Q/As About Native and Non-Native Species: Part 1

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Many of these Eco-Articles refer to either native or non-native species. Some folks have questions about exactly what the term "native" means, what it encompasses, and how it applies to neighborhood landscaping and managing natural areas such as parks. Today's feature provides some answers.

Q: What is a native species?
A: A native organism is one that evolved and naturally migrated to its current range and is biologically recognized by other species within this region. For example, the ancestor of the iconic American bison actually originated in Asia. Through natural circumstances, the ancestral bison first started crossing the land bridge into North America around 200,000 years ago and continued traversing between Asia and North America. These early bison spread across much of the continent (some maps include Northern Virginia in the former range), evolved into new species, coexisted with some organisms while other species adapted to the new animals, and integrated into diverse ecosystems. In this dynamic process, new species arise as others may move out or face extinction at the same rate. The December 2018 article about mistletoe illustrates how even a native hemiparasite fits into a balanced ecosystem. Incidentally, the horse's ancestors originated in North America and migrated to Eurasia.

A species' natural range depends on factors such as a given area's geology, climate, altitude, and the other organisms present. Political borders rarely fit a species' range but are applied to easily convey locations. For example, the Colorado blue spruce (*Picea pungens*) is "native" to the U.S. but its natural range is only areas within the Rocky Mountains. When planted in the D.C. area, this tree deteriorates in the hot, humid summers and clay soil, surviving for several years to a few decades whereas wild specimens can thrive for centuries in their natural habitat. Describing a species' native range at the county level is a more meaningful measurement. Two websites with county-level plant ranges are http://vaplantatlas.org and https://plants.sc.egov.usda.gov.

Q: I went to the nursery for native plants and they said that liriope and periwinkle *naturalize*. Don't "naturalize" and "native" mean the same thing?
A: No. Those words have two separate meanings. Naturalize is the term used when an exotic organism is brought into an area and takes over. "Naturalize" is a nice way of saying "non-native invasive," just like "colonize" is a gentle term for "conquer." Periwinkle (*Vinca minor* and *V. major*) and liriope (especially *Liriope spicata* and *L. muscari*) are non-native weeds that invade woodlands and other natural areas. Few, if any, native species benefit from these exotic plants.

Q: The bison came over from another part of the world and spread, but that was OK. What's wrong with the plants and animals designated as "non-native invasive?"
A: The key is that the new bison species spread over thousands of years, which happens through natural evolutionary and dispersion processes. Imagine a jet liner cruising at 600 mph (around MACH 0.8). To smoothly and safely land, that jet needs 25 minutes; the less amount of time, the harder the landing. If that speed and altitude change happens in a split second, it means that the plane crashes. In biological communities, a rapid change also spells disaster, resulting in more species dying off than others evolving to fill the vacant niches.

Ecological changes should happen slowly over thousands to millions of years. However, folks can witness one change occur within his or her lifetime—mere decades—anywhere from local parks to backyards! This problem is the influx of non-native invasive species. These organisms include weedy plants [e.g., Callery pears (also called Bradford or Cleveland pears, *Pyrus calleryana*), oriental bittersweet (*Celastrus orbiculatus*), winged burning bush (*Euonymus alatus*)], uncontrolled animals like the emerald ash borer (*Agrilus planipennis*), and diseases such as the Chestnut Blight Fungus (CBF, *Cryphonectria parasitica*). What makes these species different from other imported varieties is that the former escaped into the environment and have inadequate predators, parasites, or diseases to keep them in check. In fact, some of these organisms prosper better in America than they do in their native homeland! Unlike the bison's ancestors, these invaders came to the U.S. through human activity—an artificial distribution system.

Once here, people helped fan the proverbial flames of these organisms further, especially through mail order catalogs and other trade. Infected stock spread disease such as CBF. Selling invasive plants translated into multiple points to escape cultivation through seeds, runners, or other reproductive means. The native flora and fauna are unable to control this alien onslaught resulting in the pests' population exploding unchallenged thereby altering and degrading the natural environment.

Q: But what you call a "non-native invasive" plant is beautiful. What's the harm in allowing it to survive, evolve, and add to the biodiversity within the parks?
A: There are many native—often more beautiful—alternatives for each invasive plant. As we discussed earlier, artificially broadcasting exotic species into an established, balanced natural ecosystem is not evolution or a case of survival of the fittest. Instead of increasing biodiversity, it causes severe imbalances. In the invasive plant scenario, animals relying on native species cannot utilize these new invaders. For example, let's say that a person is given a salad filled with tomatoes, lettuce, peppers, cheese, hardboiled egg, and anything else they like that provides all of the nutrient and calorie requirements for a day. Each day, another of the same salad is served. Now, let's say that an inedible oak leaf substitutes one of the components—maybe a lettuce leaf. After removing that oak leaf from the salad, the rest is devoured. Each subsequent day, additional oak leaves replace more of the salad until one day the edible food drops so low that the person now starves. This same analogy occurs as non-native invasive plants displace native flora: the wildlife dependent upon those native plants either languish or leave.

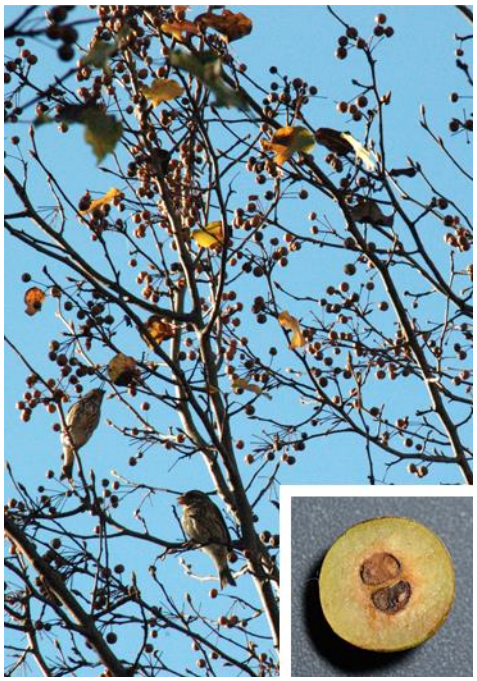

Figure 1. A big problem with non-native invasive species like this Bradford pear is its seeds, which spread, germinate, and grow uncontrollably outside of cultivation. Any birds capable of eating the small fruits dotting the branches will disperse the seeds in their droppings. Each fruit typically contains two to four viable seeds (inset).

Q: Many of the plants that are called "invasive species" are sold in garden centers. They have value. People pay money for them. How can they be all that bad?
A: Just because something is legal to sell and use does not make it right or mean that it is good. An example is tobacco: consuming these products, as directed by the manufacturer, can create severe problems for the user as evidenced by the warnings on the packaging. Too many times, private citizens to professional landscapers gravitate to certain non-native invasive species whenever their project needs a cheap "quick fix." Such actions lack a comprehensive, long-term consideration for using these plants. The weeds' abundance degrades the health of natural areas. If family, friends, or neighbors request a non-native invasive plant, instead of bowing to peer pressure, do the right thing and, "Just say no!"

By refusing a targeted weed and choosing a good native alternative, nurseries see the market trend for fewer exotic plants and more natives. Furthermore, you will help create a healthier environment for your children and generations to come.

Part 2 of this series answers more of your questions.

In full disclosure, the author is a biologist whose academic and professional careers include evolution, the environment, and genetics. His current work involves DNA-based species identification and deducing how closely related organisms are based on genetic similarities. He is also a volunteer site leader with Fairfax County Park Authority's Invasive Management Area (IMA) program.

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