

## A Comparative Study of Cowpea (*Vigna sinensis*) and Clusterbean (*Cyamopsis psoraloides*) as Green Manure Crops for Gardenlands

by

S. PREMSEKAR, B. sc., (Ag.) and A. SUBRAMANIAM, B. sc. (Ag.)  
Agricultural College and Research Institute Coimbatore-3.

**Introduction :** The role of leguminous crops in crop rotation is well known. Since they have the capacity to fix the atmospheric nitrogen in the soil, legumes form the chief source of organic nitrogen available at a low cost. The desirable attributes of a good green manure crop are easily decomposable green matter rich in nitrogen and good vegetative growth within a short period of 60 days, so that it can easily fit into the gardenland rotation. At present, sunnhemp is universally grown as a green manure crop in the gardenlands of Coimbatore because of its short duration. Earlier study had focussed attention on Clusterbean as a good green manure crop in place of sunnhemp, because it provides the grower with a rich harvest of readily marketable green pods, before it is incorporated into the soil at 60 days growth (Veeraswami and Kunjamma, 1958). In another field study, Clusterbean C. P. 177 was fixed as the type best suited for the green manure due to its heavy vegetative growth and yield of green matter (Subramaniam and Premsekar, 1960).

Cowpea is another quick growing legume which is rich in nitrogen. It produces heavy foliage which is used as green manure to enrich the soil and also as green fodder for feeding cattle. In South India, it is mainly grown for its pods and grain. Due to its rapid vegetative growth it covers the ground very well and serves as a good cover crop for smothering weeds and to prevent soil erosion. The crop can also be ploughed in situ during its vegetative growth for green manure purposes. The entire plant dried to a moisture content of 11 per cent, contains 1.95% nitrogen, 0.52% phosphoric acid and 1.47% potash (Yegnanarayana Iyer). On original moisture basis it contains 0.7% of nitrogen (Yegnanarayana Iyer). The grain is extensively used in the form of *dhall* to supplement the cereal diet and it contains about 24% protein (Yegnanarayana Iyer). There are two distinct types of cowpea; the grain type *Vigna sinensis* grown in drylands and vegetable type *Vigna sesquipedalis* grown in gardenlands. The vegetable type produces superior quality pods which are fleshy, sweet and about a foot in length.

Among the grain types maintained at the Millet Breeding Station, type C. 521 was found to put forth a luxuriant growth both under rainfed and irrigated conditions. Detailed studies were made to assess the utility of cowpea C. 521 as a fodder cum green manure type.

**Materials and Methods:** A preliminary trial was conducted during 1960 summer season under irrigated conditions for estimating the yield of the fodder type C. 521 using seed rates ranging from 20 to 80 lb. per acre. The plots were randomised and replicated five times. Each plot was of 15 x 15 link size. The treatments were 20, 30, 40, 50, 60, 70 and 80 pounds seed rate per acre. The plots were irrigated immediately after sowing and subsequent irrigations were given once in a fortnight. One hand weeding and hoeing was given during the initial stages of crop growth. A second weeding was not found necessary as the crop was able to cover the ground effectively and smother the weeds completely. The crop was cut on the 60th day after sowing and yields of green matter recorded for different treatments.

A similar trial with clusterbean green manure type C. P. 177 with seed rates ranging from 20 to 60 lb. was also laid out during the same period, under irrigation. The plots were randomised and replicated four times using seed rates of 20, 30, 40, 50 and 60 pounds per acre. As in cowpea, the crop was cut at 60 days growth and the yield of green matter recorded. The yield data in respect of both the crops are presented below :

TABLE I.

*Green Manure yield of cowpea C. 521.*

S. No.	Seed rate per acre	Acre yield of green matter in lb.	Percentage increase over the general mean	Money value per acre in Rs.
1.	20 lb.	22,578	91.5	126
2.	30 lb.	22,933	92.9	128
3.	40 lb.	23,377	94.8	130
4.	50 lb.	25,956	105.2	145
5.	60 lb.	26,133	105.9	146

TABLE I. (Contd.)

S. No.	Seed rate per acre	Acre yield of green matter in lb.	Percentage increase over the general mean	Money value per acre in Rs.
6.	70 lb.	26,667	108.1	149
7.	80 lb.	25,067	101.6	140
General Mean		24,607	100	138
Standard Error		876	3.5	...
Critical difference		2551	10.3	...

Conclusion: 70 60 50 80 40 30 20

- Note: 1. Cowpea contains 0.7 lb. of nitrogen per 100 lb. of green matter.  
 2. One lb. of nitrogen is valued at 80 nP.

TABLE II.

*Green Manure yield of Clusterbeans CP. 177.*

S. No.	Seed rate per acre	Acre yield of green matter in lb.	Percentage increase over the general mean	Money value per acre in Rs.
1.	20 lb.	14,444	96.7	81
2.	30 lb.	14,667	98.2	82
3.	40 lb.	14,889	99.7	83
4.	50 lb.	15,778	105.7	88
5.	60 lb.	14,889	99.7	83
General Mean		14,929	100	84
Standard Error		489	3.1	...
Critical difference		...	...	...

- Note: 1. Clusterbean contains 0.7 lb. of N per 100 lb. of green matter.  
 2. One lb. of nitrogen is valued at 80 nP.

**Discussion:** From the above data it may be seen that in respect of cowpea, the yield of green matter increases steadily upto 70 lb. seed rate per acre when it attains the maximum. There is a trend for a lower yield at 80 lb. seed rate per acre. But the differences in yield of green matter between 50, 60 and 70 lb. seed rates are not significant.

Similarly in the Clusterbean trial, the yield of green matter attained the maximum with 50 lb. seed rate per acre and thereafter at 60 lb. there was a decrease. This is in conformity with the earlier findings that 40 to 50 lb. seed rate is optimum for sowing clusterbean as green manure crop (Subramaniam and Premsekar, 1960).

This comparative study of cowpea and clusterbean in the yield of green matter reveals that cowpea is superior to clusterbean. Further in respect of total money value on the basis of nitrogen content of green matter, cowpea gives a better return than clusterbean.

**Summary:** The utility of cowpea C. 521 and clusterbean C. P. 177 as green manure crop was studied using different seed rates per acre. The maximum yield of green matter was recorded for 70 lb. seed rate in cowpea and 50 lb. seed rate for clusterbean. The tonnage of green matter per acre at 60 days growth was higher for cowpea than that of clusterbean. It may be concluded that cowpea is better suited as green manure than clusterbean because of the higher yield of green matter, better smothering effect and higher total nitrogen added to the soil.

**Acknowledgment:** The authors are thankful to Sri S. G. Aiyadurai, Millet and Pulses Specialist for his suggestions and help in the preparation of this paper.

#### REFERENCES

- |                                     |  |
|-------------------------------------|--|
| R. Veeraswami and<br>V. K. Kunjamma | (1958) Guar or Clusterbean and its scope as a short duration Green manure crop.<br><i>Madras Agric. J.</i> , 45: (1): 7-9. |
| A. Subramaniam and<br>S. Premsekar  | (1960) Further studies on Guar as green manure cum vegetable crop.<br><i>Madras Agric. J.</i> , 47: (2) 478-480.           |
| A. K. Yognanarayan Iyer             | "Field crops of India".  |
| A. K. Yegnanarayana Iyer            | "Principles of crop Husbandry in India".   |