Plant Juvenility

Objectives:

1. Be able to describe and explain terms related to plant aging.
2. Be able to explain how a woody plant contains tissue of different ontogenetic ages.
3. Be able to describe and explain the processes involved in ontogenetic aging.
4. Be able to describe and explain the practical applications of plant juvenility with regard to plant propagation.
5. Be able to apply plant juvenility concepts to plant propagation procedures.

I. JUVENILITY

A. Introduction

B. Terms Associated With Juvenility

1. Annual -

2. __________________ - plant has a 2-year life cycle
   a. First year is
   
   b. Second year is
      i. induce flowering by chilling - called
      ii. photoperiod may trigger

3. Perennial – plant lives more then 2 years and repeats

4. Woody perennials - plants that continue to
5. Juvenile or juvenile phase - is a developmental state

6. Adult phase - is a developmental state in which the plant

7. Transitional phase - is the state

8. Phase change or maturation -

9. Morphology -

C. Zonal Variations On A Plant

1. On woody plants, parts differ in their state of maturity
   a. Increases in plant size complicate
   b. A woody plant can have all three phases
   c. Note: the basal part of the plant
      i. based on time (or chronological age), the basal part of the plant
      ii. the base is the youngest
   d. In contrast, the extremities (distal parts) would be

2. Different parts of the plant have different "ages"
   a. The number of nodes formed
b. Apical meristems age more

c. Plant parts isolated from a woody plant will have
   
i. for example, a shoot taken from juvenile wood will be
   
ii. an isolated (propagated) juvenile shoot will form new growth in the future that
   
iii. why?

3. Processes or mechanisms governing the phase shift

   a. Change in the balance of

   b. Epigenetic - persistent changes in
      
      i. once epigenetic changes have developed,
      
      ii. example: flowering plants continue to

   c. Physiological changes are different since
     
     i. the plant can revert to
     
     ii. example: watering a lilac shrub with less water as summer progresses

D. Practical Aspects of Juvenility

   1. Rootability of cuttings is a very important

      a. Cuttings from juvenile plants root the easiest
b. Cuttings from juvenile stock plants may root better because of

c. Practical implications are to keep the stock plants

d. Hard shearing of stock plants

2. Plant morphology can

   a. Homoblastic -

   b. Heteroblastic -

   c. Leaf shape may change:

   d. Thorns may be present

   e. Leaves retained on juvenile tissue of deciduous species

E. Control of Phase Changes

1. When an older, well-tested plant is ready to be propagated,

   a. This situation is good for flowering because

   b. Avoid thorniness of juvenile

   c. The situation is bad if rootability of cutting
2. Arrest plant development in the juvenile phase by:
   a. Prune the plant back hard to obtain
   b. Select cutting material from
   c. Take root cuttings

3. Reversion of adult to juvenile plant
   a. Grafting adult ivy on to juvenile rootstock
   b. Consecutive generations of grafting
   c. Consecutive subculturing of apical meristems using
   d. Spray gibberellic acid on adult ivy

F. Summary
Layering
Text Pages: 537 - 558.

Objectives:

1. Be able to describe and explain factors that affect layering and their physiological effects on the parent plant.

2. Be able to describe and explain the general procedures involved for five types of layering.

3. Be able to identify and summarize plant modifications that lend themselves to layering.

4. Be able to describe and explain limitations of layering.

5. Be able to distinguish or predict how physical manipulations or treatments affect layering.

I. LAYERING

A. Introduction:

B. Factors Affecting Layering of Plants

1. Layering is defined as

   a. The layering is severed

   b. Usually think of layering for

2. Nutrition

   a. Advantage of layering in terms of nutrition –

   b. Xylem tissue

3. Stem treatments -
a. The stem is usually wounded in some way including:

b. Cut is made on lower side of

c. The cut slows or

4. Exclude Light
   a. Etiolation -

   b. Blanching -

   c. Examples:

5. Root promoting compounds
   a. Stems must be wounded

   b. Compound can be applied as a

C. Types of Layering

D. Simple Layering
   1. Simple layering is usually completed in

   a. Shoots older then 1 year are

   b. Plants can be layered in fall too
2. Procedure:
   a. Bend over the stem or branch and make
   b. The second bend is buried

3. If layering is done in spring, remove or sever

4. Compound/Serpentine Layering – is a

E. Tip Layering
   1. A branch is bent down into
      a. The shoot tip begins to grow
      b. Roots develop
   2. Tip layering is completed for
   3. Layer forms sufficient roots

F. Air Layering
   1. Is used for several reasons:
      a. Get larger size
      b. Good for some difficult-to-root plants
      c. Can be used on
2. Air layers can be made at
   a. For landscape plants
   b. For indoor plants

G. Latent Bud Techniques

Latent buds – buds that

1. Mound (stool) Layering – is used primarily for
   a. Procedure: start by planting a rooted layer and
   b. Beginning the next spring, cut
      i. when re-growth starts,
      ii. latent buds are now forced to grow
   c. When stems are 3 to 5 inches high,
   d. Add soil or potting medium as shoots grow until
   e. Girdling the base of the shoots may
   f. Cut off rooted layers as close to
   g. Use auxin on the mother plant?
2. Trench Layering - used on
   a. Procedure: plant the seedling tree or shrub at
   b. At beginning of the second growing season,
   c. Next, the plant is covered with 1 to 2 inches of rooting medium before
   d. As shoots grow, add rooting medium to
   e. At the end of the growing season, the soil is removed and

3. Similarities between Mound and Trench Layering
   a. Plant tissue is kept
   b. Plants are pruned back severely

II. PLANT MODIFICATIONS USED IN LAYERING
   A. Introduction -
   B. Crown Division
      1. Usually most important for
      2. Crown refers of the part of the plant at
      3. The crown consists of many
         a. The branch then
b. After several years of new shoots being produced and

4. Division - is the process of cutting

5. __________________ - is the multiplication of plants by naturally detachable structures.

6. Crown division - is used extensively on

   a. Timing of division:
      i. plants that bloom in spring or early summer –
      ii. plants that bloom in late summer or fall –

   b. Division is a good method to keep

C. Suckers –

   1. A sucker is a shoot that arises from
      a. May arise from the stem but often the shoot arises from
      b. Roots form on the base of the sucker

D. Offsets or Offshoots –

   1. Offsets - are lateral shoots

   2. This method gives us small to moderate numbers

E. Runners –
1. Runner - is a specialized stem that grows
   a. The runner starts in a leaf axil and
   b. Runners form on certain species when induced

2. The new plant usually forms adventitious roots while
   a. Adventitious roots can form in the air or
   b. New plants are detached from the parent plant

F. Stolons
   1. Stolons are modified stems that grow
      a. For layering, consider only the stolons that
      b. Stolons can form on
   2. Stolons grow and
   3. Transplant the rooted stem when

G. Summary