Xylem-based long-distance transport and phloem remobilization of copper inSalix integraThunb

发布者： [发表时间]：2020-03-11 [来源]： [浏览次数]：234

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期刊来源：journal of hazardous materials

论文摘要：

Due to high biomass and an ability to accumulate metals, fast-growing tree species are good candidates for phytoremediation. However, little is known about the long-distance transport of heavy metals in woody plants. The present work focused on the xylem transport and phloem remobilization of copper (Cu) in Salix integra Thunb. Seedlings with 45 d preculture were grown in nutrient solutions added with 0.32 and 10 μM CuSO4 for 5 d. Micro X-ray fluorescence imaging showed the high Cu intensity in xylem tissues of both stem and root cross sections, confirming that the xylem played a vital role in Cu transport from roots to shoots. Cu was presented in both xylem sap and phloem exudate, which demonstrates the long-distance transport of Cu via both vascular tissues. Additionally, the 65Cu spiked mature leaf exported approximately 78% 65Cu to newly emerged shoots, and approximately 22% downward to the new roots, confirming the bidirectional transport of Cu via phloem. To our knowledge, this is the first report to characterize Cu vascular transport and remobilization in fast-growing woody plants, and the findings provide valuable mechanistic understanding for the phytoremediation of Cu-contaminated soils.

论文链接：https://www.sciencedirect.com/science/article/abs/pii/S0304389420304179