Lesson 5 -BOTANY, PLANT PHYSIOLOGY AND PLANT GROWTH
PLANT PARTS AND FUNCTIONS Part Three: Roots

Script to Narrate the PowerPoint, 05PowerPointRoots.ppt
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PowerPoint Slide 1: Title Slide,
"Plant Parts and Functions, Part Three: Roots"

PowerPoint Slide 2:
Plant Parts and Functions, Part Three

- Segment One - Roots

In this lesson we'll devote time to root variations and functions.

PowerPoint Slide 3: Title, "Segment One – Roots"

A thorough knowledge of the root system of plants is essential if growth, flowering and fruiting responses are to be understood. The structure and growth habits of roots have a pronounced effect on the size and vigor of the plant, method of propagation, adaptation to certain soil types, and responses to cultural practices and irrigation. The roots of certain vegetable crops are important as food.

Roots typically originate from the lower portion of a plant or cutting. They possess a root cap, have no nodes, and never bear leaves or flowers directly. The principal functions of roots are to absorb nutrients and water, anchor the plant in the soil, furnish physical support for the stem and serve as food storage organs. In some plants, they may be used as a means of propagation.

PowerPoint Slide 4: Types of Roots

A primary root originates at the lower end of the embryo of a seedling plant. A taproot is formed when the primary root continues to elongate downward into the soil and becomes the central and most important feature of the root system with a somewhat limited amount of secondary branching. The taproot of a carrot or parsnip is the principal edible part.

Unlike a taproot, a fibrous root remains small in diameter because of very little activity in the cambium, the layer that produces xylem and phloem tissues. One factor that

causes shrubs and dwarf trees to remain smaller than standard trees is the inactivity of the cambium tissue in the roots.

A fibrous root system is one in which the primary root ceases to elongate and numerous lateral roots develop. These lateral roots branch repeatedly and form the feeding root system of the plant.

PowerPoint Slide 5, 6: Root Zone

- Tree roots extend beyond drip line
- Most roots occur in top 12" of soil

As plants become well established, the root system develops laterally and usually extends somewhat beyond the spread of the branches, or drip line. The greatest concentration of fibrous roots occurs in the top foot of soil, but significant numbers of laterals may grow downward from these roots to provide an effective absorption system several feet deep.

PowerPoint Slide 7, 8, 9, 10, 11: Parts of a Root

Internally there are three major parts of a root. The meristematic zone is at the tip of the root and manufactures new cells; it is an area of cell division and growth. Behind it is the zone of elongation. In this area, cells increase in size through food and water absorption. These cells, by increasing in size, push the root through the soil. The third is the maturation zone where cells undergo changes to become specific tissues such as epidermis, cortex, or vascular tissue. The epidermis is the outermost layer of cells surrounding the root. These cells are responsible for the absorption of water and minerals dissolved in water. Cortex cells are involved in the movement of water from the epidermis and in food storage. Vascular tissue is located in the center of the root and conducts food and water.

Externally, there are two areas of importance: root hairs and the root cap. Root hairs are found along the root and perform much of the actual work of water and nutrient absorption. The root cap is the outermost tip of the root and consists of cells that are sloughed off as the root grows through the soil. The meristem, the area of cell division, is behind the root cap and is protected by it.

PowerPoint Slide 12: Roots as Food Crops

- Sweet potato
- Carrot
- Parsnip
- Salsify
- Radish

The enlarged root is the edible portion of several vegetable crops. The sweet potato is a swollen root called a tuberous root which serves as a food storage area for the plant. Carrot, parsnip, salsify and the radish are enlarged taproots.

PowerPoint Slide 13, 14: Title, "Review"

Segments One through Five.

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