Abstract

Marine pollution is one of the main anthropogenic factors identified globally to affect the estuarine and coastal ecosystems. One of the recipients of pollutants is the mangroves since they are intercepting between land and ocean. In recent years, the mangrove forests have been proposed for use as natural wastewater treatment wetlands. This is based on research findings conducted in countries like China. However, before promoting the use of natural mangrove as pollution buffers, the effect of these pollutants on the ecosystems‟ biodiversity must be assessed. This study aimed at determining the impact of pollution on the feeding, bioturbation and biomass of the fiddler crab Uca annulipes in Gazi and Mikindani along the Kenya Coast. The mangroves in Mikindani on Tudor creek represented peri-urban mangroves which are heavily impacted by municipal wastewater, while the mangroves in Gazi Bay in the South Coast of Kenya represented mangroves not affected by direct sewage input. In addition, crabs Uca annulipes are one of the most important groups of mangrove epifauna. To investigate the impacts of pollution on the feeding, bioturbation and biomass of Uca annulipes a stratified nested design was adopted. The mangroves selected for the study manifested distinctive zonation pattern in the dominance of their mangrove species, due to this, a stratified random sampling approach was applied at each site. Sampling was conducted in 2 × 2 m2 quadrats in desert and Avicennia zones during July, August and October 2005. Data collection depended on each full moon springs and new moon springs when spring tides would be realised. Different parameters were measured, Chlorophyl a (Chl a) concentrations in the feeding pellets and non-processed soils, amount of bioturbated soils (expressed as dry weight of excavated material and feeding pellets), and biomass (dry weight) of Uca annulipes. Four factor Analysis of Variance (ANOVA) tests were applied to determine whether there were significant difference in feeding, bioturbation and biomass of Uca annulipes within the two sites. Results show significant differences in Chl a concentration was observed in the feeding pellets in the Avicennia zone ($F_{1, 88}=0.146$; $p < 0.05$) of the peri-urban mangroves. Moreover Chl a concentration did not vary between the processed (0.36 ± 0.07) and non-processed soils (0.32 ± 0.07) in the Avicennia zone. In Gazi Significant difference in bioturbated material was recorded compared to Mikindani ($F_{1, 16}=70.65$; $p < 0.05$).). The results manifested a consistent increase in crab biomass at the peri-urban site, than the non urban mangroves ($F_{1,16}=75.28$, $p>0.05$).The Avicennia zone of the peri-urban site had a higher Uca annulipes biomass compared to the non-urban Gazi ($F_{1,16}=54.48$, $p<0.05$). There was no relationship between the mass of bioturbated material and Uca biomass ($R2 =0.0197$,

$p < 0.05$). Results also show that the amount of excavated material did not relate to the Uca biomass ($R2 = 0.0248$, $p < 0.05$). In conclusion, fiddler crabs through feeding, burrowing and ventilation activities have an influence on microbial activity and sediment metabolism in marine sediments. Therefore, the feeding pattern in the peri-urban site indicated the need for further study of the actual potential of natural mangroves to absorb pollutants in sewage water since it will be important to find out what the crabs are feeding on.