Generating interest in Plant Biology among predominantly pre-med undergraduates using a popular science novel

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Generating interest in Plant Biology among predominantly pre-med undergraduates using a popular science novel

Abstract

Many undergraduate pre-med students see little relevance of plant biology to their daily lives or future careers. I have developed assignments for a sophomore-level plant biology course that incorporate readings from from *The Botany of Desire* by Michael Pollan. After reading a chapter students define botanical terms within the context of the book and write a response to several instructor-provided questions. Each chapter is integrated into a larger topic in class and students discussed relationships between topics on the novel and course content. For example, the fourth chapter discusses domestication and genetic manipulation of the potato. Students are asked to compare traditional Peruvian potatoes to those available in grocery stores and discuss the feasibility of growing a wide variety of potatoes on a large scale in the United States. In class, the chapter is used as a guide for learning about the creation of genetically modified (GM) crops where students compare genetic transformation to plant breeding, create a list of the pros and cons, discuss prior beliefs and formulate their own scientifically-based opinion on the use of GM crops. The majority of students (85%) responded positively to the activities and most students said the book was applicable to class content and helped them relate to the material.

Disciplines

Biology

Comments

Presented at the American Society of Plant Biologists Annual Meeting in Minneapolis, Minnesota, 2011.

This poster presentation is available at Fisher Digital Publications: https://fisherpub.sjfc.edu/biology_facpub/23
Abstract
Many undergraduate pre-med students see little relevance of plant biology to their daily lives or future careers. I have developed assignments for a sophomore-level plant biology course that incorporate readings from The Botany of Desire by Michael Pollan into the chapter sections. The course was taught in the context of the most recent research and the students were expected to respond to several instructor-provided questions. Each chapter is integrated into a larger topic in class and students discussed relationships between topics in the novel and course content. For the fourth chapter, the course discussions were based on genetic modification of potatoes. Students were asked to compare traditional potato varieties to those available in grocery stores and discuss the feasibility of growing a wide variety of potatoes on a large scale in the United States. The chapter is used as a guided discussion about the creation of genetically modified (GM) crops where students compare genetic transformation to plant breeding, create a list of the pros and cons, discuss prior beliefs and formulate their own scientifically-based opinion on use of GM crops. The majority of students (85%) responded positively to the activities and most students said the book was applicable to class content and helped them relate to the material.

Introduction
The main goal of developing a series of assignments based on Michael Pollan’s The Botany of Desire was to increase student engagement with course material. Most undergraduates at St. John Fisher College plan to pursue medically-oriented careers and are not motivated to learn about plants, seeing little relevance to their daily lives or career goals. This phenomenon of “plant blindness” presents barriers to learning and is unfortunately fairly common (Carter 2004). One of the most powerful ways to convince students of the usefulness of learning botany is to link assignments to real-world careers. By applying what they have learned to their own lives, students can more easily understand the practicality and application of course content. Previous research has shown that use of science popularizations can promote learner-centered teaching, increase curiosity and intrinsic motivation, and demonstrate the multidisciplinary nature of science (Kostelecky et al. 2005; Lynd-Ballew 2006; Shibley et al. 2005). Reading Pollan’s book also links application to biological terms, which is necessary for understanding and comprehension to occur (NRC 2000). For the four chapters of Pollan’s book, each student in a group of four was assigned two terms and asked to explain their use in the book and demonstrate how they related to material already learned in the course. Students were responsible for explaining their terms to group members during class. Students also answered several short questions or wrote a free response (FR) for each chapter and discussed their responses with group members. For each chapter, specific botanical topics were discussed: apple/sweetness – grafting, sexual reproduction; tulip/beauty – flower production; trade, breeding, marijuana/desire – botanical medicines, ethics, secondary compounds, potato/control – biotechnology, agriculture. Student responses to the assignment were surveyed over two offerings of the course (Fall 2009 – Fall 2010).

Assignment Goals and Instructions
The goals were to enable students to:
- understand the relevance of plants in science, research, agriculture, and everyday life
- apply scientific terminology to important botanical concepts
- think critically about scientific questions and develop testable hypotheses

Important terms and concepts – define in your own words. Describe how the term was used in the context of Botany of Desire and how it can be applied to material learned in the course (you don’t need the specific quote from the book – just apply the terms to concepts discussed in the chapter). For each group of four students, each student will define 2 terms and share with the group. All terms are fair game for the exam.

Short answer – each student will answer the 2 short questions regarding concepts described in the chapter. Concepts that fully address the question are expected to receive full credit.

References
Lynd-Ballew, E. 2006. Using literature and innovative assessments to ignite interest and cultivate critical thinking skills in students. The K-12 Journal of Inquiry-Based Science Education. 1(1) 77-82.

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