

## **Respiratory gas exchanges of termites from the Sabah (Borneo) assemblage**

### **Abstract**

Oxygen uptake and carbon dioxide release at 28 degrees C were determined in worker castes of twenty-six species of forest termites from the Danum Valley Conservation Area, south-east Sabah, by Warburg manometry.

Metabolic rate varied inversely with body weight in a suite of soil-, wood/soil- and wood-feeding species, giving a slope (in a log-log plot) of -0.63. However, a number of large species, actively foraging forms such as *Macrotermes malaccensis*, *M. gilvus*, *Havilanditermes atripennis* and *Hospitalitermes hospitalis*, but also the wood-feeding *Schedorhinotermes sarawakensis*, showed an oxygen consumption greater than expected for their body weight. Rates of methane emission were above 0.100  $\mu\text{mol g}^{-1} \text{h}^{-1}$  in seventeen species, with very high fluxes in two wood/soil-feeders, *Termes borneensis* (0.546  $\pm$  0.163  $\mu\text{mol g}^{-1} \text{h}^{-1}$ ) and *Prohamitermes mirabilis* (0.303  $\pm$  0.123  $\mu\text{mol g}^{-1} \text{h}^{-1}$ ). Of the fifteen remaining species, seven were soil-feeders, five were wood-feeders, two were wood/litter-feeders and a single species fed on lichen and moss. Low or negligible  $\text{CH}_4$  emissions ( $< 0.100 \mu\text{mol g}^{-1} \text{h}^{-1}$ ) were observed in three other species, all wood-feeders.

An apparent respiratory quotient ( $RQ_{\text{app}}$ ) was calculated using  $x\text{CO}_2$  and  $X\text{O}_2$  (corrected for methane emission, but not hydrogen). Mean  $RQ_{\text{app}}$  was at or above 1.00 in eleven species and between 0.95 and 1.00 in a further six species, the two sets of species together representing all trophic groups, including lichen-feeders. This is argued to be consistent with carbohydrate being the principal substrate supporting respiration.