THE PREDICTIVE EFFECTS OF LARGE-SCALE CLIMATIC VARIABILITY ON POPULATION GROWTH RATES IN THE COMMON VOLE

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Recently, indices of large-scale climatic variability have been successfully used to predict population growth rates in various organisms. In Europe, it is primarily the winter climatic effects that impact population numbers in many herbivorous mammals. Consequently, winter North Atlantic Oscillation (NAO) index was extensively incorporated in time series analyses as a proxy for climate variables. However, unlike large herbivores, the small ones, such as subnivean voles, do not seem to be particularly sensitive to NAO effects. Moreover, we know little about the predictive effects of NAO variability in other months of the year compared to the winter interval. In the present paper, we explore direct and delayed NAO effects on population growth rates in the common vole (*Microtus arvalis*) using various times of year. We use 71 time series of vole abundances covering all the territory of the Czech Republic, 21 years long each for a period 1968-1988. We applied autoregressive log-linear models (order 0-2) and AICc methodology to identify the most parsimonious model structure. We compared the predictive capacity of several NAO indices, namely winter NAO, seasonal NAO and monthly NAO indices and their combinations. Surprisingly, we found that there were 2 monthly indices, January and April NAO index that outperformed a winter NAO index (DJFM) which is traditionally used for predictions in herbivorous mammals. Seasonal NAO indices containing weather signal from three neighboring months turned out to be poor predictors of vole numbers in autumn when compared with the winter and monthly indices. There appears to be a geographical pattern in NAO effect variation, with lowland populations of voles being more responsive to NAO variability than mountain populations.