Microbial enzymatic activities and community-level physiological profiles (CLPP) in subsoil layers are altered by harvest residue management practices in a tropical *Eucalyptus grandis* plantation

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Harvest residue management is a key issue for the sustainability of *Eucalyptus* plantations established on poor soils. Soil microbial communities contribute to soil fertility by the decomposition of the organic matter (OM), but little is known about the effect of whole-tree harvesting (WTH) in comparison to stem only harvesting (SOH) on soil microbial functional diversity in *Eucalyptus* plantations.

We studied the effects of harvest residue management (branches, leaves, bark) of *Eucalyptus grandis* trees on soil enzymatic activities and community-level physiological profiles (CLPP) in a Brazilian plantation.

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Eucalyptus grandis plantation

- Itatinga (SP), Brasil (part of SOERE F-ORE-T)
- Planted in 2012 (4-year-old)
- Rainfall: 1360 mm/year (sub-tropical climate)
- Oxisols (20% Clay)

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Harvest residue experimentation

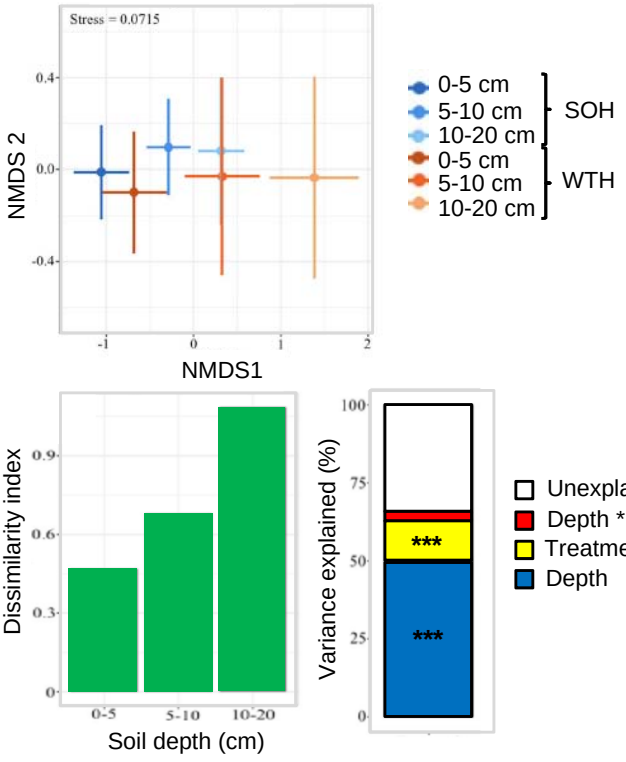
2 treatments:
- Stem-Only Harvesting (SOH)
- Whole-Tree Harvesting (WTH)

3 depths sampled: 0-5 cm; 5-10 cm; 10-20 cm

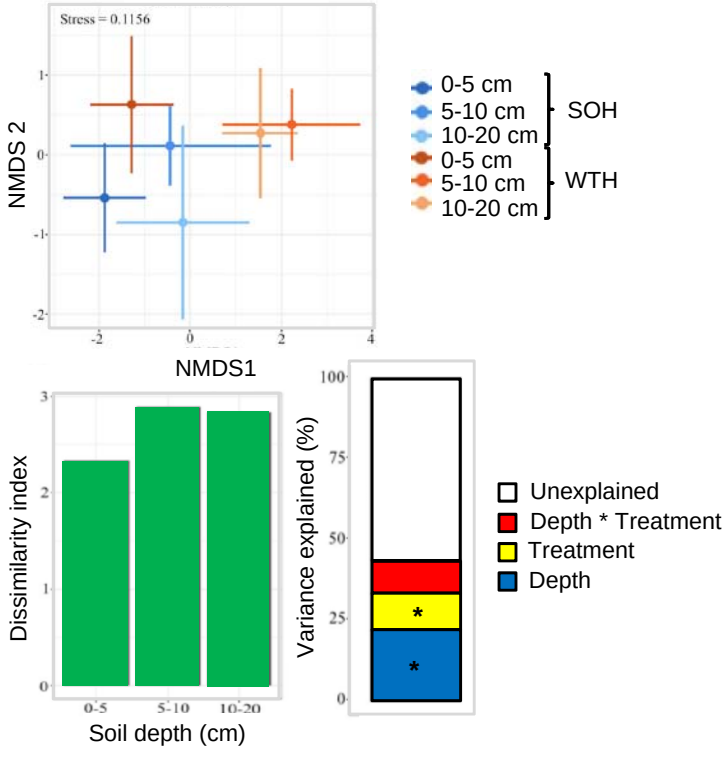
Methods

- Enzymatic assay (ß-glucosidase, cellobiohydrolase, xylosidase, glucuronidase, N-acetylglucosaminidase and acid phosphatase)
- Physiological profile approach (CLPP) assay = BIOLOG Ecoplates

Enzymatic assay



Physiological profile (CLPP) assay



CONCLUSIONS

WTH decreased enzyme activities and catabolic potential of the soil microbial community. Furthermore, these negative effects on soil functional diversity were mainly observed below the 0-5 cm layer (5-10 and 10-20 cm), suggesting that WTH can be harmful to the soil health in these plantations.