Pharmaceutical Botany Practice Week-9

Morphological and Anatomical Work

UNDERGROUND PARTS

It’s hard to imagine that in some cases over half of a plant is actually out of sight, hidden under the ground.

-Most people think that roots are the only plant parts found under the ground.

-But there are actually different types of underground parts.

-They can be mainly broken down into two types: the ROOTS and STEMS.

ROOT:

Radix (plural radixes or radices)

-In vascular plants, the root is the organ that typically (and generally) lies below the surface of the ground.

FUNCTIONS

***Anchor plant**
***Hold it upright**
***Absorb water and minerals from soil and conduct to stem**
***Store food**

UNDERGROUND STEMS:

***In many herbaceous plants subterranean stem develops and called «*underground stem*».**

***Underground stem remains dormant in unfavorable conditions and gives off shoots under favorable conditions.**

***They generally store foods and become fleshy.**

THEY HAVE THREE FUNCTIONS:

-STORAGE OF FOODS.

-PERENNATION
(to survive from one growing season to the next, often with a period of reduced growth between the seasons).

-VEGETATIVE PROPAGATION (Vegetative propagation is a form of asexual reproduction of a plant. Only one plant is involved and the offspring is the result of one parent.)

UNDERGROUND STEMS ARE DIFFERENT FROM ROOTS BY;

-Stem-like anatomical structure
-External branching
-Presence of nodes*

*node: the point on a plant stem from which the leaves or lateral branches grow.

TYPES of UNDERGROUND STEMS

1-RHIZOME

Rhizoma (**plural** rhizomas or rhizomata)

-A horizontal underground stem which can send out both shoots and roots.
-Rhizomes are sometimes thickened to store food.
-Rhizome as a horizontal plant stem with shoots above and roots below serves also as a reproductive structure.

2-BULB

-A bulb is an underground stem with fleshy, scale-like leaves surrounding a center flower bud.

-A bulb is structurally a short stem with fleshy leaves or leaf bases that function as food storage organs during dormancy.

-A papery outer covering called tunic protects the bulb from damage and drying.

3-TUBER

-Tuber is an enlarged, fleshy underground stem of certain seed plants.

-Tubers have buds=“eyes” on them.

-Under favorable conditions these eyes produce aerial shoots. Thus they help vegetative production.

-They do not have roots, thus they differ from rhizomes.

4-CORM (BULBOTUBER)

-Solid, swollen underground stem with dry, scale-like leaves.

-It serves as a storage organ used by some plants to survive winter or other unfavourable conditions such as summer drought.

-Corm is similar to bulbs but does not have fleshy scales.

-It bears many buds in the axils of scale-like leaves which develop into daughter corms.

-At the bases or even from sides of the main stem adventitious roots develop.

SAMPLES TO BE STUDIED TODAY'S LAB:

1. PN: *Glycyrrhiza glabra* (Liquorice, meyan)
DN: Radix Liquiritiae (Liquorice, meyan kökü)

A) Anatomical Work (Cross-section)
i) Schematical Drawing

A-MICROSCOPIC WORK….. A-CROSS-SECTION
i) Schematical Drawing
-I.M. (=Investigation Medium): SARTUR
-M.M. (=Microscope Magnification): 10x4

A) MICROSCOPIC WORK….. CROSS-SECTION

1. P.N.: ***Glycyrrhiza glabra*** **(Liquorice; meyan)**
D.N.: Radix Liquiritiae (Liquorice root; meyan kökü)

ii) Anatomical Drawing

-I.M. (=Investigation Medium): SARTUR
-M.M. (=Microscope Magnification): 10x40

A) MICROSCOPIC WORK….. POWDERED DRUG

1. P.N.: ***Glycyrrhiza glabra*** **(Liquorice, meyan)**
D.N.: Radix Liquiritiae (Liquorice root; meyan kökü)

a) Organoleptic control (Colour, odour, flavour, appearance of the powder)
b) Microscopic investigation
-I.M: SARTUR
-M.M.: 10x40

A) MICROSCOPIC WORK….. POWDERED DRUG

2. P.N.: ***Iris sp. (Iris; iris, süsen)***
D.N.: **Rhizoma Iridis** **(Iris rhizome/Orris root; süsen rizomu)**

a) Organoleptic control **(colour, odour, flavour, appearance of the powder)**
b) Microscobic investigation
I.M: **Distilled water**
M: **10x40**

A) MICROSCOPIC WORK….. POWDERED DRUG

3.P.N.: ***Drimia maritima (Syn.*** *Urginea maritima)*=**Squill**, **sea squill**, **sea onion; Ada soğanı)**

D.N.: Bulbus Scillae (Squill bulbus; Ada soğanı)

a) Organoleptic control (Colour, odour, flavour, appearance of the powder)

b) Microscobic investigation

I.M.: Distilled water

M.M.: 10x40

B) MORPHOLOGICAL WORK

1. P.N.: ***Glycyrrhiza glabra*** **(Liquorice, meyan)**
D.N.: Radix Liquiritiae (Liquorice Root, meyan kökü)

GENERAL CHARACTERISTICS:

- **In the form of thin cylinders**
- **Outer surface rough with longitudinal stripes**
- **Outer surface is brownish, inner surface is yellowish**
- **Fracture is fibrous**
- **Diameter……length..**

B) MORPHOLOGICAL WORK

2. P.N.: ***Smilax sp.*** **(Catbriers, greenbriers, prickly-ivys, smilaxes)**

DN: Radix Sarsaparillae (catbriers, saparna kökü)

GENERAL CHARACTERISTICS:

- **Cork layer is stripped**
- **In the form of a thin, full cylinder**
- **Outer surface brownish, rough and longitudinally channelled**
- **Inner surface is orange colour**
- **Fracture surface is fibrous**
- **Diameter……length**

In the Amazon, some tribes used it as a treatment for leprosy. It is also used as diuretic and to treat some dermal diseases.

B) MORPHOLOGICAL WORK

3. P.N.: ***Uragoga ipecacuanha*** **(*Carapichea ipecacuanha*) (Ipecacuanha; ipeka)**
D.N.: Radix Ipecacuanhae (Ipecac; ipeka kökü)

GENERAL CHARACTERISTICS

- **In the form of a curled cylinder**
- **Outer surface rough**
- **Outer surface is reddish-brown, dark brown**
- **Fracture surface is fibrous**
- **Central cylinder is visible with bare eyes in the middle**
- **Diameter……length..**

Ipecacuanha has a long history of use as an emetic, for emptying the stomach in cases of poisoning, a use that has been discontinued.
It has also been used as a nauseant, expectorant and diaphoretic.

The most common and familiar preparation is syrup of ipecac, which was commonly recommended as an emergency treatment for accidental poisoning until the final years of the 20th century.

B) MORPHOLOGICAL WORK

4.P.N.: ***Iris sp. (Iris; iris, süsen)***
D.N.: Rhizoma Iridis (Iris rhizome/Orris root; süsen rizomu, menekşe kökü)

GENERAL CHARACTERISTICS

- Cork layer is stripped
- Root traces are visible
- Outer surface whitish and rough
- Fracture surface is fibrous

Fresh roots have an earthy smell, the characteristic violet odour is gradually developed during the drying process.

It is now used mainly as a **fixative** in perfumery.

B) MORPHOLOGICAL WORK

5. P.N.: Orchis sp. (Salep Orchids; Salep orkidesi)
D.N.: Tubera Salep (Tuber Salep; Salep yumrusu)

GENERAL CHARACTERISTICS

-1-2 cm in length, elliptical/ovoid dirty yellow, brown tubers with rough surface.

-All of them more or less translucent

-They have very little odor.

-The plant has mother tuber and the sister tuber; the sister tuber is left in the soil for the following year.

-Salep is very nutritive and demulcent*, for which properties it has been used from time immemorial.

-It forms a diet of especial value to **convalescents and children, being boiled with milk and flavoured.

*A **demulcent** is an agent that supposedly forms a soothing film over a mucous membrane, relieving minor pain and inflammation of the membrane.

****Convalescence** is the gradual recovery of health and strength after illness or injury