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Non vector spread of *Bursaphelenchus xylophilus* via wood chips

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ABSTRACT

The transmission of *Bursaphelenchus xylophilus* (PWN) to new host trees depends on its vector beetles belonging to the genus *Monochamus*. Nevertheless since the first interception of PWN in wood chips in the European Union in 1984 discussions on non vector transmission of PWN from wood chips to healthy trees takes place. Currently increasing interest in importing wood chips from North America for energy purpose or paper production can be observed. Within the EU research project REPHRAME we investigated under laboratory conditions using *Pinus sylvestris* saplings, whether PWN can spread from artificially infested *Pinus sylvestris* wood chips to pine trees.

MATERIALS AND METHODS

For this purpose pine logs (eight cm average diameter) were inoculated with PWN and incubated at 25 °C for 24 days. After stripping of the bark logs were processed to wood chips using a laboratory wood mill with a maximum size of 10 x 20 x 4 mm. At test start 100 g wood chips each were placed in three liter pots of 3-4 years old *Pinus sylvestris* saplings. Test temperatures were 15 °C and 25 °C respectively. Different combinations of tree conditions and wood chips were investigated. Except for the variant “healthy trees” the pines were either wounded on the stem, the roots or were cut above the root collar. The wood chips were mixed in the soil or were placed on the soil with direct contact or in a distance to the stem. The control variant did not include wood chips. In total 12 tree-wood chip combinations were investigated for each temperature. Four variants without wood chips but with different tree conditions served as controls. During 12 weeks the trees were evaluated concerning their development of wilt symptoms. Six wilt classes (0 to 5 = no wilt symptoms to death of the tree) were used for assessing the physiological condition of the trees. In this time trees with more than 75 % wilting needles but still alive (wilt class 4) were sampled for nematode extraction using the modified Baermann funnel

method. After 12 weeks all remaining trees were also sampled for nematodes irrespectively of their wilt class.

RESULTS

At 25 °C more saplings developed higher wilt classes and found to be PWN infested compared to the 15 °C variant. Stem injured pines with direct wood chip contact and root injured pines combined with wood chips in the soil at 25 °C showed the majority of trees with wilt class 4. PWN could be extracted from 47 of all 480 non-control trees. At 15 °C three trees in the variant with chips directly attached to stem wounded trees were affected by PWN. At 25 °C seven of 12 tree-wood chip-combinations with in total 44 trees showed PWN infestation.

CONCLUSIONS

The results of the current investigation indicate the possibility of non vector spread of PWN with wood chips to trees under laboratory conditions. The temperature, tree condition and wood chip location are influencing factors for this infestation pathway. The results need to be evaluated under outdoor conditions. For Pest Risk Assessment the changing end-use of wood chips as well as the increasing amounts in international wood chip trade needs to be considered.

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