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## News Releases



### Soil Science Society of America

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#### NEWS RELEASE

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### Metal Immobilization using Plant and Poultry Waste Can Revive Soil Ecosystems

*A scientist shows that even very contaminated shooting range soils can be remediated by using poultry waste and revegetating the site.*

**MADISON, WI, AUGUST 3, 2009** -- Shooting ranges are the major source of Pb contamination in Japan where over 600 sites are present mostly in remote locations. Remediation of Pb-contaminated soils in a shooting range is generally more difficult than other types of natural and human-induced soil contaminations because the site is extensively contaminated with high levels of Pb, and therefore the local ecosystem has deteriorated. For shooting range restoration, therefore, the site needs to be revegetated and metals need to be removed or immobilized to reduce toxicological risk in the environment.

In situ chemical immobilization is a practical remediation technology for metal-contaminated soils. A scientist at Mie University in Japan has demonstrated the use of poultry waste amendment in combination with plant growth to immobilize soil Pb and restore degraded vegetation in shooting range sites. He measured Pb speciation of the soil using X-ray absorption spectroscopy at SPring-8, the world largest synchrotron radiation facility in Japan, and soil enzyme activity along with the changes in soil Pb immobilization. Results from the study were published in the July-August 2009 issue of the *Journal of Environmental Quality*. The research was also presented in Houston, TX at the Annual Meetings of the Soil Science Society of America in November 2008.

Lead speciation and enzyme activity were measured in shooting range soils treated with a grass plant and/or poultry waste in a large column setting. The research is targeted at the changes in Pb speciation along with enzyme activity and downward solute transport. As well as an understanding of metal solubility and transport, enzyme activity can become a more important factor when the goal of soil remediation program includes ecological restoration. The use of amendment with less adverse impacts on soil biological properties could be a prerequisite for a comprehensive and long-term restoration program of shooting range areas.

The study revealed that the amendment reduced the proportion of cerussite ( $\text{PbCO}_3$ ) and Pb-organic complexes and transformed them into a more geochemically stable species of chloropyromorphite [ $\text{Pb}_5(\text{PO}_4)_3\text{Cl}$ ] with 30 to 35% of the total Pb species. Applications of plant and amendment decreased downward Pb transport and increased activities of dehydrogenase and phosphatase in the surface soil.

The full article is available for no charge for 30 days following the date of this summary. View the abstract at <http://jeq.scijournals.org/cgi/content/abstract/38/4/1420>.

The *Journal of Environmental Quality*, <http://jeq.scijournals.org> is a peer-reviewed, international journal of environmental quality in natural and agricultural ecosystems published six times a year by the American Society of Agronomy (ASA), Crop Science Society of America (CSSA), and the Soil Science Society of America (SSSA). The *Journal of Environmental Quality* covers various aspects of anthropogenic impacts on the environment, including terrestrial, atmospheric, and aquatic systems.

The *Soil Science Society of America (SSSA)* is a progressive, international scientific society that fosters the transfer of knowledge and practices to sustain global soils. Based in Madison, WI, and founded in 1936, SSSA is the professional home for 6,000+ members dedicated to advancing the field of soil science. It provides information about soils in relation to crop production, environmental quality, ecosystem sustainability, bioremediation, waste management, recycling, and wise land use.

SSSA supports its members by providing quality research-based publications, educational programs, certifications, and science policy initiatives via a Washington, DC, office. For more information, visit [www.soils.org](http://www.soils.org).

SSSA is the founding sponsor of an approximately 5,000-square foot exhibition, *Dig It! The Secrets of Soil*, which opened July 19, 2008 at the Smithsonian's National Museum of Natural History in Washington, DC.