Teaching Tips/Notes NACTA Journal

Engaging Students in Active Experiential Learning through Designing a Crop Rotation Project

Experiential learning is defined as “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (Kolb, 1984). Experiential learning can be an important tool for imparting in-depth training and instruction in complex crop management concepts (Grover and Stovall, 2013; Uchanski et al., 2015). The concept of crop rotation is often discussed in Agronomy curriculum as crop rotation is a key management practice for sustainable crop production. Crop rotation is also one of the most complex aspects of agronomic research that researchers deal with. Moreover, choosing a good crop rotation is one of the most difficult and important decisions that growers have to make on their farm. Importance of teaching various components of designing a good crop rotation cannot be emphasized enough. However, not many students are able to see/learn first-hand the effect of crop rotation as typically it would take more than a semester to complete a crop rotation study project. Involving students in the scientific process methods during their undergraduate curriculum will also improve their appreciation about the research and evidence-based information.

A semester long student-led crop rotation study was designed in a senior level course in Sustainable Crop Production. The purpose of this experiment was to let students design a study and see crop rotation in action. The students were involved throughout the process starting with brain-storming and designing the study, choosing crop rotation treatments and participating in collecting and analyzing the data, and finally summarizing and presenting the results obtained from the study at the end of the semester. The replicated greenhouse study consisted of six crop rotation treatments. In each treatment, students grew a Nitrogen Fixer (legume) followed by a Nitrogen user (grass). These treatments were tested within three soil types: a high fertility potting soil to act as a control; a low fertility soil that was collected from a Maize Breeding nursery that had been under maize monoculture for several years; and soil collected from an organic field. Student groups managed their respective pots, recorded various crop growth parameters, analyzed the data in SAS program and wrote a paper describing the results and lessons learned from their study.

Students indicated a positive impact on their understanding the concept of crop rotation and its vital role in sustainable crop production. The project demonstrated improved critical thinking and problem-solving skills of the students where they applied a scientific process to collect and synthesize complex information, and made informed and well thought decisions.

References

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