

Effect of *Photobacterium Damselae* subsp. *Damselae* on Behaviour and Standard Metabolic Rate of Western Pygmy Perch (*Nannoperca Vittata*)

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Infection is often been associated with changes in host metabolic rate and behavior. Behavioral changes, particularly those relating to increased activity and boldness, have frequently been attributed to adaptive host manipulation by the parasite, but could also result from the host's response to pathology or as a non-adaptive side effect of infection. In this study, I exposed a freshwater fish (64 fish), western pygmy perch (*Nannoperca vittata*), to a sub-lethal concentration (1×10^6 cfu/ml) of a bacterial parasite (*Photobacterium damsela* subsp. *damsela*) for 6 hours, and measured the standard metabolic rate (SMR), the activity trait track length (TL), and the boldness traits time to emergence (ET) and time spent in a risky zone (RZ) (with 1-week intervals in between each time point). Infected fish (13 of 64 fish) that were exposed to *P. damsela* subsp. *damsela* died or were euthanised because of signs of infection such as ulcerated lesions or haemorrhages. The effect of *P. damsela* subsp. *damsela* challenge on the metabolic rate and behaviour of *N. vittata* was studied using generalised linear mixed models. For all attributes, the interaction between time-point and treatment was significant, with bacterial challenge boosting fish SMR, activity, and boldness. The standard metabolic rate of challenge-exposed fish remained high throughout the post-challenge period (3 weeks), although behavioural abnormalities were temporary, returning to pre-challenge values after two weeks. I hypothesize that changes in SMR and behaviour in infected fish result from a greater need for energy, either (or both) as a result of immune activation or compensatory growth.

Keywords: Adaptive manipulation, Bacterial challenge, Behaviour, Immune activation, Standard metabolic rate

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