

**Assessment of upper thermal tolerances of naiads of two odonate families:
Coenagrionidae and Libellulidae in Lake Kariba, Zimbabwe**

Abstract

Thermal tolerances of Coenagrionidae and Libellulidae naiads in Lake Kariba, Zimbabwe, were determined using the critical thermal maximum (CTM) method. Eighty eight naiads were assessed, 44 from Coenagrionidae with two size classes, small (6.0 – 9.9 mm) and big (10.0 – 19.9 mm) and 44 from Libellulidae with two size classes, small (7.0 – 14.9 mm) and big (15.0 – 22.9 mm). Water temperature was increased at a mean rate of $0.5 \pm 0.1^\circ\text{C}$ per minute until there was loss of locomotor capacity and motion. Temperatures at which the naiads stopped moving and responding to probing were recorded as the critical thermal maxima. The mean thermal tolerances of Coenagrionidae and Libellulidae naiads were 44.33°C and 46.22°C respectively. Regression analysis indicated that body size had no effect on thermal tolerance in Coenagrionidae ($P > 0.05$) but had an effect on Libellulidae ($P < 0.05$). Both families had high thermal tolerances though Libellulidae had a higher tolerance than Coenagrionidae. Anova revealed significant differences between the two families ($P < 0.05$). Understanding how temperature affects biological systems is a central question in ecology and evolutionary biology. Determination of upper thermal limits provides insight into the relative sensitivity of organisms to elevated temperatures hence to climate change.