

**The Importance of Local Ecotypes
&
The Role of Seed Banks and Seed
Networks in their Conservation**



What is Biodiversity?



**Why is Biodiversity
important?**

What is a species?

Horticultural/Taxonomic approach

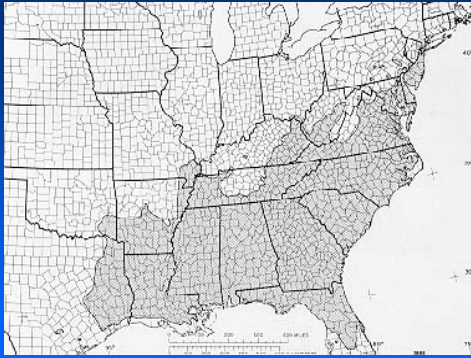
Set of **defined and measurable physical attributes**:

- Flower structure
- Plant height, flower color, leaf shape, etc.

Defined **Range**

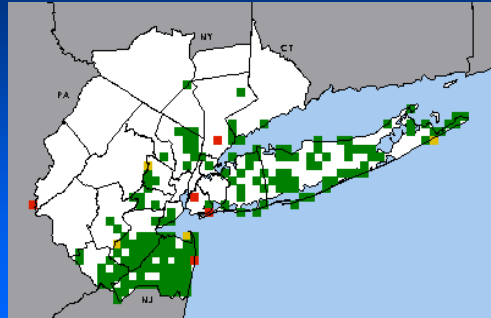
Example

Ilex opaca Aiton.
American holly. Bushy shrub or small tree to 15m; lvs evergreen, coriaceous, elliptic to oblong or ovate, 5-10 cm, tipped with a stout spine, and usually with 2-several strongly salient, spine-tipped teeth on each side; fls mostly 4-merous, the staminate in peduncled clusters; fr 8-10mm, bright red (yellow); nutlets grooved on the back; 2n=36. **Sandy soil near the coast from Mo. To Md.; widely distributed in the s. states from Va. To Ky. and s. Mo., s. to Fla. And Tex. May, June.**
Gleason and Cronquist 1991



Range of *Ilex opaca* Aiton.

Range in Greater NYC Region



Populations locally adapt to:

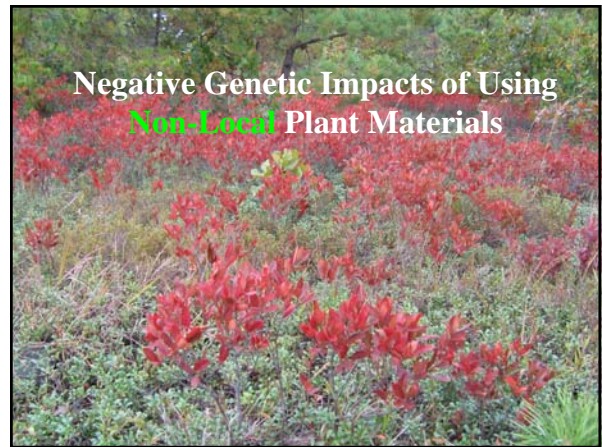
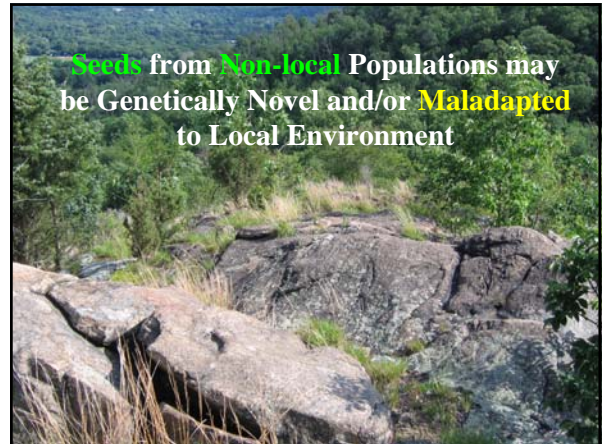
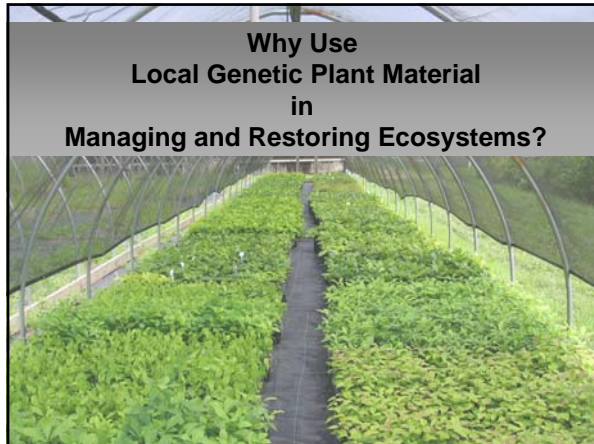
- Climatic conditions
- Soil conditions
- Other environmental conditions



Local plants have co-evolved with:

- Pollinator species
- Seed disperser species
- Predators and Diseases
- Other plant species







Protocols

We need to develop protocols for ecological restoration projects that offer guidelines for:

- how to avoid these genetic consequences
- how to select source material for our work

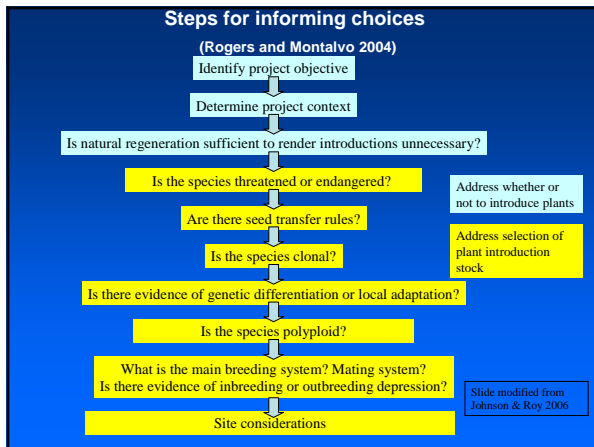
Seed Transfer Zones Concept

- Regions within which plants can be moved with little or no consequence for plant population fitness.
 - For groups of plants (where possible)
 - For individual species

Genetically Appropriate Choices for Plant Materials to Maintain Biological Diversity.

Deborah L. Rogers and Arlee M. Montalvo
 USDA Forest Service. 2004

<http://www.fs.fed.us/r2/publications/botany/plantgenetics.pdf>



Other Methods are Being Devised to Assist in Making Choices

- A 'Rapid Assessment' method (Johnson and Roy) is being devised that may prove useful
- Uses data and generalizations
- Must recognize limitations and course nature of generalizations based on life history
- Some regions are amassing data and looking at patterns in many plant species for defined area (See Native Seed Network web site)

Species Status and On-site/Nearby Extant Population Size	Freedom Breeding System	
	Selfing	Outcrossing
Sensitive species or hybridization issues Small population	DP	DLP
Sensitive species or hybridization issues Large population	DP	DLP
Non-sensitive species, no hybridization issues Small population	DP	DLP
Non-sensitive species, no hybridization issues Large population	DP	DLP
Reintroduction species not extant on site or nearby	NP	NP

Genetic Effects Rapid Assessment Matrix

Matrix tracks two issues: success on site and potential for undesirable genetic effects

Success on site

Genetic effects on site

Codes:
 DP = Distance problematic
 DLP = Distance less problematic
 NP = Distance not problematic
 - or + → lesser or greater likelihood for problems

Slide modified from Johnson & Roy 2006

- ### Conservative Approach
- Until these protocols are developed at the local and regional levels, a conservative approach to providing genetic stock for ecological restoration projects is warranted.
 - Use of local ecotypes
 - From extant population at project site
 - From neighboring population(s)
 - From translocated ecotypes as a last resort



Millennium Seed Bank Project and the Seeds of Success Program



Mission:

- Collect and conserve 10% of the world's seed-bearing flora, over 24,000 species, by 2010
- Carry out research to improve all aspects of seed conservation
- Make seeds available for research and species re-introduction
- Encourage plant conservation throughout the world by facilitating access to and transfer of seed conservation technology

Seeds of Success Program

- SOS is an interagency program coordinated through the Plant Conservation Alliance, that supports and coordinates seed collection of native plant populations to increase the numbers of species and the amount of seed that is available for use in stabilizing, rehabilitating and restoring lands in the United States.
- SOS maintains a partnership with Millennium Seed Bank to coordinate U.S. collections for MSBP).



Seed Collection and Seed Banking at the GNPC



REGIONAL ACTIVE SEED BANK

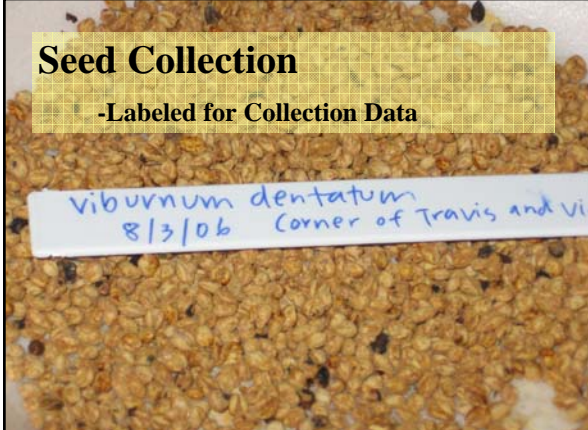


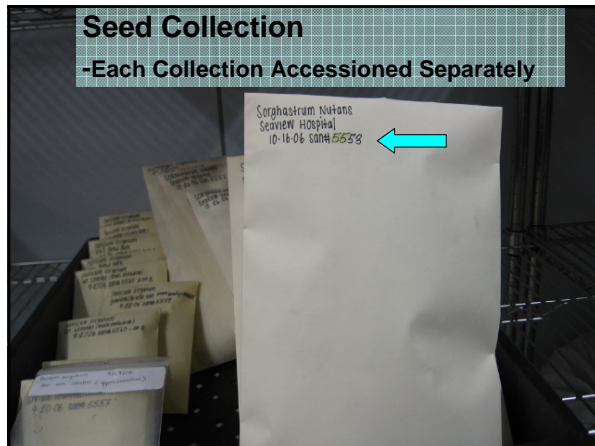
- Wild-collected seed
- Collected for genetic diversity (To avoid founder effects, etc.)



Seed Collection

- Labeled for Collection Data



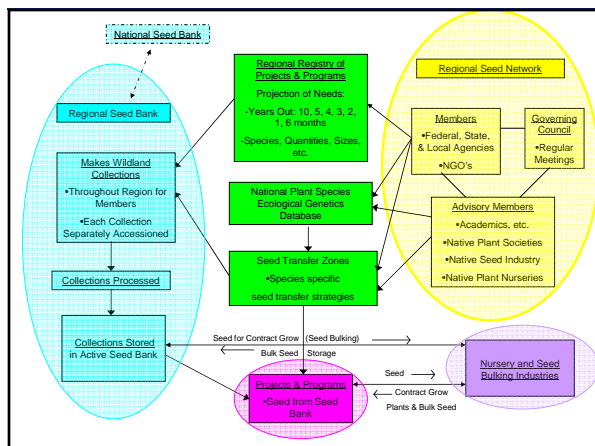


Can Regional Seed Banks and Seed Networks Answer the Need for Local Source Seed?

- **Seed Networks:** Regional Cooperative Entities formed to address the issues and meet the needs for local seed for local projects.

A WORD ABOUT SEED NETWORKS

- **Education**
- **Regional and Local Sharing of Information and Resources**
 - **Collaboration** on Development of Protocols
 - **Coordination and Collaboration on Research** on Seed Transfer Zones;
- **Sharing of seed resources based on protocols**



Need for a Nation-wide Network of Regional Active Seed Banks

- **Regional and Local Seed Banking**
- **Networking/Coordination**
- **Important Resource for responding to climate change**
- **For establishing seed transfer protocols and for collaborative research**

Thank you!

