Notes on Legumes II

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IN this paper, further notes are presented on legumes which have mostly been under trial at the Experiment Station, Peradeniya. Some of these are new and others early introductions or indigenous species which have hitherto been either of restricted use or of little economic value.

Tropical legumes far outnumber those of temperate regions though they have not been utilised so intensively. There is need for more investigations into the possibilities of the numerous wild legumes that occur in various parts of the tropics for use as ground covers, companion crops in mixtures with non-legumes, components of grass leys and forage crops. Much work remains to be done in selecting and breeding improved strains.

Considerable progress could be made if tropical countries would carry out trials with the promising legumes growing in the same agro-climatic zone of others where such legumes are not already studied. In Ceylon, there have been several successful introductions in the past. Amongst ground covers for plantation crops, especially rubber, mention may be made of the following which were introduced from about 1922 onwards :—

First, there was *Dolichos hosei* Craib formerly known as *Vigna oligosperma* Backer, then *Centrosema pubescens* Benth., *Calopogonium mucunoides Desv.*, *Pueraria phaseoloides* Benth., *Indigofera endecaphylla* Jacq. and lastly *Desmodium ovalifolium* Wall. Of the more recent introductions *Stylosanthese gracilis* HB & K as a pasture legume and velvet beans *Stizolobium aterrimum* Piper and Tracy as a drought resistant annual ground cover for improving the fertility of arable land in the dry zone are outstanding.

The legumes in these notes are discussed under their characteristic habits of growth :—

(a) *Prostrate and semi prostrate plants*—(i) *Psophocarpus palustris* Desv. (-*P. longepedunculatus* Hassk.). This species made its appearance in 1950 as a few stray plants in one of the observation plots in which *Desmodium gyroides* D. C. was planted in May 1949 from seed. It was introduced from Java in 1936 and the seed probably remained dormant for a few years during the period that there was no record of its cultivation. From these plants, seed was collected and sown in an observation plot in 1950. A good cover was formed in about 4 months' time and even after a period of 2 years it showed no signs of dying back. It produces blue flowers and angular

pods 1½–2 in. long with serrated edges on the wings. The seeds are black and measure 0·50–0·75 cm. long and 0·5 cm. wide. This legume may prove of value as a ground cover for perennial crops and as a component of pastures. It originated from tropical Africa where the young pods are used as a vegetable. It is, unfortunately, susceptible to nematode attack.

(ii) *Glycine javanica* Linn. Although a native of tropical Africa and Asia, this legume does not commonly occur in this Island. In Southern Rhodesia it is known as the Rhodesian kudzu vine. A sample of seed was received from Mr. J. L. Schofield, Pasture Research Officer, Kenya, where it is common in grassland and was sown in an observation plot on October 23, 1950. Flowering commenced on January 16, 1951, and pod development soon followed. By February 15, an excellent cover was formed. The pods are black, about 1 in. long and 1/8 in. wide, slightly hairy each containing about 3–5 brown seeds per pod. As flowering and seed production apparently only take place in January, rooted cuttings were planted in new beds and grew successfully. This legume like *Psophocarpus palustris* forms a vigorous cover which stands up well to dry weather at the Experiment Station, Peradeniya. Bogdan (i) has recorded this species to be one of the most palatable, of those tested by him, to cattle and sheep. There is every possibility of its being a useful perennial pasture legume in Ceylon.

(iii) *Indigofera enneaphylla* Linn. and *Tephrosia pumila* Linn. These legumes are found growing in close association with grasses in gardens and paddocks in the dry zone and are subject to close and regular grazing by stock. The former which occurs to a greater extent in the northern part of the Island has a spreading habit and a thick rootstock and is similar in general appearance to *I. endecaphylla* Jacq. one of the recommended legumes for pastures in the wet lowlands, though its leaves and flowers are smaller. Chandrasekera and Sunderaj (2) report that in South India 'it enriches the value of the pastures and that cattle relish it'. Seed of the South India type was obtained and sown in an observation plot. Growth was slow and under wet zone conditions it did not prove to be a sufficiently vigorous legume for inclusion in pastures. *Tephrosia pumila* has a similar habit of growth but possesses small white or pink flowers and flat pods. Observations in the dry zone show that these two legumes form useful components of pastures in that zone though during the dry season they die down but come up again in the following wet season.

(iv) *Alysicarpus rugosus* D. C. This is an indigenous species, seed of which was collected from the north (Jaffna area). It was sown in observation plots both at the Agricultural Station, Horana, and later at the Experiment Station, Peradeniya. It proved to be a quick growing annual with a semi-erect habit. The leaves which are 4·3–4·8 cm. long and 2·9–3·8 cm. wide are much larger than those of the common *A. vaginalis* D. C. (Singh. *Aswenna* Tamil *kuthiravali*), a good legume for pastures of the wet lowland regions. The pods are 4·5 cm. long and 2·5 cm. wide with 5–6 seeded joints. The plants flower in 2 months and die self sown seed. The collection of the pods can be readily undertaken and the seed when sown germinates well. For early pastures, this is a useful legume in the dry zone.

(b) *Erect bush plants.*—(i) *Desmodium distortum* Aubl. Macbride. A seed sample was received in 1950 from Guatemala through the courtesy of the U. S. Department of Agriculture Office of Foreign Agricultural Relations and the U. S. Embassy in Colombo. This is a wild plant in Central America but was reported to be of value in feeding poultry and specially young chicks by the U. S. Department of Agriculture Visiting Mission to Guatemala.

The seed that was received germinated well in about 3 days' time. The first 5 to 6 leaves are single and oval in shape while the later leaves are trifoliate, elliptic ovate to ovate in shape, 5–9 cm. long, obtuse at the apex and covered with silica hairs. The purple flowers are borne on paniculate inflorescences. The pods are 2 cm. long and 0·20 to 0·25 cm. wide and contain 4/6 seeds per pod. The plants are perennial, herbaceous and slightly suffrutescent at the base. Flowering and pod formation take place between October and March. The plants grow to a height of 6 to 8 ft., but they can be repeatedly cut back to a height of about 1 ft., from the base from which new shoots arise. The loppings can be fed direct to cattle and goats and also to poultry after finely chopping. They can also be dried and converted into a hay meal by grinding for feeding poultry in a mash with other rations. The following analysis of the leafy tops of this legume and of lucerne for comparison were carried out at the Bureau of Animal Industry, Chemistry Laboratory, Manila (3) :—

	D. distortum		*Lucerne*	
	Fresh Per cent.	*Dry* Per cent.	*Fresh* Per cent.	*Dry* Per cent.
Moisture ..	77·38..	0·00..	76·05..	0·00
Crude protein ..	5·37..	23·73..	5·61..	23·44
Ether extract ..	0·81..	3·59..	0·58..	2·42
Crude fibre ..	4·37..	19·33..	6·56..	27·38
N. free extract ..	9·96..	44·02..	9·50..	39·66
Ash ..	2·11..	9·33..	1·70	7·10

D. distortum which was introduced from Guatemala in 1950 in the Philippines by Dr. J. V. Hepler of the U. S. Department of Agriculture is considered to be an ideal forage for goats as intestinal worm infection which is serious in that country is reduced to a minimum when the goats brouse on the shrub (3). This legume has been grown successfully at Peradeniya and seed has now been sent to other areas for trial.

(ii) *Cajanus cajan* (Linn.) Millsp. Pigeon pea or Toor dhal. The attempts that were made in the past to introduce the cultivation of this pulse in Ceylon resulted in varieties from abroad developing an excess of vegetative growth with poor seeding when planted here. These tree dhals were hitherto of little value. Within the last two years a few varieties from India have proved successful and types which produce small plants with heavy seeding have been isolated. The cultivation of seed dhal types is thus no longer a difficult problem in Ceylon. Investigations with tree dhal types in improving soil fertility are in progress at the Dry Farming Research Station at Maha Illuppalama.

SUMMARY

Two legumes—*Psophocarpus palustris* Desv. and *Glycine javanica* Linn.—give promise of being good ground covers and legume components of pastures and for the wet lowland zone. The former was introduced in 1936 from Indonesia (Java) though it originated from tropical Africa. The latter is an indigenous species though seed of a strain grown in East Africa received in 1950 is doing well.

Three legumes—*Indigofera enneaphylla* Linn., *Tephrosia pumila* Linn. and *Alysicarpus rugosus* D. C., are indigenous to the dry lowland zone of Ceylon. They grow in close association with grass and stand up well to grazing.

Desmodium distortum Aubl. Macbride is a forage legume which grows wild in Central America. It is reputed to be of value in feeding poultry and especially chicks. Seed was received in 1950 from Guatemala and the plants thus raised have come up well and seed satisfactorily. They are useful for goats to brouse on.

After many attempts to introduce the cultivation of pigeon pea in this Island, a few varieties have been found which seed satisfactorily.

REFERENCES

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