

Publication

Belowground carbon trade among tall trees in a temperate forest

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Forest trees compete for light and soil resources, but photoassimilates, once produced in the foliage, are not considered to be exchanged between individuals. Applying stable carbon isotope labeling at the canopy scale, we show that carbon assimilated by 40-meter-tall spruce is traded over to neighboring beech, larch, and pine via overlapping root spheres. Isotope mixing signals indicate that the interspecific, bidirectional transfer, assisted by common ectomycorrhiza networks, accounted for 40% of the fine root carbon (about 280 kilograms per hectare per year tree-to-tree transfer). Although competition for resources is commonly considered as the dominant tree-to-tree interaction in forests, trees may interact in more complex ways, including substantial carbon exchange.

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