



# Reproductive habitat provisioning promotes survival and reproduction of the endangered endemic damselfly *Calopteryx exul*

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## Abstract

Effective habitat management is predicted to have positive effects on populations and species of conservation concern. Although studies have shown that ecological processes such as colonization can be promoted after habitat management, we still need more information on the survival and reproductive consequences at the individual level in order to reach positive conservation outcome. Here we assess the effects of reproductive habitat supplementation (host oviposition plant) on survival and mating success of an endangered endemic damselfly, *Calopteryx exul*, using capture-mark-recapture data. We first determined that the species prefer to oviposit on floating leaves of *Potamogeton* spp. Based on Cormack-Jolly-Seber modeling, we found that recapture and survival probabilities were positively affected by the number of the host oviposition patches of the host plant. Moreover, we showed a strong positive relationship between adult lifespan and lifetime mating success. Our results suggest that host-plant provisioning for reproduction not only increases the survival of individuals, but also increases the number of matings per lifetime. The procedure of supplying reproductive sites may enhance population growth of threatened odonates and other aquatic insects.

**Keywords** Conservation · Restoration · Oviposition · Odonates · Plants · Oviposition · Algeria

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## Introduction

Habitat degradation is one of the major causes of species extinction in various ecosystems. The increase in human-related activities has damaged the natural habitat of species, leading to biodiversity loss with imminent effects on ecosystem functioning and human well-being (Díaz et al. 2006). It is imperative to understand the ecology of threatened species and find globally-feasible solutions in order to maintain existing populations and recover extinct populations of species of conservation concern (Akçakaya et al. 2018; Sanderson 2006).

There is evidence that freshwater habitat is under huge anthropogenic pressure (Darwall et al. 2011; Galewski et al. 2011). Although freshwater ecosystems cover less than 1% of world's surface, they harbor a highly diverse fauna and flora (Dudgeon et al. 2006; Strayer and Dudgeon 2010). Importantly, freshwater animal diversity is related to vegetation availability (Biggs et al. 2005; Goertzen and Suhling 2013; Hassall et al. 2011) which suggests that the latter might be essential for the maintenance of the diversity of communities. In fact, since many freshwater animals