

EXPLORING THE REAL COST OF PARASITES: A META-ANALYSIS OF EXPERIMENTAL STUDIES

Watson Maggie J.

School of Animal and Veterinary Sciences, Charles Sturt University, Locked Bag 588, Wagga Wagga 2678, Australia

E-mail: mawatson@csu.edu.au

Knowledge of host-parasite interaction is important to the ecology and conservation of wild populations, yet determining the real impact of parasites on their free-ranging hosts has proven elusive. Captive and theoretical studies have quantified costs and identified life-history trade-offs, but integrating these parameters with field studies has proven elusive. Previous qualitative reviews of the costs of parasites to wild hosts have identified that there may be population costs as well as individual costs to wild hosts (Møller, 1997; Tompkins and Begon, 1999; Irvine, 2006). To date, no quantitative review of the cost of parasites has occurred. In an attempt to gain a better understanding of the cost of parasites, a meta-analysis was conducted on 42 datasets where effects of parasites on free-living hosts were determined by manipulating parasite load on the host. Both endo- and ectoparasites were examined and hosts included birds (n=35), mammals (n=6) and fish (n=1). Significant negative effects of parasites were found in the overall meta-analysis (effect size=0.41). A sub-group analysis found that only weight, body size (tarsus length) and number of young produced were significantly affected, while survival, overall breeding success, clutch size, hatching success and haematocrit were not affected. A comparison with other known drivers of population size equates this effect size with some effects of predation but not as high as resource availability. Given that most datasets in this meta-analysis were from passerines, it is imperative that future work concentrates on other groups of hosts in order to validate these findings. It is suggested that seabirds are prime candidates for such parasite perturbation experiments due to the large-sample sizes possible in colonial seabird species.

References

- Irvine R.J. 2006. Parasites and the dynamics of wild mammal populations. *Animal Science* 82: 775-781.
- Møller A.P. 1997. Parasitism and the evolution of host life history. In: *Host-parasite evolution: general principals and avian models*. Clayton D.H. and Moore J. (Eds). Oxford University Press.
- Tompkins D.M. and M. Begon. 1999. Parasites can regulate wildlife populations. *Parasitology Today* 15:311-313.