



C-Fern Root Tropism: What's Up With That?

Annotation

In this experiment, students will observe the growth of C-Fern plants under rather normal and abnormal conditions. They will then predict the reasons for any differences in tropic response.

Problem

What is the pattern of root development in C-Ferns?

Hypothesis: _____

Primary Learning Outcomes

After this lesson the student should be able to

- Define tropism
- Tell what conditions encourage or discourage this type of response
- Explain why invitro tests are not always good models for the real environment

Assessed GPS

Habits of Mind: SCSH2, SCSH3, SCSH4, SCSH5, SCSH6, SCSH7

Content: SB

Assessed QCC's

Science, Technology and Society

Agricultural Environmental Science

Horticulture

Duration

One Class period

Materials

C-Fern sporophytes grown in a tightly packed Petri dish

C-fern sporophytes grown in test tubes 3-5 to a tube

Data sheets

Pencil

Background

Unlike animals, plants have limited ability to move. They therefore respond to environmental stimuli in different ways. Major stimuli like gravity, light, and touch usually produce a positive or negative growth response in plants. That is growth towards (positive) or growth away (negative) from the stimulus. This is accomplished by differential growth- one part of the plant

grows more than another usually by cell elongation, causing the plant to bend towards or away from a stimulus. In this experiment, students will observe the growth of C-Fern plants under rather normal and abnormal conditions. They will then predict the reasons for any differences in tropic response.

Procedures

1. Obtain a Petri dish and a test tube culture of C-Fern
2. Note the growth of the fronds of the two cultures. Draw diagrams of what the fronds from the separate cultures look like.
3. Examine the roots of both cultures. Draw diagrams of what the roots of both cultures look like.

Assessment

1. What is a tropism?
2. What two tropisms did we observe in this exercise?
3. What other tropisms might be seen in C-Fern?
4. What was different between the fronds of the two cultures? Why do you suppose this is so?
5. What differences did you see between the roots of the two cultures? Why do you think this is so?
6. Did the type of growth environment affect the normal response to tropism in the two cultures? How?
7. What do you think caused the difference in response?
8. Is there a good way to measure and quantify these responses?
9. What comments would you make at this point about the use of artificial situations to study plant growth and response?

Adapted from:

Teaching With C-Fern, C-Fern: Root Tropism?

C-Fern Website: cfern.bio.utk.edu/teaching/roottropism01.html