Conservation and Ecosystem Services

Forest fragmentation alters seed-rodent interaction networks: implications for rodent management

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Forest fragmentation has caused remarkable changes in species diversity and composition. However, it is still unclear how forest fragmentation affects the structure of interaction networks between rodents and plant seeds. In forest ecosystems, the interaction network between rodents and tree seeds is an important ecological network, and it plays an important role in the maintenance of biodiversity and service and function of ecosystem. In this study, we investigated how the interaction network between rodents and tree seeds was altered under forest fragmentation in a subtropical region in the Dujiangyan region, Sichuan Province, China. We studied the seed-rodent interactions in 14 secondary forest patches that ranged in area from 2 to 58 ha, and in succession stage from 10 to at least 100 years old. We measured the visit frequency (interaction strength) of rodents eating or hoarding seeds in each patch during 3 successive years, using seed tagging and infrared camera trapping, and calculated the metrics of the seed-rodent networks. We found that the seed-rodent interactions and population abundances of seeds and rodents mainly changed with stand age, not patch size: older patches had lower connectance and interaction strength, but higher nestedness. Connectance and interaction strength decreased with increase of metabolic per capita seed availability, while nestedness increased with increase of seed richness, but decreased with increase of rodent abundance. Seed coat thickness and starch contents had significant association with network metrics. Our results indicated that higher abundance of rodents and lower abundance of plant seeds contributed to higher interaction strength but lower nestedness of the seed-rodent interaction networks at early succession stage. Therefore, in order to facilitate the restoration of degenerated forests, it is necessary to take some intervention measures to protect the scatter-hoarding rodent species and reduce the invasion of farmland or commensal rodent species into the forest patches.

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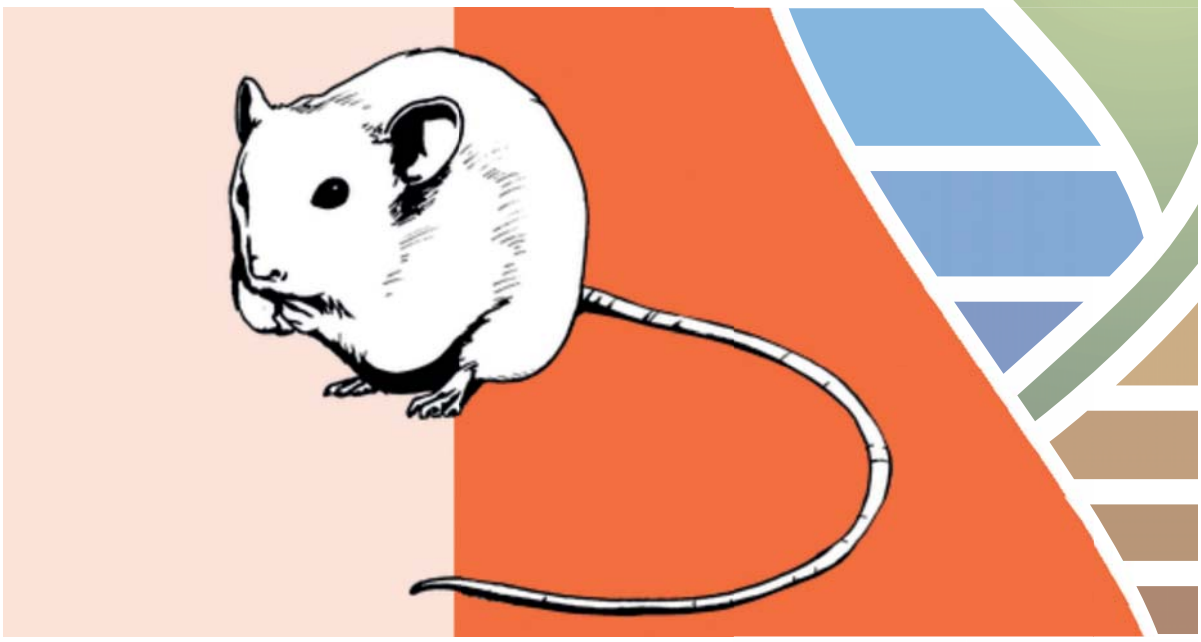

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