

A comparative study of Clusterbeans (*Cyamopsis tetragonoloba* Taub) as grain and vegetable crop*

by
S. PREMSEKAR¹

Synopsis: A comparative study of clusterbeans as grain and vegetable crop undertaken at the Millets Breeding Station, Coimbatore and evaluation of different varieties made are discussed in this paper.

Introduction: Clusterbeans is one of the popular vegetable crops of South India because of its low cost of cultivation, the lesser attention it demands and cosmopolitan growth habits. In recent times, clusterbeans seeds have assumed greater importance as a dollar earner due to demand in foreign countries. Good quality gum made out of its seed coat has found a variety of uses in textile products. Its flower is used for thickening ice cream mixes, salad dressings and bakery preparations (Subramaniam and Premsekar, 1960).

Eventhough clusterbeans seed has assumed importance as a commodity of trade, information on the yield response of varieties in respect of seed production is lacking. In view of the fact that clusterbeans is primarily a vegetable crop, it would be worthwhile evaluating the combined effect of different pickings of green pods and thereafter leaving it for seed production. A trial was therefore initiated at the Millets Breeding Station, Coimbatore, during 1960, in order to find out the response of different varieties of clusterbeans when grown purely for green pods (vegetables), purely for production of seed and the combined effects of these two practices. Besides this, the earliness of the varieties were recorded. The results of this trial are reported in this paper.

Review of literature: Work on similar lines in this crop has not been attempted before. In *Bhendai* (*Abelmoschus esculentus* Moench), Shanmugasundaram (1950) has reported that periodic picking of the tender fruits has induced the plant to produce more fruits, maximum number of fruits having got from a plot from which tender fruits were picked for the vegetable, throughout the period of growth. He has also recorded that more than 10 pickings for vegetable purposes lowers the number of seed producing pods and consequently the total revenue.

Madhava Rao (1953) has worked out the monetary return obtained out of growing *Bhendai* (1) as a pure vegetable crop; (2) partly for consumption as vegetable and partly for seed production; (3) purely for seed production. His findings are that picking tender fruits for consumption, after leaving the fruits two trusses for seed has proved significantly superior to the treatment in which the entire crop was left for seed. He has pointed out, further, that periodical

¹ Post-graduate student, Faculty of Plant Breeding and Genetics, Agricultural College and Research Institute, Coimbatore-3.

* Received on 15-11-1962.

picking of fruits for vegetable, has stimulated the plants to produce large number of fruits than the treatments in which a portion or all of the crop was diverted for seed purposes.

Materials and methods: The experiment was laid out by taking due precautions that are necessary for the conduct of a field trial. A split plot design was adopted with four varieties as major variants and six treatments of pickings, etc., as sub plots, replicated four times. A plot size of 20 x 10 links was used for the experimental study. The varieties in the main plot treatments were: 1. Pusa Mousmi (I. A. R. I.), 2. C. P. 78 (Mylapore, Madras), 3. C. P. 380 (Extracted type) and 4. C. P. 59 (Tiruchirapalli).

- Sub plot :**
1. One picking for vegetable and rest for seed production.
 2. Two pickings for vegetable and rest for seed production.
 3. Three pickings for vegetable and rest for seed production.
 5. Entire produce for vegetable.
 6. Entire produce for seed production.

A basal dressing of five tons of compost per acre was applied. The crop was sown in lines with two links apart and 1/2 link within the line. The crop received two intercultivations during the growth period. Weekly pickings for green pods were made in all treatments except in treatment 6, where the produce is entirely for grain. Pickings for vegetable was continued, however, in treatment 5, till the crop stopped producing green pods.

To evaluate the earliness of bearing, the Bartlett's index for earliness was adopted. Bartlett's index of earliness was calculated by using the formula :

$$\frac{(y_1 \times n) + (y_2 \times (n-1)) + (y_3 \times (n-2)) + \dots + (y_n \times 1)}{Y \times n}$$

Where Y is the total yield of a variety, n is the total number of pickings, and $y_1, y_2, y_3, y_4, \dots, y_n$ are the yields of individual pickings of 'n' pickings. The higher the value of the calculated index, earlier the type in duration. Earliness of the varieties was also arrived at by working out the percentage of each picking to the total green pod yield, for each variety.

For prices comparison of various treatments, the monetary benefits that may result due to vegetable and seed production was worked out for each treatment and formed the basis of comparison. The monetary value per plot was calculated by assigning a price of 25 nP. per kg. for vegetable and 70 nP. for seed. This value was adopted on the basis of the prevailing farm price.

Results: The yield of green pods from each of the varieties was recorded in grams per plot and statistically analysed. The results are presented in table 1.

A scrutiny of the data would indicate that Pusa Mousmi has given the highest return of green pods, yielding over 700 kg. per acre which is 42 per cent higher yield than the control. The other two varieties have proved inferior to the control. In respect of yield for purely seed purpose, the variety C. P. 78 has given the significantly highest yield, recording 250 kg. per acre.

TABLE 1.

Summary of Results between varieties.

Variants	Yield of vegetable		Yield of seed		Monetary income per acre	Pod to seed ratio as percentage	Bartlett's index for earliness
	per acre in kg.	as % on control	per acre in kg.	as % on control			
1. Pusa Mousmi	722	142	113	45	565	35	0.670
2. C. P. 78	438	100	251	100	460	51	0.567
3. C. P. 59	308	70	120	48	265	47	0.453
4. C. P. 380	307	70	79	32	245	38	0.485
Whether significant by 'Z' test (P=0.05)		Yes		Yes			
Critical difference	152		75				
Standard Error	47		23				

Conclusions :

- Yield of vegetable per acre :
Between varieties Pusa Mousmi C. P. 78 C. P. 59 C. P. 380
- Yield of seed per acre :
Between varieties C. P. 78 C. P. 59 Pusa Mousmi C. P. 380
- Monetary income per acre :
Between varieties Pusa Mousmi C. P. 78 C. P. 380 C. P. 59

The summary of the statistical analysis of the data on monetary return in rupees that could be expected from growing the four varieties and the efficacy of the different treatments are presented in the tables 1 and 2. It may be observed that in respect of total income per acre, Pusa Mousmi is the only variety that has surpassed the control giving an income of Rs. 565/- per acre. In respect of different treatments, treating the crop for purely vegetable purposes (treatment 5) brings the highest monetary return of Rs. 1045/- per acre.

From the data collected on the earliness study for the different varieties, it may be seen that Pusa Mousmi has given the highest index for earliness, i.e., 0.670, followed by C. P. 71 which has recorded 0.597. The time taken to produce 50 per cent of total green pod yield was taken as basis for reckoning the earliness of varieties. Pusa Mousmi has attained this level in four weekly pickings, while six weekly pickings were required by C. P. 78 and 11 weekly pickings by C. P. 380 and C. P. 59 to reach the same level of production as that of Pusa Mousmi. This indicates that Pusa Mousmi is the earliest, closely followed by C. P. 78.

Discussion : A variety to qualify as a good vegetable crop should not only prove to be a good yielder but should possess fleshy pods with fewer seeds. Lower is the pod to seed ratio in a variety, more eminently is it suited for

TABLE 2.
Summary of results between treatments.

Treatments	Yield of seed per acre in kg.	Monetary income per acre in Rs.
1. One picking for vegetable and rest for seed	153	185
2. Two pickings for vegetable and rest for seed	130	235
3. Three pickings for vegetable and rest for seed	143	315
4. Four pickings for vegetable and rest for seed	113	405
5. Purely for vegetable	Does not arise	1045
6. Purely for seed	169	115
Whether significant by "Z" test ($P=0.05$)	Yes	Yes
Critical difference	32	81
Standard Error	11	29

Conclusions:

- Yield of seed per acre:

Between treatments	6	1	3	2	4
--------------------	---	---	---	---	---
- Monetary Income:

Between treatments	5	4	3	2	1	6
--------------------	---	---	---	---	---	---

vegetable purpose. As such Pusa Mousmi proves itself as a better vegetable type than others in having low pod to seed ratio combined with higher yield. Even though C. P. 380 has low pod to seed ratio, it is shy in bearing as compared to Pusa Mousmi. Hence Pusa Mousmi may be taken as the most suitable type to replace C. P. 78 for vegetable purpose.

Regarding the seed yield, variety C. P. 78 has proved as the best, while other varieties have yielded very much less. The high pod to seed ratio is suggestive of its capacity to produce more seeds per pod which ultimately reflects on the seed yield. As regards the effect of picking vegetable on the yield of seed, it is profitable to take one picking of vegetable (treatment 1) before leaving the crop for seed production instead of leaving the entire crop for seed purpose (treatment 6). It may be seen, that treatment 3 has given a higher monetary return over treatment 2 which should have normally given the next best yield to that of treatment 1. This may perhaps be due to the fact that irrespective of the variety, the initiation of frush clusters is quicker between second and third pickings than it is between first and second pickings.

As regards the monetary return per acre from the different varieties, as an entity and the different treatments as another entity, the following independent conclusions can be drawn. Pusa Mousmi has proved the best variety for fetching good monetary return followed by the control C. P. 78. It is quite interesting to note that a higher proportion of money value for the varieties was contributed by vegetable than by seed yield, in spite of the low rate of the price fixed for the vegetable. Among the treatments, picking the entire crop for vegetable purpose (treatment 5) gives the maximum return.

The interaction for variety and the treatment also reflect these trends in that Pusa Mousmi has returned the highest monetary income per acre when treated as vegetable crop (treatment 5). The same trend is observed with other varieties as well. C. P. 78 proved the next best variety. Thus it is clear that clusterbeans is more eminently suited as a vegetable crop than as a seed crop.

The earliness study of clusterbeans has shown that Pusa Mousmi and C. P. 78 are earlier types than the other two by 30 to 40 days. The earliness exhibited by the two early varieties (Pusa Mousmi and C. P. 78) is due to their capacity to reach the peak of vegetable production, i. e., 50 per cent of total vegetable yield within a space of eleven to thirteen weeks from date of sowing whereas the late types C. P. 380 and C. P. 59 take eighteen weeks each from date of sowing to yield 50 per cent of total production. The late types exhibit an accelerated rate of bearing in the later weeks.

Conclusion: For vegetable purpose Pusa Mousmi has proved as an economic type, giving significantly higher return per acre than others. In respect of seed yield alone, C. P. 78 is the most promising type. These two types are worthy of popularising. For obtaining good monetary return from growing clusterbeans, it is more profitable to grow it as a vegetable than for seed. If it is to be grown for seed purpose, it is economical to take one picking of vegetable and leave the rest of the produce for seed. Pusa Mousmi and C. P. 78 are the earliest types by 30 to 40 days over others.

Acknowledgement: The author is grateful to Dr. B. W. X. Ponnaiya, Professor of Plant Breeding and Genetics for his helpful suggestions and keen interest evinced in the conduct of the trial. To the Pulses Specialist his thanks are due for the encouragement and guidance.

REFERENCES

- | | |
|-------------------------------------|---|
| Madhava Rao, V. N. | 1953 Certain aspects of harvest in relation to crop performance in Bendai (<i>Hibiscus esculentus</i> Linn.). <i>Madras agric. J.</i> , 40: 1-8. |
| Shanmugasundaram, A. | 1950 Variation in the fruiting habit of <i>Bhendai</i> . <i>Mezhichelvam</i> , August, 1950. |
| Subramaniam, A. and
S. Premsekar | 1960 Seed production in Guar (Clusterbeans). <i>Madras agric. J.</i> , 49: 117-20. |