Plant Propagation PLS 3223/5222

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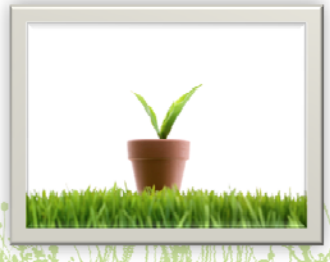
How Plant Propagation Evolved in Human Society

Chapter 1

Chapter 1 Objectives are to Understand:

- History and evolution of plant propagation
- Development of nurseries
- Plant propagation organizations



Plant Propagation

-The purposeful act of reproducing plants

- Marks the start of civilization
- Has been practiced for the past 10,000 years

Shift in Human Behavior

- 10,000 years ago…..
- Shift from nomadic hunter-gatherer to establishment of stable communities
- A big component of this shift was the domestication of plant and animal species
- This led to agriculture

Agriculture

-The deliberate cultivation of crops and animals for use by humans

- Plant Selection
- Plant Propagation
- Plant Production
- Crop Handling/Storage
- Food Technology

Originally, why were plants propagated?

Early Domestication

- Early selections were fixed by vegetative propagation
- Domestication of many fruit trees coincided with the discovery of grafting

- Most of the common forms of plant propagation were discovered by 2400 B.C.

Organization of Human Society

Ancient
9000 B.C.

8000 B.C.
Beginning of Agriculture

Greek and Roman
500 B.C. – A.D. 1000

A.D. 750 – 1500
Medieval Period

Ancient (9000 B.C. and Later)

- Plant Selection
- Plant Propagation
- Plant Production
- Crop Handling/Storage
- Food Technology

Ancient Egyptian Farming

Toogood, 1999

Ancient Chinese

Toogood, 1999

Greek and Roman (500 B.C.-A.D. 1000)

- Control of land and agricultural surplus were the keys to power and wealth
- Olive oil and wine were exported and grains were imported
- Romans developed ornamental gardening

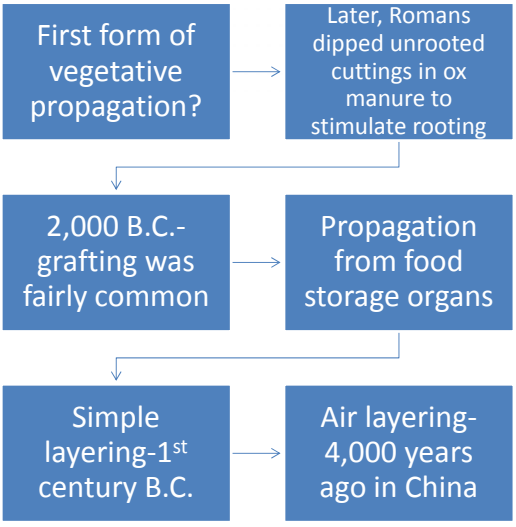
Aaron's Rod-Biblical Reference

Toogood, 1999

Medieval Period of the Middle Ages (A.D. 750 to 1500)

Agronomy	Horticulture	Forestry
• production of cereals, fibers, forages	• vegetables, fruits, herbs, flowers	• trees grown for lumber and fuel

Origins of Vegetative Propagation



Exploration, Science, and Learning

- Major changes occurred in Plant Science near the end of the 16th century as Europe shifted into a market based economy that regularly included trading across oceans.

Plant Exchanges

-The movement of plants from their place of origin to their place of use

- Expanded available food sources
- Ornamental plants introduced
- Required propagation methods
- Transportation methods developed

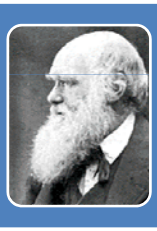
Mauseth, 1998

Figure 1-3 (Hartmann et al., 2011)

Plant Exchanging

- 1492: • Columbus
- 1753: • Linnaeus
- 1768: • Captain Cook
- 1823: • David Douglass • David Fairchild

Scientific Literature



Charles Darwin

- Origin of Species, 1859

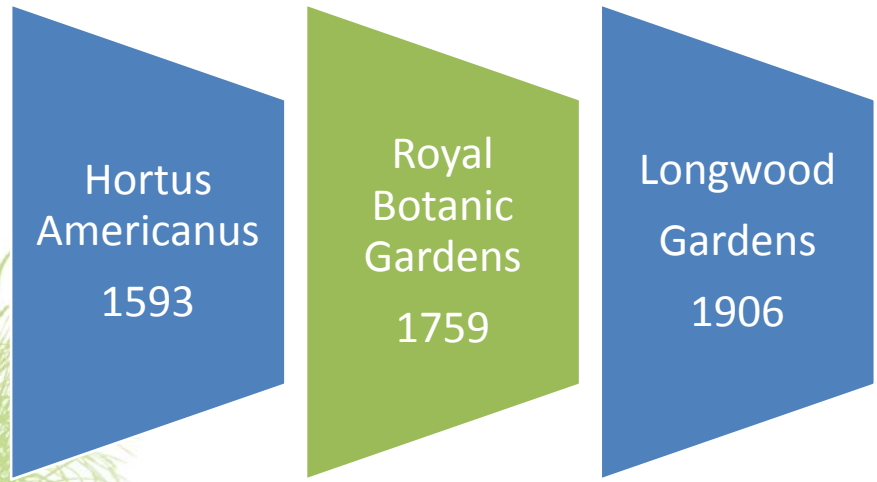
Gregor Mendel

- Fundamental Laws of Genetics, 1865

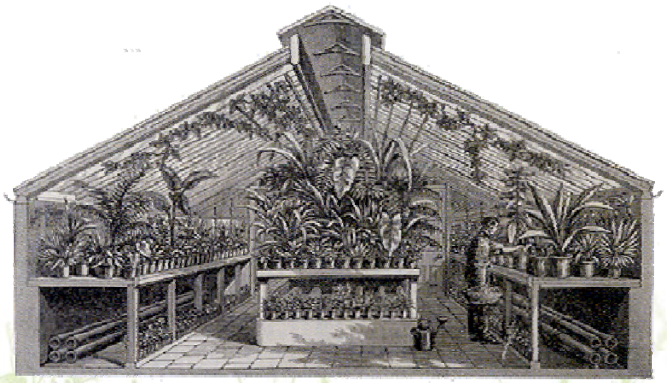
Horticultural Literature

Charles Estienne	• Seminarium, 1530
Charles Baltet	• Grafting and Budding, 1821
Andrew J. Fuller	• Propagation of Plants, 1885
Liberty Hyde Bailey	• Hortus, 1930

Botanical Gardens



Greenhouses, 1870



Toogood, 1999

The Development of Nurseries

- First Nursery in the U.S. was accredited to Prince and Son in 1730 on Long Island
- 1847 First Nursery established in the Pacific Northwest

The Morrill Act

Established land-grant universities with initial research and teaching focuses on agriculture and mechanical arts

- Passed by congress (1862)
- Established land-grant colleges
- Agronomy, horticulture, pomology, etc. became regular university pursuits

Organizations and Groups

- Amateur propagators and hobbyists
- Non-profit organizations
  - Arboreta
  - Botanical gardens
  - Research and teaching institutions
- Germplasm repositories

Organizations and Groups

- Commercial wholesale nurseries
  - Ornamental landscape plants
  - Bedding plant producers
  - Foliage plant producers
  - Fruit and nut tree nurseries
  - Forest plants

Organizations and Groups

- Tissue Culture Laboratories
  - Commercial nurseries
  - Research institutions
    - private vs. public
- Seed Producers
  - Commercial companies
  - Certified seed growers

Plant Propagation Organizations

- International Plant Propagators Society (IPPS)
- American Society for Horticultural Science
- Association of Official Seed Analysts
- International Association for Plant Tissue Culture
- International Society for Hort. Sci.

The Modern Plant Propagation Industry

- Increased scale of production
- Product marketing, regulation, consultation
- Technology
- Research

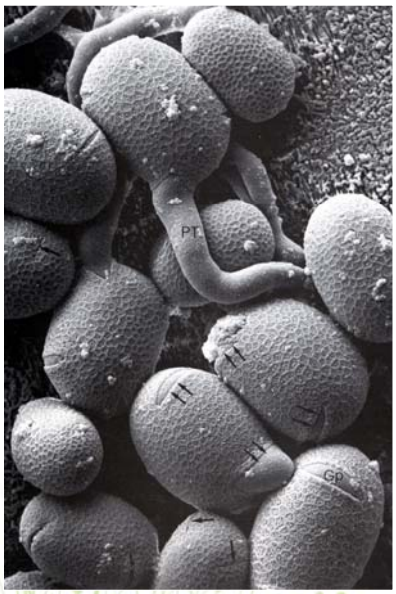
Modern Propagation

Toogood, 1999

- Seed treatments
- Micropropagation
- Genetic engineering

Seed Technology

- The value of seeds
- Molecular farming
- Commercial seed treatment technology
- Seed substitutes from the laboratory
- Seed conservation



Cresti et al., 1992

Prelude to Propagation

- Plant propagation depends on the natural responses which enable plants to survive in wild communities (Thompson, 1997).

All Plants do not Respond the Same to ....

- Temperature
- Moisture
- Light
- Fertility
- Humidity
- Daylength

Components of Plant Propagation

- The art of propagation
- The science of propagation
- The knowledge of plants