

Arbuscular mycorrhizal fungi systemically compensate crude oil effects on root biomass

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The arbuscular mycorrhizal (AM) symbiosis beneficially effects plant growth and enhances plant tolerance toward biotic and abiotic stresses, mainly due to improved plant water uptake and nutrient supply. Environmental pollution such as crude oil soil contamination is of major concern as organic pollutants in general may harm human health particularly because of mutagenic and carcinogenic capacities. Moreover toxicity and persistence in soils may lead to a lack of vegetation on polluted areas. Several investigations confirm AM fungi to improve the establishment and maintenance of plants on contaminated soils resulting in an amelioration of soil rhizosphere and vegetation cover. But there is little known about the systemic impact of AM fungi in response to organic soil contaminants although systemic effects have already been confirmed regarding biotic stresses such as plant pathogen infestations.

A pot experiment was set up to determine the impact of both crude oil pollution and mycorrhizal symbiosis on growth of *Phaseolus vulgaris*. Plantlets were grown in a split-pot system, exposed to either polluted or non-polluted soil, supplemented or not with viable propagules of *Glomus* spp. (Symbivit^R). The experimental soil derived from an arable land in Austria and was spiked with crude oil four years prior to the experimental setup. Plants were cultivated in a green house for 6 weeks, each treatment carried out in 4 replicates.

At harvest leaf, stem and root biomass were determined. Roots were further stained and AM colonization quantified. Morphological root characteristics of bean were analyzed by means of WinRhizo computer program. Significant effects of both crude oil pollution and mycorrhiza colonization were observed. These treatment effects are particularly discussed regarding a systemic impact of AM symbiosis in response to the a-biotic stress of crude oil soil contamination.

Keywords: Systemic effect, *Glomus* spp, Hydrocarbons, Environmental pollution, Rhizosphere