Spatially correlated environmental factors drive synchronisation in populations of the Dalmatian pelican

Spatial synchrony in population dynamics has been documented recently across a range of taxa, and a number of hypotheses about the mechanisms driving spatial synchrony and the consequences of this phenomenon for the persistence of populations have emerged. Spatial environmental covariance is one of the principal factors influencing this synchrony on a large scale. However, most studies focus on population abundances, and little evidence exists on the spatial synchrony of demographic parameters. We used a 15-year dataset from two populations of a vulnerable bird species, the Dalmatian Pelican (Pelecanus crispus), to identify local and global environmental factors that cause population synchrony. We show that survival rates were temporally synchronized between the studied populations and that a large part (50 % for both populations) of this co-variation was driven by local environmental conditions. Several components of the North Atlantic Oscillation index were correlated with local climatic conditions, but not all of these components can be used as informative proxies for future variation in survival. We also present evidence that an individual's future survival can be strongly influenced by the conditions occurring during the early period of its life. Environmental factors such as water level and food availability had similar influences on breeding success and juvenile survival. This finding indicated that intra-specific competition may act as a limiting factor for species demography, especially in large populations. Estimating the strength of synchrony is important and should be considered in population and metapopulation analyses and in relationship to conservation measures.

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