Landscape Genetics of Monochamus galloprovincialis, Vector of the Pine Wood Nematode in Europe.

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The pine wood nematode (PWN), Bursaphelenchus xylophilus (Steiner & Burher) Nickle (Nematoda, Aphelenchoididae) is the causal agent of the pine wilt disease (PWD), a virulent syndrome killing susceptible pines trees within few months. From its native area in North America, it has been introduced in several Asian and European countries causing considerable damages to native pine forests. The PWN was detected for the first time in Europe in Portugal 15 years ago. From its introduction site, it rapidly expanded its range to a large part of the country and entered into Spain. In Europe, the native longhorn beetle Monochamus galloprovincialis (Olivier) is the only known vector for this nematode. This beetle performs its larval development in the wood of declining pine trees and spread the PWN when it emerges from infected wood. Thus, natural dispersal of the PWN is highly depending on beetle dispersal. Given the rapid range expansion of this pest and the threat to forests involved, it is crucial to identify potential barriers to dispersal of M. galloprovincialis to define suitable pest management strategies.
Based on 1043 individuals from Iberian Peninsula, genotyped at 13 microsatellites loci, we conducted a landscape genetic analysis to uncover the landscape features affecting dispersal of M. galloprovincialis. To avoid confounding effect of evolutionary history of this species in the area of study, we used a nested sampling design and assessed population genetic structure in order to select the appropriate populations and the optimal scale for correlation analysis.
Our results show that mountain ranges represent a break to dispersal of M. galloprovincialis, and subsequently potential barriers to the spread of the PWN.

Keywords: Alien spread, dispersal, Coleoptera, Cerambycidae.