Optimizing Boron Nutrition through Novel Fertilizer Formulations

Boron (B) supply to crops is a challenging fertilization practice, given its narrow window between deficiency and toxicity, the difficulty in uniformly delivering the recommended low rates in the field, its high mobility in the soil that can potentially result in leaching losses, and its requirement later in the season when crops are flowering.

In an upcoming issue of the *Soil Science Society of America Journal*, researchers report on the incorporation of both fast- (borax) and slow-release (colemanite) B sources into a macronutrient fertilizer (muriate of potash, MOP), to address these issues. In a laboratory-scale trial, they found an even B distribution in the soil after the incubation with a MOP+0.5% B fertilizer compared with a simulated bulk-blend of MOP and borax. The incorporation of colemanite into the formulation slowed the release of B from the MOP+B fertilizer. This translated into higher B uptake by canola grown in pots leached to mimic a rainfall event.

This novel formulation results in a uniform B spatial distribution, reduces the risks of leaching and seedling toxicity, and may result in more synchrony between nutrient availability and crop demand.


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An ESRI Story Map as an Educational Tool

Story maps are web applications that enable scientists, educators, and others to use interactive maps with text, figures, and multi-media content for educational purposes. In an article recently published in *Natural Science Education*, researchers described the development and evaluation of an Environmental Systems Research Institute (ESRI) story map as a learning module for an undergraduate soil science course at Clemson University. This story map, “Soil Forming Factors: Topography” (https://arcg.is/Xz51D), is tailored to a specific learning objective, which allows students to interact with geospatial data and descriptive text.

The ESRI story map was tested in an introductory soil science course at Clemson University. Students’ knowledge was evaluated using an online quiz on the subject matter. Also, students assessed the quality of the story map using an ESRI framework, which utilizes principles of effective storytelling. Detailed comments from students provided positive feedback and ideas for future developments.

“Soil Forming Factors: Topography” is one of many potential applications of story maps for soil science and other types of education. Story maps have the advantage of worldwide accessibility through a standard web browser. This study provides a conceptual diagram for developing story maps as learning modules and for evaluating their effectiveness in delivering course material.


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Cumulative amount of boron (B) leached (as percent of added B) from soil columns amended with muriate of potash (MOP) + B fertilizers (left); and B taken up by canola in response to the application MOP+B fertilizers produced with borax, colemanite, or a combination of both in soil leached prior to planting (right).

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