Lecture 2

BOTANY OF LEGUMES

Legumes are dicotyledonous, i.e. the embryo consists of two cotyledons or seed- leaves). The legume family is sometimes divided into three groups or subfamilies: Mimosoideae, woody plants and herbs with regular flowers, caesalpinoideae, plants with irregular flowers; papilionaceae, herbaceous and woody plants with a distinctive papilionate or butterfly shaped flower. Most of the forage and economically important legumes belongs to papilionaceae family. Legumes may be annuals, biennials or perennials.

A. Vegetative organs

1. Aerial parts

There are distinct morphological differences among the legumes but general characteristics of some plant are similar and rather uniform. The above ground portion consists of a main stem with axillary branches, usually compound leaves, stipules and inflorescences. Tillers sometimes arise from the basal portion of the stem (crown) and stems also develop axillary branches. The stems are jointed, with nodes and internodes, and are usually hollow, except at the nodes. They may be covered with hairs or may be glabrous. Herbaceous stems contains chlorophyll. The leaves contains a common leaf stalk (petiole), with 3 or more leaflets, each with its own stalk (petiolule). The leaves could be 'palmately' compound i. e leaflets directly attached to the end of the petiole e.g. *Centrosema pubescense* or' pinnately'

Compound when the petiole extends into a long slender structure with leaflets e.g. *Clitoria ternatea.* Some have leaflets modified to tendrils e.g. *Lathyrus spp.* Presence of *pulvinus* is the characteristic feature of legume family.

Stipules are leaf-like outgrowths found at the base of the main leaf stalk, vary in shape and size and used for identification of species. The leaflets and stipules may be smooth or possess hairs. The veins on the leaves are netted pattern unlike parallel venation of grasses.

2. Subterranean parts

The roots system of most legumes consists principally of an actively growing primary roots and its branches (secondary). The primary roots may penetrate the soil to a depth of 6-8m e. g Lucerne. The roots of many leguminous plants become infected by bacteria of the species

Rhizobium, Which grows and multiply, forming nodules which differ in size, shape and arrangement on the roots.

B. Reproductive organs

Inflorescence

The Mimosoideae produces flowers in dense heads or small globular, spike – like inflorescences, and commonly has the floral parts arranged in the sets of four, They are rendered conspicuous by the long, coloured filaments of the numerous stamens. e. g *Leucaena leucocephala* and *Acacia spp.*

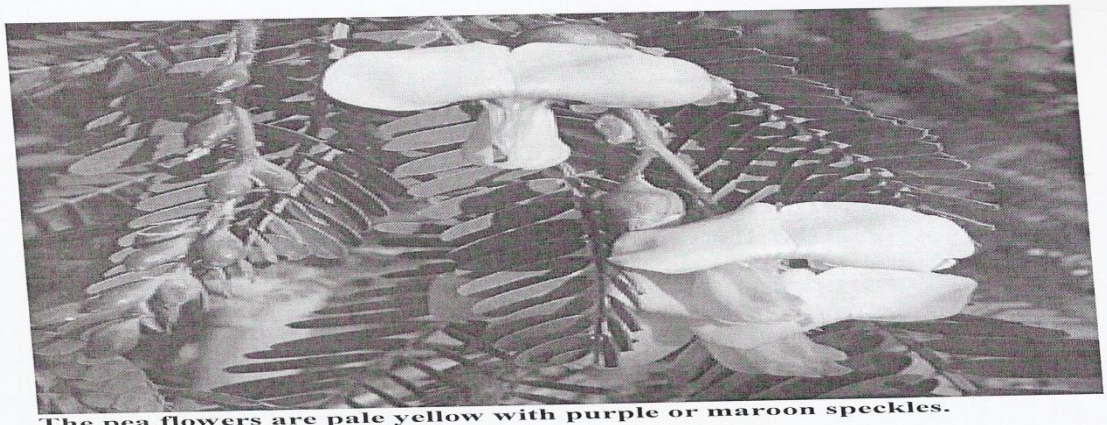
The caesalpinoideae flowers appears in clusters or racemes, with overlapping petals .The stamens are usually separated e. g *cassia spp., Ceratonia spp. and Gleditschia.*

The flowers of papilionaceae are arranged in racemes as in *Desmodium spp.* in heads as in T*rifolium spp.* or spike-like racemes as in *Medicago sativa*. There is a central axis, along with the individual flowers develop. Each flower has its own short stalk or peduncle. The inflorescence may be terminal or auxiliary.

The flower

The corolla consists of five petals of three distinct kinds : ‘standards’ or ‘banner’ uppermost or outer petal, largest and most showy; two wing petals, with slender stalks called the claw , and an expanded portion; keel, two petals folded together, partially concealed by the wing petals, the expanded portions more or less united at the outer margin into a boat-shaped structure.

The calyx with five teeth forms a tube at the base of the corolla. The keel encloses the stamens and pistil .The androecium consists of the ten stamens, the filaments of which may be united. The Staminal tube surrounds a superior ovary, an elongated structure comprising one carpel with one ovule or a single row or several ovules. A bent style surmounts the ovary and the stylar tip broadens into the stigmatic surface. The nectar resides at the bottom of the corolla.



The pea flowers are pale yellow with purple or maroon speckles.
Photo by R. P. Ellis courtesy Ecoport
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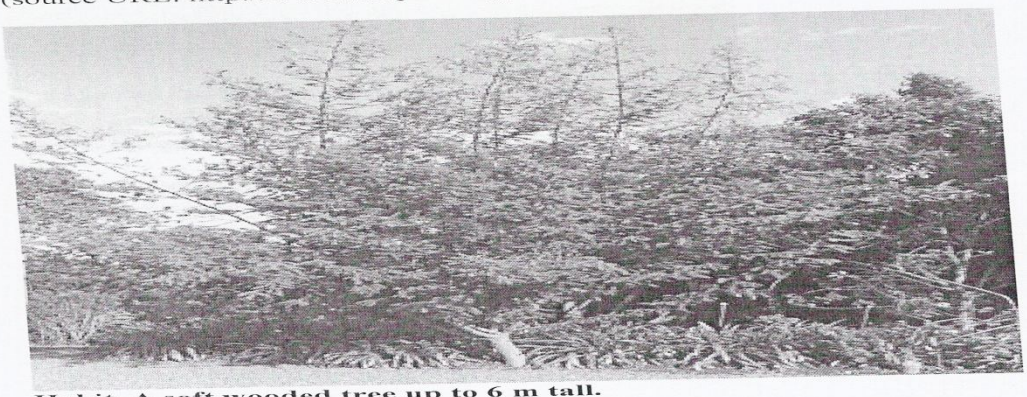

Habit. A soft wooded tree up to 6 m tall.
Photo by R. P. Ellis courtesy Ecoport