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Presence of glyphosate and AMPA in orchard soils and water in the upper Río Negro and Neuquén valley

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The Upper Valley of Río Negro and Neuquén provinces is the most important region of Argentina for pear and apple production. The local climate is arid, with deficits of plant available water of 1,200 mm per year with soils classified as Entisols and Aridisols. Flooding irrigation provides approximately 2,000 mm yearly. The weeds control consists on the application of glyphosate along the planting row 0.5 m each at both sides of the trees. The aim of this work was to detect the presence of glyphosate and AMPA (aminomethylphosphonic acid) remaining in water and soil. Some orchards were monitored one year after the herbicide application. Soil composed samples were taken at the 0 to 10 cm depth and also in the canals. Percolation water was taken from drainage canals until its final destination. Irrigation water before entering the orchards were also sampled. The presence of glyphosate and AMPA was detected in all samples. The soil in the canals had 1,098 and 340.5 μg.kg-1 of glyphosate and AMPA respectively. 934 and 1,864.5 μg.kg-1 of glyphosate and AMPA respectively on a land where the herbicide was recently applied; figures from 11 y 208μg.kg-1 (minimun) to 149.5 y 583 μg.kg-1 (maximum) of glyphosate and AMPA respectively in orchards on which the herbicide was applied one year before; finally, 13 and 17.5 μg.kg-1 minimun, and 32 and 30.5 μg.kg-1 maximun of glyphosate and AMPA respectively in draining channel sediments. As regards waters, and according to the quantity of molecules and the level allowed by the EU of 0.5 μg.l-1, the water source contained 0.56 μg.l-1, while, in the draining waters, we found concentrations between 1.5 and 12.21μg.l-1 right after soil percolation and between 0.49 and 5.0 μg.l-1 in secondary drainage canals and finally, between 0.5 and 1.4 μg.l-1 in the main canal. Glyphosate and AMPA comprised between 73% and 99.9% of the sum of total molecules in all cases.