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Multifunctional agroecosystems contributing for nutrients cycling in irrigated environments of the Brazilian semi-arid

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The Brazilian semi-arid region is characterized by monoculture that eventually degrade the soil. Due to this reality, there is a need to recover degraded areas and to preserve those that still are productive. Different practices are used for soil management and conservation, the most important being the green manure, which consist of the use of plant mixture that cover the soil. Therefore, the present work aims to evaluate the micronutrient cycling capacity by the use of green manure in mango production systems in the Brazilian semi-arid to mitigate the excessive use of fertilizer in agroecosystems. The study was carried out in long-term experiment installed in Petrolina, Pernambuco, local climate classified as BSw'h' and Ultisol dystrophic plinthic, loamy/clayey plain relief. The experiment was conducted in a randomized block design with four replications and treatments arranged in subdivided plots. The plots consisted of two soil management systems (tillage and no-tillage), and the subplots consisted of 3 types of green manures: plant mixture 1 (PM1); plant mixture 2 (PM2) and spontaneous vegetation (SV). The litter bag technique was used for the evaluation of the release of nutrients. Altogether, there were used 312 litter bags, with monthly collections of 13 samples, during 12 months. The micronutrients accumulation on the phytomass of the green manures wasn't influenced by the soil management, but changed the cycling capacity of Mn on green manure. The soil's stirring speeds up the decomposition of the vegetable residue, providing a faster release of most micronutrients. In the tillage systems, the Fe was the micronutrient that took longer to release in all of the green manures, but the release of the remaining micronutrients changed from study to study, due to the type of fertilizer. The Mn, followed by the Zn, were the micronutrients that released first in every green manure, and the release of the remaining nutrients changed due to the type of fertilizer. In general, the Cu was the slowest element to release, the liberation speed being PM1>PM2>SV. To this nutrient, the release speed in on its maximum on tillage. The practice of cultivating plant mixtures in between the orchard's rows, as well as the maintenance of the spontaneous vegetation is a very promising technology to the cycling of soil's micronutrients and to improve or maintain the soil's quality, providing sustainability to the irrigated mango crop on the Brazilian semi-arid.

Keywords: micronutrients, Plant mixtures, green manure, spontaneous vegetation

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