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Abstract





S2.9 Modelling the impact of multi-host helminth parasites on hosts' population dynamics

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This work is inspired by multi-annual observations of helminth infection levels and population densities of rock partridge (*Alectoris graeca saxatilis*) that is an endangered species in the Dolomitic Alps (northern Italy). Field data show that the nematode parasite *Ascaridia compar* infect both rock partridge and black grouse (*Tetrao tetrix*), and also suggest a competitive interaction between the two galliform species that share a common spatial domain in the Alps. We hypothesized two possible interaction mechanisms: direct competition and parasite-mediated competition, also called apparent competition, and we used mathematical models as a proof-of-principle verification of these hypotheses. Outputs from the direct competition model are in contrast with field observations, while outputs of the parasite-mediated competition model qualitatively fit the observed pattern suggesting that the sharing of parasite free-living stages between the two species can trigger the competition playing an important role in the decline of rock partridge in Trentino region. The model has been extended to a spatial model that allows for a partial habitat overlap, showing the role of diffusion in shaping either exclusion or spatial segregation of the competitor less tolerant of infestation.