

Anatomy of Stem, Root and Leaf

Priyanka Sharma, Lecturer, Bright Institute, Sri Ganganagar (Rajasthan)

Abstract

The anatomy of the stem, root, and leaf provides an essential understanding of the internal organization and functional adaptations of plants. These vegetative organs exhibit distinct anatomical structures that enable plants to perform vital processes such as absorption, transport, photosynthesis, storage, and mechanical support. The root is primarily specialized for anchorage and absorption of water and minerals from the soil. Its internal organization generally includes the epidermis, cortex, endodermis, pericycle, and vascular tissues, with variations occurring among different plant groups. The stem functions mainly in supporting aerial parts and transporting water, minerals, and photosynthetic products. Its anatomical features include the epidermis, cortex, vascular bundles, and pith, with the arrangement of vascular tissues differing between monocotyledonous and dicotyledonous plants. The leaf is the principal organ of photosynthesis and contains specialized tissues adapted for efficient absorption of light and exchange of gases. Its major anatomical regions include the epidermis, mesophyll, and vascular bundles, with stomata facilitating gaseous exchange and transpiration. Comparative study of these organs reveals their structural specialization and the close relationship between anatomy and physiological function. Knowledge of plant anatomy is important in botany, agriculture, horticulture, plant physiology, and ecological studies. This paper presents an overview of the anatomical structure of roots, stems, and leaves and highlights their functional significance and major structural adaptations.

Keywords: Plant Anatomy, Root Anatomy, Stem Anatomy, Leaf Anatomy, Vascular Tissue, Xylem, Phloem, Mesophyll, Epidermis, Plant Structure

