Effects of riparian vegetation and bottom substrate on macroinvertebrate communities at selected sites in the Otara Creek, New Zealand

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Abstract

The effects of riparian vegetation and bottom substrate on water quality and macroinvertebrate communities were assessed by utilising data gathered during a 2004 reconnaissance of nine sites in the Otara Creek, New Zealand. The aim of the study was to use multivariate statistical techniques to better explain the specific environmental factors that drive biological communities in an environment. During the survey, macroinvertebrate assemblages were sampled along with water quality, bottom substrate, riparian vegetation and habitat assessments. Multivariate statistical analyses of habitat and channel characteristics, physical conditions and water quality data were used to determine the relationship between environmental variables and the macroinvertebrate community structure. Ordination of biological and environmental data showed a clear separation of bush from urban and pastures streams. The observed macroinvertebrates assemblage pattern was best correlated with a single variable, riparian width ($r = 0.81$), a combination of two variables: cobbles and riparian width ($r = 0.88$), three variables: boulders, nitrate and riparian width ($r = 0.91$) and five variables: habitat score, shade, boulders, nitrate and riparian width ($r = 0.94$). The BIO-ENV procedure showed that habitat and channel characteristics had the greatest relationship to macroinvertebrate community structure followed by water chemistry.