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FLOODS AND FUNGI AND PHOSPHORUS—OH MY!

Standing water in fields. It comes from those Wizard-of-Oz-like storms that inundate the soil. The longer the water sits, the more processes get set into motion – all of which can create P deficiencies in crops.

The cause? Soil fungi called mycorrhizae, and no, it's not because these fungi appear after flooding and cause problems. In fact, it's the lack of these fungi that cause the problems.

Most field crops form symbiotic relationships with mycorrhizae. These fungi explore the soil and take up nutrients, similar to plant roots. However, for fungi to grow, they need a host that provides a source of carbon, which they can't get on their own. Enter the crop and its carbon-rich sugars – the perfect sweet treat for the fungi.

Once fungi colonize the roots of the crop, the nutrient trading starts. Fungi get the sweet stuff and the plants get some of the nutrients the fungi took up from the soil. This relationship is so important that plants regularly depend on mycorrhizae for part of their P supply each season – except for the mustard family. They always were a little different.

Mycorrhizal fungi do two things that really help the plant. First, they explore areas of the soil that plant roots don't always reach, especially those "hard to get to" places like small soil pores. Second, they can take up P from compounds in the soil that aren't as easy for plants to tap.

Recommended rates of P depend on crops playing well with these fungi, except of course for that odd mustard family down the block. But when soils remain flooded for days or weeks, the beneficial relationship gets hit hard. It turns out these fungi like oxygen, just like we do, and being under water for a long time really sets them back.

It takes about one cropping season to get things back on track. So if water stands in a part of a field this year and reduces crop growth, P nutrition can be affected next season too.

A couple of options can be tried. A cover crop can be planted in those previously flooded areas before next season's crop, in an attempt to provide a late-season host for the fungi to help them get reestablished. Second, banding P near the seed when planting the next year can provide an additional, well-positioned P supply to help make up, at least partially, for a reduced supply of P from the struggling fungi.

So the next time you see water standing in a field for days to weeks, just remember that your good fungi may not be in Kansas anymore.

—TSM—

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Abbreviations: P = phosphorus