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85. © Can NPK fertilizers enhance seedling growth and mycorrhizal status of *Tuber melanosporum*-inoculated *Quercus ilex* seedlings? Suz, L. M., Martin, M. P., Fischer, C. R., Bonet, J. A., and Colinas, C. *Mycorrhiza* 20:349-360. 2010.

Can NPK fertilizers enhance seedling growth and mycorrhizal status of *Tuber melanosporum*-inoculated *Quercus ilex* seedlings?

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Abstract Although successful cultivation of the black truffle (*Tuber melanosporum*) has inspired the establishment of widespread truffle orchards in agricultural lands throughout the world, there are many unknowns involved in proper management of orchards during the 6–10 years prior to truffle production, and there are conflicting results reported for fertilizer treatments. Here, we systematically evaluate the combined effects of nitrogen, phosphorous, and potassium with different doses of each element, applied to either foliage or roots, on plant growth parameters and the mycorrhizal status of outplanted 3-year-old seedlings in five experimental *Quercus ilex*–*T. melanosporum* orchards. Fertilization did

not significantly improve seedling aboveground growth, but the plants treated with the fertilizer 12-7-7 applied to the roots (HNr) displayed longer field-developed roots. Only the fertilizer with the highest dose of K (10-6-28) applied to the foliage (HKf) increased the probability of fine root tip colonization by *T. melanosporum* in field-developed roots. However, the plants treated with the same fertilizer applied to the soil (HKr) presented the highest probability for colonization by other competing mycorrhizal soil fungi. Potassium seems to have an important role in mycorrhizal development in these soils. Apart from *T. melanosporum*, we found 14 ectomycorrhizal morphotypes, from which seven were identified to species level, three to genus, two to family, and two remained unidentified by their morphological characteristics and DNA analyses.

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Introduction

Truffles are the fruiting bodies of hypogeous ectomycorrhizal (ECM) fungi belonging to the genus *Tuber* F. H. Wigg. (Ascomycota). The black truffle (*Tuber melanosporum* Vittad. or *Tuber nigrum* Bull.) has high commercial value due to its excellent organoleptic properties. The decline in wild black truffle production during the last century has led to the development of truffle orchards, using *T. melanosporum*-inoculated seedlings (mainly oak and hazelnut), but truffle production in orchards is difficult to predict. In the establishment of these orchards, the early years are particularly critical for survival and growth of both plant and fungal symbionts.