Laboratory 7 Specialized Structures

Objectives:

1. Be able to describe and explain specialized structures of plants that are useful for asexual propagation.

2. Be able to describe and explain the propagation procedures for the specialized structures.

3. Be able to demonstrate the proper procedures for propagating bulbs, tubers and fleshy roots.

4. Be able to distinguish between the different types of specialized structures.

I. SPECIALIZED STEMS

A. Introduction

1. Some plants have specialized structures that serve some purpose, such as carbohydrate storage or some survival mechanism.

2. Fortunately, these specialized structures can be used for

3. Some of these structures are used for commercial propagation, whereas homeowners may use structures for some species

B. Tubers – propagated or multiplied by division

1. Tuber – a tuber is a

2. A tuber has all the stem

3. Propagate by

C. Tuberous Stems

1. Tuberous stem – is a swollen

Examples: tuberous begonia and cyclamen
2. Propagation of these specialized stems includes:

D. Rhizomes – is a type of specialized stem

1. Rhizome – is defined as a specialized stem that is the
   
   a. The rhizome has nodes and internodes that can be
   
   b. Two types of rhizomes exist for this course (the book covers three types).

2. PACHYMORPH – is a rhizome that is
   
   a. Rhizome is determinant – stem ends in a
   
   b. Rhizome has a compressed,
   
   c. Example: bearded iris, ginger, and calla lily

3. LEPTOMORPH – rhizome with long slender appearance and much space
   
   a. Rhizome is indeterminant – stem does NOT end with
   
   b. Rhizomes spread over an area
   
   c. Examples: lily of the valley, cattails, and quackgrass

4. Propagation of Rhizomes is mainly by
   
   a. Pachymorph – individual sections are removed or cut
   
   b. Leptomorph – are divided by cutting enough of the rhizome to include a root section. One or more dormant lateral buds
c. Plants are divided before growth starts in

d. Each rhizome piece should have a

e. CULMS are aerial/above ground shoots: culm cuttings from BAMBOO can be used like regular stem cuttings – works only for some species!

E. Bulbs – Geophytes: specialize plant structures

1. Bulb – is a specialized underground organ made of a

   a. The vertical stem axis is called the

   b. The basal plate is fleshy or thickened and bears a

2. TUNICATE BULB – has dry (papery) outer coverings on it

   a. Why is this type of bulb tolerant of mildly rough handling?

   b. Scales (modified leaves) are usually in

   c. Examples: tulip, daffodil, hyacinth, onion, garlic, and amaryllis.

Related Story: Tulip Bulb Mania in 1636 in the Netherlands – not test material

3. NON-TUNICATE BULB – (scaly bulb) has separate scales and lacks a dry papery covering

   a. This type of bulb usually is intolerant of

   b. Examples: Easter lily or oriental lily
4. Propagation of bulbs – includes several methods
   a. Offsets – sufficiently rapid method for commercial production of
      i. usually inadequate method for lily, amaryllis, and hyacinth
      ii. offsets remain attached to the mother bulb for three to
      iii. the offsets may take several years to reach
   b. Bulblet formation on stems – a second method of propagation
      i. bulblets form **underground** on the stems of particular
         ii. stem bulblets form (underground), and the stems are harvested in late
             summer. These bulblets are replanted in October
         iii. **aerial bulblets** (called **bulbils**) form on a few lily species and are
   c. Stem cuttings - used for lily. Instead of roots or shoots forming,
   d. Leaf-bud cuttings - used for lily. Bulblet forms
   e. Bulblet formation on scales - for certain lilies (non-tunicate types)
      i. scaling procedure - scales are removed from the mother bulb and placed
         ii. adventitious bulblets form at the base of the
   f. Basal cuttage - is used for hyacinth since it produces offsets slowly - several
      types of cuttage can be used.
      i. scooping - removes the entire
ii. **scoring** - makes 3 cuts through the

iii. **coring** - removes the central portion of the basal plate and the

iv. note: adventitious bulblets will form at the

g. Bulb cuttings - involves cutting the bulb into pieces

i. each piece contains part of the

ii. each piece can be further divided so that it contains three

iii. new bulblets developed at the basal plate and

iv. twin scaling involves the cutting consisting of only two scales that have a

F. Corms - the swollen base of a stem and is enclosed by a few, dry papery leaves

1. NOTE - corms lack

2. Propagation methods include:

a. **new corms** - are separated from the old, deteriorated corm

   i. to get the largest new corm, leave foliage intact for at least

   ii. best time to remove foliage is to wait until it

   iii. examples: crocus and gladiolus

b. cormels - are separated from the new and old

c. corm cuttings - corm is cut into several sections, and each section should
II. SPECIALIZED ROOTS

A. Tuberous Roots

1. Is an enlarged or swollen secondary root with a growing point (shoot) in a

2. Propagate by DIVISION with a

3. Example: dahlia

B. Fleshy Roots

1. Fleshy root – is an enlarged or swollen root that must

2. The adventitious shoots MUST

3. Proximal dominance – can be seen in fleshy roots, meaning that

4. A heat treatment – 100°F (37°C) for one to several days -

5. Example: sweet potato

C. Propagation of these specialized roots - by DIVISION or

D. Summary