

ABSTRACT

Effect of the Bauxite/Alumina Waste on the Diversity and Distribution of the Benthic Macroinvertebrates of the Upper Rio Cobre

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Bauxite/alumina is one of Jamaica's leading foreign exchange earners and the abundance of this resource puts the island amongst the top ten producers in the world. Pollution of natural water systems from the processing of bauxite has been well documented by Fernandez, Parkin, O'Callaghan and Andrews *et al.*

This study assesses the impact of wastewater from the processing of bauxite on the benthic macroinvertebrate (BMI) community of the Upper Rio Cobre River. One hundred and ninety two benthic samples were collected (four replicates from each site) from May 1999 to June 2000 at four sites on the Rio Cobre. Whole-sample identification and enumeration of taxa collected was done.

Dissolved oxygen and water temperature differed significantly between sites according to the level of exposure to sunlight. Conductivity, though not correlated to any pattern in the presence/numbers of BMI, supported the assumption of high metal content in the water at impacted sites (Victoria, Linstead, and Deeside) almost doubling the values obtained at the reference

site (Black River). Forward stepwise multiple regression revealed that only discharge and pH significantly impacted the BMI by affecting their diversity.

A distinct change in the BMI community was observed at impacted sites in comparison to Black River (reference site). Black River was dominated by the scrapers *Cubanoptila tridens* and *Helicopsyche ochtheiphila*; while the filterer/collectors *Smicridea jamaicensis* and *Baetis sp.* dominated the impacted sites Victoria and Linstead. Deeside, the site farthest from the wastewater outfall, displayed a recovery type fauna dominated by *Baetis sp.*, *Cubanoptila tridens*, *S. jamaicensis*, Pyralidae and *Thiara granifera*, which include both scrapers and filterer/collectors. One of the main features of the diminishing impact of the waste with distance was the return of reference site fauna observed at Deeside.

S. jamaicensis, *Physella*, Chironomidae, Ceratopogonidae (*Bezzia sp.*), Ostracod A, *Ferrissia hendersoni*, Empididae (*Clinocera sp.*) and Elmidae A were identified as possible indicators of metal pollution and are recommended subjects for further study.

Keywords: Bauxite/Alumina; Benthic macroinvertebrates; *Baetis sp.*; *Cubanoptila tridens*; *Smicridea jamaicensis*; Pyralidae; *Helicopsyche. Ochtheiphila*, *Thiara granifera*; *Physella*; Chironomidae; Ceratopogonidae (*Bezzia sp.*); Empididae (*Clinocera sp.*); Elmidae A, Ostracod A, *Ferrissia hendersoni*