

## A hotspot for threatened Mediterranean odonates in the Seybouse River (Northeast Algeria): are IUCN population sizes drastically underestimated?

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Several odonate species are threatened in the Mediterranean basin and some of them show alarming decreasing trends. The distribution and population estimations provided by the IUCN are based on occasional field sampling or non-rigorous methodologies and could be erroneous and misleading. To obtain reliable estimations of the population size and distribution of three threatened species, *Calopteryx exul*, *Coenagrion mercuriale*, and *Gomphus lucasii*, we first conducted capture-mark-recapture in a natural population during one flight season, and second we carried out intensive sampling of adults, larvae and exuviae in the Seybouse watershed, Northeast Algeria. In addition, a revision of odonate occurrence and distribution in the watershed was done by pooling information collected over six years (2010–2015). Our results show that population estimations of the three species are much higher than what the IUCN presents; that is, 2208 individuals of *C. exul* (22.08% of the estimated global population), 1765 individuals of *C. mercuriale*, and 11,204 individuals of *Gomphus lucasii* (about 4.5 times as large as the estimated global population). Moreover, a total of 42 species were recorded in the study site, of which seven are new. The mean number of localities per species increased by a factor of 2.47, e.g. from six to 12 in *C. exul*, two to 12 in *Coenagrion mercuriale* and five to 14 in *Gomphus lucasii*. Our results suggest that the Seybouse watershed is one of the most important areas in North Africa and the Mediterranean basin for these three threatened species and requires particular attention and an urgent conservation plan to reduce anthropogenic effects and maintain populations.

**Keywords:** Odonata; *Calopteryx exul*; *Coenagrion mercuriale*; *Gomphus lucasii*; distribution; endemic; population status; capture-mark-recapture

### Introduction

The Mediterranean Basin is one of the world's richest areas in terms of faunal and floral diversity, and is consequently considered as one of the 25 Global Biodiversity Hotspots (Medail & Quezel, 1997; Myers, Mittermeier, Mittermeier, da Fonseca, & Kent, 2000). The assessment of the odonatofauna of this region listed 165 odonates, with 19% of the species classed as

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