



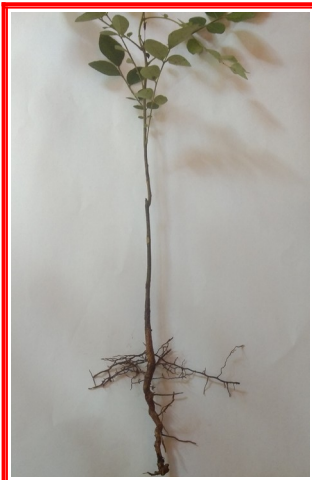
Unit2

The leaf too has to say



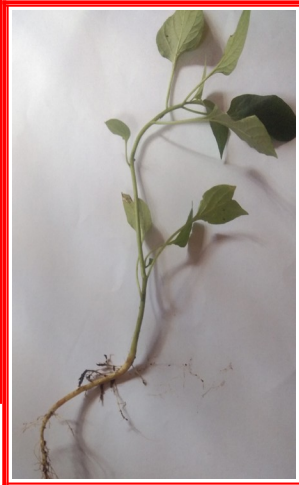
Root system of plants.

Let's go for an eco walk and uproot different types of plants and observe their roots carefully.



Curry
leaf plant

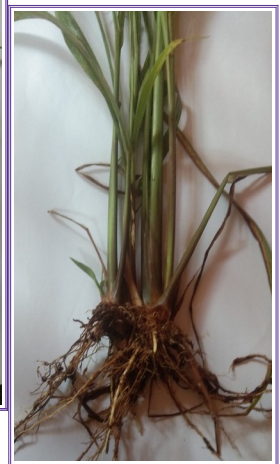
Chilly plant



Group A



Grass



Group B

Observation notes.

Roots of plants in Group A	Roots of plants in Group B
A thick ,long main root is seen growing from the base of the stem.	Several roots have grown from the base of the stem.
Many smaller branch roots have grown from the main root.	All roots are similar.
	All roots are thin.

The root system.

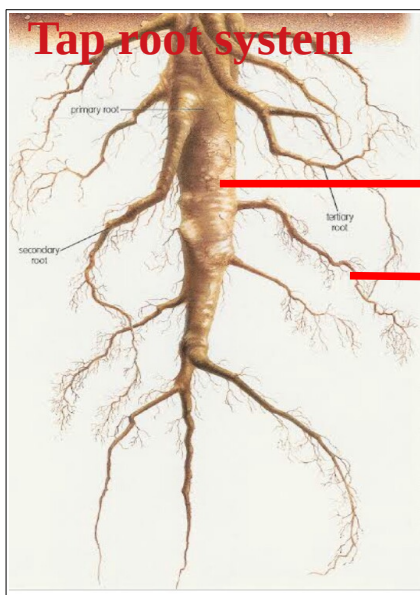


The arrangement of the roots of a plant is called root system.

There are two types of root system.

1. Tap root system.

2. Fibrous root system.



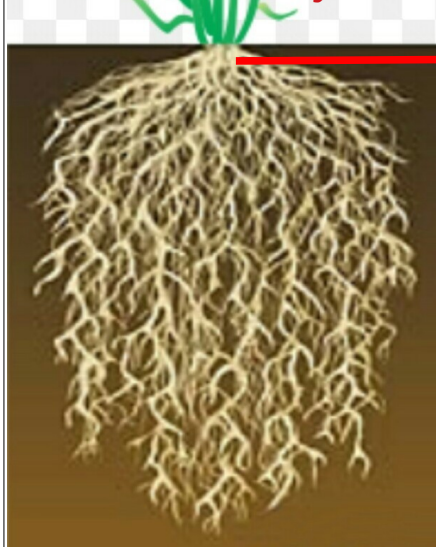
Tap root

Small roots grow from the taproot

Taproot

A taproot is a long, straight and dominant root from which other roots grow.

Fibrous root system



Similar thin roots growing from the base of the stem.

Tap root system

The tap root system consists of the larger taproot and smaller branches growing from it.



Fibrous root system

The fibrous root system includes a cluster(മുട്ടം) of similar roots growing from the base of the stem.



Plants with taproot system	Plants with fibrous root system
Leucas (ഇമ്പി) basil(tulsi),spinach (ചീര) rose, hibiscus, brinjal, pea,mango tree, jack fruit tree, etc.	Grass, paddy, wheat, maize,palm, sugar cane, bamboo, coconut, arecanut

What are the differences between tap root system and fibrous root system?

Taproot system	Fibrous root system
There is a taproot.	There is no taproot.
Taproot growing from stem	A cluster of similar roots growing from stem.
Small roots grow from taproot. They are different in size, but smaller than taproot.	All roots are similar and thin
They grow more deeply in the soil .Hence these roots hold the plant firmly in the soil. We can't easily uproot these plants.	Roots do not grow very deep in the soil. They hold several soil particles together and thus prevent soil erosion. (മണ്ണൊലിപ്പ്) These plants are easier to uproot than taproot plants

Some plants with tap root system.



Carrot



Brinjal



Rose



Mango tree



Jack fruit tree

Some plants with fibrous root system



Arecanut palm



Onion



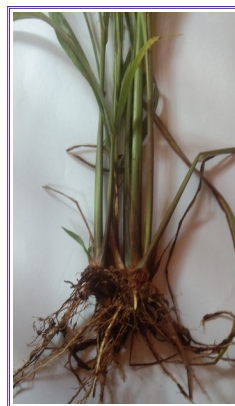
Sugarcane



Bamboo



Coconut tree



grass



muthanga

Observation of leaves



How do leaves differ from each other?

**The leaves are different for different plants.
They are different from the leaves of other by shape, size, and venation**



What is venation?



veins



The arrangement of veins (nerves) in a leaf is called venation

Try to tear a mango leaf, a jack tree leaf, rose leaf, coconut palm leaf, grass leaf, bamboo leaf etc.. into several pieces downwards from the tip.

Which of these leaves could you tear cleanly and easily with even sides?

Which of them you could not tear cleanly with even sides?

Classify and tabulate them

Leaves that could easily tear	Leaves that could not easily tear
Coconut palm leaf grass leaf bamboo leaf	Mango leaf jack tree leaf rose leaf



Mango leaf ,jack tree leaf,rose leaves are not able to tear easily .They break into pieces.

Coconut leaf,grass leaf,bamboo leaf can be torn easily with even sides.

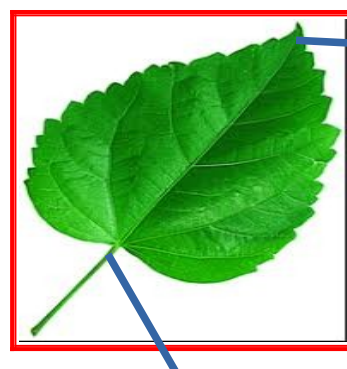
The presence of different types of venations are the reason for it.

There are two types of venation

Reticulate venation and parallel venation

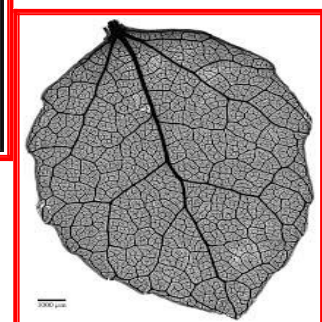
Reticulate venation

The net-work like venation in leaves is called reticulate Venation.



tip of leaf

Leaf stalk



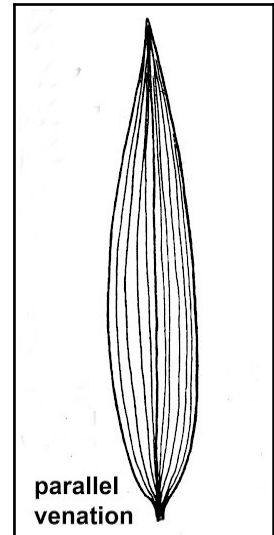


Parallel Venation



Banana Leaf

Parallel venation
The parallel arrangement of veins in leaves is called **Parallel venation**.



Differences between reticulate venation and parallel venation

Reticulate venation	Parallel venation
A main vein in the middle of the leaf, starting from the leaf stalk to its tip.	The veins starts from the leaf stalk ,they run parallel and join at the tip of the leaf.
Small veins start from both the sides of the large vein as branches. Smaller veins start from these branches. All these together form a network of veins.	There is no network condition because the veins are parallel to one another.

Venation and root system.

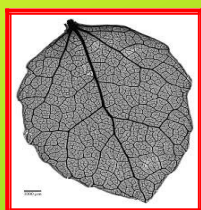
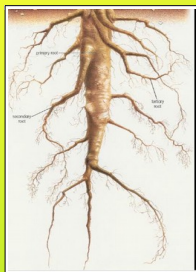


Tabulate the root system and venation of the plants we observed.

Name of the plant	Root system		venation	
	Tap root	Fibrous root	Reticulate	Parallel
Mango tree	✓		✓	
Coconut tree		✓		✓
Rose plant	✓		✓	
Jack tree	✓		✓	
grass		✓		✓
Bamboo		✓		✓

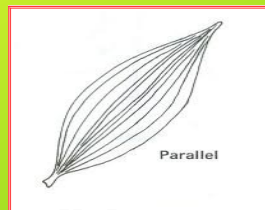
Plants with tap root system have reticulate venation.
Plants with fibrous root system have parallel venation

Tap root



Reticulate venation

Fibrous root



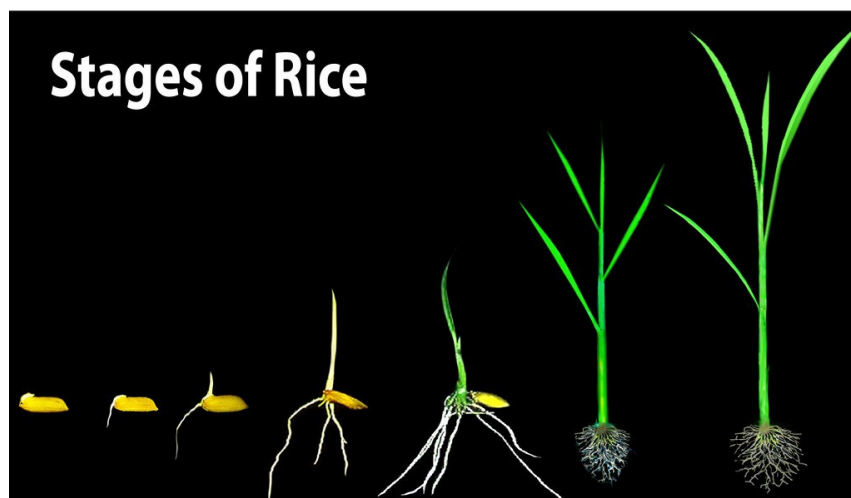
Parallel venation

Root system	venation
Tap root system	Reticulate venation
Fibrous root system	Parallel venation

Germination of seeds



Different stages of germination of a pea seed



Different stages of germination of a paddy grain

Which part of a plant comes out first from a germinating seed?

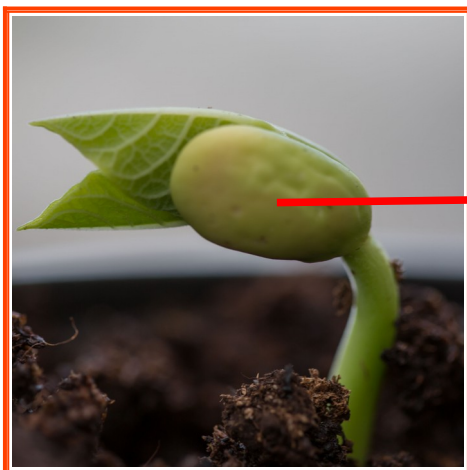


Plumule

Radicle

The part that comes out first from the seed is called **radicle**. **Radicle** grows into **root**. It grows down into the soil.

The part that comes out after the radicle is **plumule**. The **plumule** grows into the stem.



cotyledon

The thick leaf-like part seen in the Plumule of the germinating seed is the Cotyledon.

How do cotyledons help a germinating seed?

The food required for a seed to germinate, is stored in the cotyledon. So they are thick.

The plant grows using the food in the cotyledons till it Prepare its own food. So the cotyledons shrink and decrease in size as the plant grows.

Examine the cotyledons of germinating pea seed and paddy grain.

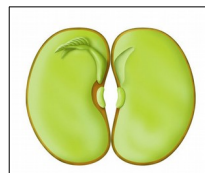


Pea plant

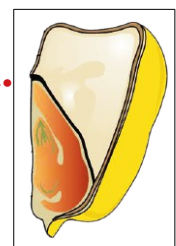


Rice grain

The pea plant has two cotyledons.



The rice plant has only one cotyledon.



Monocotyledonous plants and dicotyledonous plants.

Monocotyledonous plants (monocots)

Plants having only one cotyledon are called **monocotyledonous plants (monocots)**

Monocots

Rice plant
coconut tree
Wheat
Bamboo
Arecanut tree. Etc.
Banana plant

Dicotyledonous plants (Dicots)

Plants having two cotyledons are called **dicotyledonous plants. (Dicot)**

Dicots

Mango tree
Jack tree
Cashew tree
Pea plant
Pumpkin. etc.

Differences between monocots and dicots.

Monocotyledonous plants	Dicotyledonous plants
Fibrous root system.	Tap root system.
Parallel venation.	Reticulate venation.
one cotyledon in the seed.	Two cotyledons in the seed.
The outer part of the stem is harder than the inner part	The inner part part of the stem is harder than the outer part.

Relationship between Rootsystem, Venation, Number of cotyledon of the plants you have observed.



Plant	Root system	Venation	Number of cotyledon
Coconut tree	fibrous root	parallel	one
Mango tree	taproot	reticulate	two
Jack tree	taproot	reticulate	two
Rice plant	fibrous root	parallel	one
Pea plant	taproot	reticulate	two

Inference: (m)

Monocot plants have fibrous root system and parallel venation.

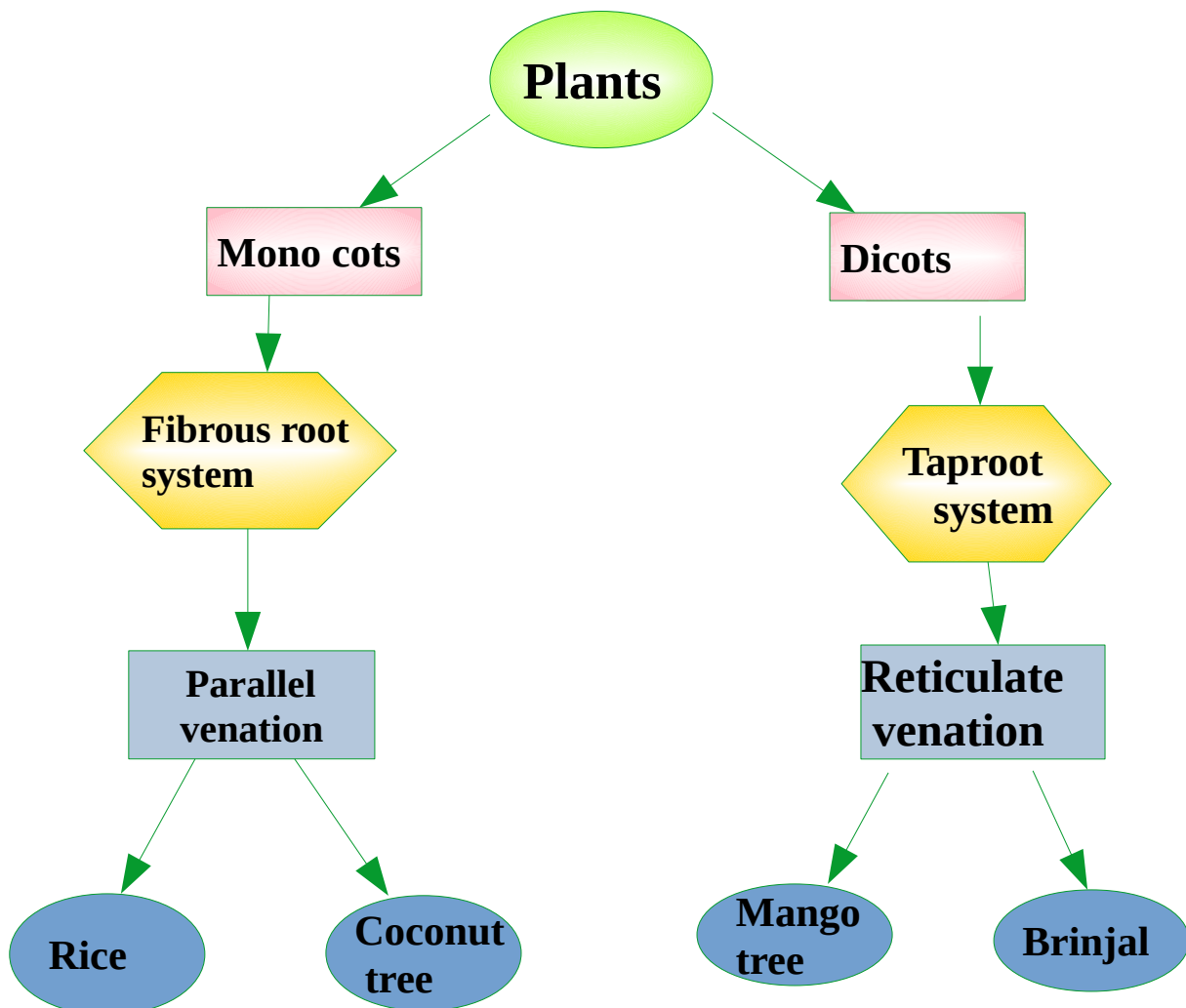
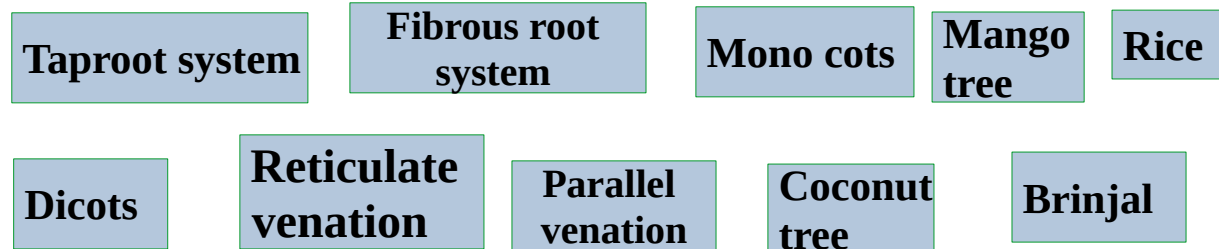
Dicot plants have taproot system and reticulate venation

Monocots plants → fibrous root system → parallel venation

Dicot plants → taproot system → reticulate venation.



Arrange the concepts given below and make a meaningful concept map.



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Govt UPS Kuttur.