

Flooding Effects on Biodiversity

Flooding in a field prior to planting may lead to “fallow syndrome” in the crop due to a decrease in soil microbial communities. Utilizing an inoculant at planting may help increase the beneficial rhizobia populations in soybean fields. Using an inoculant for corn may improve the availability of phosphorus.

Fields that recently experienced flooding before planting may have reduced soil biological diversity. The decrease in soil microbial communities following flooding is due to the depletion of oxygen in the soil profile. Silt deposited by a flood may add to the problem by sealing the field and further preventing oxygen from entering the soil. Fallow syndrome is the nutrient deficiencies and reduced growth of a crop that results from the absence of sufficient populations of beneficial soil microbes and can dramatically affect crop production.



Figure 1. Early season flooding in corn.

Effects of Flooding in Soybean Fields

Long periods of soil saturation and anaerobic conditions (three days or longer) decrease populations of the nitrogen-fixing rhizobia bacteria. Soybeans need rhizobia for optimal nitrogen fixation and without this beneficial bacteria, significant yield reductions can occur.¹

When planting into a field that was previously flooded, the use of rhizobia inoculants may improve root development, nodulation, vigor, and plant stand establishment, which can lead to faster canopy closure, better plant health, higher yields, and a higher return on investment (ROI). In addition to these benefits, rhizobia inoculants provide the convenience of retail application and can be used in tandem with fungicidal and insecticidal and nematicidal seed treatments.

TagTeam® LCO and Optimize® branded soybean inoculants with LCO technology combine nitrogen-fixing inoculants with the LCO molecule for improved nodule formation. The LCO Technology is a naturally-occurring molecule which enhances both root and shoot development – immediately and independently of soil and environmental conditions.

Effects of Flooding in Corn Fields

Corn and small grains that have been planted into a field following flooding may show symptoms of phosphorous or zinc deficiency accompanied by slow, uneven early growth and stunting. These deficiencies are often due to a decrease in populations of vesicular-arbuscular mycorrhizal fungi, which act as an extension of corn roots, helping them absorb additional nutrients.

QuickRoots® microbial seed treatment for corn is a seed inoculant that can improve the availability of phosphorus in addition to nitrogen and potassium. QuickRoots microbial seed treatment contains *Trichidermia virens* fungi and *Bacillus amyloliquifacines* bacteria which produce enzymes that release organically bound phosphorus in the soil profile increasing phosphorus availability.

Sources:

¹ Staton, M. 2014. Identifying and responding to soybean inoculation failures. Michigan State University. <http://msue.anr.msu.edu>. Other sources: Ellis, J. R. 1998. Post flood syndrome and vesicular arbuscular mycorrhizal fungi. J. Prod. Agric. 11:200-204. Acceleron BioAg 2019 Product Guide. Web source verified 9/28/18 160226130100

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