

Challenges to Sustainable Forestry: Exotic Invasive Plants



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If you've ever driven I-81, you've seen exotic invasive plants. The dominant median tree along the stretch that goes through Roanoke is tree of heaven, an exotic invasive (unless you're driving this stretch in April, when the dominant species appears to be redbud...a much better, native tree!). Pictured here are the seeds of tree of heaven. Estimates have it that a single female tree can produce over 300,000 seeds in one summer. Further south along I-81, the main ground cover you'll see is an exotic invasive vine called Kudzu. Rumor has it, you can actually see the vines growing. Most questions from landowners in Virginia are about identifying and controlling these species. So, what are they exactly? And why are they so hated?

Exotic Invasives



versus



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What are they?

Alien plants also known as exotic, non-native, or non-indigenous plants, are species intentionally or accidentally introduced by human activity into a region in which they did not evolve. Many alien species are well known and economically important in agriculture and horticulture, such as wheat, soybeans, and tulips. Alien species, whether plant or animal, often do not become established outside of cultivation and, if they do, they usually have few impacts on natural communities. Examples of non-invasive exotic plants include agricultural crops, such as corn and horticultural plants such as tulips.

Invasive alien plants, however, escape cultivation and become agricultural pests. Across the country and around the world, invasive alien plants and animals have become one of the most serious threats to native species, natural communities, and ecosystem processes. They also exact a costly toll from human economies that depend on resources and services provided by healthy ecosystems.

The photos on the right are of Japanese stiltgrass (top) and autumn olive and Japanese honeysuckle (bottom), both of which are exotic invaders.

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Exotic invasives don't only come in plant form.

We have many exotic invasive insects, like the gypsy moth caterpillar and the hemlock woolly adelgid; diseases such as dogwood anthracnose and the chestnut blight; and animals, such as the Chinese mitten crab and the northern snakehead fish. Insects, diseases and animals can wreck havoc on a forest or a watershed as well as plants can. But, since we only have 30 minutes today, we will focus just on plants. I will provide you with a number of resources at the end of this talk, so you can learn more about all types of invaders on your own.

One clarification to something a lot of people think...the chestnut blight did not kill all our American chestnuts – they still exist in the wild. In general, they are sprout stumps growing from old root stock from larger trees which died; there are some larger ones out there that show some resistance to the blight too. And a lot of research is being done to develop a cross between the American and Chinese chestnut trees (the Chinese is blight resistant).

Exotic Invasives

- Alter ecosystem function
 - Replace native species
 - Change forest structure
 - Decrease productivity
 - Decrease biodiversity



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Why are they so hated?

This photo demonstrates clearly why exotic invasive species are so detrimental to our forestland. Kudzu is the species pictured. If an exotic invasive like kudzu gets into an area and isn't controlled, it can alter the ecosystem function. It does this by replacing native species (which wildlife may depend on for food and cover), changing the forest structure (in this case, it is smothering the trees, eventually killing them, resulting in a vine dominated landscape, instead of a multi-level forest), and of course, this reduces biodiversity, which is an important for maintaining healthy ecosystems. And, since kudzu isn't a commercial crop, the productivity of this site is severely decreased. There is also an economic cost. Time and money are needed to control these plants. Examples include destruction of vast areas of western rangelands, clogging of important waterways, and increased costs in maintaining open powerline rights-of-way. It is estimated that between 1901 and 1991 economic losses caused by just 15 of these exotic plants (excluding agricultural weeds) were \$603 million!

Exotic Invasives



- Prolific seeders
- Efficient dissemination
- Adaptability
- Rapid growth
- Lack of natural controls

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What makes invasives so good at, well, invading?

1. In general, they tend to be prolific seeders (recall the female tree of heaven which produces up to 300,000 seeds/year! In many cases, some exotic invasives can reproduce by a number of different means. For example, hydrilla, an aquatic invader, can reproduce four different ways – by fragments – bits of the plant which break free from the main plant, stolons – starchy roots, seeds – not common, and turions – compact buds along the stem where the leaves attach.
2. They also tend to produce seeds which are easily spread (or disseminated). That means light wind blown seeds or tasty seeds which are eaten and spread by animals.
3. Many invaders can grow on a number of different soils, under varying light and moisture conditions
4. They grow fast – recall the kudzu vine which you can actually see growing!
5. And, there tends to be a lack of natural controls to keep the plants in check (i.e., no diseases, insects or wildlife which infect or eat the plant itself). Deer do a number on native oak seedlings, but won't eat a tree of heaven seedling.

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- Plants



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There are approximately 400 serious exotic invasive plant species in the United States. Half were intentionally introduced as horticultural species. The others arrived accidentally in seed packages, packaging materials, and on ship ballasts. They now infest more than 100 million acres nationally. To put that in perspective, Virginia is approximately 26 million acres....so nationally, an area almost 4 x the size of the Commonwealth is infested with exotic invasive plants.

There are 115 in Virginia; of those, 32 are considered to be highly invasive species.

Exotic Invasives

- *Place your order within 7 days and receive 10% off your first **purchase**; Exclusive member ... **English Ivy**, or *Hedera helix*, is a hardy evergreen climbing vine or used as a groundcover ...*
- **How to Grow English Ivy Successfully | eHow.com**
*By Kimberly Johnson · Difficulty: Easy · How to **Purchase English Ivy** in a Los Angeles Nursery; How to Grow **English Ivy** in a Pot;*
- **English Ivy Pricing: English Ivy.** *A beautiful and traditional ground cover, **English Ivy** has been a trustworthy ...*
- **English Ivy - Free Ship** *Several types of **English Ivy**: \$0.87 to \$3.47. Sold in full flats only.*

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Don't assume just because you can purchase a plant from a nursery that it won't be an invasive species. Many on-line and local nurseries sell these plants. A good example is English ivy, a commonly planted species which is also an exotic invasive species. I found 1.74 million results when I searched for "Purchase English Ivy" on the web.

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- **No Ivy Day 2010 Saturday, October 9** *Traditionally, this event has been held on the first Saturday in May. It is often a day of great weather but it is after the native plants have bloomed for the spring, which makes it hard for volunteers to avoid them as we move through the forest. This year, the No Ivy League is moving the date of this event into the fall as a response to feedback we have received about the ecological sustainability of ivy removal in spring. Holding the event in the fall will allow us to remove the hated English ivy with less damage to native vegetation. It will also help to limit damage to ground-nesting birds during a sensitive time.*
- **How to Control the Spread of English Ivy | eHow.com** *By Mary Lougee · Difficulty: Moderate · English ivy is a noxious weed that grows on the East and West Coasts of the United States; the plant grows out of control in these climates...*

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There is also a wealth of information available on how to control invasives. Nice of ehow.com to tell us both how to grow English ivy successfully and to control it! Not a slam on ehow.com, but an example of the mixed messages that are out there and how easy it is for a landowner to unwittingly plant something noxious.

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A couple of photos showing infestations of English ivy. Common in urban areas where homeowners have planted it.

Nurseries sell many other exotic invasive plants too. Including some of the worst ones we have in Virginia, such as tree of heaven, autumn olive, Japanese honeysuckle, and barberry.

Control



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We do have a number of tools available to control exotic invasives. But it's important to know that one tool doesn't control all. The first step in trying to control the spread of an exotic invasive, is to admit defeat. That is, recognize that you probably won't be able to eliminate ALL the invasives. But, with persistence, you certainly can knock them back and maintain control. These photos show more out of control invasions (clockwise from left, oriental bittersweet,, crown vetch, and hydrilla).

The second step in control is to understand the species you are trying to get rid of.

- How does it reproduce? By seed? By sprouts? Can pieces be broken off and rooted?
- How are the seeds spread? By wind? Animals? Water?
- Where does it grow? In the shade? In full sun? In wet areas? On disturbed areas?
- How does it grow? Is it a shrub? A tree? An herbaceous species?

Control



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Based on the answers to these questions, you can begin to make a plan of attack. There are numerous resources available to the public on exotic invasive identification and control. Some of these resources are listed on the Resources page in your packets. The tools we have to control exotic invasives include:

- Mechanical – which includes hand pulling, mowing, plowing, disking, grubbing, fire
- Chemical – which includes herbicides
- Biological – which includes using biological agents, such as insects, for control

Using the wrong tool can make an invasive problem even worse.

I would like to spend the next few minutes talking about 4 major exotic invasive species; these are plants you have definitely seen, even if you didn't know what they were. And I'll talk about which tools are appropriate for control of these buggers. And which can make matters worse.



First up, one that has already been mentioned, tree of heaven.

This tree is also called stink tree, peanut tree, Chinese sumac, or, more maliciously, Tree of he**

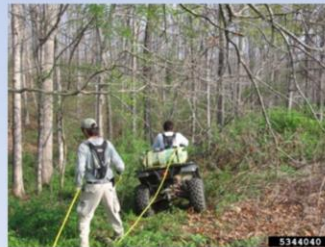
If you've ever read "A Tree Grows in Brooklyn" the tree species they are referring to is this one. It WILL grow anywhere!

We will go into a lot more detail on how to identify species later today; but tree of heaven is pretty easy to pick out. It looks a lot like black walnut (a desirable, native species).

This species was introduced to the US in 1784 by a PA gardener. Now found in 42 states. Tree of heaven forms dense, impenetrable thickets under which nothing else grows. In fact, the roots secrete a chemical which is toxic to other plant species...a kind of natural herbicide. If you are showing property with this species on it, the potential landowners should be made aware. The earlier this species is controlled, the easier it is to eliminate or at least keep under control.

There are ways to kill tree of heaven. The most efficient way is to inject herbicide into the stem using a method called hack-n-squirt. Hack the stem with an ax. Squirt herbicide into the wound. As far as tools for control are concerned, a combination of mechanical (hacking) and chemical (squirting) is appropriate. If you simply cut down the tree, the stump will produce a bunch of sprouts, so you end up with 10 trees instead of 1. Making matters worse.

Multiflora Rose



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Another very common exotic invasive in Virginia is multi-flora rose, which is aptly named for the multiple flowers it produces. This species was introduced from Asia in 1866 as a rootstock for ornamental roses. Later, it was widely promoted for use as a living fence to keep livestock in or out. Which, if you've ever encountered a hedge of multi-flora rose, you know is very effective. One plant can produce up to 1 million seed per year; and they can remain viable for up to 20 years. Viable means they can still germinate, given the right conditions. Birds eat the rose hips and disseminate the seeds. Like tree of heaven, this species forms dense thickets, under which nothing else grows. And the seeds are spread widely. On our farm, there are thousands of multiflora rose seedlings all through the wooded areas. Next to impossible to get rid of all of them.

This species can be controlled using both mechanical (pulling up the plants) and chemical (apply an herbicide to the leaves). If you do pull the plants, you must pull the entire root system up. Any pieces left in the ground will sprout a new plant.

Autumn Olive



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Autumn olive is very common along the edges of fields, trails, roadsides and forest edges. It was intentionally brought to the US for wildlife food and cover, roadside stabilization, and to reclaim mine soils.

One plant can produce 8 pounds of seeds a year. Fruits are eaten by animals who spread the seed. Again, these plants form dense thickets, preventing native species from seeding in. And, although wildlife do eat the seeds, there are native species which produce more nutritious foods. However, this species does have some favorable qualities: the fruits are used to make jams and jellies, and a white wine. And the fruits contain up to 7 times more lycopene than tomatoes. But still, it shouldn't be encouraged.

A combination of tools work best to control these species.

Mechanical means can be used – the young seedlings can be pulled up – roots and all; however, cutting, burning, or mowing without herbicide follow-up can exacerbate the problem. Roundup is an effective herbicide for chemically controlling autumn olive. And, as a biological control, goats are pretty effective at eating these shrubs. Just be careful not to let them overbrowse desirable vegetation as well.

Giant Hogweed



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Many of our exotic invasives come from Japan or China. This one comes from a different area: the Caucasus Mountains which are between the Black and Caspian Seas – forming the border between Georgia and Russia.

Hogweed is a species, which, if it is in Virginia, it is not yet widespread. But it is coming. And it is nasty. This is the only exotic invasive I know of which causes severe injuries to those who encounter it. This is a biennial herb (lives for 2 years) which can grow up to 12 feet tall. It shades out native species, like many of the other species we have talked about. But it also has a sap which is toxic. It causes severe burns to the skin, and can cause long-term scarring. It's so bad, Genesis wrote a song about it called "Return of the Giant Hogweed". You can find the video on Utube.

This species can be controlled mechanically, by digging up the roots. However, many precautions must be taken to keep the sap away from skin and eyes. Herbicides are effective and perhaps safer to the applicator. And, for biological control, it seems sheep cattle and pigs can tolerate the sap and will eat the plants. At least providing temporary control. You do not want to cut the seedheads off and throw them on the ground. You will simply be aiding hogweed's dissemination!

This species is definitely in PA. Soon to be in VA.

Exotic Invasives

What can we do?

- Maintain a healthy forest
- Inspect your property regularly
 - Know how to identify common invasives
 - **www.invasive.org**
- Treat problems as soon as detected
- Rehabilitate sites



As an educator, I encourage landowners to become familiar with the most common exotic invasives and regularly walk their property to look for signs of infestation. The earlier an invasive problem is detected and dealt with, the easier it will be to manage.

Many resources for identifying and controlling exotic invasives are provided on the Resources sheet in your packets.