

Is Janzen-Connell hypothesis valid in temperate forests (Biological Interactions in Arable Land-Grassland-Forest Continuums and their Impact on the Ecosystem Functions, 7th International Symposium on Integrated Field Science)

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# Is Janzen-Connell hypothesis valid in temperate forests

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For forest managers, the maintenance of biodiversity has become an increasingly important management goal, to provide a broad array of ecosystem services that directly or indirectly benefit human endeavors. In forest ecosystems, however, little information is available in the mechanisms of maintaining the species diversity particularly in temperate forests. In this study, we examine whether the Janzen-Connell hypothesis is valid in temperate forests, we investigated the density, growth, mortality, and agents of mortality of seedlings, and the density, size, and age of saplings of *Prunus grayana* at three distances (0–3, 6–10, and 16–26 m) from conspecific adults in a temperate forest in Japan. An inoculation experiment was also conducted to test the host range of a leaf pathogen. The probability of mortality was highest at 0–3 m during the first two years of growth. Mortality mainly resulted from distancedependent attack by two types of pathogen that caused damping-off epidemics and spot symptoms on leaves. The leaf pathogen was identified as *Phaeoisariopsis pruni-grayanae* SAWADA, which infected many more seedlings of *P. grayana* than of the two other tree species tested in an inoculation experiment. The vertical and diameter growth was lowest at 0–3 m and highest at 16–26 m in both seedlings and saplings. As a result, the greatest number of large and older saplings was observed at 16–26 m. Our results demonstrate that the Janzen-Connell mechanism operates in a beech-dominated forest in the temperate region of Japan.

## References

- Janzen, D.H. 1970. Herbivores and the number of tree species in tropical forests. *Am. Nat.* 104: 501-528.
- Seiwa, K., Miwa, Y., Sahashi, N., Kanno, H., Tomita, M., Ueno, N., and Ymazaki, M. (2008) Pathogen attack and spatial patterns of juvenile mortality and growth in a temperate tree, *Prunus grayana*. *Can. J. For. Res.* 38: 2445–2454.
- Tomita, M., Hirabuki and Seiwa, K. (2002) Post-dispersal changes in the spatial distribution of *Fagus crenata* seeds. *Ecology* 83:1560-1565.