**Vegetable Dyes**

Acacia catechu

Butea monosperma

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# YIELD VARIATION IN SUMMER GREEN GRAM WITH RESPECT TO EFFECTIVE FLOWER PRODUCTION IN DIFFERENT DATES OF SOWING

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**ABSTRACT**

A trial was undertaken in 1992 with six green gram varieties in four dates of sowing to identify the best performing varieties and the most suitable time for sowing with respect to effective flower production in the summer season. The best varieties in terms of flower production and grain yield were AAU-39 and ML-131. Flower drop and poor pod setting were the most serious problem limiting crop yield. Total number of flower produced, percentage flower retention and total number of pods harvested were positively correlated with grain yield. The best period for sowing summer green gram was identified as the period between last week of February and first fortnight of March.

KEYWORDS : Green gram, yield variation, effective flowers

Green gram (*Vigna radiata* (L.) Wilcjek), which is mainly cultivated in the *kharif* season in Assam occupies around 9000 ha of cultivable land. Until a few years back, summer green gram and black gram cultivation was not a traditional practice among the farmers of Assam. But after intensive research and extension efforts, many of the farmers are beginning to cultivate these crops in the summer season also. As most of the upland in Assam remains vacant in the period between February and March, the cultivation of summer green gram and black gram provide the farmers

with an extra income. It also helps in enhancing the fertility status of the soils. Six green gram varieties were identified for cultivation in the summer season. However, recently it has been observed that these varieties were behaving erratically when sown in the early February or late March. Hence, the main objective of the study was to identify the best varieties with maximum flower retention and the most suitable time of sowing within this period (February-March). As it was observed that the number of pods per plant in all these six varieties showed a varying trend when sown in different dates within this period, the main emphasis in this study was given on counting the number of flower buds produced, number of aborted flowers and the final number of pods per plant an correlating it with the actual grain yield obtained in all the varieties under study.

## MATERIALS AND METHODS

The experiment was conducted at Shillongani in the year 1992 with the varieties, PS-16, AAU-39, ML-131, PIMS-1, 11/395 and T-44. Seeds were sown in four dates of sowing, *viz.*; $D_1$ (17 February). $D_2$ (27 February), $D_3$ (9 March) and $D_4$ (19 March) with four replications in each sowing. Ten random (uniform) plants were selected in each variety in all the replication in all the four dates of sowing. Observations on number of flower buds initiated, number of shedded flowers, number of pods per plant, grain yield per plant and plot yield were recorded. The data was subjected to statistical analysis following standard procedure. Correlation coefficients were worked out according to Johnson *et al.* (1955).

## RESULTS AND DISCUSSION

The analysis of variance revealed that considerable variation exists among the varieties in respect of all the characters studied. All the six varieties performed exceptionally well in terms of flower produced and pod setting (Table 1) when sown of $D_2$. After $D_2$, there was a gradual decrease in the number of flowers produced and pod setting upto $D_4$. In $D_1$ also, the number of flowers produced and pod setting was low in comparison to $D_2$. It was observed that (Table 1) the maximum number of flowers were produced in the variety AAU-39 (60.0) followed by ML-131, PS-16,

**Table 1. Mean data on characters under study of six green gram varieties in four dates of sowing**

| Varieties | Number of flower buds plant$^{-1}$ | | | | Number of shedded flowers plant$^{-1}$ | | | | Percentage flower retention | | | | Number of pods plant$^{-1}$ | | | | Grain yield plant$^{-1}$ (g) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $D_1$ | $D_2$ | $D_3$ | $D_4$ | $D_1$ | $D_2$ | $D_3$ | $D_4$ | $D_1$ | $D_2$ | $D_3$ | $D_4$ | $D_1$ | $D_2$ | $D_3$ | $D_4$ | $D_1$ | $D_2$ | $D_3$ | $D_4$ |
| PS-16 | 35.4 | 55.6 | 39.6 | 18.4 | 8.2 | 4.9 | 6.0 | 10.0 | 76.8 | 91.2 | 84.8 | 45.7 | 27.2 | 50.7 | 33.6 | 8.4 | 12.9 | 21.4 | 14.6 | 6.7 |
| AAU-39 | 39.4 | 60.0 | 49.2 | 30.2 | 6.6 | 4.3 | 5.4 | 8.0 | 83.2 | 92.8 | 89.0 | 73.5 | 32.8 | 55.7 | 43.8 | 22.2 | 15.2 | 26.1 | 17.9 | 11.1 |
| ML-131 | 35.6 | 58.7 | 44.5 | 26.3 | 7.0 | 4.2 | 6.2 | 9.4 | 80.3 | 92.8 | 86.1 | 64.3 | 28.6 | 54.5 | 38.3 | 16.9 | 13.0 | 24.4 | 16.1 | 9.3 |
| PIMS-1 | 30.5 | 49.6 | 32.5 | 25.2 | 8.4 | 5.0 | 7.4 | 11.1 | 72.5 | 89.9 | 77.2 | 55.9 | 22.1 | 44.6 | 25.1 | 14.1 | 6.4 | 15.6 | 11.1 | 6.9 |
| 11/395 | 31.0 | 46.3 | 33.4 | 21.6 | 6.9 | 5.2 | 6.9 | 12.9 | 77.7 | 88.8 | 79.3 | 40.3 | 24.1 | 41.1 | 26.5 | 8.7 | 7.9 | 14.2 | 11.8 | 5.2 |
| T-44 | 26.4 | 41.2 | 29.2 | 22.4 | 6.8 | 5.1 | 7.4 | 10.8 | 74.2 | 87.6 | 74.7 | 51.8 | 19.6 | 36.1 | 21.8 | 11.6 | 5.4 | 11.2 | 8.3 | 6.1 |
| CD 0.05 | 3.1 | 4.6 | 2.9 | 3.7 | 0.20 | 0.15 | 0.21 | 1.2 | 1.9 | 0.8 | 2.8 | 3.2 | 3.2 | 4.2 | 4.9 | 3.8 | 1.7 | 3.0 | 2.6 | 0.9 |

$D_1$ : 17 February ; $D_2$ : 27 February ; $D_3$ : 9 March ; $D_4$ : 19 March

Table 2. Mean grain yield (kgha$^{-1}$) of six greengram varieties in four dates of sowing

| Varieties | Mean grain yield kgha$^{-1}$ | | | | |
|---|---|---|---|---|---|
| | $D_1$ | $D_2$ | $D_3$ | $D_4$ | Mean |
| PS-16 | 731 | 903 | 867 | 724 | 806 |
| AAU-39 | 905 | 1391 | 1235 | 957 | 1122 |
| ML-131 | 820 | 1148 | 925 | 764 | 914 |
| PIMS-1 | 626 | 841 | 804 | 579 | 713 |
| 11/395 | 762 | 824 | 782 | 595 | 741 |
| T-44 | 607 | 766 | 694 | 604 | 668 |
| CD at 5%. | 174 | 225 | 189 | 170 | |

$D_1$ : 17 February ; $D_2$ : 27 February ; $D_3$ : 9 March ; $D_4$ : 19 March

PIMS-1, 11/395 and T-44 in $D_2$. It was also interesting to note that with the decrease in the number of flowers produced in the four dates of sowing there was also a gradual increase in the number of shedded flowers from $D_2$ to $D_4$ and $D_1$ also. Percentage flower retention also followed a similar pattern. There was significant different among the varieties in respect of grain yield in all the four dates of sowing (Table 2). The variety AAU-39 was the highest yielding variety in all the four dates of sowing followed by ML-131. The varieties where maximum number of flowers were produced in all the four dates. These results are in conformity with the findings of Kumari and Varma (1983) in mungbean and Ogunbodede (1990) in cowpea.

There appears to be a positive correlation between the number of flowers produced and the final grain yield in all the six varieities (Table 3). All the varieties producing more flowers retained more pods and showed higher yields in comparison to the other varieties. Percentage flower retention and total number of pods harvested were also positively correlated with grain yield both at genotypic and phenotypic levels. Number of shedded flowers was negatively correlated with number of pods and grain yield. Similar results were also reported by Kumari and Varma (1982) in mungbean and Ogunbodede (1990) in cowpea.

From the above results it can be inferred that the best period of sowing summer greengram was the period between $D_2$ and $D_3$ when all the six varieties produced the maximum number of flowers and the grain yield was higher than in the other dates. The best varieties in terms of flower produced and grain yield were AAU-39 and ML-131. Flower drop and poor pod setting appeared to be the most serious problem limiting crop yields in all the other dates of sowing in comparison to $D_2$. So, if the farmers are to get the maximum benefit from summer green gram cultivation in Assam they will have to opt for the better varieties like AAU-39 and ML-131 and sow their crops in the period between fourth week of February and the first fortnight of March, instead of sowing their crops in early February or during late March.

Table 3. Genotypic (G) and phenotypic (P) correlation between various characters in six green gram varieties[1]

| Characters | | Number of shedded flowers plant$^{-1}$ | Percentage flower retention | Number of pods plant$^{-1}$ | Grain yield plant$^{-1}$ |
|---|---|---|---|---|---|
| Number of flower buds plant$^{-1}$ | G | 0.129 | 0.513** | 0.813** | 0.621** |
| | P | 0.068 | 0.402** | 0.762** | 0.590** |
| Number of shedded flowers plant$^{-1}$ | G | | 0.109 | -0.269** | -0.229** |
| | P | | 0.084 | -0.194** | -0.164** |
| Percentage flower retention | G | | | 0.343** | 0.510** |
| | P | | | 0.286** | 0.423** |
| Number of pods plant$^{-1}$ | G | | | | 0.619** |
| | P | | | | 0.496** |

** Significant at 0.01 probability level

1 Analysis done on pooled data of four dates of sowing

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