SST 3603 - SOIL FERTILITY MANAGEMENT

Class: SST 3603 (Soil Fertility Management)

PBL Title: Identifying Nutrient Deficiency Symptoms through Visual Observation and Confirmed by Tissue/Foliar Analysis

Course LO:

1. Describe nutrient management, water and soil fertility technique based on principle and good agriculture practice (C4)
2. Quantify fertility, nutrient and water in soil
3. Choose environmental friendly and sustainable methods of soil fertility, nutrient and water management (A3, LMS)

PBL strategies:

PBL LO:

1. Identify and diagnose common nutrient deficiency symptoms in corn/plants
2. Know potential limitations of visual diagnosis of nutrient deficiency symptoms
3. Develop initial competency in interpretation of plant analysis data and fertilizer recommendation programs to mitigate nutrients deficiency symptoms

Contact hours: 3 hours

Preparation time: 4 hours

Scenario:
The availability of nutrients to plants is often highly variable due to differences in inputs treatments. A one year field trial was established to determine the effects of different fertilizer types on the growth of sweet corn (Zea mays L.) in UPM experimental field in Puchong. The experimental plots were divided into two: 1. fertilized plots and 2. non-fertilized plots. For fertilized plots, four different fertilizers were applied to the corn (Figure 1). For the non-fertilized plots, no fertilizer was applied to study the residual effect of the previous season, which was fertilized (Figure 2). Each of the treatments (except control) contained standardized rates of nitrogen, phosphorous, potassium, magnesium and boron. The yield of sweet corn varied significantly among some treatments due to differences in nutrient uptake efficiency by the plants from the fertilizers.
Figure 1: Effects of different fertilizer treatments on grain yield of corn
Control = no fertilizer, T2 to T5 = fertilizer added

Figure 2: Effects of different fertilizer residuals on grain yield of corn
T1 to T5 = no fertilizer added

You are required to critically examine each of the figures given above, provide diagnosis (visual observation and tissue analysis (ear leaf) of the plant samples for each treatment). The ear leaf is the derivative or determinant of cob yield.

Instruction for students:

1. The class will be divided into groups (select group leader) and each group will do the assigned task based on a list of questions given.
2. Participation is compulsory for all members of each group.
3. Bring related materials to the PBL session (lab coat is compulsory).
4. Read brief notes/literature on plant sampling and analysis, nutrients deficiency symptoms for corn cob and leaves and fertilizer recommendation.

Instructions to facilitator:
1. Introduce the scenario to the students and make sure they set up the experiment correctly.
2. Encourage interaction in class through random selection of students to the answer questions.
3. Inform the students 1 week ahead of the PBL time.
4. The students will discuss as a group for the assigned task.
5. Distribute and discuss the results to students in the PBL class
6. Ask the students these questions:

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<thead>
<tr>
<th>No.</th>
<th>Questions</th>
<th>Answers</th>
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<tbody>
<tr>
<td>1</td>
<td>What is your visual observation of figure 1?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>What is your visual observation of figure 2?</td>
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<td>3</td>
<td>Compare contrast your observation in cob yield between figure 1 and figure 2.</td>
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<td>4</td>
<td>Conduct tissue analysis of ear leaves of each treatment in figure 1 and figure 2.</td>
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<td>4</td>
<td>Interpret the tissue analysis results and relate them to deficiency symptoms of the affected treatments from each figure</td>
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Assessments:

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<th>No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>1</td>
<td>Participation</td>
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<td>2</td>
<td>Peer review/assessment</td>
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<td>3</td>
<td>Test and or report</td>
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Reflections:

1. What is the level of student participation?
2. Did the students demonstrate communication skills through presentation, asking and answering question, interaction, etc?
3. Did the students show critical scientific thinking skills?
4. Was the theme of the activity understood and demonstrated?