

# Managing soil copper in crops irrigated with cattle footbath wastewater

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Getting a head start on stopping soil copper buildup will now be a bit easier, thanks to studies by U.S. Department of Agriculture (USDA) scientists. This research could help Pacific Northwest farmers develop long-term irrigation management strategies to protect crops from potentially dangerous soil copper levels.

Scientists with USDA's Agricultural Research Service (ARS) conducted a laboratory investigation to assess how copper levels in wastewater used for irrigation affected crop performance and [soil](#) microbial activities. ARS is USDA's chief intramural scientific research agency, and this work supports the USDA priority of promoting international food security.

The research was carried out by soil scientists Jim Ippolito and David Tarkalson and microbiologist Tom Ducey. Ippolito and Tarkalson work in the ARS Northwest Irrigation and Soils Research Laboratory in Kimberly, Idaho, and Ducey works at the ARS Coastal Plains Soil, Water and Plant Research Center in Florence, S.C.

Copper sulfate baths are used to prevent foot infections in [dairy cattle](#), and the discarded foot bath is often recycled to irrigate corn and alfalfa crops. The scientists surveyed alfalfa growth and development in soils containing different levels of total copper. Copper sulfate at soil levels of up to 250 parts per million (ppm) had no effect on alfalfa growth, but alfalfa growth stopped when soil copper sulfate levels exceeded 500 ppm.

The team also discovered that beneficial soil bacterial activity declined when test soils accumulated available soil copper levels above 50 ppm. Further analysis indicated that soil levels above 63 ppm of plant-available copper resulted in alfalfa copper concentrations that could potentially harm grazing livestock, according to National Research Council guidelines.

Ippolito notes that in real-world conditions, soil copper accumulations and impacts will vary, depending on a range of factors. In addition, negative impacts might not be observed for anywhere from 15 to 75 years after irrigation begins.

**More information:** Read more about this research in the September 2012 issue of *Agricultural Research* magazine.

[www.ars.usda.gov/is/AR/archive/sep12/cows0912.htm](http://www.ars.usda.gov/is/AR/archive/sep12/cows0912.htm)

Provided by United States Department of Agriculture

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