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Introduction

Río Negro and Neuquén Valley 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 annually.



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 exploring work was to detect the presence of glyphosate and AMPA (aminomethyl phosphonic acid) remaining in soil and water.



Materials and methods

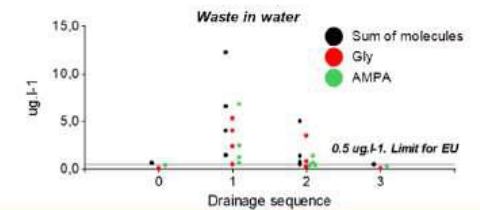
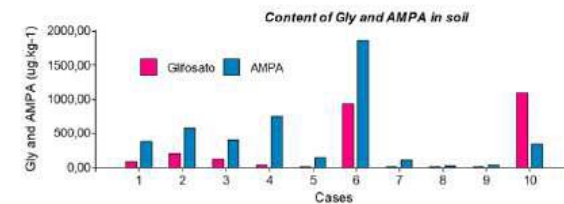
Some orchards were monitored one year after the herbicide application. Soil composed samples were taken at the 0 to 10 cm depth and also in the canals. Percolation water was taken from drainage canals until its final destination. Irrigation water before entering the orchards were also sampled.



Results

The presence of glyphosate and AMPA was detected in all samples. The soil in the canals had 1,098 g.kg⁻¹ of glyphosate and 340.5 g.kg⁻¹ of AMPA. On soil where the herbicide was recently applied, 934 g.kg⁻¹ of glyphosate and 1,864.5 g.kg⁻¹ of AMPA were found. In orchards where the herbicide was applied one year before, from 11 to 149.5 g.kg⁻¹ of glyphosate and 208 g.kg⁻¹ to 583 g.kg⁻¹ of AMPA were found. Finally, in draining channel sediment, from 13 to 32 g.kg⁻¹ of glyphosate and 17.5 to 30.5 g.kg⁻¹ of AMPA were found.

As regards waters, the quantity of molecules level allowed by the EU is 0.5 g.l⁻¹. Water source contained 0.56 g.l⁻¹ (1) while in the draining waters, we found concentrations between 1.5 and 12.21g.l⁻¹ right after soil percolation (2) and between 0.49 and 5.0 g.l⁻¹ in secondary drainage canals (3) and finally, between 0.5 and 1.4 g.l⁻¹ on the draining channel to the final destination (4).



Conclusion

Glyphosate and AMPA were the major components in the sum of total molecules (between 73% and 99.9%). Through conversations with producers we can assume that these levels in soil and water are due to the mismanagement of the herbicide with respect to weed phenology, calendar applications, application in undue sites such as irrigation channels, or use of alternative trade marks.