, 27.5-29°C, 33.5-35.5 PSU, and 0-0.4 $m^2 s^{-2}$, respectively. The basic results of this study can be applied to predicting habitats for BYT in the northern Indian Ocean.

Keywords: Catch per unit effort, Generalised Additive Model, Indian Ocean, Longline