

Polycyclic aromatic hydrocarbon migration from creosote-treated railway ties into ballast and adjacent wetlands.

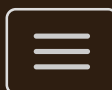
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Polycyclic aromatic hydrocarbon migration from creosote-treated railway ties into ballast and adjacent wetlands



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Description

Occasionally, creosote-treated railroad ties need to be replaced, sometimes in sensitive environments such as wetlands. To help determine if this is detrimental to the surrounding environment, more information is needed on the extent and pattern of creosote, or more specifically polycyclic aromatic hydrocarbon (PAH), migration from railroad ties and what effects this would have on the surrounding environment. This study is a report on PAH level testing done in a simulated wetland mesocosm. Both newly treated and weathered creosote-treated railroad ties were placed in the simulated wetland. As a control, untreated ties were also placed in the mesocosm. Samples were taken of the ballast, wetland sediments, groundwater, stormwater, and soil cores. Ballast and sediment samples were taken at intervals during the 18 months of the study. Results of the study showed that there was an initial pulse of PAH moving from the treated railway ties into the ballast during the first summer of the study. More PAH moved from the newly treated ties than from the weathered ties at this time. No significant PAH loss was observed from ties during the second summer. A small portion of PAH appeared to move vertically down into the ballast to approximately 60 cm. Small amounts of PAH may have migrated from the ballast into adjacent wetlands during the second summer, but these amounts were not statistically significant. These results suggest that it is reasonable to expect a detectable migration of creosote-derived PAH from newly treated railway ties into supporting ballast during their first exposure to hot summer weather. The PAH rapidly disappeared from the ballast during the fall and winter following this initial loss. Then statistically insignificant vertical and horizontal migration of these PAH suggests that they either evaporated or were degraded in the ballast. Effects of PAH on the environment are discussed in the Appendix.

Publication Notes

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Keywords

Creosote, leaching, railway ties, wetlands, polycyclic aromatic hydrocarbons

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