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**Innovation Grant Progress Report**

PROJECT TITLE: *Nanoscience to predict nitrogen mineralization in soil (4503-17SP)*

REPORTING PERIOD: April 1 to June 30, 2017

FARMER INNOVATOR: NA

COLLABORATING ORGANIZATION/PERSON: University of Minnesota/Jeffrey Strock

PHONE NUMBER: 507-752-5064

EMAIL: jstrock@umn.edu

1.) PROJECT ACTIVITIES COMPLETED DURING THE REPORTING PERIOD. (*Describe project progress specific to goals, objectives, and deliverables identified in your project proposal.*)

***Objective 1.*** **Calibration of the Pd-Sn sensors in soil**. A meeting of US and Chinese collaborators was held on October 10th. The discussion focused on calibration of the Pd-Sn sensors.

***Objective 2.* Incubation experiment to evaluate the sensors capacity to measure mineralization/immobilization**. No work has been done on this objective during this quarter.

2.) IDENTIFY ANY SIGNIFICANT FINDINGS AND RESULTS OF THE PROJECT TO DATE. (*There may be none to report at some stages of the project)*

***Objective 1.*** **Calibration of the Pd-Sn sensors in soil**. Discussion during the meeting focused on different levels of calibration. The first level of calibration will consist of calibrating the three sensors in an aqueous solution. The second level of calibration will consist of calibrating the three sensors in a simulated soil consisting of an aqueous solution plus two sizes of glass beads, <0.5 mm to represent silt sized soil particles and glass beads >1.0 mm to represent sand size soil particles. The initial discussion also included calibration at two levels of acidity, pH 4 and pH 7. The Chinese scientists insisted on starting at a pH of 2, which is in the range that the original sensors were calibrated. Although this is unrealistic for a soil there was consensus to proceed as recommended by our Chinese colleagues. The focus then shifted to calibration in the soils collected for the incubation experiment. Adjusting soil pH was a topic of discussion. The Chinese scientists suggested pretreating the soil to lower the pH to the working range of the current version of the sensors. Additional discussion focused on other factors present in field soils which may affect sensor performance. The main center of discussion was on changes in soil water content and its effect on sensor performance and mineralization.

Initial calibration in aqueous solution and in the simulated soils will occur during the current quarter.

3.) CHALLENGES ENCOUNTERED. (*Describe any challenges that you encountered related to project progress specific to goals, objectives, and deliverables identified in the project proposal.*)

NA

4.) EDUCATION AND OUTREACH ACTIVITES. *(Describe any opportunities to engage with farmers, influencers or the media about your project.)*

NA

5.) HOW CAN WE HELP? *(Please let us know how we can improve the experience or assist in your project if possible.)*