Simulating the dispersal of *Monochamus galloprovinciallis* based on its flight mill performance and testing several management scenarios

Robinet C[1], David G[2], Piou D[2,3], Roques A[1], Jactel H[2]

[1]*INRA, UR633 Zoologie Forestière, F-45075 Orléans, France*
[2]*INRA, UMR BIOGECO, F-33612 Cestas, France*
[3]*DSF-MAAF, F-33612 Cestas, France*
Email: christelle.robinet@orleans.inra.fr

The potential spread of the pine wood nematode, *Bursaphelenchus xylophilus*, and its associated pine wilt disease are strongly associated with the flight capacity of the insect vector. Although some data were available from congeneric species in North America and Asia, the flight performances of the European vector, *Monochamus galloprovinciallis*, were largely unknown. They were assessed with flight mill experiments and used to fit a dispersal kernel. A stochastic individual-based model was then developed to simulate the trajectory of adults over one season. With this dispersal model and a transmission function of the nematode, the area where the vector can transmit the pine wood nematode can be determined and several forest management scenarios to contain its spread can be tested. Although this dispersal model is still at an exploratory stage, and beetle's dispersal capacity might be overestimated with flight mill, this approach contributes to a better understanding of vector's dispersal pattern and can be used to test the effects of several management scenarios. This dispersal model is a first step towards the development of a refined spread model of the nematode and the disease at larger spatial and temporal scales in Europe.