CURRENT AND FUTURE POTENTIAL DISTRIBUTION OF GLACIAL RELICT *LIGULARIA SIBIRICA* (ASTERACEAE) IN ROMANIA AND TEMPORAL CONTRIBUTION OF NATURA 2000 TO PROTECT THE SPECIES IN LIGHT OF GLOBAL CHANGE

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Abstract: In the recent history, climatic changes have taken place at a planetary scale and organisms needed to adapt to these changes. The last glaciation is one of most documented climatic events responsible for the current distribution of living organisms. In the last two decades, conservationists have intensively discussed how extant organisms, some of which witnessed the last glaciation, will be able to cope with the new challenge: global warming. In this matter, several recently developed statistical algorithms (e.g., MaxEnt) and GIS techniques have been employed in species distribution modelling and identifying suitable conservation strategies. At the European level, the Natura 2000 network is one of the most extensive conservation strategies currently applied. But is this strategy always efficient? To respond to this main question we selected a typical glacial relict species (*Ligularia sibirica* (L.) Cass.) that is declining due to anthropogenic activities and which could also be influenced by global warming. We modelled the current and future distribution of the species in Romania using MaxEnt algorithm with bioclimatic data and investigated the efficiency of Natura 2000 in the long-term conservation of the target species. Our results showed that the niche of *Ligularia sibirica* has been conserved over time and is mostly influenced by cold and wet climate conditions. The projected climatic changes will not affect the future predicted distribution of the species' bioclimatic niche. We conclude that the efficiency of Natura 2000 in Romania for this species is less than optimal. In a broader conservation perspective, we recommend that information provided by species climatic distribution models (both present and future) should be taken into account to improve future protected area networks.

Keywords: MaxEnt, species distribution model, potential distribution, glacial relict, global warming, Natura 2000, Romania

1. INTRODUCTION

During the last glaciations the high amplitude of the climatic oscillations had an important impact on biodiversity. The average temperature in Greenland decreased rapidly (in only 10-20 years) by 10-14°C and lasted for 70-75 thousands of years (Dansgaard et al., 1993). The impact of the last glaciations was influenced by latitude and hypsometry and produced almost all the present biological variability (Hewitt, 2003, 2004). In Europe species had been forced to seek refuge into warmer regions (e.g. Iberian, Italian and Balkan Peninsulas or Carpathian Basin) (Provan & Bennett, 2008). Presently "old", relict species (i.e. species which have evolved over 10,000 years ago) are faced with new climatic changes, towards an overall global warming trend. As a result of industrial activities over the last decades, the global climatic changes have produced alterations in the distribution of biodiversity. The resulted changes represent an important challenge for conservationists (Thomas et al., 2004), which make use of various tools (such as Species Distribution Models [SDM] methods) for studying these effects at