Abstract

Score-based biotic indices are widely used to evaluate the water quality of streams and rivers. Few adaptations of these indices have been done for South America because there is a lack of knowledge on macroinvertebrate taxonomy, distribution and tolerance to pollution in the region. Several areas in the Andes are densely populated and there is need for methods to assess the impact of increasing human pressures on aquatic ecosystems. Considering the unique ecological and geographical features of the Andes, macroinvertebrate indices used in other regions must be adapted with caution. Here we present a review of the literature on macroinvertebrate distribution and tolerance to pollution in Andean areas above 2000 masl. Using these data, we propose an Andean Biotic Index (ABI), which is based on the BMWP index. In general, ABI includes fewer macroinvertebrate families than in other regions of the world where the BMWP index has been applied because altitude restricts the distribution of several families. Our review shows that in the high Andes, the tolerance of several macroinvertebrate families to pollution differs from those reported in other areas. We tested the ABI index in two basins in Ecuador and Peru, and compared it to other BMWP adaptations using the reference condition approach. The ABI index is extremely useful for detecting the general impairment of rivers but class quality boundaries should be defined independently for each basin because reference conditions may be different. The ABI is widely used in Ecuador and Peru, with high correlations with land-use pressures in several studies. The ABI index is an integral part of the new multimetric index designed for high Andean streams (IMEERA).

Keywords

Andes, aquatic macroinvertebrates, altitudinal distribution, tolerance to pollution, BMWP adaptations, biomonitoring, water quality.