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Effect of the crops sequence on the content of organic matter and the concentration of glyphosate in soils of the southeast of the Chaco

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In molisoles soils, the increase in the frequency of soybean cultivation reduces the storage of organic matter (OM) in macroaggregates (> 250 μm) located in the superficial 0-5 cm (Rampoldi, A. et al 2007). The agronomic practices that favor the accumulation of OM constitute a way to reduce the transport of pollutants to the subsurface horizons, due to their role in the retention process of several pesticides. In Argentina, the use of glyphosate has increased since its introduction in the 1980s, reaching 200,000 tons in 2012 and representing 80% of the total of commercialized herbicides (CASAFE, 2012). The objective of this work was to evaluate the presence and stratification of the glyphosate + AMPA concentration and the percentage of organic matter in a long-term test soil with three crops sequences.
The experiment is located in the Agricultural Experimental Station of INTA Las Breñas (Province of Chaco). It was installed in 2005 under no till, in complete blocks at random, with four repetitions per treatment. The treatments are: T1: Soy monoculture, T2: Corn - Sunflower / Sorghum; Soy and T3: Sunflower - Coverage Crop - Corn. The soil samples were extracted in two depths (0-5 and 5-30 cm) on soy stubble in all treatments. In the samples, the content of organic matter and the concentration of the glyphosate herbicide and its metabolite, AMPA, were determined. The concentration of glyphosate + AMPA = concentration of glyphosate + 1.5 AMPA concentration.
It was observed: i.- a significant accumulation of the concentration of glyphosate + AMPA, in both depths, being the values: T1: 583.5 and 410.6 μg kg-1, T2: 248.1 and 25.1 μg kg-1, T3: 242.4 and 75.0 μg kg-1 for 0-5 cm and 5-30cm respectively; ii.- a significant reduction of the MO% in the first 5 cm of depth, the values being: T1: 2%, T2: 3.1% and T3: 2.7%. The% MO, 5-30 cm deep was similar for all treatments
These results demonstrate the importance of significantly reducing the chemical control of weeds, first exhausting the use of other strategies such as Integrated Weed and Pest Management, cover crops, etc. in order to reduce the burden of agrochemicals in the environment. In addition, it is confirmed that a sequence of crops in which the grasses participate improves the OM contents of the soil.