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Changes in the stand structure of a pine forest after rapid growth of *Quercus serrata* Thunb.

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Abstract

We studied the species composition and stand structure of secondary pine forests affected by pine wilt disease, caused by epidemic attacks of the nematode *Bursaphelenchus xylophilus*, in western Japan. Based on the species composition, the vegetation was divided into four types: (1) *Cladonia rangiferina*, (2) *Wikstroemia sikokiana*, (3) *Quercus glauca*, and (4) *Gleichenia japonica*. The sequence of types from (1) to (3) represents a successional series in accordance with topographical position. The relative basal areas of *Rhododendron reticulatum* and *Juniperus rigida* in the *C. rangiferina* and *W. sikokiana* types were larger than in the *Q. glauca* type. The relative basal areas of *Q. serrata*, *Clethra barbinervis*, and *Eurya japonica* in the *C. rangiferina* and *W. sikokiana* types were less than in the *Q. glauca* type. The mortality of light-demanding trees was higher in the *Q. glauca* type than in the *C. rangiferina* and *W. sikokiana* types. In stands that were severely affected by pine wilt disease, light was reduced and soil became moist after rapid growth of *Q. serrata* and other species which are not affected by the disease. The numbers of species and components of evergreen broad-leaved natural forests were decreased, because pine forests in the study area had been cut frequently and the land had degraded. Pine wilt disease has shifted the dominance of pine forests from *Pinus densiflora* to deciduous oaks such as *Q. serrata* and physical conditions seemed to provide a safe site for shade-tolerant plant species, which are components of evergreen broad-leaved forests. Moreover, the seed dispersal of evergreen oaks appears to be an important factor in the succession to evergreen broad-leaved forest in degraded areas.

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