

How grass buffers keep agricultural herbicides at bay

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This photo shows field herbicide pulverization in the vicinity of the studied site.
Credit: P. Lafrance, 2005

Grass buffer strips are commonly used in crop production to reduce herbicide runoff. These practices are encouraged through incentives, regulations or laws, and are effective at lowering herbicide concentration in runoff. However, subsurface filtration (under the buffer strips) is not as well documented, and neither are the effects of trees integrated into buffer strips with grasses. Understanding these effects is crucial as agriculture producers continue to adopt these strategies.

Researchers studied the impact of grass and grass/tree buffer strips on three herbicides commonly used in agriculture. The scientists studied the transport of the herbicides in both surface runoff and subsurface infiltration during two growing seasons.

Vegetative barriers reduce [herbicide](#) concentrations in runoff, but movement of herbicides through subsurface filtration actually increased. Total export of herbicides was reduced through the use of grass and grass/tree barriers. The research was conducted by Emmanuelle Caron, Pierre Lafrance, Jean-Christian Auclair of the University of Quebec, and Marc Duchemin of the Institute of Research and Development in Agri-Environment.

The results are reported in the March/April 2010 edition of the [Journal of Environmental Quality](#), published by the American Society of Agronomy, the Crop Soil Science Society of America, and the [Soil Science Society of America](#).

The results for the first year showed a 35% reduction in herbicide concentration in grass and grass/tree buffer strips than with no buffer. Herbicide concentrations in subsurface filtration increased 800-1200-% with buffer strips, although total overall concentration was reduced 40-60%. In 2005, total herbicide concentration exported through the buffer strips was 75-95% less than without the buffers. The findings indicate that grass barriers decrease surface water runoff while increasing subsurface infiltration, resulting in an overall loss of herbicides before reaching bodies of water.

Integrating trees into the barriers did not result in any significant differences. This was possible due to the fact that the trees were only two years old at the beginning of the study, and their root systems were not yet developed enough to demonstrate any impact. Further research is needed to determine the effects of long-established trees in buffer strips. Local meteorological conditions also play an important role in the efficiency of buffer strips, and the two years of the study experienced a wide range of variability that future long term research should address.

More information: View the abstract at

jeq.scijournals.org/cgi/content/abstract/39/2/617

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