SBL 1152- HORTICULTURE AND NURSERY

TOPIC 3: PLANT ANATOMY AND PHYSIOLOGY

What are the parts of the plant, and how do they work?

DR.HAMIDAH AHMAD

PLANT ANATOMY

The word "anatomy" comes from the Greek WORDS

ana- meaning up or through

+ tome meaning a cutting.

MAJOR PLANT PARTS

- Roots
- Stems
- Leaves
- Flowers

ROOTS

- Functions:

1. Absorb water and nutrients
2. Anchor the plant, and support the above ground part of the plant.
3. Store food

Root Systems:

Fibrous: A system that has no dominant primary root.

Tap: A system composed of one primary root and many secondary roots that branch off.

- Primary Root: The first root to emerge at germination. May become the main tap root.

- Secondary Roots: Roots that branch out from the primary root.

- Apical Meristem: Area at the tip of the root where new cells develop

- Healthy Roots:

Roots are white or nearly white, and smell fresh.

- Unhealthy Roots:

Roots are black, brown, or dark orange and smell rotten and sour.

STEMS

- Functions:
  - Support the leaves, and positions them so they can receive as much sunlight as possible
  - Responsible for the size and shape of the plant.

- Functions:
  - Move water, minerals, and manufactured food throughout the whole plant.
  - Green stems produce food through photosynthesis.

Internal Structures of STEM

Xylem: Tissue responsible for carrying water and nutrients from the roots to the leaves. It is located near the center of the stem.

Xylem Up!!

- Internal Structure:
  - Phloem: Tissue responsible for carrying food produced in the leaf to the rest of the plant. The phloem is usually located near the outside of the stem.
  - Phloem Down!!
- Internal Structure
  - Cambium: Tissue responsible for the production of new xylum and phloem. It is found between the xylum and phloem.

Specialized Stems

Bulbs: Short flattened stem which has several fleshy leaves. Bulbs are found beneath the soil.

Example: Onions

Corm: Sphyrical structure similar to a bulb.

Example: Gladiolus

Specialized Stems

Rhizome: Thick underground stem which lies horizontally. Example:

Mother in Law's Tongue, Ginger

Stolon: Horizontal stem which lies above the ground (often called runners). Example: Strawberry runners, Grass

Tuber: Rhizome with a tip that is swollen with stored food.
Example: Potatoes.

LEAVES

Functions:

- Produce food for the plants.
- They are designed to efficiently collect light and use that light to make energy.

Leaf Parts

Leaf Blade:
Large, broad, flat surface whose job is to collect sunlight

Petiole:
supports the leaf and holds it away from the stem.

Midrib:
Main vein running down the center of the leaf. It helps hold the leaf so it is facing the sun.

Leaf Types

+Has only one leaf on the petiole.

+Simple leaf:

+Compound leaf: A leaf with multiple

+blades.

Vein Patterns

Parallel: Veins never cross. Found in monocots.

Netted: Veins form a network. Found in Dicots.

Leaf Layers:

+Cuticle:

The top waxy, non-cellular part of the leaf. Its job is to prevent water escaping.

+Epidermis:

Skin like layer of cells found on both the top and bottom of the leaf. Its job is to protect the leaf.

Leaf Layers

Palisade Mesophyll: A layer of cells standing on end directly below the upper epidermis. This area is responsible for photosynthesis.

Spongy Mesophyll: Loosely packed cells located beneath the palasade mesophyll. This area is responsible for holding the products of photosynthesis.

FLOWERS

Flower Parts -- Male

Stamen: Male part of the flower.

Filament: Stalk like in the stamen that holds up the anther

Anther: Sack-like structure that contains pollen.

Flower Parts -- Male

Pollen grains are released from the anther that contains sperm.

Staminate: Flowers that have only male parts.

Flower Parts – Female

Pistil: Female part of the flower

Stigma: Sticky part of the pistil that is receptive to pollen.

Style: Rod shaped middle part that has a swollen base (ovary) containing eggs

Flower Parts –
Neither male or female

+Petals: colorful leaf-like structures which attract animals and insects.

+Corolla: When all of the petals are fused together.

+Sepals: Green leaves that protect the flower before it opens.

+Calyx: When all of the sepals are fused together.

Flower Types:

+Perfect Flower: Has both male and female parts.

+Imperfect Flower: A flower that is missing either male or female parts.

+Complete Flower: Flowers that have sepals, petals, pistils, and stamens.

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Flower Types:

+Incomplete Flowers: When a flower is missing sepals, petals, pistils, or stamen.

+Imperfect Flowers are always incomplete. Incomplete flowers may or may not be imperfect