

Ecological assessment of the Tajan river using feeding groups of benthic macroinvertebrates and biotic indices

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Abstract

One of the best practical methods to understand ecological status of a water body and determine impacts of human intervention in reducing water quality is using benthic macroinvertebrates as assessment tools for monitoring their biological integrity and health. The Tajan River is one of the rivers of Caspian Southern sub-basin that drains the Caspian Sea. Macroinvertebrate samples were taken using Surber's sampler (40 x 40 cm and 100 μ mesh size) in 45 day intervals with 3 replicates in each sampling site for a period of one year (May 2010 to May 2011). The collected organisms were preserved in 4% formalin solution and transferred to the laboratory for identification and counting. Six different functional feeding groups of macroinvertebrate e.g. Collector-gathering, Collector-filtering, Predator, Collector-gathering /Scraper, Predator/Collector-gathering and Scraper were determined. Feeding groups of Collector-gathering, Collector-filtering and Collector-gathering /Scraper were relatively dominant in comparison to other groups. Groups of Collector-filtering and Collector-gathering were dominant in slightly and heavily polluted stations, respectively. In this study population structure measures including abundance, EPT percent and the EPT and EPT/CHIR indices were measured. Species diversity, species richness were also determined using Shannon-Weiner, Margalef and Jacard indices. The minimum and maximum values of Hilsenhoff biotic index were observed in stations 1 (4.29) and 5 (5.57), respectively. Moreover, the highest and lowest values of BMWP/ASPT were observed in station 1 (4.51) and 5 (3.25), respectively. Evaluation of indicators revealed less water quality at stations 2, 3 and 5 which located at the lowermost of fish farms and effluent of factory. This reduction might be implicated to the effluents of water dams from fish farms running into the stream as diversity and total abundance (%) of sociable macroinvertebrates decreased and that of resistant macrofauna increased due to water pollution. Hence, from the obtained results, this can be concluded that the use of benthic macroinvertebrates as bioindicator for the assessment of water quality of the stream is desirable.

Key words: River pollution, Macro-invertebrates, Biomonitoring, Effluent, Hilsenhoff index.