The effects of habitat deterioration and social status on patrolling behavior in the territorial damselfly *Calopteryx splendens*

Maria J. GOLAB¹*, Paulina A. GOŁĄB¹, Jorge CONTRERAS-GARDUÑO² and Tadeusz ZAJĄC¹ and Szymon SNIEGULA¹

¹Institute of Nature Conservation, Polish Academy of Sciences, Mickiewicza 33, 31-120 Krakow, Poland
²ENES, Campus Morelia, Universidad Nacional Autónoma de México, México
*e-mail: marysiagolab@gmail.com (corresponding author)*

**ABSTRACT**

Patrolling behavior plays an important role in resource defense and in shaping social interactions in territorial species. However, it is not clear whether and how resource deterioration affects patrolling and interactions between territorial males. We addressed this issue by studying the territorial patrolling of damselfly *Calopteryx splendens* males, which use riverine vegetation patches composed of floating rafts of *Potamogeton natans* as territories. Males can hold single territories established on one vegetation patch (solitary residents) or hold adjacent territories established on shared vegetation patch (contiguous residents). The study predicted that solitary males engage more in patrolling than contiguous residents and that patrolling intensity is proportional to patch quality. Two types of semi-natural vegetation patches were sunk: of high and low quality measured on the basis of the patch size (range 2-5 m²) and its attractiveness to damselflies (measured as number of residents, non-territorial males and contests observed at a given patch). Changes in number of patrolling flights were monitored for solitary and two contiguous residents: first which hold territory situated closer to the patch centre and secondary holding territory nearer to the edge of a patch. Results indicated that solitary residents patrolled more often than either of the two contiguous residents. Habitat deterioration significantly reduced the patrolling intensity of both single and first contiguous resident, however, their patrolling activity was not resumed at the same intensity after the original patch had been restored. The secondary resident of a contiguous pair did not respond to habitat deterioration, but increased its patrolling activity following restoration. Patch quality was found to have no impact on patrolling, which implies that social context can be more important in predicting changes in patrolling behavior in response to resource deterioration.

**INTRODUCTION**

Individuals of territorial species, usually males, compete with conspecifics for resources and defend them directly by chasing or fighting. However, space partition can be maintained without overt aggression but through display (Briffa and Sneddon 2010, Matthews and Matthews 2010, Westneat and Fox 2010, Mandal 2012). This can be exceptionally important for neighbor interactions, because the costs of repeated between-neighbor contests are usually higher than the payoffs (Maynard Smith and Parker 1976, Gordon 1997).