

## Going native: The best choice for trees?

### **Perception #1: Loss of biodiversity due to nonnative species**

### **Perception #2: Only native species can fill ecological roles**

### **Perception #3: Natives are superior to introductions**

- adaptation to local environment
- reduced maintenance
- integration with other species
- sense of place

**Research question:** Do native and nonnative trees differ in how they affect community diversity?

### **Study parameters**

- Peer-reviewed scientific articles
- “Urban” settings
  - Private residences & residential streets
  - Botanical gardens & public parks
  - Remnant natural areas
  - Golf courses
- Exempt: ecological restoration sites, geographically isolated areas

### **Plant biodiversity**

- Older trees important for epiphytic species: bark is thick and coarse
- Compared to forest interiors, edge habitats are richer in total species and forest specialists
- Edges act as refuges for rare and endangered species
- Home gardens and other cultivated areas serve as refuges for endangered and vulnerable plant species.

### **Bird biodiversity**

- Urbanization favors omnivorous, carnivorous, granivorous, and cavity nesting species
- Gardens provide fruit and nectar; forests provide mostly seed
- Urban areas have wide range of resources
- Negatives: lawns, lack of water, lack of protection for ground nesters or foragers
- Native fruit-eating birds can increase invasive species over native relatives

### **Insect biodiversity**

- Many native pollinators have become dependent on introduced plants as their native hosts disappeared.
- Community, botanical, and residential gardens support a wide diversity of insects (especially pollinators).

### **Pest insects**

- Resistance of introduced trees to pests often the same as or greater than natives
- Damage higher in natural forests than urban or ornamental settings
- Generalists can feed on plants in several families – nativeness doesn't matter

### **Animal biodiversity**

- Introduced tree species, including invasives, can meet and diversify habitat needs.
- Richness and diversity of animal species enhanced by:
  - Habitat structure – BIMR
  - Larger and/or connected sites – BIM
  - Older, larger trees – BIMR
  - Hollow trees – IMR
  - Woody debris - R
  - Moderately disturbed sites – B
  - Profusely flowering species with seasonal diversity – I
  - Permanent water source – I
  - Herbaceous/grass cover – MR
  - Native vegetation – specialists only

### **The rationale, revisited:**

- Definitions of native and alien are value judgments.
- Not all introduced species are invasive.
- Urban areas are not natural.
- Native species often not adapted to urban conditions.
- Introduced species provide ecological benefits.
- Vegetation diversity, structure and function more important to biodiversity than nativeness.
- Mandating native trees in urban areas is not a science-based policy.

## Utilize introduced species to enhance ecosystem biodiversity

### **Selection strategies: tree surveys**

- Age distribution
- Percent canopy cover
- Size distribution
- Species diversity

### **Selection strategies: comparing urban to native sites**

- Air pollution
- Drought
- Heat
- Light
- Salt
- Soils
- Pests and disease

### **Selection strategies: diversifying palette - identify needed roles in plant community**

- food value
- nesting value
- structural diversity
- species diversity - natives & nonnatives

### **Selection strategies: predicting invasiveness (Reichard and Hamilton, 1997):**

- non-vegetatively reproducing trees
- hybrids
- slow-growing species from noninvasive taxonomic groups

### **Management strategies:**

- Plant alternative resources before removing invasive species utilized by native birds
- Remove invasive species favored for nesting during the winter
- Maintain a vertically-diverse assemblage of trees, shrubs, and groundcovers to enhance vegetation structure.
- Protect middle-aged trees to ensure they become old trees
- Plant trees in diverse groups rather than as isolates or monocultures
- Enhance vegetation at landscape edges ("buffer strips") – and leave alone
- Maintain deadwood and other nesting structures in place when possible
- Reduce managed, open lawns when possible
- Protect quality of surface waters
- Reduce soil compaction with organic mulch
- Adopt less intrusive practices

### **Special situations: golf courses out-of-bounds areas similar to forests outside courses**

- Large percentage of edge
- Increase deciduous and coniferous tree cover
- Vegetate around water
- Reduce amount of highly managed turf

### **Special situations: residential**

- Educate property owners as to how well-managed gardens and landscapes contribute to urban biodiversity

### **Beyond arboriculture**

- Science-informed decision-making must occur in planning and design of urban green spaces
- Cannot overemphasize the importance of edge habitat in enhancing biodiversity across the board
- Urban areas are not natural ecosystems – natives-only policies reduce biodiversity
- Non-native trees species have demonstrated value in storing carbon, supporting biodiversity, and enhancing urban landscapes
- Residential and public greenspaces with noninvasive, introduced species support biodiverse communities
- Neighborhood well-being positively associated with species richness, abundance of birds, and vegetation cover

### For more information:

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