

ANTHROPOGENIC PATHWAYS IN THE SPREAD OF THE PINEWOOD NEMATODE AND PREDICTIONS OF FUTURE EXPANSION

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The pinewood nematode, *Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle, is the causal agent of the pine wilt disease. This pest originating in North America has invaded many countries in the world, especially in Asia, causing dramatic damage in pine stands. Until now, transmission by insect vectors of the genus *Monochamus* was considered as the primary means of dispersal. Yet human activities could increase the risk for accidental transportation of infested wood, disseminate the nematode over greater distances, and consequently accelerate the spread of the disease.

We analyzed the effects of anthropogenic pathways on the expansion of the pinewood nematode in China based on the invasion history since its arrival in 1982 in Nanjing. We developed a predictive model of expansion combining climatic suitability, short-distance dispersal caused by carrier beetles and long-distance dispersal as a function of the human population density.

We found that transportation by carrier beetles could explain local spread at 7.5 km per year. Railways, ports, lakes and human population density could explain the nematode dispersal at a longer distance (111-339 km). Model predictions suggest that the pinewood nematode could extend its distribution in China by 40-55% in 2025 under various climate scenarios.

This model is currently applied to Europe to determine the risk of expansion of the nematode from Portugal where it was discovered in 1999. The first results will be presented. Since human-mediated dispersal is clearly involved in the spread of invasive species, control measures should be taken in close relation with the invasion risk.

Poster presentation

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