

Characterization of endosymbiotic flagellates from Australian termites

C. Turner, P. O'Donoghue* and S. Cameron

Department of Microbiology and Parasitology, The University of Queensland, Brisbane 4072

Numerous flagellates have been described from the hindguts of termites but few studies have been conducted on Australian species. Samples from soldiers and workers were collected from 40 colonies of lower termites (Rhinotermitidae and Kalotermitidae) and 20 colonies of higher termites (Termitidae) in Queensland and examined by light and electron microscopy. Flagellates were ubiquitous in all lower termites examined but absent in all higher termites. A total of 18 flagellate species belonging to 3 orders (Hypermastigida, Trichomonadida and Oxymonadida) were detected; 7 species had been recorded previously while the remaining 11 were new endemic species. Hypermastigids were abundant in rhinotermitids but absent in kalotermitids, trichomonads were present in both but most abundant in kalotermitids, whereas oxymonads were only found in kalotermitids. The variable host specificity of the flagellates appeared to be linked to host diet: hypermastigids were abundant in rhinotermitids which consume decaying wood; and trichomonads were abundant in kalotermitids which consume sound wood. Ultrastructural studies demonstrated serial replication of the mastigont unit in hypermastigids, replication of the karyomastigont unit in calonymphids, and specialization of the recurrent flagella in trichomonads. There was a negative correlation between the presence of hydrogenosomes and endo-/ecto-symbiotic bacteria: flagellates with hydrogenosomes lacked bacteria; and vice versa.