

NITROGEN'S TURNING POINT

THE ENVIRONMENTAL BENEFITS OF PIVOT BIO PROVEN™

Iowa State University (ISU) is conducting a multi-year project that measures the environmental and ecological impact of synthetic nitrogen fertilizer and Pivot Bio PROVEN™. The research project, managed by the Iowa Nutrient Research and Education Council (INREC), is an important step toward demonstrating that the nitrogen produced from Pivot Bio PROVEN™ microbes is used by the corn plant and is not lost to the environment like traditional synthetic fertilizer.

Approximately half of the synthetic nitrogen fertilizer that farmers apply is lost to the environment. Nitrogen is a difficult element to track and what is not used by the crop tends to move quickly from soil to water to air. ISU and INREC are working with Pivot Bio to measure the nitrogen lost to leaching as well as measure any nitrogen lost to volatilization comparing Pivot Bio PROVEN™ to synthetic nitrogen fertilizer.

What are mesocosms?

- An outdoor experimental system designed to examine the natural environment under contained conditions.
- Mesocosms help fill the gap between field studies and highly-controlled laboratory experiments.
- Mesocosm studies help to separate and understand the underlying mechanisms affecting the subject in question.
- Each mesocosm is an intact steel box that is installed without disturbing the soil, which is critical to obtaining data that reflects on-farm conditions.
- Mesocosms work by mimicking, as closely as possible, the conditions of an enclosed ecosystem.

Study Methodology and Focus

- The study aims to answer the question: "Is the nitrogen produced by Pivot Bio PROVEN™ less vulnerable to environmental losses than synthetic fertilizer?"
- Iowa State University has a long history of involvement in field drainage plots to determine nitrate leaching at a field scale. This study measures nitrate leaching on a smaller, more controlled scale.
- The study measures two environmental variables: nitrous oxide released from the soil into the air and nitrate leaching from the soil into waterways.
- Water that falls on the steel boxes has two ways out: evaporation from the soil and transpiration from the crop, or it can move down through the soil profile.
- Each block has one drainage tile, which allows the researchers to measure the complete drainage volume from each block.
- There are blocks with Pivot Bio PROVEN™ and blocks without so the product's impact on the nitrogen within the system can be measured.
- The mesocosms were surrounded by a full field of corn to mimic the energy balance of a natural cornfield and its natural environmental conditions (e.g. heat that is absorbed versus transpired and relative humidity).

Collaborative Involvement

- This study is a collaborative effort amongst Iowa State University researchers, Iowa Nutrient Research and Environmental Council (Iowa NREC), and Pivot Bio.
- Pivot Bio was born out of an ambition to replace synthetic nitrogen fertilizer with something more sustainable and safer for farmers to use. Pivot Bio is inspired by farmers and continues to be focused on creating new solutions that makes farming more productive and farms more sustainable.

