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# Soil conditioner eliminates majority of field runoff sediment

This past growing season, U.S. farmers irrigated more than a million acres of farmland, including a couple hundred thousand in Idaho, with water containing the soil conditioner polyacrylamide, or PAM. An off-the-shelf chemical, PAM dissolved in irrigation water keeps soil particles from eroding off fields and the bottom of irrigation furrows, and it settles out sediment suspended in the water.

"The first time I saw it, I couldn't believe the difference it made," said Don Morishita, a UI weed scientist. "Without it, you see very muddy, very brown water moving down the furrow. With PAM, the water is very clear."

Research conducted by the USDA Agricultural Research Service in Idaho since 1991 shows that PAM eliminates an average 94 percent of the sediment in field runoff from furrow irrigation, said Bob Sojka, soil scientist with the service's Northwest Irrigation and Soils Research Laboratory in Kimberly. Besides that, it increases water infiltration into the soil by as much as 50 percent on medium- to fine-textured soils.

A few years ago, Sojka interested Morishita in finding out whether PAM might have implications for weed control. Morishita has since found that PAM in irrigation water reduces the movement of weed seeds in irrigation furrows, keeping seeds from spreading from one part of a field to another or onto fields of neighbors farther along the canal. The result is "a real positive

Photo by Don Morishita
A plastic flume installed in an irrigation furrow allows UI graduate student Matt West to monitor water flow and to sample irrigation runoff for sediment, weed seeds, and herbicides.

from the standpoint of trying to manage weeds in the field," said Morishita, who has studied PAM in both corn and beans.

In research in bean fields at the UI Kimberly Research and Extension Center in 2000, for example, Morishita, UI graduate student Matt West, and UI weed scientist Pamela Hutchinson found that PAM reduced the numbers of broadleaf weed seeds in irrigation runoff water by 84 percent and the numbers of grass weed seeds by 80 percent.

PAM also reduced levels of soil-applied herbicide in the irrigation runoff water. In 2000, irrigation runoff from PAM-treated furrows contained 1.5 ppb (parts per billion) Sonalan, an herbicide that clings to soil particles, compared with 9.3 ppb from untreated furrows. "There's a benefit from using PAM in reducing herbicide loss from the field," said Morishita, "especially one like Sonalan." PAM had no effect on runoff of Outlook, which is more soluble in water than Sonalan.

Finally, the scientists found that although PAM increases water infiltration, even Outlook moves no deeper into the soil than it does without PAM.

Brian Olmstead, a farmer south of Twin Falls, has used PAM for almost 10 years. With PAM holding soil onto his fields, the sediment retention ponds at the bottoms of his fields don't fill up as fast. He used to have to dig them out every year, but PAM lets him do it every third year.

Olmstead also is in charge of water quality at the Twin Falls Canal Company, where teaching other farmers about PAM is one way he is helping the company to minimize the amount of sediment draining into the Middle Snake River. The company's irrigation return flows contribute to sediment levels in the river that exceed state water quality standards. Today, about 60 percent of the company's 4,000 irrigators are using PAM along with other practices, according to Olmstead, and the river has responded. "Visually, it's way, way better than it was two years ago."

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