Quadrant II- Notes

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Name of the presenter: Dr. Annie D'Souza e Gomes

LEAF TYPES: SIMPLE AND COMPOUND

In extreme cases of leaf incision (e.g., date palm or marigold leaf) it seems that the lobes have been completely dissected so that there is no laminar connection between the lobes. A closer observation, however, shows that a very narrow lamina connects the lobes. If dissection goes on still further even this connection disappears so that the lobes become completely independent of one ano-ther.

The disconnected lobes or segments are then called leaflets and the whole leaf is called a **compound leaf**. The compound leaf again may be **pinnate or palmate**. As opposed to these compound leaves showing an extreme type of dissection, the ordinary entire or incised (including even the -sect types) leaves are known as **simple leaves**.

In a simple leaf the lamina, however dissected, will present a single appearance because of the presence of some sort of laminar connection between the dissected lobes.

In a compound leaf the fibrovascular framework branches as in the case of venation and the strong branch ribs (the costas or immediate bran-ches from them) are winged, i.e., provided with lamina, forming leaflets.

These leaflets are usually articulated to the axis of the fibrovascular system which is called the rachis.

Leaf Incision

A compound leaf is sometimes confused with a twig bearing leaves. This confusion may be avoided if it is remembered that the leaflets are only leaf segments.

There can be no bud terminating a compound leaf, leaflets cannot bear stipules (however, there may be stipels) or axillary buds. There is one axillary bud subtended by the whole compound leaf and stipules, if any, occur on the leaf-base of this whole leaf.

The whole compound leaf can never arise from the axil of another leaf which would have been the case if it were a twig.

A compound leaf, just like venation, may be pinnate or palmate.

- Pinnate Compound:

In a pinnate compound leaf the rachis (which is the midrib) either bears the leaflets (also called pinnae) articulated directly along its two sides as in a feather or along the branches of this rachis.

The patterns may be as follows:

(**1) Simple pinnate or Unipinnate:**

Leaflets (usually in pairs) are borne directly on rachis.

(a) Paripinnate:

Leaflets are borne in pairs as in Tamarindus indica , different species of Cassia, Swietenia mahogoni, etc.

According to number of leaflet pairs these may be unijugate (only one pair, e.g., *Zornia diphylla*), bijugate (ground-nut), trijugate, etc.

(b) Imparipinnate:

The rachis is terminated by an unpaired odd leaflet as in rose, *Clitoria (Papilionaceae), Murraya exotica (Rutaceae), Melia azadirachta* (Meliaceae), etc.

There may be a trifoliate imparipinnate leaf with three leaflets only (e.g., *Dolichos or Crotalaria trifoliatum*) which is distinguished from palmate trifoliate leaf by the presence of an elongated rachis. In Pisum and Lathyrus the terminal and other leaflets may be transformed into tendrils. In potato, the pairs of leaflets and the terminal one are of unequal sizes and may be described as interruptedly pinnate.

(2) Bipinnate:

The pinnae are dissected again into pinnules so that the leaflets (pinnules) are borne not on die rachis but on its branches as in *Acacia nilotica , Mimosa pudica, Caesalpinia pulcherrima*, etc.

(3) Tripinnate:

Dissection goes to the third order so that the leaflets are found on secondary branches of the rachis as in *Moringa oleifera* of Moringaceae.

(4) Decompound:

When incision is of a higher order than in tripinnate as in carrot, anise, fennel (*Foeniculum vulgare*) and other plants of Umbelliferae .

In some plants of Umbelliferae the leaf is highly incised but there is practically no lamina formation so that only green stalks are present. This is the case in many aquatic plants as well.

B. Palmate Compound:

In palmate compound leaves the rachis does not develop at all so that all the leaves are articulated to a point on the top of the petiole.

These may be:

(1) Unifoliate:

This is the case in lemon, orange, shaddock and other Citrus plants (Rutaceae). Only a single leaflet is articulated to the top of the winged petiole. The articulation shows that the leaf is not a simple one but compound.

(2) Bifoliate Palmate or Binnate:

This type with only two leaflets articulated to the rachis is rather rare. This is found in *Balanites aegyptiaca* of Simarubaceae,

Hardwickia binnata of Papilionaceae, *Campsis grandiflora* of Bignoniaceae, etc.

(3) Trifoliate or ternate:

Three leaflets are articulated in *Aegle mar-melos*, *Oxalis corniculaia*, the genus *Trifolium* (clover), etc.

(4) Quadrifoliate Palmate:

This is another rare type found in the Paris plant. The very common Pteridophyte *Marsilea quadri-foliata* presents a quadrifoliate appearance although the actual morphology of the four leaflets is not so simple.

(5) Digitate or Multifoliate:

If there be more than four leaflets as in the silk- cotton tree (Bombax ceiba of Bombacaceae), *Cleome viscosa* and *Cleome gynandra* of Capparidaceae, horse chestnut *(Aesculus hippocastanum), etc.*