

Distance- and density-dependent seedling mortality and host specific differentiation of the fungal pathogen near the conspecific adult trees in a temperate forest (Biological Interactions in Arable Land-Grassland-Forest Continuums and their Impact on the Ecosystem Functions, 7th International Symposium on Integrated Field Science)

著者	YAMAZAKI M., SEIWA K.
journal or publication title	Journal of Integrated Field Science
volume	7
page range	97-97
year	2010-03
URL	http://hdl.handle.net/10097/48843

Distance- and density-dependent seedling mortality and host specific differentiation of the fungal pathogen near the conspecific adult trees in a temperate forest

M. YAMAZAKI¹ and K. SEIWA²

¹Miyagi Prefectural forestry technology Institute; ²Tohoku University.

Janzen-Connell (J-C) hypothesis proposed that not only abiotic factors (e.g., water, light and nutrient limitations) but also host-specific, distance- and/or density dependent natural enemies (e.g., pathogens, insects and small mammals) maintain high tree diversity in tropical forests. High mortality caused by natural enemies might in turn liberate area for recruitment of other tree species and thereby contribute to maintenance of high local diversity. This hypothesis has been widely tested in tropical forests but rarely in temperate forests. Furthermore, little is known about host specificity of natural enemies especially pathogens through tropical forests and temperate forests, although host specificity of natural enemies is crucially important to apply to this hypothesis.

To examine whether J-C hypothesis is valid for common tree species (i.e., *Prunus grayana*, *Cornus controversa*, *Magnolia obovata*, *Fraxinus lanuginosa*, *Acer mono*, *Castanea crenata*, *Fagus crenata* and *Quercus serrate*) in temperate forests of Japan, seedling survival and causes of the mortality were investigated at two densities (high, low) at each of two distances (beneath, far) from conspecific adult trees. Furthermore, for seedlings of *P. grayana* and *F. lanuginosa*, we conducted the inoculation tests using strains (*Colletotrichum* sp.) isolated from dead seedlings of four tree species. For each tree species, the degrees of damages by damping-off disease were compared among the strains that isolated from different host species.

Higher seedling mortality was observed beneath- compared to far from- conspecific adults for most of the study species. One exception was *Q. serrate*. For most of the study species, disease accounted for the large proportion of the seedling death. In seedlings of *P. grayana* and *F. lanuginosa*, the damage by fungal strains from conspecific dead seedlings under conspecific adults was more severe than those from heterospecific dead seedlings under heterospecific adults, suggesting species-specific attack by the pathogens. The result of this study clearly revealed that pathogenic fungi strongly influence the spatial distribution of tree species and consequent species diversity in temperate forests.