

Control Activity

Time: 1 hour plus homework

Supplies: (all documents are per students), Management Think Sheet, Control Methods handout, Case Study Summary, Mechanical Case Study, Chemical Case Study, Biological Case Study, 'Plant Invasion' story (found in Plant Invasion Activity), Spotted Knapweed Study, Spotted Knapweed Management, Invasives and Economics article, Herbicide Resistance article, Mechanisms of Herbicide Resistance document*

*The "Mechanism" document is a very informative and thorough explanation of how herbicide resistance occurs. Teachers should read the document, but use their discretion on whether or not to assign portions of it to their students. It is a fairly technical document. Recommended reading for students would be the beginning of the report through section 4.2, and starting again at section 7 to the end of the report.

Introduction

While it is important for students to understand the biological and ecological impacts of invasive plant species, it is also important for them to understand the real-world implications and difficulties of dealing with invasive plant species. This lesson introduces students to the various types of plant control methods, provides a few examples of successful treatment programs, informs them of some of the problems with controlling invasive plants, and gives them the opportunity to develop their own management ideas.

Background

There are many different methods of controlling invasive plant species. Decisions to use each method are based on a number of factors, such as the biology of the invasive plant, economics, size and location and severity of infestation, land use type, and ecological sensitivity of an area. All of these criteria, and more, must be evaluated when selecting an appropriate management plan. As with many problems humans encounter, prevention is the safest and most cost effective means of controlling invasive plants. Refer to the Control Method handouts and related links for further information on invasive plant species control methods.

Herbicide resistance among plant species is a problem that is becoming more common as the use of chemical control increases. Chemicals are not causing mutations in plants, rather the plants in a population that already have a resistant mutation survive treatment and proliferate. Herbicide resistance is an excellent example of adaptation and the evolution of plant species

through human actions. A thorough description of how plants develop herbicide resistance is described in the 'Mechanisms of Herbicide Resistance' document. It is included in the module, and can be found online here:

<http://www.weedscience.org/paper/Mechanism%20of%20Herbicide%20resistance.PDF>.

Students will conclude this lesson with an opportunity to develop their own integrated management plan for controlling a spotted knapweed infestation. Two documents covering some of the methods specifically used to control spotted knapweed have been included in this module and can be used at the teacher's discretion.

INSTRUCTIONS

1. Instruct students to read the summary on plant control methods, the case studies for control methods, and the Invasive and Economics article. Readings can be assigned as homework prior to class, if necessary.
2. Explain the concept of herbicide resistance and how it occurs and have the students read the documents about herbicide resistance.
3. Discuss control methods and integrated weed management.
4. Remind students about the story on the spread of spotted knapweed from the 'Plant Invasion' activity. Students will be referring to this story in their assignment.
5. Students are to write a one to two page paper on invasive weed control from answering the questions on the Management Think Sheet. They may use the spotted knapweed documents as references for their paper.

EXTENSIONS

- Create more detail for the spotted knapweed invasion that will affect the type of management plan students develop. Ideas could include a budget restriction, the placement of a nearby stream, or presence of sensitive species.
- Instead of having students write individual papers, place student in groups and have them develop an integrated management program for the spotted knapweed invasion. Have each groups present their ideas to the class.
- For a more extensive project, speak with a local invasive plant species manager to find out about an existing invasive problem in your area. Have students develop a management plan and present it to the land manager.

DISCUSSION IDEAS

- What are some factors that prevent the use of various control methods in an area?
- What are some risks associated with mechanical, biological, chemical, and integrated control methods?

- How could land managers continue to use herbicides but prevent herbicide resistance?
- Think of some other ways humans affect the evolution of species besides the use of herbicides. (Examples: selective breeding, genetic modification)