

Do disturbance and productivity shape stream invertebrate traits

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Disturbance is a major force in lotic ecosystems governing what animals can survive in a stream and consequently how those ecosystems function. Flow disturbances remove individuals and periphyton, but it is still not clear whether the physical removal of individuals or the loss of food is the principal driver of flow disturbance effects on benthic invertebrate communities. Invertebrate communities exhibit low resistance, but high resilience, to floods despite having traits, (e.g. streamlined bodies, hooks, suckers) that help maintain themselves during high flows. Traits also offer the chance to examine direct mechanistic linkages. We investigated the ability of a trait based approach to understand the drivers of flow disturbance on benthic invertebrate communities. Data was collected from 10 streams around Mount Taranaki, New Zealand. Two locations on each stream were sampled, one inside the forest (closed canopy sites); the others downstream in low intensity agriculture grassland (open canopy sites). Macroinvertebrates, periphyton biomass and substrate movement were sampled. Trait characteristics of the macroinvertebrates were investigated to determine how disturbance (removal of individuals, removal of periphyton, or both) affected species abundance. Regardless of overhead cover, taxa in sites exposed to high disturbance were characterized by having flattened bodies, a general diet, and gills and plastron respiration. In open canopy sites, the proportion of taxa having a general diet, scrapers and flattened bodies increased in disturbed sites.