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Comparisons of Species Biotic Index (SBI) and the Index of Biological Integrity (IBI) as a Tool for Ecological Assessments of Lotic Ecosystems

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Two ecological indices of species biotic index (SBI) and the Index of Biological Integrity (IBI) using fish assemblages were developed in this study and evaluated the comparability between the two indices using same data set of stream fish samples. Values of SBI averaged 5.72 and varied from 4.09 (good condition) in the upstream reach of S1 to 8.77 (very poor) at the S4 below the point-source pollution location (wastewater disposal plant). Based on modified criteria of Hilsenhoff (1988), current stream health was identified as a fair condition among five categories of excellent (0 - 3.57), good (3.76 - 5.0), fair (5.01 - 6.50), poor (6.51 - 7.25) and very poor (7.26 - 10). In the mean time, IBI averaged 36.6 and varied from 17 (very poor) at the S4 location to 49 (good - excellent condition) in the headwater of S1, indicating a fair condition based on a modified criteria of US. EPA (1993). Surprisingly, longitudinal pattern of the SBI from the headwater site to the downstream was exactly followed the trend of the IBI, and reflected the percent of omnivores at each sampling site, indicating a reflection of degrading trophic composition. Regression analysis of IBI against the SBI showed that the variation of SBI accounted 95% of the variation of the IBI (R^2 = 0.952, $p < 0.0001$). These results indicate that the approach of SBI is well matched to the multi-metric IBI methodology and also may be matched to chemical water quality assessments as well as various ecological measurements of biological diversity, richness, or various pollution indices. We recommend the application of SBI approach to ecological assessments of lotic ecosystems as the methodology of IBI have widely used in numerous countries.

Key words : species biotic index, IBI, ecological assessment, fish, stream health