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Arbuscular mycorrhizal fungi (AMF) diversity obtained from gooseberry plantations (*Physalis peruviana*) in the Colombian Andean region

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Highlights: This research focused on determining the relationship between arbuscular mycorrhizal fungal diversity and soil physical -chemical properties, in gooseberry plantations in Andean Mountains from 1500 to 2700 m.a.s.l. The spore abundance, spore morphotype and diversity index were determined and analyzed through multiple regression. It was possible determine that some soil conditions affect the abundance and diversity of AMF.

Keywords: Arbuscular mycorrhizal fungi, ecotype diversity, spore abundance, Andean soils,

Arbuscular mycorrhizal fungi (AMF) are able to establish association with 80% of plants which are components of most terrestrial ecosystems and agro-ecosystems (Smith and Read, 2008). Knowledge regarding the diversity and variability of AMF in specific ecosystems is the basis for pre-selection in application programmes to optimize the symbiosis (Hector *et al*., 2001; Kogel **,** 2008). The objective of the present work was to evaluate the diversity of AMF in soils below gooseberry, in a transect from 1500 to 2700 m above sea level, in the Andean area where the edaphic-climatic differences are quite high. A total of 10 pooled soil samples were collected from gooseberry plantations during dry and rainy seasons. Chemical and physical soil analysis, were performed in order to establish the relationship between soil characteristics and AMF diversity. In addition, spore abundance, diversity index, presence of morphotypes (Noss, 1990), and arbuscular mycorrhizal genus or species were recorded. Spores morphology was used for taxonomic identification. The results showed natural colonization by AMF in all of the soils evaluated. Forty eight AMF species and 22 morphotypes were identified from the area of study, reflecting high diversity present in tropical mountain areas. Spore abundance ranged between 20 and 120 g^{-1} of soil, in wet season and between 387 and 1531 spores g^{-1} soil in dry season. In rainy season 15 morphotypes and 33 species of AMF were identified, while in dry season 22 morphotypes and 48 species of AMF were found. Multiple regression showed, for rainy season, that spore abundance was reduced significantly with altitude (by-56.4%), soil clay content (by-12,7%) and soil compaction at 10 cm deep (by-15%) and that it was increased significantly in soils with high Ca and Mg content (by + 8%) and S content (by +3.8%). By contrast, for dry season, spore abundance only shows a negative relation with soil cation exchange capacity (by -37%), soil compaction at 5 cm depth (by -33.6%) and soil pH (by -8%) as reported by Horn and Lebert, 1994, Nadian *et al*., 1997 and Serralde and Ramírez, 2004. Diversity indexes (Shannon, Simpson Index) were affected by Ca, Mg and K content in soils (by 30%). Results allow us to confirm that there is a clear effect of some physical and chemical soil characteristics, in the composition of the community of AMF associated to gooseberry plantation in the Andean Mountains of Colombia.

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