

No effects of drought on the most abundant small Passerine birds in Wetlands of semiarid landscapes

Abstract

One of the most important direct effects of climate change is the continuous increasing of droughts, particularly in arid and semiarid regions. By the use of temporal climatic datasets of fourteen years (1991-2004) and information arisen from ringing captures of small reed passerines it is demonstrated that drought cycles in a wetland of SE Spain, immerse in a semiarid landscape, had not effect on the two small passerines that conform the gross of the reed-bed bird's assemblage, in terms of abundance and biomass. Weak breeding seasons caused by drastic environmental events may have a synergic effect on the different flexibility of the moult strategies and morphological adaptations of well adapted individual body-sizes and hence not affecting them. Finally, novel studies focused on genomic sequence and environmental change in non-model species like birds could offer future prospects to find drought-resistant genes in small individual birds associated to terrestrial aquatic bodies in especially sensitive areas as the semiarid landscapes.

Keywords: droughts, bird's assemblage, wetlands, semiarid regions, SE Spain

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Introduction

Drought is a widespread event chiefly given in areas and regions submitted to a high temperatures and small rainfall as for example wetlands immerse in arid and semiarid landscapes. Climate change is involving considerable territories and likely limits further expansions of water bodies.^{1,2} In these sectors, wetlands and other wet spaces depend properly of hydrological regimes which are submitted to strong cyclic seasonality. This cyclic seasonality, altered by climate change, is influencing directly the full biodiversity of the fauna and flora of wetlands.³ Fluctuations in flood degrees can provide restrictions of frameworks that run its communities as diversity, evenness, specific turnover, etc^{4,5} or can provide contractions in the breeding success of birds but no its complete block.⁶

It has investigated, by means ringing programs, that two small Passerine birds explain the most bird's assemblage of Mediterranean wetlands in terms of biomass⁷ and quantity.⁸ One of them is a widespread breeder or afro-tropical migrant in Eurasia highly linked to reed-beds⁹ and the other is a principal breeder in mainland Eurasia but overwinter in Mediterranean regions using reed-beds as suboptimal habitat.¹⁰

Material and methods

To check the effect of droughts on the bird's quantity in a semiarid Mediterranean wetland (El Hondo Natural Park, SE Spain), I essentially recorded the drought cycles by means of the residuals on the linear regression of the year (1991-2004) on the overall annual rainfall (mm). Afterwards I correlated both (Pearson's r) with the annual total number of ringed birds gathered for the period 1991-2004.

Results

The correlation among annual drought events by ringing totals didn't provide serious effects for the afro-tropical summer visitant Eurasian Reed Warbler (*Acrocephalus scirpaceus*) and the winter visitant Common Chiffchaff (*Phylloscopus collybita*) (Figure 1 and 2).

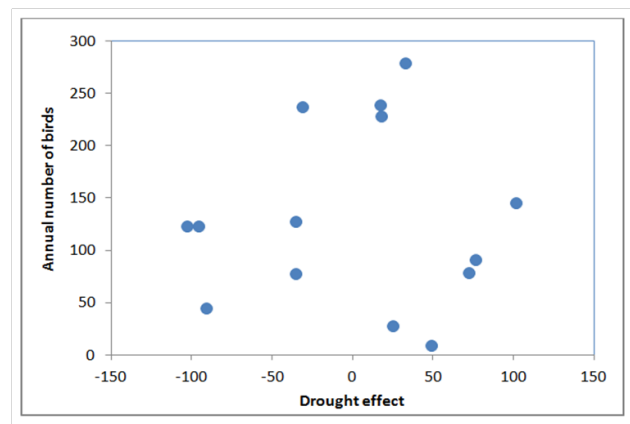


Figure 1 Weakly positive relation among drought effect (see Material and Methods) and number of Eurasian Reed Warblers (*Acrocephalus scirpaceus*). Pearson's correlation not significant ($r = 0.04$; $P = 0.703$, $d.f = 14$).

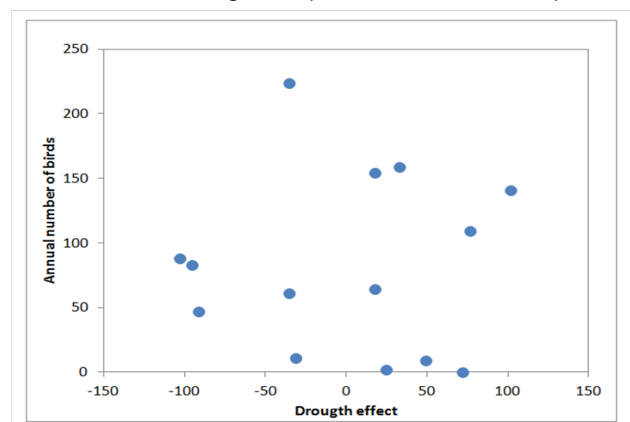


Figure 2 Weakly positive relation among drought effect (see Material and Methods) and number of Common Chiffchaffs (*Phylloscopus collybita*). Pearson's correlation not significant ($r = 0.07$; $P = 0.277$, $d.f = 14$).

Discussion

This evaluation provides evidence that the gross of the small reed-bed bird's assemblage in a man-made semiarid wetland, in terms of abundance and biomass⁷ does not depend on drought episodes, but may occur an effect the human-mediated management of waters¹¹ not here analysed. Droughts may influence alternative units of the community structure such as richness and diversity¹² involving the migratory strategy and the habitat selection of wetland passerines^{13,14} but not the magnitude of the bird's assemblage in quantitative terms. In fact, the effect of climate change, may not influence the population sizes of species in an ecosystem, because prevents the competitive exclusion of sympatric species and enhancing its abundances^{15–17} but it can shape the quality in terms of richness, by falling off the number of species.^{18,19} It has been proved that in arid climates, weak breeding seasons due to climatic conditions are linked to the different flexibility of moult strategies in species that coexist at various periods. Different moult strategies of Eurasian Reed Warblers and Chiffchaffs carried out at distant seasons²⁰ might have a synergic effect induced by unsuccessful years due to harsh environmental conditions and thus have not effect on survival and the overall abundance.²¹ On the other hand, morphological adjustments of body-size to high-temperatures in arid climates resulting of drier years could determinate more or less abundance in dry years of the different well adapted body sizes (25). Finally, novel studies focused on genomic sequence and environmental change in non-model species like birds^{22–25} could provide future prospects to identify drought-resistant genes in individual small birds associated to terrestrial aquatic bodies in susceptible sectors as the semiarid landscapes.

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Conflict of interest

Author declares that there is no conflict of interest.

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