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Comparative Assessment of Heavy Metals Influence on Growth of Silver Catfish (Chrysichthys nigrodigitatus) and Tilapia Fish (Oreochromis niloticus) Collected from Brackish and Freshwater, South-West, Nigeria

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Abstract : Ecological studies were carried out in Asejire Reservoir (AR) and Lagos Lagoon (LL), Southwest Nigeria from January 2012 to December 2013 to determine the health status of Chrysichthys nigrodigitatus (CN) and Oreochromis niloticus (ON). The fish species samples were collected every month, these were separated into sexes, and growth pattern {length, (cm); weight (g), Isometric index, condition factor} were measured. Heavy metals (lead (Pb), iron (Fe), zinc (Zn), copper (Cu), and chromium (Cr) in ppm concentrations were also determined while bacteria occurrence(s), (load and prevalence) on fish skins, gills and intestine in the two ecological zones were determined. The fish ratio collected is in range with normal aquatic (1: 1+) male: female ratio. Growth assessment determined revealed no significant difference in length and weight in O. niloticus between locations, but a significant difference in weight occurred in C. nigrodigitatus between locations, with a higher weight (196.06 ±0.16 g) from Lagos Lagoon. Highest condition factor (5.25) was recorded in Asejire Reservoir O. niloticus, (ARON); and lowest condition factor (1.64) was observed in Asejire Reservoir C. nigrodigitatus (ARCN); as this indicated a negative allometric value which is normal in Bagridae species because it increases more in Length to weight gain than for the Cichlidae growth status. Normal growth rate (K > 1) occurred between sexes, with the male species having higher K - factors than female species within locations, between locations, between species, and within species, except for female C. nigrodigitatus having higher condition factor (K = 1.75) than male C. nigrodigitatus (K = 1.54) in Asejire Reservoir. The highest isometric value (3.05) was recorded in Asejire Reservoir O. niloticus and lowest in Lagos Lagoon C. nigrodigitatus. Male O. niloticus from Asejire Reservoir had highest isometric value, and O. niloticus species had higher condition factor which ranged between isometric (b ≤ 3) and positive allometric (b > 3), hence, denoted robustness of fish to grow more in weight than in length; while C. nigrodigitatus fish has negative allometric (b < 3) indicating fish add more length than in weight on growth. The status of condition factors and isometric values obtained is species-specific, and environmental influence, food availability or reproduction factor may as well be contributing factors. The concentrations of heavy metals in fish flesh revealed that Zn (6.52 ±0.82) had the highest, while Cr (0.01±0.00) was ranked lowest; for O. niloticus in Asejire Reservoir. In Lagos Lagoon, heavy metals concentration level revealed that O. niloticus flesh had highest in Zn (4.71±0.25) and lowest in Pb (0.01±0.00). Lagos Lagoon C. nigrodigitatus heavy metal concentration level revealed Zn (9.56±0.96) had highest, while Cr (0.06±0.01) had lowest; and Asejire Reservoir C. nigrodigitatus heavy metal level revealed that Zn (8.26 ±0.74) had highest, and Cr (0.08±0.00) had lowest. In all, Zinc (Zn) was top-ranked in level among species.

Keywords : Oreochromis niloticus, growth status, Chrysichthys nigrodigitatus, environments, heavy metals
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