Plant this – not that: Native alternatives to invasive plants as part of National Invasive Species Awareness Week

Brought to you by “United by Art”
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The University of North Carolina at Chapel Hill
TEN WAYS TO OBSERVE NATIONAL INVASIVE SPECIES AWARENESS WEEK

February 26 – March 3, 2012

1. **Do Some Research:** You don't even have to leave the comfort of your own home. Get on the Internet and find out what's invasive in your area, region or state. Identify which species might be growing in your backyard or neighborhood. Learn to recognize common invaders and keep an eye out for signs of new ones. Check trees, gardens, vacant lots, roadsides, yards, agricultural areas, wetlands, ponds, and lakes. Early detection is crucial to stopping the spread of invasive species! Visit [http://www.invasivespeciesinfo.gov/unitedstates/main.shtml](http://www.invasivespeciesinfo.gov/unitedstates/main.shtml) to get started.

2. **Join in an Eradication Effort:** Many parks and nature reserves manually remove invasive plants (and sometimes animals) with the help of local volunteers. These outings are a great way to get some exercise, enjoy time outdoors, meet new friends, and gain the satisfaction of knowing that you're helping to protect your natural heritage.

3. **Become a Citizen Scientist:** Working out in the field can be a very rewarding way to combat invasive species. Whether you are collecting scientific data to be used by local, state, or national agencies and organizations or actually helping get rid of the invasive plants and animals, you will be able to see up close and personal the impacts of invasive species and the results of your efforts. Visit Citizen Science Central ([http://www.birds.cornell.edu/citsci/](http://www.birds.cornell.edu/citsci/)) to learn more.

4. **Visit a Garden, Park or Nature Center:** Spend an afternoon at a botanic garden, park or natural area and familiarize yourself with the native flora and fauna in your area. See if a guided tour is offered.

5. **Read a Book:** Not an outdoor type? Not to worry, even bookworms can participate in National Invasive Species Awareness Week. Authors have written field guides about invasive species in particular states. Find a book and read up on the threats posed by invasive species.

6. **Donate:** If you can't give time, you might be able to give money. Even small amounts can help local invasive species organizations with control and management and other costs.

7. **Start a Garden:** Replace your invasive landscape plants with native alternatives. Unlike many non-native plants, native plants are hardy, less susceptible to pests and diseases and unlikely to escape and become invasive. The great variety of plants native to any region give gardeners options that work well in any type of garden design. Because maintaining native plants requires less work, they provide excellent choices for large commercial landscapes as well as residential gardens. Of course, native plants have other benefits. They help conserve water, reduce mowing costs, provide habitat for birds, butterflies and other wildlife, protect the soil and save money on fertilizer and pesticides.
“Plant this – not that” outline

• What is an invasive species
• Why have some exotic species become invasive
• Variation in exotic plant impact
• Gardening with local ecology in mind
• A few of the thousands of native plants that are available for the landscape
HIPPO

Many different factors contribute to the destruction of biodiversity on Earth. Scientists have come up with a list of factors that can be summarized by the acronym “HIPPO“

H = Habitat Destruction
I = Introduced Species
P = Pollution
P = Population Growth
O = Over-consumption
Definitions and the need for a common language...
With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

Executive Order 13112
An exotic species whose introduction does, or is likely to cause, economic or environmental harm or harm to human health.

Executive Order 13112

A non-native species that intrudes upon an environment. Often possessed of rapid growth and efficient reproduction, it crowds out native species, damaging wildlife habitat and threatening biodiversity.

United by Art
Some invasive species
Emerald ash borer is on our doorstep...

On July 8, 2008 Fairfax County staff identified sites in Herndon and Springfield infested with emerald ash borer. Currently Fairfax County Urban Foresters are trying to find the extent of the infestation and are preparing a public outreach campaign.

A federal order quarantines, effective immediately, Fairfax County for emerald ash borer. All interstate movement of infested ash wood and wood products from Fairfax County is regulated, including firewood of all hardwoods, nursery stock, green lumber, waste, compost, and chips from ash trees. Virginia Department of Agriculture and Consumer Services (VDACS) has also put in place a similar quarantine for the counties of Fairfax, Arlington, Fauquier, Loudoun, and Prince William and the cities of Alexandria, Fairfax City, Falls Church, Manassas, and Manassas Park.

Please help by contacting the Forest Pest Branch if you notice any signs or symptoms of emerald ash borer on your property. You may visit the Dendrology at Virginia Tech Web site for more information about identifying ash trees. There are many species of ash, but emerald ash borer will attack them all and is almost always fatal. Green and White ash are commonly found in this area.

Remember: Don't move firewood! Buy your firewood once you reach your destination.

Emerald Ash Borer Press Release

For more information, view the national emerald ash borer Web site and the pest alert fact sheet or contact the Forest Pest Branch at 703-324-5304, TTY 711, or via e-mail.

Also, view the Forest Pest Branch's emerald ash borer brochure (PDF)

The emerald ash borer is an insect that was first discovered killing ash trees in Michigan in the late 1990s. Accidentally introduced into North America from Asia, the emerald ash borer has killed millions of ash trees throughout Michigan, Ohio, Indiana, Illinois, Maryland, Pennsylvania, West Virginia and Canada. This pest has caused billions of dollars of damage to North America's forest industry and has killed many popular landscaping trees. The emerald ash borer does not generally spread great distances on its own. It is mainly spread when various ash articles (firewood, wood chips, nursery stock, etc.) are transported from infested areas to uninfested areas.
Hemlock wooly adelgid
Redbay Ambrosia Beetle
*Xyleborus glabratus* and fungus (*Raffaelea lauricola*)

Laurel Wilt Disease
From where do invasives come???
Exotics become invasive because they:

- are placed in matched habitats from other parts of the world, but without their former pests and pathogens
- have “weedy” characteristics
- take advantage of disturbed environments
- fill an “empty” niche
- resist herbivory and competition using novel chemical defenses
- were selected for superior competitive abilities
- have evolved herbicide resistance
Variation in Exotic Plant Impact

After White and Schwarz, 1998

Exotic species effects:

• Do not persist after cultivation
• Persist after cultivation but do not spread
• Spread vegetatively and/or by seed after cultivation
• Spread only in human-created habitats
• Spread into native habitats but do not reduce native species
• Spread into native habitats and reduce native species
• Spread into native habitats, change ecosystem function, alter composition, or reduce natives
Species that do not persist after cultivation
Species that persist after cultivation but do not spread
Species that spread vegetatively or by seed after cultivation
Species that spread only in human-created habitats
Species that spread into native habitats but do not reduce native species
Species that spread into native habitats and reduce natives
Spread into native habitats, change ecosystem function, alter composition, and/or reduce natives.
Gardening with local ecology in mind
If you would be happy for a week, take a wife (or husband).

If you would be happy for a month, kill a pig.

If you would be happy for all your life, plant a garden.

Chinese Proverb
Generally unhappy people...
Really happy people...
More happy people and who color coordinate with their landscape
Ecologically designed landscapes should create beauty while reducing maintenance by:

- minimizing site disturbance
- choosing the right plant for the right spot
- attempting to recreate natural relationships (i.e., mimicking nature)
- maximizing plant diversity
- employing zeroscaping where possible
Typical questions asked in choosing landscape plant material

- Sun or shade?
- What are the soil type preferences (pH, moisture, etc.)?
- Evergreen or deciduous?
- How large at maturity?
- When does it flower?
- Is it hardy in my area?
- Are any parts of the plant poisonous?
Questions that *should* be asked in choosing landscape plant material

- Is the plant invasive (based on public garden, native plant society, or other conservation organization data)?
- Is it useful or harmful to wildlife?
- Sun or shade?
- What are the soil type preferences (pH, moisture, etc.)?
- Evergreen or deciduous?
- How large at maturity?
- When does it flower?
- Is it hardy in my area?
- Are any parts of the plant poisonous?
- Etc.
Understand your landscape and recognize the need for critter habitat.
Lepidopteran Use of Native & Alien Ornamental Plants

Landscaping paradigms have promoted the use of alien ornamentals over native plants with ornamental value for over a century. The bias toward landscaping with alien ornamentals has been so complete that the first trophic level in suburban/urban ecosystems throughout U.S. is now dominated by plant species that evolved elsewhere. If alien ornamentals are not the ecological equivalents of native species, particularly in their palatability to herbivores that transfer energy to higher-level consumers, herbivore productivity, as well as the biomass of organisms that depend on herbivores will be compromised in landscapes in which alien plants comprise a large portion of the plant biomass.

The following list is our attempt to categorize native and alien plant genera in terms of their ability to support insect herbivores and, by inference, overall biodiversity. We did this by ranking all native plant genera (woody and herbaceous) in terms of the number of Lepidoptera species recorded using them as host plants. Our hope is that this ranking will be used as one of the criteria for plant selections in managed and unmanaged landscapes by restoration ecologists, landscape architects and designers, land managers, and homeowners.

We chose Lepidoptera as surrogates for all insect herbivores for two reasons. Published host plant records for this group of herbivores, though far from definitive, are more complete than are host records for any other taxon of insect herbivores. Moreover, lepidopteran larvae (caterpillars) are disproportionately valuable sources of food for many terrestrial birds, particularly warblers and neotropical migrants of conservation concern. We restricted our search to moths and butterflies that develop on plant genera occurring naturally or planted ornamentally in the mid-Atlantic region of North America (Maryland, Delaware, Pennsylvania, Virginia, Connecticut, Rhode Island, New York, and New Jersey) for two reasons. First, the region is sufficiently diverse in both native and alien plant genera (1385 native genera, 854 native genera, 501 alien genera) and native Lepidoptera species (~3500 species) to reveal robust patterns of host use. Second, most host use records are only specified at the generic level; our early attempts to compare host use of alien and native plants in the same genus were thwarted by a serious lack of information at the species level.
Explore your “ecological address”

It’s as easy as

Your zip code.
My favorite site for information...

www.ncbg.unc.edu
Native Alternatives to Invasive Plants

Invasive Tree
*Quercus acutissima* • Sawtooth Oak
Current Invaded Range: Mid-Atlantic region; Louisiana

Native Alternative
*Quercus imbricaria*
Shingle Oak
Native Habitat and Range: Upland forests and wooded slopes from Pennsylvania to Minnesota, south to North Carolina and Kansas
Hardiness Range: Zones 4 to 8

Ornamental Attributes and Uses
Elegant, laurel-like glossy green foliage sets this oak apart from most others. The broad lance-shaped leaves are not lobed, and their autumn color is mostly russet to brown, sometimes yellow. The bark is smooth in youth and grows furrowed with age. The form is pyramidal when young, becoming rounded with maturity. Use shingle oak as a street tree, shade tree, or screen; it is even suitable for small gardens.

Growing Tips
Plant in rich, moist soil in full sun or light shade. Like most oaks, this species is long-lived and drought tolerant when established. It grows moderately to fast when young and slows with age. An easy oak to transplant, it should be more widely used.

Related Native Alternatives
*Quercus nigra*, water oak, is a larger tree (50 to 80 feet tall) with spatula-shaped semievergreen leaves. The wide crown makes it a perfect shade tree. It is found from New Jersey, south to Florida, and west to the central Mississippi valley and Texas. *Quercus phellos*, willow oak, is another large species, to 80 feet tall and wide, with narrow, willow-like leaves that create a soft, graceful look. It grows from New York, south to Florida, and west to Texas.

Attributes at a Glance
*Quercus imbricaria*
- Pyramidal to round-crowned tree
- 50 to 60 feet tall and 30 to 40 feet wide
- Smooth gray-brown bark when young
- Lance-shaped, unlobed foliage
- Yellow to russet autumn color

More Native Alternatives
For a list of additional native trees, visit www.bbg.org/nativealternatives.
NCBG Exotic Plant Policy

• Possess plant collections that do no harm to natural areas and native plant diversity.

• Protect and restore natural areas by eradicating invasive exotic species.

• Interpret and promote the natural diversity of NC and the Southeast.

• Promote the preservation of native biodiversity.
The Chapel Hill Thesis and Challenge

Do No Harm to Plant Diversity
Do No Harm to Natural Areas

Perform risk assessment for introductions

Remove invasives from plant collections

Control invasives in natural areas

Develop non-invasive and native plant alternatives and certify non-invasiveness for the trade

Do not distribute seeds/plants that will be invasive elsewhere

Educate the public

Become partners with conservation organizations

Obey import rules and enact strong procedures to minimize the risk of introducing disease and pest organisms
## TREATMENT OF INVASIVE PLANTS

The table below serves as a guide to controlling most invasive plants, including species not listed in the invasive plant profiles on the following pages.

<table>
<thead>
<tr>
<th>Habit</th>
<th>Duration</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tree</strong></td>
<td>Deciduous</td>
<td>P seedlings</td>
<td>CP, GD, HS, P</td>
<td>CP, GD, HS, P</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Evergreen</td>
<td>P seedlings</td>
<td>CP, GD, HS, P</td>
<td>CP, GD, HS, P</td>
<td>CP, GD, HS, P</td>
</tr>
<tr>
<td><strong>Shrub</strong></td>
<td>Deciduous</td>
<td>P</td>
<td>CP, P, S</td>
<td>CP, P, S</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Evergreen</td>
<td>P</td>
<td>CP, P, S</td>
<td>CP, P, S</td>
<td>CP, P, S</td>
</tr>
<tr>
<td><strong>Herb</strong></td>
<td>Annual</td>
<td>C, P, S</td>
<td>C, P, S</td>
<td>C, P, S</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Perennial</td>
<td>C, P</td>
<td>C, P, S</td>
<td>C, P, S</td>
<td>CM, P</td>
</tr>
<tr>
<td><strong>Vine</strong></td>
<td>Deciduous</td>
<td>C, CP, P</td>
<td>C, CP, P, S</td>
<td>C, CP, P, S</td>
<td>P</td>
</tr>
</tbody>
</table>

C = Cut, CM = Cardboard & mulch, CP = Cut & paint, GD = Giant
HS = Hack & squirt, P = Pull, S = Spray

Please refer to the next two pages—“Guidelines for Treatment of Invasive Plants”—for descriptions of the control methods listed in the above table.
The Workshop on Linking Ecology and Horticulture
To Prevent Plant Invasions
December 2001
St. Louis, Missouri

St. Louis Declaration

www.mobot.org/iss

FINDINGS AND OVERARCHING PRINCIPLES

VOLUNTARY CODES OF CONDUCT

The Voluntary Codes of Conduct

ELEMENTS OF THE CODES:

- Prevention, risk assessment, regionalism
- Distribution
- Removal
- Non-invasive alternatives
- Public awareness, demand
- Professional training
- Partnerships, databases, communication
- Importation, exportation rules
Voluntary Codes for the gardening public

Voluntary Codes of Conduct for Gardening Public

- Invasive species when you acquire plants. Plant only non-invasive species in your gardens. Work towards and promote new landscape design systems.

- On which species are invasive in your area. Sources could be botanists, conservationists, and government agencies. Remove and replace them with non-invasive species suited to your climate.

- Talk with other gardeners if you know they are species with which you have problems.

- Botanical gardens and nurseries promote, display and sell only non-invasive species.

- Talk with your community and other gardeners in your area through plant clubs and other civic groups.

- Use the media to emphasize the problem of invasive species. Request that garden writers promote only non-invasive species.

- People knowledgeable on the invasive species issue to speak to groups and other community groups.

- Keep information on control of invasive plant species and organize a workshop for invasive plant species under the guidance of knowledgeable people.

- Botanical gardens and natural areas to assist ongoing efforts.

- Early warning systems by reporting invasive species you observe. Your group or agency should be responsible for reports emanating from your area. If an early warning system for such reporting, request that one be established with a 800 number and website links to information about invasive species.
The purposes of the NC-EPPC are:
• To provide a focus for issues and concerns regarding exotic pest plants in North Carolina.
• To facilitate communication and the exchange of information regarding all aspects of exotic pest plant control and management.
• To provide a forum where all interested parties may participate in meetings.
• To promote public understanding regarding exotic pest plants and their control.
• To serve as an advisory Council regarding funding, research, management, and control of exotic pest plants.
• To facilitate action campaigns to monitor and control exotic pest plants in North Carolina.
• To review incipient and potential pest plant management problems and activities and provide relevant information to interested parties.

Board of Directors represent:
- Botanical Gardens and Arboreta
- Conservation Organization
- Allied Industry
- NC Nursery and Landscape Association (NCNLA)
- Landscape Industry/NCLA
- Academia
- Government
- Citizens
### NC Native Plant Society Plants to Avoid

Exotic plant species that have invasive characteristics and spread readily into native plant communities, displacing native vegetation.

#### Rank 1 - Severe Threat

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allantus altissima (Mill.) Swingle</td>
<td>Tree of Heaven</td>
</tr>
<tr>
<td>Albizia julibrissin Durazz</td>
<td>Mimosa</td>
</tr>
<tr>
<td>Alliaria peltata (Bieb.) Cavara &amp; Grande</td>
<td>Garlic-mustard</td>
</tr>
<tr>
<td>Alternanthera philoxeroides (Mart.) Gieb.</td>
<td>Alligatorweed</td>
</tr>
<tr>
<td>Celastrus orbiculatus Thunb.</td>
<td>Asian bittersweet</td>
</tr>
<tr>
<td>Elaeagnus angustifolia L.</td>
<td>Russian olive</td>
</tr>
<tr>
<td>Elaeagnus umbellata Thunb.</td>
<td>Autumn olive</td>
</tr>
<tr>
<td>Hedera helix L.</td>
<td>English ivy</td>
</tr>
<tr>
<td>Hydrilla verticillata (L.f.) Royle</td>
<td>Hydrilla</td>
</tr>
<tr>
<td>Lespedeza bicolor</td>
<td>Bicolor lespedeza</td>
</tr>
<tr>
<td>Lespedeza cuneata (Dum.-Cours.) G. Don</td>
<td>Sciricea lespedeza</td>
</tr>
<tr>
<td>Ligustrum sinense Lour.</td>
<td>Chinese privet</td>
</tr>
<tr>
<td>Lonicera fragrantissima Lind. &amp; Paxton</td>
<td>Frequent honeysuckle</td>
</tr>
<tr>
<td>Lonicera japonica Thunb.</td>
<td>Japanese honeysuckle</td>
</tr>
<tr>
<td>Microstegium vimiticum (Trin.) A. Camus</td>
<td>Japanese stiff grass</td>
</tr>
<tr>
<td>Murdannia keisak (Kassak.) Hand.-Ataz.</td>
<td>Asian spicerwort</td>
</tr>
<tr>
<td>Myriophyllum aquaticum (Vell.) Verdc.</td>
<td>Parrotfeather</td>
</tr>
<tr>
<td>Paulownia tomentosa (Thunb.) Sieb. &amp; Zucc. ex Steud.</td>
<td>Princess tree</td>
</tr>
<tr>
<td>Persicaria perfoliata (Linnæus) H. Gross (=Polygonum perfoliatum L.)</td>
<td>Mile-a-minute vine</td>
</tr>
<tr>
<td>Phragmites australis (Cav.) Trin. ssp. australis</td>
<td>Common reed</td>
</tr>
<tr>
<td>Phyllostachys aurea (Cav.) M. F. ]</td>
<td>Bradford pear</td>
</tr>
<tr>
<td>Pueraria montana (Lour.) Merr.</td>
<td>Kudzu</td>
</tr>
<tr>
<td>Rosa multiflora Thunb.</td>
<td>Multiflora rose</td>
</tr>
<tr>
<td>Salvinia molesta Mitchell</td>
<td>Aquarium water-moss</td>
</tr>
<tr>
<td>Vitex rotundifolia L.f.</td>
<td>Beach vitex</td>
</tr>
<tr>
<td>Wisteria sinensis (Sims) DC.</td>
<td>Chinese wisteria</td>
</tr>
</tbody>
</table>

*Highlighted plants were added Aug 2010*

www.ncwildflower.org
Print, fold, and carry
Some native plants for the landscape
Butterfly Milkweed
(*Asclepius tuberosa*)
Rosinweeds (*Silphium* spp.)
Climbing Aster (*Ampelaster carolinianus*)
Scarlet Calamint or Scarlet Wild Basil
(*Clinopodium coccineum*)
Black-eyed Susan (*Rudbeckia hirta*)
Tickseed (*Bidens aristosa*) for the moist ditch in front of your house...
Prickly-pear (*Opuntia* spp.)

Spanish Bayonet or Adam’s Needle
(*Yucca filamentosa*).
Eastern aromatic aster (*Symphyotrichum oblongifolium*)
Maryland Golden-aster
(*Chrysopsis mariana*)

Coneflowers
(*Echinacea* spp.)
Baptisia species and hybrids – various colors, from blue to white
Curleyheads *(Clematis ochroleuca)*
North Carolina state wildflower – Carolina lily
(Lilium michauxii)

New England aster
(Symphotrichum novae angliae)
Downy phlox (*Phlox pilosa*)

Southern Sundrops (*Oenothera fruticosa*)
Wild Quinine (*Parthenium integrifolium*)

Blazing-star (*Liatris* spp.)
Vines

Crossvine (*Bignonia capreolata*)

Coral honeysuckle (*Lonicera sempervirens*)
Native grasses:
Big Bluestem (*Andropogon gerardii*)
Little Bluestem (*Schizachyrium scoparium*)
Switchgrass (*Panicum virgatum*)
Plume grass (*Saccharum giganteum*)
Indiangrass (*Sorghastrum nutans*)
Hairgrass (*Muhlenbergia capillaris*)
River oats (*Chasmanthium latifolium*)

And many others...
Goldenrods (*Solidago* spp.), frost aster (*Symphyotrichum pilosum*), and Indian grass (*Sorghastrum nutans*)
Pinkster flower (*Rhododendron periclymenoides*)
Mountain Holly
(*Ilex montana*)

Hearts-A-Bustin’
(*Euonymous americanus*)
Viburnum species
(*Viburnum dentatum*, *V. acerifolium*, and *V. rufidulum*)

Mountain laurel
(*Kalmia latifolia*)
This is not the end, but the beginning of our new exhibit!

Please join us in the Elenor Pegg Exhibit Hall for a reception with “United by Art”