

EGU22-9397

<https://doi.org/10.5194/egusphere-egu22-9397>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Analysis of survival probability on multiple species using metapopulation model

Eun sub Kim¹, Yong won Mo², Ji yeon Kim¹, and Dong kun Lee³

¹Seoul National University, College of Agriculture and life Sciences, Landscape Ecology & Climate Change Adaptation, Seoul, Korea, Republic of (mr.solver92@gmail.com)

²Department of Landscape Architecture, Yeungnam University

³College of Agriculture and Life Sciences, Seoul National University

The ecological concept of the meta population helps evaluate the effectiveness of conservation areas (Soule et al., 1988), and is used as a useful tool for evaluating responses between individuals to artificial stressors such as urbanization, habitat destruction, and fragmentation (Kawecki. 2004). In particular meta population model can help increase the accuracy of population estimation across various spatial scales and explain several interactions populations (Walther et al., 2002; Faborg, 2014). Previous studies have demonstrated that habitat destruction and fragmentation caused by urbanization can affect the viability of species in habitats due to reduced fertility and mobility, but papers on the selection of conservation areas can increase the viability of multi species according to the changing surroundings are insufficient. Therefore, this study analyzed the possibility of multi species surviving in the habitat using a meta population model for conservation area scenarios and analyzed the effect of habitat pattern changes on each population from various perspectives.

In order to analyze the survival probability of multi species in habitats by conservation area scenario, (1) setting the 15 virtual habitat spaces within 160ha, (2) Big & Small conservation scenarios considering habitat area, connection, and connection, (3) collecting and estimation of migration rate, home range, dispersal distance for biological species for analyzing the possibility of extinction by population. Finally, the change in the population of each population during period t was analyzed using the meta population model.

Overall, when the Big Conservation area was applied, the probability of extinction of all species was low, followed by the Big+Connectivity scenario. In addition, the probability of survival was similarly derived in the Small scenario and the Connectivity scenario. However, the preferred conservation scenarios for each classification population group were different depending on the conservation scenario. In particular, birds had a high probability of extinction in the small scenario, while small mammals had a low probability of extinction. Through this study, the effect on the change in the number of multi species according to the conservation area scenario was analyzed, which is expected to be used to evaluate the validity and effectiveness of setting up a conservation area in the future.

