# Vegetative Buffers Reduce Herbicide Runoff

**COLUMBIA, MO.**

Research has shown that vegetative buffers are very good at controlling sediment and keeping it out of waterways. But what about reducing herbicides?

"We have a major problem with that in the claypan soils in northeast Missouri," said Bob Lerch, a soil scientist with the USDA Agricultural Research Service and an adjunct assistant professor at the University of Missouri.

Lerch and his ARS colleagues decided to see how well buffers reduced herbicides in soils with high runoff potential.

In 2004 the researchers began working with buffer plots at the MU College of Agriculture, Food and Natural Resources' Bradford Research Center that had been used for studies focusing on sediment and nutrients. They conducted a preliminary study to see if buffer plots would work at all for herbicides.

"We got some nice results and then started a longer-term experiment that went from 2006 to 2010," Lerch said. "We looked at four different buffer treatments involving different types of grasses."

The grasses were tall fescue, a cool-season grass and the most common grass in Missouri; tall fescue with a switchgrass hedge; a mixture of warm-season grasses including Indian grass, switchgrass and eastern gamma grass. A fourth treatment used no vegetation.

Plots were split in two. The lower part had the buffer. The upper part was sprayed with a chemical, which was sampled as it went through the buffer.

"We sampled the water right above the buffer coming right off the sprayed area, then about three feet into the buffer, then another 12 feet and then another 24 feet, so we can see how the reduction in the load and the concentration occurs as it goes through the buffer," Lerch said. "We did that because we were interested in not only how the different grass treatments work, but also how much buffer do you need."

Finding the correlation between the width of the buffer and how effective it is in reducing contaminants has implications for design. That information can be given to the Natural Resources Conservation Service and other land management agencies.

"We found that grass buffers across the board were effective," Lerch said. "Every buffer was better than nothing."

The effectiveness drops off quickly in relation to the ratio of the drainage area to the buffer. A drainage-to-buffer ratio of 2-to-1 or less doesn't make much difference. The ratio is very sensitive in a certain range and then flattens out and has minimal effect.

"We can give them a good idea even though it was a plot-scale experiment of what you might expect in a real-field scale," Lerch said. "The relationship of how much contaminant is reduced versus the width of the buffer is really the basis for design criteria. For something like atrazine, if you have a 20-to-1 drainage to buffer ratio you will get 30 to 35 percent reduction. Is that good enough? Well, someone has to decide what is good enough, but we deliver the numbers."

NRCS has not yet adopted the findings into their technical field guides. Lerch says it takes time for the research to translate into what gets done in the field. The key is to educate people and make sure they understand the science so it can be effectively put into practice. Δ