

Differential elevational cline in the phenology and demography of two temporally isolated populations of a damselfly: Not two but one taxon?

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Abstract. 1. Temporal isolation by cohort splitting is a life-history mechanism that has been reported in many temperate insects, including those inhabiting freshwater habitats. Although the cohorts seem to maintain separate temporal niches in a specific location, the temporal isolation may be disrupted across a geographic gradient due to constraints imposed by seasonality.

2. This prediction was tested on two temporally isolated populations of the obligatory univoltine *Lestes virens* (Odonata, Lestidae) in north-east Algeria. Although the two cohorts emerge at the same time in spring, one cohort reproduces in summer, while the second cohort estivates in summer and reproduces in autumn. A survey assessing the phenology and abundance was conducted on eight ponds across an elevational gradient (5–1012 m asl) using capture–mark–recapture and adult density sampling.

3. In all sites from low to high elevation, the species showed cohort splitting. The phenology of reproduction of both cohorts showed a delay with elevation, but the cline was 2.2 days for the summer cohort and 0.7 days for the autumn cohort per 100 m of elevation. Moreover, the density of adults in the autumn cohort was higher than that of summer cohort across the entire elevational range, and the difference increased with elevation.

4. These findings regarding the differential elevational cline in the phenology show that the temporal isolation of the two cohorts becomes narrower at high elevation, suggesting potential inter-cohort temporal overlap at higher elevations.

5. The claim that the two cohorts of *L. virens* are true temporally isolated species needs further investigation.

Key words. Algeria, damselfly, Lestidae, life history, North Africa, odonate.

Introduction

Phenology, the timing of recurrent biological events, is a plastic life-history trait that shows intraspecific variation in many taxa (Lieth, 2013). Local environmental conditions and temperature,

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