EGU21-10644
https://doi.org/10.5194/egusphere-egu21-10644
EGU General Assembly 2021


# Shooting the messenger: Identifying the mycorrhizal species transferring carbon between neighboring trees

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EMF play an important role in forests around the globe, by improving tree nutrition and water supply, as well as connecting different tree species through common mycorrhizal networks (CMN's). However, the extent to which EMF control resource sharing within these networks has not yet been thoroughly addressed. We constructed a simple network of tree-fungus-tree and monitored carbon flow from a $^{13}CO_2$ labeled donor tree to the final recipient. DNA Stable Isotope Probing (DNA-SIP) of ectomycorrhizal root tips was used to identify the main fungal symbionts involved in carbon transfer among trees. We used pairs of inter and intra-specie Pinus halepensis and Quercus calliprinos saplings, and examined the carbon dynamics for 40 days within the leaf, stem and root tissues. The peak of $^{13}C$ in the roots of the donor trees was around day 4 post labeling, while the recipient roots peaked at day 9 with observed differences between pairs. The intrinsic tree carbon pool, and not the tree species identity, was the main factor governing carbon transfer between trees. Finally, we were able to identify the main fungal symbionts enriched with $^{13}C$. Our results add the "missing piece of the puzzle" by linking specific mycorrhizal species to carbon transfer within CMN's.