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Prunus persica crop management as step toward AMF diversity conservation for the sustainable soil management

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We investigated the diversity of arbuscular mycorrhizal fungi (AMF) in roots of Prunus persica under two fertilization treatments (CF: consisted of application of chicken manure (1400 kg.ha-1), urea (140 kg.ha-1), complex fertilizer 12-12-17/2 (280 kg.ha-1), and potassium sulfate (40 kg.ha-1) and IF: consisted of application of urea (140 kg.ha-1), complex fertilizer 12-12-17/2 (400 kg.ha-1) and potassium sulfate (70 kg.ha-1)) combined with integrated pest management (IM) or chemical pest management (CM), in a tropical agroecosystem in the north of Venezuela. Our goal was to ascertain how different fertilizers/pest management can modify the AMF diversity colonizing P. persica roots as an important step towards sustainable soil use and therefore protection of biodiversity. The AM fungal small-subunit (SSU) rRNA genes were subjected to PCR, cloning, sequencing and phylogenetic analyses. Twenty-one different phylotypes were identified, which were grouped in five families: Glomeraceae, Paraglomeraceae, Acaulosporaceae, Gigasporaceae and Archaeosporaceae. Sixteen of these sequence groups belonged to the genus Glomus, two to Paraglomus, one to Acaulospora, one to Scutellospora and one to Archaeospora. A different distribution of the AMF phylotypes as consequence of the difference between treatments was observed. Thus, the AMF communities of tree roots in the (IF+CM) treatment had the lowest diversity (H′=1.78) with the lowest total number of AMF sequence types (9). The trees from both (CF+IM) and (IF+IM) treatments had similar AMF diversity (H′ [U+F0BB] 2.00); while the treatment (CF+CM) yielded the highest number of different AMF sequence types (17) and showed the highest diversity index (H′=2.69). In conclusion, the crop management including combination of organic and inorganic fertilization and chemical pest control appears to be the most suitable strategy with respect to reactivate the AMF diversity in the roots of this crop and thus, the agricultural and environmental sustainability in the agroecosystem.