

## Publication

## Mycorrhizal Networks : Common Goods of Plants Shared under Unequal Terms of Trade

**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 1469107**Author(s)** Walder, Florian; Niemann, Helge; Natarajan, Mathimaran; Lehmann, Moritz F; Boller, Thomas; Wiemken, Andres**Author(s) at UniBasel** [Lehmann, Moritz](#) ; [Boller, Thomas](#) ; [Walder, Florian](#) ; [Niemann, Helge](#) ; [Wiemken, Andres M.](#) ; [Natarajan, Mathimaran](#) ;**Year** 2012**Title** Mycorrhizal Networks : Common Goods of Plants Shared under Unequal Terms of Trade**Journal** Plant physiology**Volume** 159**Number** 2**Pages / Article-Number** 789-97

Plants commonly live in a symbiotic association with arbuscular mycorrhizal fungi (AMF). They invest photosynthetic products to feed their fungal partners, which, in return, provide mineral nutrients foraged in the soil by their intricate hyphal networks. Intriguingly, AMF can link neighboring plants, forming common mycorrhizal networks (CMNs). What are the terms of trade in such CMNs between plants and their shared fungal partners? To address this question, we set up microcosms containing a pair of test plants, interlinked by a CMN of *Glomus intraradices* or *Glomus mosseae*. The plants were flax (*Linum usitatissimum*; a C3 plant) and sorghum (*Sorghum bicolor*; a C4 plant), which display distinctly different <sup>13</sup>C/<sup>12</sup>C isotope compositions. This allowed us to differentially assess the carbon investment of the two plants into the CMN through stable isotope tracing. In parallel, we determined the plants' "return of investment" (i.e. the acquisition of nutrients via CMN) using <sup>15</sup>N and <sup>33</sup>P as tracers.

Depending on the AMF species, we found a strong asymmetry in the terms of trade: flax invested little carbon but gained up to 94% of the nitrogen and phosphorus provided by the CMN, which highly facilitated growth, whereas the neighboring sorghum invested massive amounts of carbon with little return but was barely affected in growth. Overall biomass production in the mixed culture surpassed the mean of the two monocultures. Thus, CMNs may contribute to interplant facilitation and the productivity boosts often found with intercropping compared with conventional monocropping.

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