

Application of a Generalized Additive Model to Reveal the Relations between the Density of Zooplankton with Other Variables in the West Daya Bay, China

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Abstract : Zooplankton are a central issue in the ecology which makes a great contribution to maintaining the balance of an ecosystem. It is critical in promoting the material cycle and energy flow within the ecosystems. A generalized additive model (GAM) was applied to analyze the relationships between the density (individuals per m^3) of zooplankton and other variables in West Daya Bay. All data used in this analysis (the survey month, survey station (longitude and latitude), the depth of the water column, the superficial concentration of chlorophyll a, the benthonic concentration of chlorophyll a, the number of zooplankton species and the number of zooplankton species) were collected through monthly scientific surveys during January to December 2016. GLM model (generalized linear model) was used to choose the significant variables' impact on the density of zooplankton, and the GAM was employed to analyze the relationship between the density of zooplankton and the significant variables. The results showed that the density of zooplankton increased with an increase of the benthonic concentration of chlorophyll a, but decreased with a decrease in the depth of the water column. Both high numbers of zooplankton species and the overall total number of zooplankton individuals led to a higher density of zooplankton.

Keywords : density, generalized linear model, generalized additive model, the West Daya Bay, zooplankton

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