**DISTRIBUTION OF DIATOM TAXA AS A RESPONSE**

**TRAITS, TOLERANCES AND TRACER EXPERIMENTS;**

**CAPABILITIES OF HIGHLY SENSITIVE PET MACROINVERTEBRATES TO SURVIVE CLIMATE CHANGE**

**(AUSTRALIA)**



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**Abstract**

Macroinvertebrate organisms are commonly used as specific indicators for stream assessment, however much of the information relating to sensitive macroinvertebrate species is focussed on pollution rather than environmental changes.

Plecoptera, Ephemeroptera and Trichoptera (PET) are often used as a rapid method of stream assessment and are considered to be the most sensitive macroinvertebrate orders in Australia though little is known about their tolerances to environmental changes and future climate conditions.

For subtropical South-East Queensland Australia area, climate change projections suggest the fact that by the year 2030, surface temperatures will rise by 1°C and rainfall will decrease by 2% and by 2050 these numbers are expected to rise to 2.2°C and 5% respectfully. There will also be increases in drought severity and an increase in extreme heat waves.

The ability for sensitive macroinvertebrates to survive these circumstances will depend greatly on their potential for adaptation. To investigate this potential we have used data from a combination of trait based literature; spatial and temporal samples; temperature tolerance tests; and a tracer experiment using enriched 15N isotope to track insect movements during the drying phase of an intermittent stream. This data has been used to identify which of the PET species in South-East Queensland will be most vulnerable to climate change scenarios and those that have the ability to adapt to the potential environmental change.

Results have shown that some invertebrates (e.g. Gripopterygidae*: Reikoperla* spp*.*) are already at the limits of their environmental thresholds whereas surprisingly other invertebrates (e.g. Leptoceridae*: Triplectides* spp.) are relatively tolerant towards environmental change despite their “sensitive” status.

This information can assist in preventing future biodiversity loss by identifying which species are most vulnerable and the habitats that need to be preserved to ensure their viability. It is also important in the development in future monitoring programs using PET as a rapid assessment of stream condition.