Clean, Drain, Dry!

Activity

Students participate in hands on activity that demonstrates the ways in which aquatic plants and other nuisance species may be accidentally introduced or spread to new locations.

Grade Level: K-8
Subjects: Life science, biology, ecology
Setting: Classroom
Duration: One class period
Key Terms: "Clean, Drain, and Dry"

Objectives

- Students observe how aquatic plants and other nuisance species may be accidentally introduced or spread to water bodies by recreational activities.
- Students discuss ways in which the spread of ANS by recreational activities might be reduced or eliminated.
- Students learn the important concept of Clean, Drain, and Dry.

Materials

Distribute the following items to each group of students:

- 1 tsp. dry dill weed (available in bulk spice section of local grocery store)
- 3 (12 quart) plastic tubs labeled **Lake, Pond,** and **Wetland**
- Paper towels
- Magnifying glasses (optional)
- Small toy boat, pencils, string, paper clips or washers, rubber duck, small dog figurine, or any other materials representing recreational activities common to local area waters.
- 2 coffee filters
- Large funnel

Background

Hydrilla (*Hydrilla verticillata*) is a submerged, perennial aquatic plant that is capable of growing in a variety of aquatic habitats including: rivers, streams, lakes, ponds, marshes, canals, ditches, and reservoirs. Hydrilla is native to Asia (i.e., India, Sri Lanka, and Korea) and was first brought to the United States intentionally in the 1960's to sell as an aquarium plant. Today it can be found in many parts of the US (including 4 western states), and is spread primarily by human activities. Small fragments of hydrilla can be transported from one water body to another on boats, trailers, recreational gear, earthmoving equipment, and even our four-legged furry friends.

Hydrilla can be identified by its small, bright green, pointed leaves with serrated edges and 1 or more sharp "tooth" under the center of each leaf. The leaves of hydrilla are arranged in whorls of 3-8 (generally 5), that are connected directly to the stem. Hydrilla also produces potato-like tubers at the end of each underground stem that the plant uses for reproduction and food storage. Stems of hydrilla are thin and may grow at a rate of one inch per day. As hydrilla nears the water surface, the stems branch prolifically and will continue to grow horizontally, often forming impenetrable mats of vegetation. Hydrilla generally grows rooted into substrate, but the plant is easily fragmented and will also survive as a free floating mat at the water surface.

Part of hydrilla's success as an invader is its capacity to grow in a range of aquatic habitats under a variety of water conditions, substrates, and temperatures. Unlike most native aquatic plants, hydrilla is capable of growing under extremely low light conditions at depths of up to 30 feet. Hydrilla is able to begin photosynthesizing much earlier in the morning than native plants so it is able to capture most of the carbon dioxide in the water, which limits the growth of other plants. In its non-native range, hydrilla can grow very rapidly (it can double its biomass every two weeks in summer) and has no natural predators or diseases to limit its population.

Under ideal growing conditions, hydrilla can completely take over a water body. Dense infestations can shade or crowd out all other native aquatic plants, alter water chemistry, cause dramatic swings in dissolved oxygen levels, increase water temperatures, and affect the diversity and abundance of fish populations. Thick mats of hydrilla can impede navigation, reduce recreational boating, swimming and fishing opportunities, obstruct flow in irrigation canals, and clog industrial pipes and intake grates.

Unfortunately once hydrilla infests a water body, it is difficult and costly to eradicate. Millions of dollars are spent each year on a multitude of control methods, each with varying levels of success and environmental risk. For now, the best method of controlling hydrilla is preventing new infestations through outreach and education. Aquatic nuisance species often travel by hitchhiking with the help of unsuspecting people, so take the time to inspect and clean your boat or recreational equipment before leaving a body of water and before entering a new body of water. Always remember to practice **Clean**, **Drain** and **Dry.**

CLEAN: mud and plant fragments from your boat, propeller, boat trailer and <u>all</u> recreational gear before leaving a water body

DRAIN: all water from your boat (i.e., bilge, live well, and motor), trailer, tackle and recreational gear before leaving the area, away from waterways and storm drains.

DRY: your boat, trailer and recreational gear completely (at least 48 hours) after each use.

Preparation

- Before beginning the activity, review the topic of aquatic nuisance species and provide students with a brief introduction to hydrilla (see background material).
- Explain to students that the dill weed in this exercise represents hydrilla, and that students will be conducting an investigation to see how aquatic nuisance species may be spread from one water body to another through recreational activities.

Directions

- Divide the class into small groups and give each group three plastic tubs and up to three items that will represent aquatic recreational activities. For example, a toy boat could represent boating, a pencil, string and paper clip/washer could represent fishing, and a dog figurine could represent playing catch with a pet in the Lake.
- Instruct students to label each tub as **Lake, Pond** or **Wetland**, and fill the containers about halfway full with tap water.
- Add 1 teaspoon of dry dill weed to the "**Lake**" tub, and carefully mix the "weed" into the water.
- Now it's time for some fun! Each group will select a piece of recreational equipment and act out the associated activity in the **Lake** for approximately 30 seconds.
- After 30 seconds, the item will be removed from the **Lake** and transferred directly into the **Pond** Container, where the student will perform the recreational activity for another 30 seconds.
- After 30 seconds, the item will be transferred directly to the **Wetland** container, where the student will demonstrate the recreational activity once again for 30 seconds.
- After 30 seconds in the **Wetland** container, transfer the item to a clean paper towel for examination.
- Once all recreational gear has been used and placed on separate paper towels, allow students to examine the gear closely (using magnifying glasses if necessary) to look for any sign of weed fragments on the paper towel or items. Have students pay particular attention to the insides of the boats or other spaces that may hold water.
- In a sink (or outside), <u>slowly</u> pour all water from the **Pond** container into a coffee filter placed inside a funnel. Next, pour the **Wetland** water into a separate coffee filter. Carefully examine the filters for weed fragments and compare how many weeds were captured in each filter.

Evaluation

Discuss the following as a class:

- Did the items representing recreational equipment still have weeds on them after visiting the **Pond** and **Wetland**? If so, where were the weeds located on the items?
- Did you find weeds in the **Pond** and **Wetland** coffee filters? If so, how did the nuisance weed get into the other water bodies?
- Were there different amounts of weed in the **Pond** and **Wetland** coffee filters? Why or why not?
- Did one recreational activity seem to be worse at spreading the weed than others? Why?
- How could you prevent the spread of the nuisance weed from one container to another?
- How does this activity relate to real recreational activities?
- Can the students think of any other water-related recreational activities that could potentially spread ANS? (e.g., swimming, scuba diving, water skiing/tubing, kayaking, duck hunting)

To wrap up the exercise, compare what happened in the demonstration to the real life spread of aquatic nuisance species in local water ways. Remind students that many ANS (including hydrilla) are spread accidentally through recreational activities when gear or equipment is not properly cleaned between uses. In the case of hydrilla, it only takes a 1 inch fragment of the plant to start an infestation in a new water body. The best way to prevent the introduction and spread of ANS from one water body to another is to practice **Clean, Drain,** and **Dry**!

Extensions

- Allow students to predict the results before performing the experiment. Students can reflect on how accurate or inaccurate their predictions were (and why) in a short paragraph or essay.
- Have students develop their own hypothesis about the spread of aquatic nuisance species (e.g., boats spread more ANS than pets) and design an investigation to test the hypothesis.

Resources

- **http://www.habitat.noaa.gov/pdf/best_management_practices/Cleaning%20of%20Watercraft%20and%20Equipment.pdf**

Source

This activity is an adaption of Aquatic Invaders from “kNOweeds”, K-12 Montana Invasive Plant Curriculum Guide.