Expository Performance Task: Non-Native Plants

Student Directions

Task:

Your science class is completing a class project about invasive plants. Your teacher has given you the topic of non-native plants and why some succeed in new environments while others become nuisances.

*Read the sources carefully to **write an explanatory article** to explain why some non-native plants succeed in new environments while others become nuisances. Using more than one source, select the most relevant information to support your thesis/controlling idea about non-native plants.*

Sources for Performance Task:

Source #1

As you start your research, you find this article about how some non-native plants came to North America.

Plant Invaders!

When you hear invaders, you might think the word only applies to science fiction novels. But some invaders live right in your backyard! These are invasive plants, and once they take root, getting rid of them can be a challenge.

What Is an Invasive Plant?

An invasive plant is a plant that thrives outside of its natural habitat and is likely to cause harm to the ecosystem. These plants come into an area from other parts of the world and sometimes arrive by accident.

If a plant is naturally fast-growing, it can be especially invasive in a new habitat. Insects and other animals that eat the plant in its natural habitat do not always live in the new environment. Without the insects and animals to eat the plant, it grows unchecked and can quickly cause problems.

Some invasive plants arrived with the colonists when they traveled to the New World. Before setting sail, the colonists weighed down their ships with soil and rocks from their homeland. This material, called ballast, was meant to balance the weight to keep the ship from capsizing. The soil in the ballast often included seeds from European plants. When the ships arrived in the New World and the ballast was emptied, the seeds began growing in the new soil.

What's the Problem with Invasive Plants?

Invasive plants can have many negative effects on an ecosystem. They can crowd out plants native to the ecosystem, causing the native plants to die. This effect multiplies when the insects and animals that rely on those plants for food also die. In other cases, the animals that rely on the native plants must move to another ecosystem where native plants still grow.

In the 1980s, scientists studying ecosystems began to notice a number of invasive plants. They eventually

identified more than 4,000 non-native species in the United States and Canada. Some of the most common were Japanese kudzu and honeysuckle. Kudzu was brought over from Japan in 1876 at a special exposition celebrating the United States' 100th birthday. Visitors to the exposition were impressed by the fast-growing vine, and some took its seeds with them. The U.S.U.S. government began planting it to control erosion and soon entire hillsides were covered with the vine. However, it quickly eliminated other plants in native forests. Now, cities across the United States, particularly in the south, battle the vine every year. Like kudzu, Japanese honeysuckle was also planted as a ground cover in the 1800s, mostly on the East Coast. Many people enjoy its sweet-smelling flowers in late spring and summer. But its beauty is deceptive; it can quickly overtake native trees and bushes.

Are All Non-Native Plants Problematic?

Some non-native plants, though, are not as aggressive and can be fairly easily managed. For example, many people in North America plant English ivy as a ground-covering plant. Although it is not native to the continent, the ivy can be pruned regularly so that it does not grow out of control. Other plants have been growing in North America for such a long time that it is hard to remember that they are not native plants. Tulips and irises, for example, first grew in Europe, the Middle East, and Asia. Oranges, wheat, and apples, also originally non-native plants, have become staples.

Earth's ecosystems need diversity among their plants and animals in order to maintain balance. The challenge is making sure invasive plants do not reduce this diversity and upset the natural balance.

Sources

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Source #2

Next, you find an article that shows a different view on the introduction of non-native species.

Friendly Invaders
by Carl ZimmerZimmer

New Zealand is home to 2,065 native plants found nowhere else on Earth. They range from magnificent towering kauri trees to tiny flowers that form tightly packed mounds called vegetable sheep.

When Europeans began arriving in New Zealand, they brought with them alien plants—crops, garden plants and stowaway weeds. Today, 22,000 non-native plants grow in New Zealand. Most of them can survive only with the loving care of gardeners and farmers. But 2,069 have become naturalized: they have spread out across the islands on their own. There are more naturalized invasive plant species in New Zealand than native species.

It sounds like the makings of an ecological disaster: an epidemic of invasive species that wipes out the delicate native species in its path. But in a paper published in August in The Proceedings of the National Academy of Sciences, Dov Sax, an ecologist at Brown University, and Steven D.D. Gaines, a marine biologist at the University of California, Santa Barbara, point out that the invasion has not led to a mass extinction of native plants. The number of documented extinctions of native New Zealand plant species is a grand total of three.

Exotic species receive lots of attention and create lots of worry. Some scientists consider biological invasions among the top two or three forces driving species into extinction. But Dr. Sax, Dr. Gaines and several other researchers argue that attitudes about exotic species are too simplistic. While some invasions are indeed devastating, they often do not set off extinctions. They can even spur the evolution of new diversity. . .

Dr. Brown argues that huge negative effects of invasions are not documented in the fossil record, either. "You see over and over and over again that this is never the case," he said. Species have invaded new habitats when passageways between oceans have opened up or when continents have collided.

"The overall pattern almost always is that there's some net increase in diversity," Dr. Brown said. "That seems to be because these communities of species don't completely fill all the niches. The exotics can fit in there."

But critics, including Anthony Ricciardi of McGill University in Montreal, argue that today's biological invasions are fundamentally different from those of the past.

"What's happening now is a major form of global change," Dr. Ricciardi said. "Invasions and extinctions have always been around, but under human influence species are being transported faster than ever before and to remote areas they could never reach. You couldn't get 35 European mammals in New Zealand by natural mechanisms. They couldn't jump from one end of the world to another by themselves."

It is estimated that humans move 7,000 species a day. In the process, species are being thrown together in combinations that have never been seen before. "We're seeing the assembly of new food webs," said Phil Cassey of the University of Birmingham in England. Those new combinations may allow biological invasions to drive species extinct in unexpected ways.

Both sides agree, however, that decisions about invasive species should be based on more than just a tally of positive and negative effects on diversity.

"Friendly Invaders" by Carl Zimmer, from http://www.nytimes.com/2008/09/09/science/09inva.html?pagewanted=1&ref=invasivespecies&_r=1&.

Source #3

Your research then leads you to an article from a newspaper in Charleston, South Carolina, about an interesting way the community battles a fast-growing, non-native plant.

"High Point employs goats to eradicate weeds, kudzukudzu"
by Pat KimbroughKimbrough

HIGH POINT, N.C.N.C. (APAP)—The vegetation behind the old Highland Mill complex is as thick as a jungle, but Ron Searcy has no doubt that his charges will make short work of it.

Searcy, owner of Wells Farm in the North Carolina mountain community of Horse Shoe, recently brought about 50 of his goats to the property surrounding the mill to begin eating their way through the kudzu, grass, small trees and other growth as part of a neighborhood revitalization effort.

"There's a chain link fence back there somewhere. Here in a week or 10 days, you'll probably be able to see it," said Searcy, looking toward an area downhill from the mill property where Richland Creek runs. "There's almost 17 acres here. I can't see them being in this area much more than a week or 10 days."

Searcy was hired by a group of grassroots volunteers, the Southwest Renewal Foundation, which received a grant from the city.

The foundation works to revitalize the 2-square-mile area between English Road, South Main Street and West Market Center Drive which was once the city's industrial heart but is now filled with closed furniture and textile plants.

The foundation is seeking to develop a greenway along Richland Creek, and it brought in the goats to clear the kudzu and other vegetation that surrounds it.

"You've got to start somewhere," said foundation co-chair Dorothy Darr. "We've always thought that if we could just be able to get people to see the beautiful creek, we think it will be a big boon. Most people don't even know it's there right behind the mill."

Highland Mill closed about 20 years ago. Cisco Brothers, a furniture company, uses a portion of the property for showroom space.

There are about 50 acres of kudzu along Richland Creek where the foundation wants the greenway to run. The goats tackled one section of it last year.

The animals will be here the rest of the summer, each consuming up to 18 pounds of kudzu and other invasives per day. The more they eat, the less machinery and pesticides are needed to eradicate the kudzu for good.

"The kudzu will come back, but when you see it come back a second time, it's much more spindly. The leaves are much smaller. You can kind of tell that the plant's being stressed a little bit," said Searcy. "Once the goats are done, you can keep it mowed and sprayed. Repeated grazing will kill it out. It will take several years."

Darr said the goats will cost about $1,200$1,200 per acre cleared. The foundation has about $33,000$33,000 in funds allocated by the City Council that it will use for the goat project and other upcoming initiatives.

The group is continuing to pursue funding for a feasibility study for the greenway and is involved in a host of other initiatives that its leaders hope will draw new businesses and create a better quality of life for neighborhood residents.

"High Point employs goats to eradicate weeds, kudzukudzu" by Pat Kimbrough, from http://www.postandcourier.com/article/20130907/PC1610/130909606/1177/high-point-employs-goats-to-eradicate-weeds-kudzu.

Source #4

Here is an article about a non-native plant that became a part of cultures around the world.

The Tomato: A World Traveler

Spaghetti and meatballs with tomato sauce now is considered a basic Italian meal, but it once was hard to find. In fact, the tomato did not first grow in Italy. The plant actually is native to South America. Today, the tomato is grown on every continent except Antarctica. How did this shiny red fruit spread throughout the world?

There is some disagreement about where tomato plants first grew. Historians believe that the tomato originally grew in part of the Andes Mountains—either in what is modern-day Peru or Chile. The plant, which first appeared as a weed, could be used only when it was in season. As a result, the Inca people who lived there were not interested in growing the fruit. They instead focused on crops that could be stored.

In the early sixteenth century, Spanish explorers arrived in what is now Mexico. They discovered that the Aztecs had been cultivating the tomato for years. No one knows exactly how the tomato caught the interest of the Aztecs, but the plant became a common part of their diet. The Spanish then carried the tomato back to Spain, along with vegetables like potatoes, chili peppers, and sweet potatoes.

Tomatoes began to spread through Europe and were first mentioned in print in 1544 when an Italian herbalist referred to them as a "malamala aurea," or golden apple. At first, people were afraid to eat tomatoes because they believed they were poisonous. This fear was seen in France, where tomatoes first became popular as a ground-covering plant. Livestock ate too many of the plant's leaves and died. Understandably, the French became nervous about trying the plant's fruit because they believed it also was poisonous. American cooks also had fears about the plant. They were told to cook tomatoes for three hours before eating them. These fears were only partially correct, however; the plant's leaves are poisonous, but the fruit is not.

Hundreds of years passed before people in Europe actually began eating tomatoes. By the mid-1800s, however, tomatoes had become very popular, especially in Italy, and by the 1900s, their popularity had grown in France and North America. Now, the tomato is the world's most popular fruit, with more than 60 million tons produced and eaten per year.

Sources

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