

# Nurseries and the Spread of Exotic Invasive Plants

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# Objectives:

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1. Explore reasons why Exotic Invasive Species (EIS) are sold at nurseries
2. Identify commonly cultivated EIS in nurseries and landscapes
3. Review the “Voluntary Code of Conduct” for nurseries regarding EIS
4. Acknowledge the recent efforts and successes of nurseries to market native plants

# South Carolina and North Carolina Nurseries

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Nursery	Native Plants/ Total Plants	Percent Native Plants	# of Exotic Invasive Plants
LCN	14/87	16%	4
CNF	13/56	23%	7
SGP	30/76	39%	3
WWN	24/54	44%	3
BEN	73/84	87%	3
BWN	37/112	33%	11
ST	15/31	48%	2



# Commonly Grown Exotic Invasives

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- Pampas Grass *Cortaderia sellowana*
  - Bradford Pear, *Pyrus calleryana* 'Bradford'
  - Chinese Privet, *Ligustrum sinense*
  - English Ivy, *Hedera helix*
  - Japanese Barberry, *Berberis thunbergii*
- 
- Maiden Grass, *Miscanthus sinensis*
  - Heavenly Bamboo, *Nandina domestica*



- The United States suffers from \$100-120 billion per year in economic losses due to exotic, invasive species
- Approximately 42% of Threatened or Endangered species are at risk due to non-native, invasive species

-Center for Invasive Species and  
Ecosystem Health, UGA



UGA1261004



- Songbird populations are negatively impacted by exotic landscape plantings
- Native insects are often host-specific and require particular plant species for food



Impact of Native Plants on Bird and Butterfly Biodiversity in Suburban Landscapes. K.T. Burghardt, et al. Conservation Biology.



# Impact of Horticulture Industry

- 3500 exotic species have escaped cultivation in the United States
- 10 percent of those species are highly invasive
- Half of these species were introduced for horticulture





# Why are EIS available in nursery trade?

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1. Not aware of invasive potential
2. Consumer demand
3. Uniformity in the nursery and landscape
4. Familiar
5. Hardy; can thrive in most landscape soils and sites
6. Fast-growing
7. Easy to propagate







# Variegated Chinese Privet

*Ligustrum sinense*  
'Variegata'

Wholesale  
production nursery  
in South Carolina





*Ligustrum  
sinense*

James Island,  
South Carolina





*Ligustrum  
sinense*

Wood line of a  
wholesale nursery in  
Red Top,  
South Carolina



# University of Georgia Football Stadium





# "Between the Hedges"

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*"Now that Olympic soccer is over, the secret home of the hallowed hedges is revealed."*



University of Georgia  
Football Stadium

*Ligustrum sinense*







# Exotic Invasive Species:

Any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem; and whose introduction does or is likely to cause economic or environmental harm or harm to human health.

-Center for Invasive Species and Ecosystem Health  
University of Georgia





At least 102 Commonly Sold  
Nursery Plants are on the List of  
Exotic Invasive Plant Species



If these plants are known to be  
EIS, why are they still  
produced and sold?

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# Commercial Nursery Plants

- Bred for uniformity, large flowers, compact size, pest resistance
- Must be able to thrive in an artificial environment
- Must mature quickly
- Must be able to withstand shipping and transplant





Consumers want to know what to expect.





Consumers take comfort in what they already know.





Consumers are trained to expect perfection.





Consumers do not understand blemishes or defects.





Consumers want uniformity.





The nursery industry has responded to consumer demand.





# Nursery Shipping Dock









# *Invasive Plants of the 13 Southern States\**

## COMMONLY SOLD IN NURSERIES

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Akebia quinata	Lonicera fragrantissima
Clematis ternifolia	Mahonia bealei
Euonymus fortunei	Nandina domestica
Hedera helix	Phyllostachys aurea
Vinca major	Spiraea japonica
Vinca minor	Koelreutaria elegans
Berberis thunbergii	Paulownia tomentosa
Elaeagnus pungens	Poncirus trifoliata
Euonymus alatus	Pyrus calleryana
Lantana camera	Quercus acutissima
Ligustrum japonicum	Cyperus involucratus
Ligustrum lucidum	Miscanthus sinensis
Ligustrum sinense	Ajuga reptans
Pinus thunbergiana	Foeniculum vulgare
	Iris pseudacorus
	Liriope muscari
	Nepeta cataria
	Xanthosoma sagittifolium



\*Miller, J.H., E.B. Chambliss and C.T. Bargeron



# Voluntary Code of Conduct for Nursery Professionals

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St. Louis Declaration on Invasive Plant Species  
February 2002 (revised April 2002)



1. Ensure that invasive potential is assessed prior to introducing and marketing plant species new to North America. Invasive potential should be assessed by the introducer or qualified experts using emergency risk assessment methods that consider plant characteristics and prior observations or experience with the plant elsewhere in the world. Additional insights may be gained through extensive monitoring on the nursery site prior to further distribution.

A green square containing a white letter X.



2. Work with regional experts and stakeholders to determine which species in your region are either currently invasive or will become invasive. Identify plants that could be suitable alternatives in your region.



X



# Marketing time determines naturalization rates of horticultural plants.

Pemberton, Robert and Hong Liu, University of Florida

Ecology Magazine May 6, 2008



## TROPICAL PLANTING BOOK

### FRUIT TREES AND PLANTS, continued

**Fig. HW.** One of the most delicious fruits, which does well along the Gulf Coast. In the presence of nematodes, care must be taken (preferably of stones or brick-bats) in planting close up to buildings under which they are often found. Another excellent plan for growing this is the following: Make ridges in mucky soil, the surface is above high water. Set Fig trees and fertilize with chemical fertilizers and use cyanamide before setting.

After this year only three time-tried varieties, each, \$3.50 for 10.

Fruit large, dark violet in color; flesh very strong grower and prolific fruiter.

Called "Sugar Fig," as its fruit is so very small fruit, brownish yellow, borne in profusion.

Lemon-colored fruit, ripening early.

**PECAN. Pecan. HW.** Pecan nuts form a staple crop in the South and fine, large nuts.

The industry is a safe one in the proper part of South has an immense area of excellent pecan trees. In South Florida select good soil with yellow or chocolate subsoil, and give good manure. Price of standard size, 4 to 5-ft. trees, \$4 for 10, \$125 per 100.

These are the very best for South Florida planting, bearing and quality. Medium in size with shell and full, plump, yellow kernel of rich, nutty flavor.

**FROTSCHER.** This is doing very well in South Florida,

**LITCHI CHINENSIS. Litchie Fruit. ST.** Native to China. A tree of medium growth with dense, very handsome foliage. While the fruit of the ordinary kinds is of small size and mediocre, our stock is from the finest strain of large-fruited improved sorts, layered from fruiting trees. The fruit hangs in clusters, having a thin, roughened, tough skin-like rind, of a brilliant red color when ripe, and the translucent white flesh is firm and jelly-like in consistency and of exquisite refreshing flavor. This promises to be one of the most prominent fruit crops of the state, both because of its popularity with those to whom the fruit is familiar and also because the tree is hardier than the mango—about like the lemon. Set on moist, acid soil. P. \$3 each; seedlings, \$2 each.

**MACADAMIA TERNIFOLIA. Queensland Nut. T. Australia.** Moderate-sized tree, about 40 feet high, with dense, prickly dark green foliage somewhat resembling chestnut. The hard-shelled round nuts have solid "meats" that are very rich and oily and of most delicious flavor. It has borne at several points in the state. P. 50 cts. each, \$4.50 for 10; \$35 per 100; extra-large, \$1 each, \$9 for 10.

**MANGIFERA INDICA. Mango. T.** One of the most important tropical fruits for South Florida. We have been importing the delicious East Indian varieties for years, and we were the first to introduce these in Florida, beginning in 1837. All sorts named are East Indian varieties of exceptional value, almost or entirely devoid of fiber. These should be planted everywhere in South Florida (and of course in the Tropics generally); in Florida in protected spots or else protected as per suggestions on second cover.

Nothing compares with the improved Mango for table use, and even one tree is worth a lot of trouble to grow, as grafted



# Royal Palm Nursery Catalog 1886-1930

1909 non-native species

15% naturalized (286)



## TROPICAL PLANTING BOOK

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Large, dark violet in color; flesh very juicy grower and prolific fruiter.

"Sugar Fig," as its fruit is so very sweet, brownish yellow, borne in profusion.

Colored fruit, ripening early.

**Pecan.** **HW.** Pecan nuts form a staple crop in the South and fine, large nuts for the nut industry is a safe one in the proper soil. In an immense area of excellent soil. In South Florida select good soil or chocolate subsoil, and give them plenty of water. Price of standard size, 4 to 5-ft. \$125 per 100.

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Doing very well in South Florida.

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China. A tree of medium growth with very handsome foliage. While the fruit of this kind is of small size and mediocre, our stock is of the finest strain of large-fruited improved sorts of fruiting trees. The fruit hangs in clusters, with a roughened, tough skin-like rind, of a brilliant red when ripe, and the translucent white flesh is firm and of consistency and of exquisite refreshing flavor. It is to be one of the most prominent fruit crops of the future because of its popularity with those to whom the fruit is new and also because the tree is hardier than the orange and like the lemon. Set on moist, acid soil. P. \$3.50 each, \$2 each.

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The most important tropical fruit of South Florida. We have been importing the Indian varieties for years, and we were the first to introduce them in Florida, beginning in 1887. All sorts named in the catalog are varieties of exceptional value, almost or entirely without fiber. These should be planted everywhere in Florida (and of course in the Tropics generally); in Florida spots or else protected as per suggestions on each variety.

Nothing compares with the improved Mangos and even one tree is worth a lot of trouble to grow.

Strong relationship  
between number of years  
marketed and  
naturalization rate



# Marketing Period and Naturalization

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Years Marketed	Naturalization Rate
6.8	Not likely to naturalize
15.5	15%
30+	70%

Pemberton and Liu, 2008



# Naturalization by Plant Type

Plant Type	Naturalization Rate
Aquatic Herbs	36.8%
Vines	41%
Pan-tropical Distributions	42%
Asian-African Distributions	42%

High naturalization rates:

Apocynaceae (Dogbane)  
Convolvulaceae (Morning Glory)  
Moraceae (Fig)  
Oleaceae (Olive)  
Verbenaceae (Lantana)



# *Invasive Plants of the 13 Southern States\**

## COMMONLY SOLD IN NURSERIES

*Akebia quinata*

*Clematis ternifolia*

*Euonymus fortunei*

*Hedera helix*

*Vinca major*

*Vinca minor*

*Berberis thunbergii*

*Elaeagnus pungens*

*Euonymus alatus*

*Lantana camera*

*Ligustrum japonicum*

*Ligustrum lucidum*

*Ligustrum sinense*

*Pinus thunbergiana*

*Lonicera fragrantissima*

*Mahonia bealei*

*Nandina domestica*

*Phyllostachys aurea*

*Spiraea japonica*

*Koelreutaria elegans*

*Paulownia tomentosa*

*Poncirus trifoliata*

*Pyrus calleryana*

*Quercus acutissima*

*Cyperus involucratus*

*Miscanthus sinensis*

*Ajuga reptans*

*Foeniculum vulgare*

*Iris pseudacorus*

*Liriope muscari*

*Nepeta cataria*

*Xanthosoma sagittifolium*



\*Miller, J.H., E.B. Chambliss and C.T. Bargeron



3. Develop and promote alternative plant material through plant selection and breeding.





# *Wisteria frutescens* 'Amethyst Falls'



- Only Wisteria sold by most nurseries
- Flowers on new growth



# *Taxodium distichum* 'Shawnee Brave'



- 2004 Theodore Klein Plant Award Winner
- Narrow pyramidal growth habit
- Suitable for some urban landscapes



# *Ilex vomitoria* 'Pendula'



- Attracts birds to the garden
- Evergreen with salt tolerance
- Weeping habit



# *Juniperus virginiana* 'Brodie'





# *Spartina bakeri*



- Great for use in marshy areas and in ditches
- Native coastal grass
- Gaining popularity with landscapers and architects



# *Muhlenbergia capillaris*



- Wildly popular
- Easy to grow
- At some nurseries, the number one seller



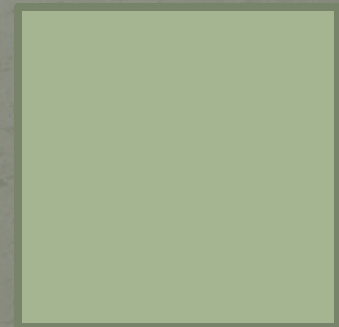
# *Rhapidophyllum hystrix*



- Very cold hardy
- Readily available in nursery trade
- Sun or shade



4. Where agreement has been reached among nursery associations, government, academia and ecology and conservation organizations, phase-out existing stocks of those specific invasive species in regions where they are considered to be a threat.



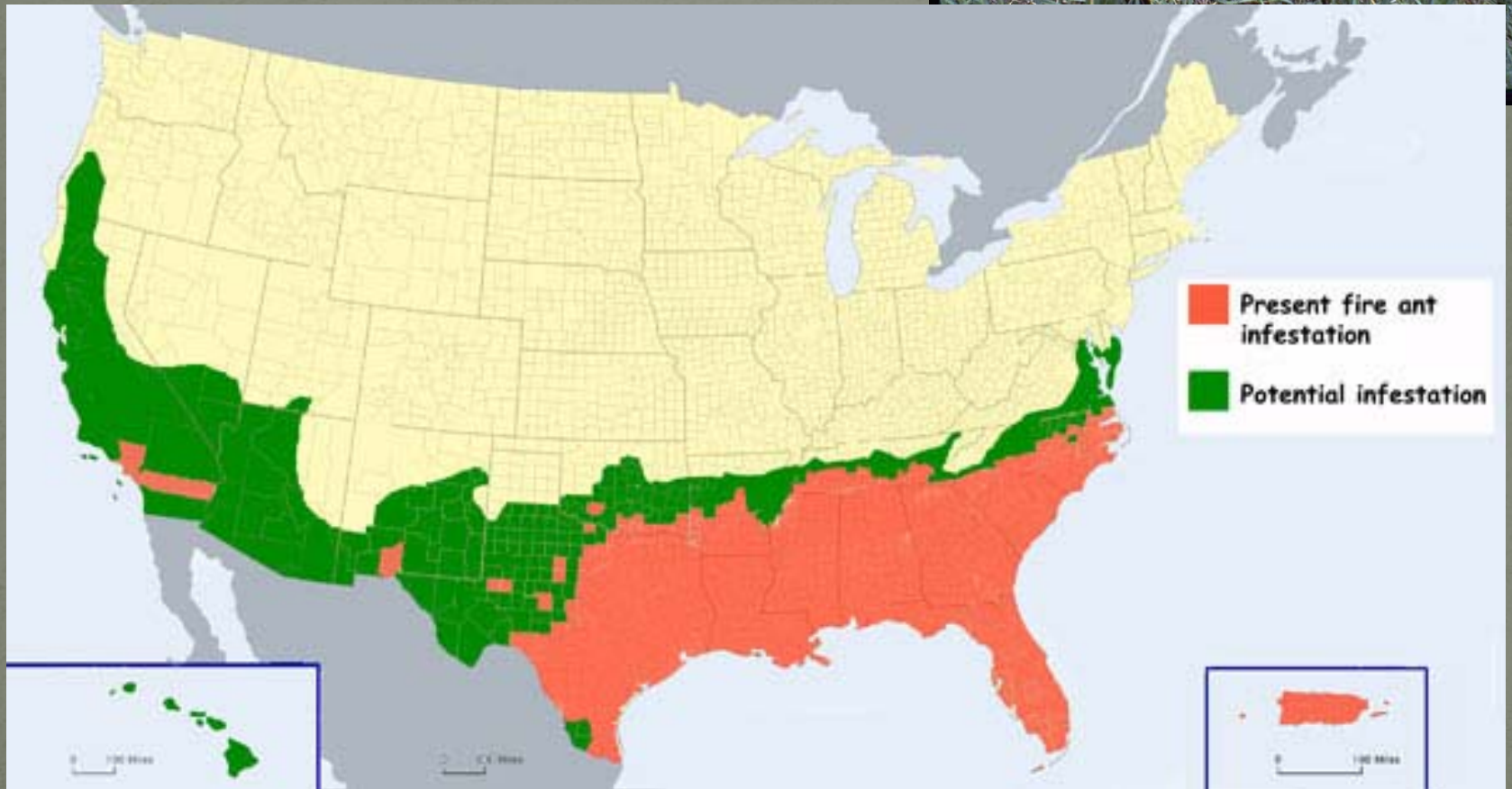


5. Follow all laws on importation and quarantine of plant materials across political boundaries.





# Imported Fire Ant





# Imported Fire Ant Quarantine

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- USDA maintains quarantine against unregulated transport of soil or soil-containing items from IFA-infested areas to uninfested areas
- Sod and nursery stock within quarantined areas must have appropriate inspection certificates
- Follow guidelines issued by USDA for treatment



# Sudden Oak Death

Fungus Spread on Nursery Plants from a Nursery in California to the Southeast



Legislation was passed that requires all plants to be tagged with the name and address of where it was grown.

Nurseries figured out how to accommodate this requirement.



6. Encourage customers to use, and garden writers to promote, non-invasive plants.







“Improving Sustainability in the Nursery Industry”

“Native Alternatives to Invasive Plants”

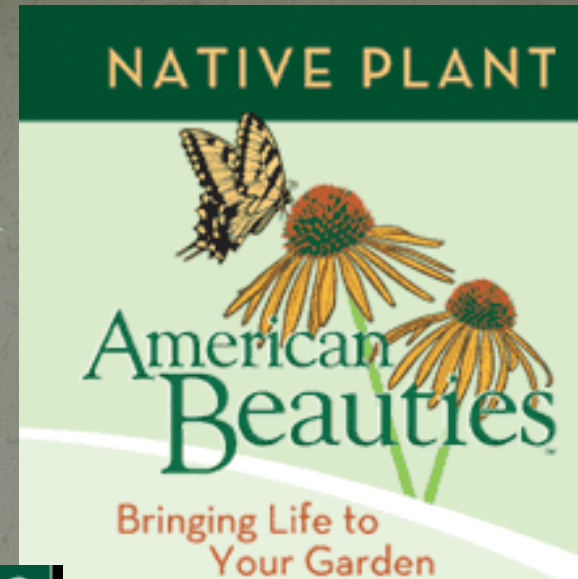
## Monrovia introduces Dan Hinkley Collection

The first items in Monrovia's new [Dan Hinkley collection](#) will be available in early summer 2009. The collection has seven exclusive and semi-exclusive varieties, including a frost-hardy *Abutilon*, four fuchsia, a winter-hardy *Disporopsis* and a red-leafed *Mukdenia*. Dan Hinkley is a renowned plant-hunter and founder of Heronswood Nursery. His collaboration with Monrovia focuses on exotic plants that do not possess the potential for bio-invasiveness.



# American Beauties

- Cooperative partnership between the National Wildlife Federation, North Creek Nurseries and Prides Corner Farms
- Marketing a selection of plants native to the Northeastern US
- Grouped into 4 categories – bird, butterfly, dry shade and moist sun gardens
- Portion of each sale goes to the NWF





NATIVE PLANT



Bringing Life to  
Your Garden



## New England Aster

*Aster novae-angliae*  
'Purple Dome'



NATIVE PLANT



# Wild Ginger

*Asarum canadense*



NATIVE PLANT



## Butterfly Weed

*Asclepias 'Hello Yellow'*

### **BENEFITS:**

Nectar and sometime host plant for monarch butterflies

Great nectar source for many other butterflies

Thrives in sun in average or dry soil

Deer resistant



# Why Choose American Beauties Native Plants?

- Adapt to our soils and climate
- Attract birds and butterflies
- Offer food and shelter for many species all year long
- Are rewarding for you and your landscape critters
- Benefit the educational programs of the National Wildlife Federation
- Require less care and watering when established
- Thrive with less fertilizer and disease control
- Provide carefree beauty
- Solve landscape problems that many non-natives can't
- Make it easy to be successful in the home landscape



The consumer must have confidence that they will succeed and the plants will live.

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# What do homeowners want?

“I don’t like to do yard work so it needs to be low maintenance. I don’t like things that lose their leaves. I would like for most of the plants to have flowers. Yes, flowers all year long.

Did I mention that I have a black thumb?”

- Crape Myrtle
- Ligustrum
- Azalea
- Liriope
- Flowers
- Palmettos



# Why these plants?

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- They are familiar with them
- Memories/emotions
- Easy to grow
- They see them in their neighbor's landscapes





How can we influence change in the  
Green Industry?

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Encourage and fund breeding programs that focus on developing seedless/fruitless cultivars





Encourage and fund breeding programs that focus on native plant cultivars



# Encourage interdisciplinary programs at universities between departments of Ecology, Horticulture and Landscape Architecture





Educate and inform consumers and  
Green Industry about invasive and  
potentially invasive plants







80% of consumers would not purchase a plant if they knew it was invasive

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Pennsylvania State University, Department of Horticulture



# Directly inform the consumer at point of purchase

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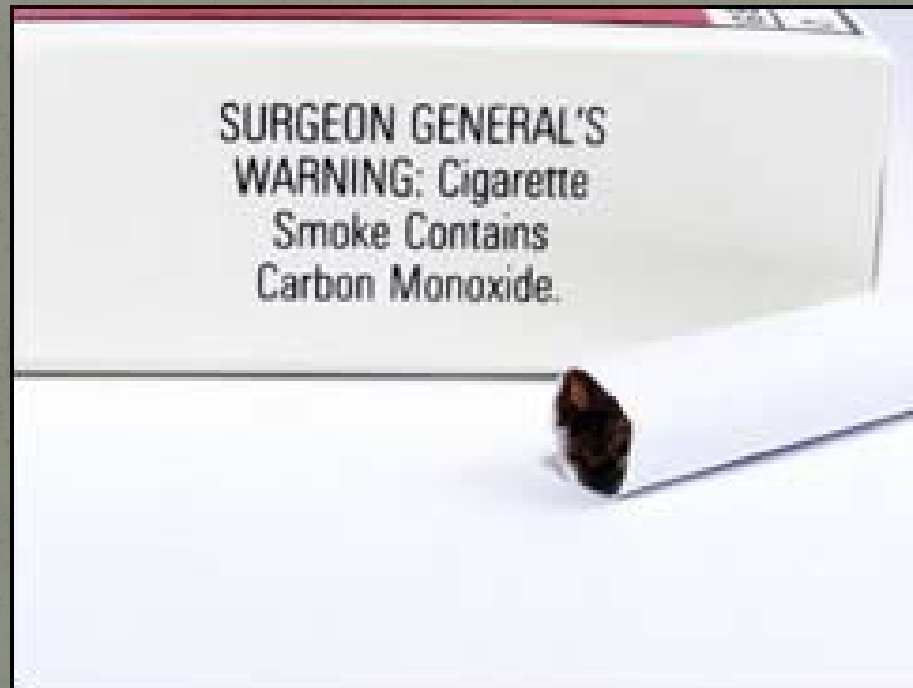
- Provide information about invasiveness
- Inform consumer of the need for native plants and habitats
- Explain how EIS impact native populations
- List native/non-invasive alternatives with similar growth characteristics





Tax the sale of invasive plants to offset  
the taxpayer burden of managing these  
plants

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# "If you knew better, you'd do better"

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My pledge:

- Lecture at state landscape and nursery conferences
- Lecture at local level
- Work with the South Carolina Nursery Association (SCNLA) to phase out EIS
- Educate my clients and encourage them to use appropriate alternatives





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