Dispersal patterns of exotic forest pests in South Korea

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Invasive species have potentially devastating effects on ecological communities and ecosystems. To understand the invasion process of exotic forest pests in South Korea, we reviewed four major species of exotic forest pests: the pine needle gall midge (*Thecodiplosis japonensis*), pine wilt disease caused by the pine wood nematode (*Bursaphelenchus xylophilus*), the fall webworm (*Hyphantria cunea*), and the black pine bast scale (*Matsucoccus thunbergianae*). We consider their biology, ecology, invasion history, dispersal patterns and related traits, and management as exotic species. Among these species, the dispersal process of fall webworm was linear, showing a constant range expansion as a function of time, whereas the other three species showed biphasic patterns, rapidly increasing dispersal speed after slow dispersal at the early invasion stage. Moreover, human activities accelerated their expansion, suggesting that prevention of the artificial movement of damaged trees would be useful to slow expansion of exotic species. We believe that this information would be useful to establish management strategies for invasion species.

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