Plant Competition

Learning Objectives
1. Demonstrate knowledge of interspecific and intraspecific competition in plants
2. Demonstrate knowledge of the scientific method

Pre Lab Activity
After reading the lab handout answer the following questions BEFORE coming to lab:

1. What is interspecific competition? ________________________________________________________________

2. What is intraspecific competition? ________________________________________________________________

3. What constitutes a control? ________________________________________________________________

4. How many controls are there for the plant competition experiment in this lab? __________________________

5. Are they positive or negative controls? ________________________________________________________________

6. Form a hypothesis specifically stating how do you expect competition to affect the plants?
   ________________________________________________________________

7. What conditions/variables have been standardized? ________________________________________________________________

8. What are the experimental variables? ________________________________________________________________

9. Are there any uncontrolled variables? ________________________________________________________________
Introduction

Competition is the ecological interaction among organisms (of the same or different species) which occurs when they both need the same limited resource(s). Of all possible ecological interactions, competition is the only one that has negative consequences for all of the organisms involved.

Plant Competition Experimental Design

This design will allow us to independently determine how each species responds to interspecific and intraspecific competition. Each group of students will be assigned one or two of the nine possibilities listed in Table 1 - obviously, all members of the class will need to pool their data for analysis.

Table 1. Numbers of plants per pot

<table>
<thead>
<tr>
<th>Interspecific competition</th>
<th>Intraspecific completion (Corn)</th>
<th>Intraspecific competition (Radish)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 radish + 1 corn</td>
<td>1 corn</td>
<td>1 radish</td>
</tr>
<tr>
<td></td>
<td>2 corn</td>
<td>2 radish</td>
</tr>
<tr>
<td></td>
<td>5 corn</td>
<td>5 radish</td>
</tr>
<tr>
<td></td>
<td>10 corn</td>
<td>10 radish</td>
</tr>
</tbody>
</table>

Methods

1. Obtain a pot and place approximately 10 cm of labeling tape on the pot.
2. Label your pot with the number and type of plants, group name, lab section, and your instructor’s last name.
3. Fill your pot with gently compacted soil to within 1 cm of the top of the pot (be sure to clean up any spilled soil).
4. Obtain the correct number of seeds that were assigned to your group. Remember to obtain one seed more than required for each species, because 100% germination is not guaranteed. If all seeds do germinate, remove the weakest/smallest seedling next week.
5. Evenly space your seed(s) on the surface of the soil.
6. Push each seed into the soil for a distance equal to approximately twice its minimum dimension.
7. Cover each seed with soil and place pot in one of the class trays.

Plants will be watered by your instructor once plants are placed in the greenhouse. The pots will be kept in the greenhouse. Standard greenhouse care includes watering as needed and fertilizer applications once a week. Depending upon your instructor’s instructions, you may be required to measure weekly above-ground plant growth measuring the height of each plant (cm). In the final lab, plants will have their heights measured and will have their above-ground mass per plant (g) determined. ***Some instructors may require that plants be removed from their containers and have above- and below-ground mass measured*** Write your results (height and mass) in the space below and also on the board at the front of the room.
Results

After determining height and average mass for your plants, graph your results on the grids provided. Be sure to label your axes correctly and discuss with your group which type of graph (bar or line) is appropriate for each graph.

Table 2. Interspecific competition: Class Results – Radish + Corn

<table>
<thead>
<tr>
<th>Plants</th>
<th>Above-Ground Height (cm)</th>
<th>Above-Ground Mass (g)</th>
<th>Total Mass (Above / Below-Ground)(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 radish + 1 corn</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Intraspecific Competition: Class Results - Corn

<table>
<thead>
<tr>
<th>Plants</th>
<th>Above-Ground Height (cm)</th>
<th>Above-Ground Mass (g)</th>
<th>Total Mass (Above / Below-Ground)(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 corn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 corn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 corn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 corn</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Intraspecific Competition: Class Results - Radish

<table>
<thead>
<tr>
<th>Plants</th>
<th>Above-Ground Height (cm)</th>
<th>Above-Ground Mass (g)</th>
<th>Total Mass (Above / Below-Ground)(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 radish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 radish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 radish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 radish</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Graph 1. Interspecific competition between corn and radish.

Graph 2. Intraspecific competition (put corn and radish on the same graph, use different colors for each)
Post-Lab Activity

Conclusions

Briefly discuss your findings.

__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

How do your results compare to your hypothesis?

__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

Was interspecific competition observed? If so, describe below.

__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

Was intraspecific competition observed? If so, describe below.

__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________