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Tracking water pathways and origins in cranberry production: Isotope hydrology application

Jenifer Gadomski¹, Silvio Gumiere¹, Thiago Gumiere¹, Genevieve Bordeleau², and Alain Rousseau²

¹Université Laval, Faculté de l'agriculture et de l'alimentation, Département sols et environnement, Canada

(jenifer.gadomski.1@ulaval.ca)

²INRS - L'Institut national de la recherche scientifique - Centre ETE - Eau - Terre - Environnement

New scientific advances based on integrating water management approaches have been developed in order to reduce the environmental footprint. Cranberry production is one of the most influential cultures in Canada, where water is substantial for irrigation, harvesting, and frost control. The cranberry farms are considered closed-circuits. Water is mainly recycled in large pools, increasing the risk of accumulation of chemical substances affecting the quality of irrigation water. The use of isotopic geochemistry provides an additional layer of information for studying hydrological phenomena in agriculture.

The main objective of this project is to identify the sources and sinks of the water in a typical cranberry farm with the help of isotopic hydrology technics and groundwater surveys.

Water samples for stable isotope of the water molecule analysis (¹⁶O, ¹⁷O, ¹⁸O, ¹H, ²H) were collected during the growing season from May to September (from 2017 to 2020). Preliminary results have shown that isotope hydrology technics can be used to trace the water pathway in a cranberry farm by using the mixing model.

These results can help to implement integrated water management procedures helping to increase fruit yields and to reduce environmental impact. Isotope mixing model also makes it possible to assess water losses by infiltration into the aquifers and by evaporation.