

كلية العلوم

القسم : علم العيادة

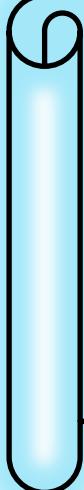
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Plant Organs

As we learned in our study of human anatomy and physiology, life begins with cells, which can then organize into tissues, which can then assemble into organs and organ systems, and this organizational hierarchy applies to plants just as it does to humans.

In plants, especially vascular plants, there are two organ systems.

Those are the root system and the shoot system.

The root system

The root system includes all of the parts of a plant that grow below the ground.

These include roots, tubers, and rhizomes.

1. The roots

The roots are branching structures that extend into spaces in the soil and absorb water and mineral nutrients, delivering them to the rest of the plant.

Some plant roots also include pockets for bacteria or fungal colonies to live in.

The fungi living in these pockets are called mycorrhizae, and they form symbiotic relationships with plants, providing mineral nutrients to the plant in exchange for sugars from photosynthesis.

Legume plants, like beans and peas, form similar relationships with bacteria living in nodules on their roots.

These bacteria specifically help legumes collect nitrogen, which is often a scarce resource in the soil, and its scarcity can limit plant growth.

Many plants also use their roots as a place to store starches, a convenient form of long-term energy storage made of complex polysaccharides.

2. The tubers

However, other plants like potatoes store their starch in underground organs called **tubers**.

Starch storage in tubers is important for plants that grow year after year, called perennials, because the energy in the starch allows the plant to grow before its leaves and photosynthetic abilities are functional at the beginning of the growing season.

This explains why if you've ever left a potato on your counter for too long, it will actually start growing buds and shoots of its own.

3. The rhizome

The last part of the root organ system in plants is the **rhizome**. Just like tubers, not all plants have rhizomes.

But the ones that do have an advantage, because rhizomes can do multiple beneficial things for a plant.

A rhizome is basically a secondary plant stem that grows out horizontally under the ground.

This provides stability to the plant, especially if the rhizome also grows small supplemental roots.

Rhizomes can also grow new plant shoots up out of the soil, so a rhizome can allow a plant to create clones of itself and grow over a much wider area, potentially outcompeting other plants trying to grow in the same space.

This strategy is called clonal reproduction, and is common in certain types of plants like grasses.

So that covers the root system, which is the underground portion of a plant.

The other portion is the above-ground organ system, or the shoot system.

The shoot system

The shoot system includes the vegetative or structural parts of the plant, and also the reproductive parts of the plant.

1. The vegetative parts of a plant

The vegetative parts of a plant include organs like the **stem** and **leaves**.

stem

The stem provides central structure for a plant, holds all of the other above-ground organs, and serves as a connection between the root and shoot systems, allowing nutrients to flow up and down through its xylem and phloem tissues.

The stem may also divide into several smaller stems in bigger, more complex plants like trees.

leaves

The leaves attach to the stem or branches via small stems called petioles.

Leaves do the main work of providing nutrients to the plant through the process of photosynthesis.

Water, gases, and nutrients are moved around the leaves through their veins, which are very tiny tubes of xylem and phloem tissue.

Leaves can be wide or thin, long or short, round or oblong, thick or thin.

The shape and other physical qualities of leaves are distinct to each type of plant, and can provide certain benefits.

For instance, the fat, wax-covered leaves on succulent plants like cacti allow the plants to store extra water in the arid environments where they grow.

The broad leaves of plants in the rainforest allow them to capture as much light as possible in an ecosystem where there's a lot of competition for sunlight.

In general, leaves can be either simple leaves, with one undivided blade, or compound leaves, where the blade consists of multiple leaflets, which are sometimes even further subdivided.

2. The reproductive organs

The other part of a plant's shoot system is its reproductive organs.

These organs are often all contained within a structure we know of as a flower, although we will discuss some kinds of plants that do not have flowers.

At the base of a flower, there are modified leaves called sepals that protect a flower until it is done developing, at which point it is ready to open.

The petals of a flower are also modified leaves.

They're often bright and colorful to get the attention of pollinating animals, and may even have ultraviolet patterns on them to guide insects like bees.

Flowers on wind-pollinated plants are usually less showy and smaller than flowers pollinated by animals.

As we said, a flower contains a plant's reproductive organs.

Most plants are hermaphroditic, meaning they contain both male and female reproductive organs.

The male reproductive organs, called the stamens, include the anthers, where pollen is stored, which is like the "sperm" of a plant, as well as thin filaments that connect the anthers to the flower.

While there are often multiple stamens in a flower, there is usually only one pistil, which is the female reproductive organ.

The top of the pistil is called the stigma, and this sticky platform is where pollen attaches at the beginning of plant reproduction.

The style is the long channel that connects the stigma to the rest of the pistil, and pollen tubes grow through the style.

The bottom of the pistil is the ovary, and this is where the ovules or “eggs” of a plant are.

We'll get into the specifics of plant reproduction later in the series, so for now we can just note that, once pollinated, the ovary of a flower and the fertilized ovules will become the fruit and seeds, ready to create a whole new generation of plants.

So that covers the organs and organ systems of plants, which are organized within the underground root system and the above ground shoot system.

Next, let's talk about how plants are able to grow and develop all of these organs.

Wishing you the best of luck

Engr. Maissoun Ziadeh

Vocabulary - Lecture 4

مفردات المحاضرة الرابعة

Organs	الأجهزة - الأعضاء	succulent	العصارية
assemble	تتجمع	cacti	الصبار
hierarchy	سلّم- تسلسل هرمي	broad leaves	الأوراق العريضة
applies	ينطبق	capture	تلقط- تحجز
vascular plants	النباتات الوعائية	competition	منافسة
shoot	المجموع الخضري	multiple leaflets	وريقات متعددة
extend into	تمتد عبر	subdivided	مقسمة - مجزأة
absorb	تمتص	modified	متحورة
pockets	جيوب - عقد	sepals	السبلات
colonies	مستعمرات	petals	البتلات
symbiotic relationships	علاقة تكافلية	pollinating	التلقيح
beans	الفاصولياء	أنماط الأشعة فوق البنفسجية	ultraviolet patterns
peas	البازلاء	less showy	أقل بهجة
nodules	العقيدات	hermaphroditic	خنثى
scarce resource	مورد نادر	stamens	الأسدية
convenient form	الشكل المناسب	anthers	المأبر
The tubers	الدّرّنات	pollen	حبوب اللقاح
perennials	المعمر	filaments	خيوط
counter	منضدة	pistil	المدقّة
buds	براعم	stigma	الميسّم
The rhizome - الريزوم	الجذمور - الريزوم	sticky platform	سطح لزج
The vegetative	الخضري	style	القلم
structural parts	الأجزاء الهيكلية	ovary	المبيض
reproductive parts	الأجزاء التكاثرية	ovules	البويضات
attach	ترتبط	fertilized	محصبة
via	عبر - بواسطة	generation	جيل
petioles	أعناق	develop	تطور
veins	عروق		
tiny tubes	أنابيب صغيرة		
physical qualities	الصفات الفيزيائية		
distinct	متميّز		
benefits	فوائد		
For instance	على سبيل المثال		



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