LEVEL OF CONTAMINATION IN THREE AQUATIC ECOSYSTEMS OF THE STATE OF CHIHUAHUA, MEXICO, USING A MULTIVARIATE ANALYSIS

Jesus Manuel Ochoa-Rivero[1], Alberto Hernandez-Armendariz[2], Jose Roberto Espinoza-prieto[3] and Hector Rubio-Arias[3]

[1]*National Research Institute for Agriculture, Forestry and Animal Production,* [2]*Former student at the Faculty of Engineering of the Autonomous University of Chihuahua,* [3]*Faculty of Animal Science and Ecology at the Autonomous University of Chihuahua. Mexico*

Abstract: The objective of this study was to develop a multivariate analysis of eight physico-chemical parameters of water obtained in three aquatic ecosystems located in the state of Chihuahua, Mexico. The ecosystems were las Francisco I. Madero Dam, la Boquilla Dam and the Colina Lake, all of them placed in the Conchos River. The three aquatic systems are considered of vital importance to the state of Chihuahua due to their importance for agriculture, animal production, tourism as well as human consumption. Monthly, water samples were obtained during the period of March 2011 to February 2012. Six sites were randomly selected in Francisco I. Madero Dam and La Boquilla Dam water samples at two depths were obtained (0.30 m and 5.0 m) and Colina Lake (0.30 m and 3.0 m). The parameters were pH, electrical conductivity (EC), dissolved oxygen (DO), temperature (T), turbidity, total dissolved solids (TDS), total hardness (TH) and Chlorides (Cl^-). The statistical analysis was performed in two steps. In the first step the descriptive statistics of the parameters were obtained, their distribution and a non-parametric multivariate analysis of variance were accomplished (NPMANOVA). During the second step the parameters were analyzed considering the time and a principal component analysis (CA) was developed. The results showed that no differences were noted due to sample depths; however, statistical differences were noted for aquatic systems. The parameters pH, Cl^- and turbidity were stables during the sample periods. TH was high during all the study and in the three ecosystems. The parameters TDS and EC were higher in the winter season particularly at Colina Lake. The levels of DO were similar in the three ecosystems as well as temperature. It is concluded that according to Mexican normativity for ecology purposes, the three aquatic ecosystems are safe during the year.

Key Words: Multivariate analysis**,** water quality, Chihuahua, Mexico