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Penn State Study Investigates Effect of Manure on Soybean Ground

HARRISBURG, PA (May 14, 2014) – Results of an important research study conducted by Penn State University to determine if manure applications to soybean ground had any effect on the incidence of disease, weed pressure, soil nitrate levels, nodulation and yields has been released. The results indicate that applying manure at lower rates to soybeans will result in neither a positive nor negative impact on the crop. The three-year research project study was funded by the Pennsylvania Soybean Board through the soybean checkoff.

"The study is important to Pennsylvania growers," says Penn State Extension educator Del Voight, who along with Dr. Doug Beegle, Dr. Greg Roth and Penn State Extension educators Paul Craig and Jennifer Bratthauar, was one of the investigators in the study. "Although there has been some research done on this topic in the Midwest, little research has been done in Pennsylvania to determine if manure land applications positively or negatively affect soybean yields. Soybeans are becoming an integral part of crop rotations throughout Pennsylvania, and many farmers rely on their soybean ground to provide the amount of land needed for their manure applications."

Based on this research study, there appears to be no management advantage or disadvantage to applying manure to soybeans. The fact that the soybeans in this trial were not impacted positively or negatively from the manure nitrogen indicates that manure could be applied if necessary to supply phosphorus and potassium to soybeans. Finally, the lower residual nitrate-nitrogen levels at the end of the growing season indicate little increased potential for nitrogen loss to the environment through leaching if manure is applied to soybeans.

There has been concern that manure (nitrogen) applications on soybeans will negatively impact their nodulation. However, this was not observed in this trial. At the end of the season, there was no difference in residual soil nitrate-nitrogen due to the manure applications, and the soil nitrate-nitrogen levels were at typical background levels for soil nitrate-nitrogen in Pennsylvania.

The study looked at three separate field locations, each applying a different type of manure. Location #1 utilized liquid dairy manure, location #2 utilized liquid swine manure and location #3 spread poultry (turkey) manure. Each location consisted of replicated strip trials, three treated

(manure applied) and three untreated. All three types of manure were applied with the broadcast method.

All the plots were scouted on a regular basis (approximately every seven to 10 days) throughout the growing season to determine if there was a higher incidence of weeds and diseases in the plots that had received manure applications versus the plots that did not receive manure. In the first year of the study, the poultry manure plots showed an increase in weeds. In 2013, however, there were no noticeable differences in the growth and prevalence of weeds at any of the locations.

The incidence of plant diseases did not seem to be affected by manure applications. The plant diseases that were identified occurred in all 18 of the plots (nine treated and nine untreated). As in many soybean fields, the first occurrence of disease was Septoria brown spot in all three locations in all of the plots. Some of the other diseases identified throughout the plots were downy mildew, frogeye leaf spot and Phytopthora stem rot. When the diseases did appear, they appeared at the same time throughout the plots. Manure applications did not seem to cause a difference in the timing and severity of the diseases.

“One of the concerns with applying manure to soybeans is the increased incidence of white mold,” says Voight. “No evidence of white mold was found during scouting of the plots. However, it is important to note that the three fields in this study did not have a history of white mold.”

Yields in these trials were good at over 60 bushels/acre, and there was no impact of manure application on yield. There was no apparent increase in weeds or diseases. There was an increase in soil nitrate nitrogen and consequently in early season plant nitrogen where manure was applied as might be expected, but this did not carry through to have any impact later in the season.

To see the results of **this study** and other research funded by the soybean checkoff to provide reliable crop production data to soybean growers, please visit the Research Summaries at **www.pasoybean.org** .

About the Pennsylvania Soybean Board

The Pennsylvania Soybean Board is a farmer-controlled Board responsible for managing Pennsylvania’s share of funds received from the nationwide Soybean Checkoff program. The funding is available under an assessment program, approved by Congress in 1990, under which soybean farmers contribute 50 cents of every $100 they receive for their beans at the first point of sale. Funds are used to develop markets, educate consumers, and research new ways to utilize and produce soybeans more efficiently.

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