

Farming will never be a success unless the farmer  
had more voice in the disposal of  
his produce—P. Morrel.

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**Botany of some useful plants-II.**

*(Continued from January-February issue.)*

**CANAVALIA ENSIFORMIS.**

The sword-bean (Tam. Thambattankai, Coliavarakai or Valavarakai) is common throughout India being cultivated in gardens or round about the dwellings. It is supposed to be a native of India and several varieties exist. Many wild forms are met with some of which are held to be poisonous. Climbing and bush forms are found. The climbers are allowed to trail over trellis frames or over the roofs. The plant flowers mainly from August to October but many cases have been observed where flowering takes place even as late as March or April.

It is a perennial or biennial climber or scandent herbaceous plant with a rounded and twisted pubescent stem. The leaves are pinnately trifoliolate, with long petiole and prominent pulvinus. The petiole has a distinct groove on the upper surface. The stipules are small and warty and the stipels are very minute and subulate. The leaflets are borne on short cushiony stalks and are ovate acute, entire, pinnate-reticulate, leathery and sparsely pubescent.

The flowers are in axillary elongated racemes fasciated on a nodose rachis, of a bright pink or white colour with short pedicels. The bracts are minute and the bracteoles are bigger than the bracts and caducous. The calyx is gamosepalous, bell-shaped and obscurely two-lipped the upper lip consisting of two broad sub-connate lobes and the lower of three small teeth. The standard is large, orbicular and clawed. The wings are as long as the standard and spurred. The keels are fused in the middle but free above and below and spurred; they are slightly longer and broader than the wings. Stamens are ten in number and of two different heights. One posterior stamen is free at the base but united with the staminal tube for the major part (monadelphous); the anthers are oblong and uniform. There is a very prominent disc of yellowish glands surrounding the base of the ovary. The ovary is sessile, elongated, and flattened with an incurved style and a rounded terminal stigma. The pod is flattened with a prominent ridge on each valve, 6 inches to over a foot in length and  $\frac{3}{4}$ " to  $1\frac{1}{2}$ " in breadth. The seeds vary in number from eight to twelve. The pericarp is somewhat fleshy,

When young the pods are sliced and cooked as a vegetable. The mature seeds are used in soups.

#### PHASEOLUS.

This genus which is widely distributed both in the tropical and temperate regions supplies a number of important pulses and beans very commonly used as articles of diet. The representatives of this genus are mostly herbaceous, erect, prostrate or climbing in habit. Some species exhibit all these variations. The leaves are pinnately trifoliolate or very rarely unifoliolate with peltately fixed leafy stipules. The flowers are of various colours and occur in axillary racemes fasciated on an elongated peduncle. Conspicuous bracts and bracteoles occur. The gamosepalous calyx is often bellshaped with the posterior lobes usually fused together. The corolla is exerted with a recurved standard; the wings are often large and adnate to the keel; the keel petals are characteristically spirally coiled and include the stamens and the pistil. The stamens are diadelphous, nine and one. The ovary is sessile and many ovuled. The style which is enclosed inside the twisted keel is itself spirally coiled and is markedly bearded with an oblique stigma. The pod varies in size in different species.

The flowers are very well adapted for pollination by insects. Nectar is secreted at the base of the ovary and this can be obtained by the insects only if they push in their proboscis through a cleft at the carinal tip. The stamens surround the pistil and the pollen is shed on to the bearded portion of the style. The alae or the wings are adnate to the spirally twisted keel. When insects alight on the wings the pressure thus created acts on the keel which is depressed. Owing to this the stylar end with its pollen dusted brush protrudes from the tip of the keel and thus comes in contact with the body of the insect. It regains its normal position when the pressure is removed.

#### PHASEOLUS MUNGO.

The black-gram (Tam. Ulundu) is one of the most important of the pulses and is extensively cultivated throughout India. It is grown either by itself or as a mixed crop along with millets or cotton. In some parts it is sown on the bunds surrounding paddy fields. The seeds are sown with the rains and the crop is harvested about November. It prefers heavy soils and forms an important crop in black soils.

It is a hirsute diffusely branching herb the whole plant being rough with reddish and rusty-brown hairs. The entire plant has a dark green appearance. The flowers are axillary and are of a yellow colouration. The pods are generally somewhat cylindrical erect, septate between the seeds and covered with long ferruginous hairs, 8-15 seeded and about  $1\frac{1}{2}$ — $2\frac{1}{2}$  inches in length. The seeds are usually black but sometimes green seeds also occur.

The seeds enter into the composition of a good many culinary preparations and form one of the articles used for seasoning the various curries. Mixed with flour of rice the black gram as flour or made into a pulp is employed in the preparation of a variety of delicious cakes. Appalams and pappadams are preparations composed mainly of black gram flour. Next to rice it is one of chief ingredients in Hindu diet. The grain and the straw form valuable cattlefood. The seeds are used medicinally in the preparation of a medicated oil. Made into a pulp and mixed with egg albumen it is often applied externally on inflamed parts.

#### PHASEOLUS RADIATUS.

The green gram (Tam. Pasi or Pachai payaru) is a native of India and is distributed as cultivated and wild forms throughout the plains and up to a height of 6000 feet on the Himalayas. In Madras it is grown throughout the presidency generally as a

subsidiary crop to one of the cereals—as a second crop in rice-fields. It thrives best on good deep soils. The seeds are sown at the commencement of the rains and harvested about October to November.

This resembles *P. mungo* but can be differentiated from the latter by its being less hairy, less robust and the colour of the hair being more brownish than ferruginous. The plant as a whole is paler than mungo and is about 1-2 feet high. The flowers are of a light yellow creamy colour. The pods are generally smaller than those of *mungo* and the seeds are green or blackish green and smaller than those of *mungo*. The easiest way to distinguish the two is to split the seed; the black gram is white when split while the green gram is yellow.

The kernels are largely used mixed with rice by the Hindus and on ceremonial occasions this gram is used in place of dhal. Many sweets are prepared by using this gram. The husk of the seeds is used as an excellent cattle food. When grown thick this plant has a tendency to smother weeds and is used for this purpose in irrigated lands. The flour made from the kernel is employed in place of soap during baths, particularly in oilbaths for children and the constant use of this flour is said to improve the complexion and be cooling to the system.

#### PHASEOLUS VULGARIS.

The French bean or the kidney bean is a native of tropical America and is at present commonly cultivated in gardens throughout India. In Madras it is grown chiefly in the hillstations and Bangalore and Mysore. In America 145 varieties of kidney beans have been noted. These can be classified into two main groups as bush forms and climbing forms. The bush forms are dwarfy and are the varieties that are commonly cultivated on account of their high yield. Green podded and waxy podded forms are also present.

It is an annual with ovate leaflets. The flowers which are of a white, purple or yellow colour are small and borne on racemes shorter than the leaves. The pods are linear and smooth being  $\frac{1}{2}$ " broad and differ much in colour. The seeds are kidney shaped and often have a mottled appearance when old.

Young and green pods are used as a vegetable. The pods are also used after drying or are canned mixed with other articles of food. In the preparation of media for growing fungi powdered french beans are commonly used

## PHASEOLUS LUNATUS.

The lima bean which is also called butter bean or Burma bean by some, is a native of Brazil and is grown in many parts of India in gardens as a vegetable. As in the French bean both bush forms and climbers are found. The seeds are sown about October and the plants come into bearing in the course of 2 or 3 months.

The leaves are trifoliolate with small stipules. The flowers which vary in colour from pink to white or yellow are small and borne in axillary racemes. From the peduncle which is elongated the flowers are given off in clusters of 3, rarely more. The pod is flat, broad, green, scimitar shaped 10-12 cms. long and 3 cms. broad. Usually three seeds are formed inside each pod and measure  $3-3\frac{1}{2}$  cm. by  $2-2\frac{1}{2}$  cm. The seeds vary in colour being pink, white or mottled. The pericarp is very fibrous.

The seeds alone are generally used mixed with curries or made into soups. Very young pods are sometimes sliced and cooked like french beans.

## PHASEOLUS ACONITIFOLIUS.

The dew gram (Tam. Thulukkapayaru) is a native of India and is distributed throughout the country in the plains and on the hills upto 4,000 feet. In Madras it forms a subordinate crop and is grown mixed with others especially with millets on poor or dry sandy soil. Sometimes it is cultivated by itself for fodder and as a green manure. It is generally a hot weather crop sown about June-July and harvested about October-November. Heavy rainfall appears to be harmful to the crop.

It is an annual or perennial herb with a diffused trailing slender stem. The leaves are trifoliolate and the leaflets are deeply three lobed, the lobes being narrow and sometimes again variously cut. The flowers are yellow and are clustered at the end of an elongated peduncle. The pods are one to two inches long, glabrous and many seeded.

The pods when young are used as a vegetable. The seeds are used in place of dhal in Bombay. Medicinally the seeds are used in fevers. The whole plant is esteemed as a valuable fodder and a green manure.

*PSOPHOCARPUS TETRAGONLOBUS.*

The Goa bean which is an introduced plant is cultivated in gardens in many places in India. Usually it is made to grow over pandals or trellis frames. Some times it is sown round the edges of the fields. The seeds are sown in August-September and the pods come into the market in November-December.

It is a herbaceous climbing plant (twiner) with an obscurely ridged stem sparsely covered with short hairs. Leaves are pinnately trifoliolate, the petiole with a groove on the upper surface pulvinate and with peltately attached elongated leafy stipules upto 10 mms. long and 3 mm. broad. The leaflets are provided with cushiony stalks and are stipellate: the terminal leaflet has an additional joint with an extra pair of stipels. The lateral leaflets are oblique while the terminal one is cuneate, acuminate obscurely mucronate, entire with three prominent veins from the base.

Flowers are borne in axillary congested racemes at the end of long peduncles; they are short pedicellate, bracteate and bracteolate, the latter being longer and striate. The gamosepalous calyx is bellshaped and five lobed the two posterior being connate.

The standard is large and greenish white on the outside and blue inside clawed and greenish at the base; the wings are as long as the standard blue and clawed with a T-shaped spur; the keel petals are broad and connate above, with a truncate apex and whitish blue in colour.

Stamens are diadelphous, 10 in number, unequal in length with oblong basifixed anthers. There is a prominent honey disc made up of cushiony, yellow glands surrounding the base of the ovary. The ovary is sessile with a thick curved style and a profusely hairy stigma the hairs being silky white.

The fruit is a legume with a persistent style and provided with four prominent wings which are outgrowths from the pericarp; the wings are crisp and toothed; the pod varies from 18-20 cms. in length and is  $3\frac{1}{2}$  cms., in breadth from wing to wing. The seeds are attached to the ventral suture the long axis being parallel to the suture.

When young, the pod is sliced and cooked as a vegetable. Immature ones are sometimes pickled.