

Methanogenic Archaea dominate mature heartwood habitats of Eastern Cottonwood (*Populus deltoides*)



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Background

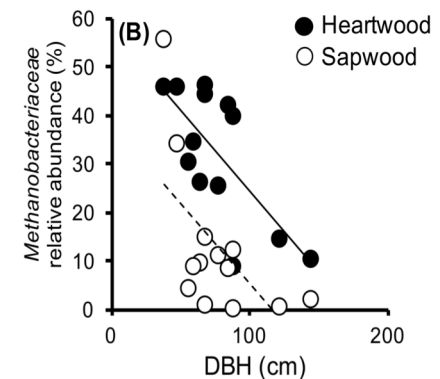
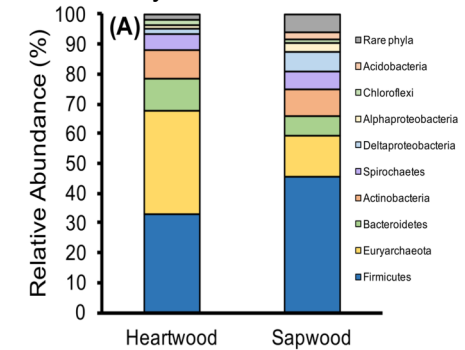
- Recent reports from diverse forests show direct emission of methane from living tree trunks and that it may be a significant terrestrial emission source. However, there is debate whether tree methane emissions are due to transport from soils or produced in wood.
- Reports of the presence of methanogens from the wood of trees were prominent in the literature 40 years ago, but, haven't been evaluated by molecular ecology approaches.

Science

- Examine heartwood and sapwood communities associated with *Populus deltoides* in mature riparian forest trees using rRNA gene sequence analyses to understand how the microbiome varies with tree and wood properties
- Wood environments are dominated by anaerobic microbiomes and methanogens are more prominent in heartwood (34% relative abundance) compared to sapwood environments (13%).
- Tree diameter was the strongest predictor of methanogen abundance, but wood moisture content and pH were also significant predictors of microbial community composition.

Significance

- Improved understanding of the mechanisms and prevalence of methane producing communities across tree species could help explain terrestrial methane cycling in earth system models.



Relative abundance of dominant bacterial and archaeal phyla across tissue types (DBH, diameter at breast height).



Flammable gas being emitted from increment borer at time of sampling.