

Woody Ornamental Plants
HORT 306 Fall 2011



**Plant Development
 & Genetic Variation**

Reading Assignments

Pages 35 and 58 - 62 in
**Landscape Plants For Texas And
 Environs, Third Edition**

Life Cycle of Woody Plants

- **Seedling**
 - Exponential growth rate, emphasis on root establishment and competition for sunlight
- **Youth**
 - Rapid growth, little flowering, immature morphology, few years to decades
- **Maturity**
 - Emphasis on seed production, more spreading habit, slower growth rate, few to thousands of years
- **Senescence**
 - Dieback, declining vigor, few to many years
- **Death**
 - Ceasing of life functions, collapse and decay



Celosia cristata
Example



Note the wide variation in growth habit, size, foliage, and flower structures present within *C. cristata*

Genetic Variation

- **Genotype x environment interaction**
 - Genotype sets potential for traits, environment modifies expression
 - Removing genotype from ecological community
 - Relative competitiveness of given genotype may change with different environment
- **Sources of genetic variation**
 - Mutations, genetic segregation, & recombination
 - With environmental selection get evolution
 - Intervention by people results in cultivars
- **Intrinsic Variation = within the species**
- **Extrinsic Variation = outside the species**



Types of Intrinsic Variation

- **Ecophenic or Non-genetic**
 - **Phenotypic plasticity**
 - Response to environment not under genetic control
 - Sun versus shade leaves
 - Smaller fruit on dry site
 - **Not heritable**
 - **Reciprocal transplant studies**
 - Is trait stable in different environments?
 - Ecotype versus Ecophene



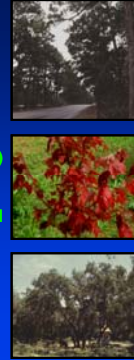
Genetic Variation

- **Heteroblastic Change**
 - Juvenile to mature phase change
 - Seasonal heteromorphism
- **Mutations**
 - Alterations in genetic code
- **Chromosomal Variations**
 - Haploid, aneuploidy, polyploidy
- **Non-adaptive Variation**
 - Not associated with environmental factor



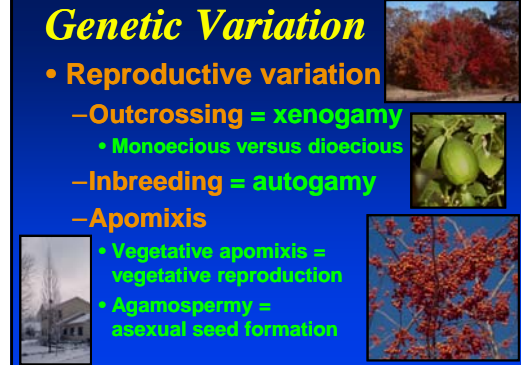
Genetic Variation

- **Ecotypic variation**
 - **Ecological Race**
 - In response to environment, often discontinuous (Lost Pines)
 - **Cline**
 - Like ecotypic, but environmental gradient response (Red Maple)
 - **Speciation**
 - Result of ecotypic variation and/or isolation over time (Recreation Live Oak)



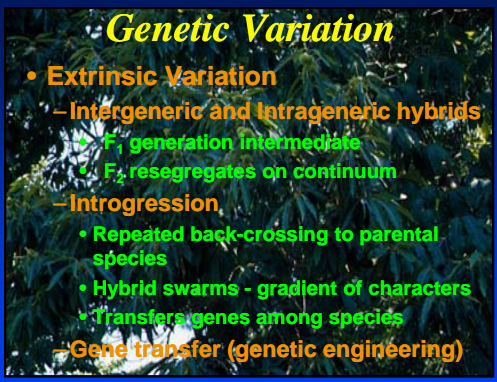
Genetic Variation

- **Reproductive variation**
 - **Outcrossing = xenogamy**
 - Monoecious versus dioecious
 - **Inbreeding = autogamy**
 - **Apomixis**
 - Vegetative apomixis = vegetative reproduction
 - Agamospermy = asexual seed formation



Genetic Variation

- **Extrinsic Variation**
 - **Intergeneric and Intrageneric hybrids**
 - F₁ generation intermediate
 - F₂ resegregates on continuum
 - **Introgression**
 - Repeated back-crossing to parental species
 - Hybrid swarms - gradient of characters
 - Transfers genes among species
 - **Gene transfer (genetic engineering)**



Questions / Comments?

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