



Saskatchewan Water Monitoring Program for Neonicotinoid Pesticides

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Neonicotinoids are an important family of insecticides in Saskatchewan, and are estimated to contribute to agricultural production in excess of \$15 billion annually. However, the PMRA of Health Canada has plans to phase out the neonicotinoid insecticides clothianidin and thiamethoxam in response to water quality information from a limited data set, mostly from Eastern Canada. A Saskatchewan water quality monitoring program for neonicotinoids was implemented in 2017-2019 to get a better understanding of neonicotinoid concentrations in prairie streams. Results detected very low levels (well below the chronic and acceptable level of residual contamination) of neonicotinoids in provincial water bodies.

Neonicotinoids are an important family of insecticides in Saskatchewan, and are estimated to contribute to agricultural production in excess of \$15 billion annually for the province. The use of clothianidin and thiamethoxam is extensive, approximately 20 million seeded acres annually in Saskatchewan. In fact, all canola; 30 per cent of wheat; 100 per cent of pulses and soybeans; and 10 per cent of potatoes use neonicotinoid seed treatments. However, the Pest Management Regulatory Agency (PMRA) of Health Canada has plans to phase out the neonicotinoid insecticides clothianidin and thiamethoxam in response to water quality information showing concentrations high enough to be toxic to aquatic insects. This decision, however, appears to be based on water quality information from limited data set, mostly from Eastern Canada where larger volume of neonicotinoids are used as a foliar spray. Loss of this family of pest control products would cost Saskatchewan producers (based on estimates used for the European Economic Union) two billion dollars annually in terms of lost yield.

Current water quality data for neonicotinoid concentrations and movement in water streams is limited in prairie environments. In the prairies, the dominant form of application for neonicotinoids is as a seed treatment, as a result, neonicotinoid movement in the environment is expected to be different than elsewhere in the country. In order to get a better understanding of neonicotinoid concentrations in prairie streams, Agriculture and Agri-Food Canada (AAFC) and the Saskatchewan Ministry of Agriculture partnered with the Saskatchewan Water Security Agency (WSA). The goal is to support, develop and implement water quality monitoring for neonicotinoids in Saskatchewan by using consistent protocols and standards developed by the environmental working group and the directives of the PMRA. The Ministry also partnered with Saskatchewan Crop Insurance Corporation to gather additional cropping data for each sampling location and watershed. The focus on streams was to better understand changes of neonicotinoid concentrations with flow, precipitation events and time of the year. The PMRA accepted this new water

monitoring data for 2017-2019 for further evaluation before a final decision is made regarding their phase-out.

The annual water monitoring was conducted at 15 existing Saskatchewan WSA's Baseline Environmental Monitoring of Lower Order Saskatchewan Streams (BEMLOSS) sites, established in 2008 through the partnership between the WSA and the Saskatchewan Ministry of Agriculture to monitor the effects of agriculture on water bodies. Additional ad hoc sites (two in 2018 and one in 2019) were also included in this monitoring to capture the influence of rainfall events. The collection of water samples was done by WSA staff and integrated into their regular collection activities for BEMLOSS sites. During the monitoring period (2017-2019), a total of 483 samples was collected and analyzed for the full suite of neonicotinoid pesticides at the AAFC laboratory in Lethbridge and the Vagon laboratory in Cochrane, Alberta. For 2019 monitoring, sample collection started in late March and continued through the end of July; for 2018 monitoring, sample collection started in April and continued through September. Sampling frequency was initially on a two-week schedule and decreased in streams with non-detects of neonicotinoids and as flows subsided and/or as the concentration of neonicotinoids stabilized. Water monitoring also targeted periods when flows increased as a result of rain events.

Generally, the results obtained from the 2019 water monitoring program were similar to the results obtained in 2017 and 2018, suggesting very low levels of neonicotinoids in provincial water bodies (well below the chronic and acceptable level of residual contamination). There were a few detections that were above a chronic threshold, but well below the acute threshold. The elevated levels only occurred for a short period of time and usually dissipated to below the level of concern in two weeks or less.

Given that Saskatchewan's water monitoring data (2017-2019), which is consistent with the data from the other western regional provinces, suggests very low levels of neonicotinoids in provincial water bodies, the Government of Saskatchewan recommended the PMRA should reconsider its proposed re-evaluation decision and continue the registration for thiamethoxam and clothianidin as seed treatments. An alternative recommendation was made to the PMRA, based on the findings from water monitoring in Western Canada, to consider a regional registration of neonicotinoids as seed treatments in Western Canada. This registration would be supported by the data collected by the four western provinces as part of the Multi Stakeholder Forum, Environmental Monitoring Working Group over the past three years.