



Habitat manipulation of Exposed Riverine Sediments (ERS) how does microhabitat, microclimate and food availability influence beetle distributions?

S. E Henshall, J. P Sadler , and D. M Hannah

School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK.
seh538@bham.ac.uk

Exposed riverine sediments (ERS) are frequently inundated areas of relatively un-vegetated, fluvially deposited sediment (sand, silt, gravel and pebble). These habitats provide an important interface allowing the interaction of aquatic and terrestrial habitats and species. ERS are highly valuable for many rare and specialist invertebrates particularly beetles. Within an area of ERS, beetle species richness tends to be highest along the water's edge. This higher species richness may be linked to: (1) the availability of food items in the form of emerging and stranded aquatic invertebrates and (2) favourable physical microhabitat conditions in terms of temperature and moisture. This paper explores the role of microclimate and food availability by creating areas of 'water's edge' habitat in the centre of a gravel bar. Typically these areas are drier, reach higher temperatures and devoid of emerging aquatic invertebrate prey. Four 2m x 2m experimental plots were created: one wet plot, one wet- fed plot, one dry-fed plot and one dry plot (control). These plots were each replicated on three separate areas of ERS. Sixty colour marked ERS specialist ground beetles (*Bembidion atrocaeruleum*) were released into each plot to monitor beetle persistence and movement on and between plots. The plots were maintained wet using a capillary pump system, and fed with dried blood worms for 30 days. Sediment temperature (0.05 m depth) was measured at 15 minute intervals and spot measurements of surface temperature were taken daily. A hand search was carried out on 25% of each plot after 7, 14, 21 and 30 days. Significant temperature differences were observed between the wet and dry sediment and air temperature. The wet plots on average were 1.8oC cooler than the dry plots and had a reduced temperature range. Both wet and dry sediments remained significantly warmer than air temperature. The wet and wet-fed plots yielded significantly greater numbers of beetles and marked beetles than the dry and dry-fed plots; however, no significant difference was found between the wet and wet-fed plots. These results indicate that microhabitat in terms of increased moisture and lower temperature is the driving factor influencing beetle distribution and movement. Food alone is not as influential. ERS carabid beetles may be using lower temperatures and increased moisture as a cue for aquatic food availability.