



Microbial communities and soil fertility in flood irrigated orchards under different management systems in eastern Spain

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Unsuitable land management such as the excessive use of herbicides can lead to a loss of soil fertility and a drastic reduction in the abundance of microbial populations and their functions related to nutrient cycling. Microbial communities are the most sensitive and rapid indicators of perturbations in agroecosystems. A field experiment was performed in an orange-trees orchard (*Citrus sinensis*) to assess the long-term effect of three different management systems on the soil microbial community biomass, structure and composition (phospholipid fatty acids (PLFAs) total, pattern, and abundance). The three agricultural systems assayed were established 30 years ago: herbicides (Glyphosate (N-(phosphonomethyl)glycine) with inorganic fertilizers (H), intensive ploughing and inorganic fertilizers (NPK 15%) (P) and organic farming (chipped pruned branches and weeds, manure from sheep and goats) (O). Nine soil samples were taken from each system. The results showed that the management practices including herbicides and intensive ploughing had similar results on soil microbial properties, while organic fertilization significantly increased microbial biomass, shifted the structure and composition of the soil microbial community, and stimulated microbial activity, when compared to inorganic fertilization systems; thus, enhancing the sustainability of this agroecosystem under semiarid conditions.