



REPRODUCTIVE AND YIELD PARAMETERS AMONG SEED CLUSTER BEAN CULTIVARS UNDER WEST GODAVARI CONDITIONS

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Abstract

The range of crop duration was from 92.44 days (HG 870) to 102.15 days (HG 365) with mean of 95.66 days (Table 2). The crop duration was found highest in the cultivar HG 365 (102.15 days) which was on par with RGC 197 (101.32 days). Maximum pod yield per plot was recorded for HG 365 (3.89 kg) which was on par with HG 884 (3.86 kg), RGC 1017 (3.46 kg), RGC 1033 (3.45 kg), HG 563 (3.44 kg), RGC 936 (3.42) whereas minimum pod yield per plant was recorded in RGC 1002 (2.41 kg). Five cultivars registered numerically higher yield compared to check HG 563. Maximum seed yield per plot was recorded for HG 365 (1.85 kg) which was on par with RGC 1033 (1.82 kg) and RGC 1003 (1.62 kg), whereas the minimum seed yield per plant was found in RGC 197 (1.48 kg) which was on par with RGC 1055 (1.49 kg), HG 2-20 (1.51 kg), RGC 1038, RGC 1002 (1.53 kg), HG 563 (1.58 kg) and RGC 1003 (1.62 kg).

Key words: Seed guar, reproductive and yield parameters.

Introduction

Cluster bean is botanically called as *Cyamopsistetragonoloba* (L.). It belongs to the family Leguminaceae. The crop is popularly known as guar referring to its seed. India is considered as native place for guar or cluster bean. Very limited scientific information is available on local germplasm evaluation in this crop under Godavari Zone of Andhra Pradesh. Cluster bean has good germplasm collection in our country. Evaluation of the cultivars is required across different locales or agro-climatic regions to know their performance in terms of yield and its attributing characters.

Material and Methods

The present investigation was carried out during the year 2015-16 at College of Horticulture, Dr. Y.S.R Horticultural University, Venkataramannagudem, West Godavari District. A total of 14 cultivars were taken for evaluation study which were sourced from Rajasthan Agriculture Institute and Hissar Agriculture Institute whereas, the rest of the accession were sourced from Andhra Pradesh. Observations was recorded on days to flower initiation, days to 50% flowering, days taken from flowering to pod maturity, Number of pod yield per plot (kg) and seed yield per plot (kg).

Results and Discussion

Days to flower initiation

The data for days to first flowering ranged from 16.65 days (RGC 1033) to 23.01 days (HG 2-20) and showed mean value of 18.90 days (Table 1). Exhibited first flowers in 17.01 days next only to RGC 1033 and followed by HG 884 (17.15 days) and RGC 1017 (17.17 days), whereas cultivars HG 2-20 (23.01 days) and RGC 197 (23.00 days) took the longest period for first flowering. The earlier flower initiation was observed in six cultivars as compared to the check HG 563 (18.09 days). Similar results were reported by Nehra and Manjunath (2001) in cow pea.

Days to 50% flowering

Days to 50% flowering exhibited a mean value of 21.22 days which varied from 25.38 days (HG 365) to 19.26 days in RGC 1002 and RGC 986 (Table 1). The cultivars RGC 1038 (20.16 days) and HG 563 (20.41 days) attained the stage of 50% flowering next only to RGC 1002 and RGC 986, whereas the cultivar HG 365 (25.38 days) showed longest duration for days to 50% flowering on par with RGC 197 (25.00 days). When compared to check HG 563 which took 20.41 days to fifty per cent flowering, nine cultivars were found to be

Table 1: Flowering parameters in cluster bean cultivars.

| S. No. | Cultivars | Days to flower initiation | Days to 50% flowering |
|-----------------|-----------------|---------------------------|-----------------------|
| 1 | RGC1003 | 17.01 | 21.24 |
| 2 | RGC1038 | 20.52 | 20.16 |
| 3 | RGC1055 | 19.26 | 22.32 |
| 4 | RGC1002 | 18.07 | 19.26 |
| 5 | RGC197 | 23.00 | 25.00 |
| 6 | RGC1017 | 17.17 | 22.05 |
| 7 | RGC936 | 18.72 | 20.75 |
| 8 | RGC1033 | 16.65 | 20.57 |
| 9 | RGC986 | 19.81 | 19.26 |
| 10 | HG2-20 | 23.01 | 20.62 |
| 11 | HG870 | 19.26 | 19.44 |
| 12 | HG884 | 17.15 | 20.73 |
| 13 | HG365 | 17.01 | 25.38 |
| 14 | HG563 (Check) | 18.09 | 20.41 |
| Mean | | 18.90 | 21.22 |
| SEm± | | 0.76 | 0.95 |
| CD at 5% | | 2.22 | 2.78 |

earlier to achieve this stage.

Minimum days for first flower initiation has been observed with the cultivars RGC 1033, HG 365 and HG 884, on the other hand HG 2-20, RGC 197 and RGC 1038 were found comparatively late for showing the first flower. However, the stage of 50% flowering did not exactly occurred in the same sequence indicating that some of the cultivars though initiated flower bud took an extended period of time to gear up the transformation into reproductive phase in all the plants in a population. Thus, the cultivars RGC 986, RGC 1002, HG 870, RGC 1038, HG 563, RGC 1033 and HG 884 attained 50% flowering stage one after the other among which only RGC 1033 and HG 884 were first to initiate flowering. The other cultivar HG 365 which was also first to initiate flowering took a great amount of time to pick up and was comparatively late to achieve fifty per cent flowering stage. Bezerra *et al.* (2001) documented similar results in cowpea.

Days taken from flowering to pod drying

The data for flowering to pod drying days per plant ranged from 73.12 days (HG 563) to 81.25 days (HG 365) with mean of 74.46 days (Table 2). The maximum number of days from flowering to pod drying per plant was recorded for HG 365 (81.25 days). whereas minimum number of pods per plant was found in HG 563 (73.12 days) which was on par with RGC 197 (74.20 days), RGC 1003 (74.53 days). Seven cultivars were found to

Table 2: Time taken from flowering to pod drying and crop duration in cluster bean cultivars.

| S. No. | Cultivars | Days taken from flowering to flowering | Crop duration (days) |
|-----------------|-----------------|--|----------------------|
| 1 | RGC1003 | 74.53 | 95.77 |
| 2 | RGC1038 | 75.95 | 93.26 |
| 3 | RGC1055 | 75.70 | 95.28 |
| 4 | RGC1002 | 76.16 | 95.42 |
| 5 | RGC197 | 74.20 | 101.32 |
| 6 | RGC1017 | 76.69 | 95.00 |
| 7 | RGC936 | 78.10 | 93.09 |
| 8 | RGC1033 | 79.19 | 96.10 |
| 9 | RGC986 | 76.88 | 96.24 |
| 10 | HG2-20 | 75.98 | 96.39 |
| 11 | HG870 | 75.50 | 92.44 |
| 12 | HG884 | 78.75 | 93.71 |
| 13 | HG365 | 81.25 | 102.15 |
| 14 | HG563 (Check) | 73.12 | 93.03 |
| Mean | | 74.46 | 95.66 |
| SEm± | | 0.42 | 0.58 |
| CD at 5% | | 1.21 | 1.66 |

possess longer duration between flowering and pod drying as compared to the check HG 563.

The number of days taken to show the first flower was at minimum in the cultivars RGC 1033, HG 365 and RGC 884, on the other hand HG 2-20, RGC 197 and RGC 1038 were found comparatively late for showing the flower initiation. As it comes to the length of duration from flowering the pod drying the lengthiest period was observed in the same cultivars that showed the earliest flower initiation (RGC 1033, HG 365 and RGC 884) whereas the shortest phase was exhibited by the cultivars RGC 197, HG 870 and RGC 1055 which were late for flower initiation. This is clarifying a fact that the cultivars that entered late to reproductive phase under local agro-climatic conditions could not properly develop sufficient foundation for pod and seed development and in addition to this the duration from flowering to pod drying was also less in these cultivars giving an indication perhaps these cultivars may end up with poor yielding capacity under the local conditions, whereas, the other group which were earlier to initiate flower and spent a prolonged period from flowering to pod drying (for example RGC 1033, HG 365 and HG 884) had better scope to push more assimilates into reproductive sinks like pods and seeds). The results on pod and seed parameters as described above were also suggestive of the similar facts with much

Table 3: Yield parameters in cluster bean cultivars.

| S. No. | Cultivars | Pod yield per Plot (kg) | Seed yield per plot (kg) |
|-----------------|------------------|-------------------------|--------------------------|
| 1 | RGC1003 | 3.34 | 1.62 |
| 2 | RGC1038 | 3.25 | 1.53 |
| 3 | RGC1055 | 2.81 | 1.49 |
| 4 | RGC1002 | 2.41 | 1.53 |
| 5 | RGC197 | 2.59 | 1.48 |
| 6 | RGC1017 | 3.46 | 1.61 |
| 7 | RGC936 | 3.42 | 1.60 |
| 8 | RGC1033 | 3.45 | 1.82 |
| 9 | RGC986 | 3.02 | 1.48 |
| 10 | HG2-20 | 2.89 | 1.51 |
| 11 | HG870 | 2.62 | 1.48 |
| 12 | HG884 | 3.86 | 1.48 |
| 13 | HG365 | 3.89 | 1.85 |
| 14 | HG 563 (Check) | 3.44 | 1.58 |
| Mean | | 3.17 | 1.57 |
| SEm± | | 0.27 | 0.07 |
| CD at 5% | | 0.80 | 0.23 |

more lucidity.. These results are in agreement with those reported by Ramesh *et al.* (2002) in cow pea.

Crop duration

The crop duration varied significantly among the cultivars in the present study. The range of crop duration was from 92.44 days (HG 870) to 102.15 days (HG 365) with mean of 95.66 days (Table 2). The crop duration was found highest in the cultivar HG 365 (102.15 days) which was on par with RGC 197 (101.32 days). The minimum duration was observed in HG 870 (92.44 days) which was on par with HG 563 (93.03 days), RGC 936 (93.09 days), RGC 1038 (93.26 days) and HG 884 (93.71 days). A total of twelve cultivars were found to show longer crop duration as compared to the check HG 563.

An examination of results on crop duration with reference to the duration between flowering and pod drying brings a fact to light that both the duration between flowering and pod drying as well as total crop duration was found highest in HG 365 making it to be in an advantageous position in the race of top ranking cultivars in respect of pod or seed yield. The cultivars RGC 1033 and HG 884 registered lesser or minimum total crop duration in spite of their maximum time period between flowering and pod drying.. Similar results were reported by Savitha *et al.* (2012) in Dolichos bean.

Pod yield per plot (kg)

The data for pod yield per plot showed a mean of

3.17 and ranged from 2.41 kg (RGC 1002) to 3.89 kg (HG 365) (Table 3). Maximum pod yield per plot was recorded for HG 365 (3.89 kg) which was on par with HG 884 (3.86 kg), RGC 1017 (3.46 kg), RGC 1033 (3.45 kg), HG 563 (3.44 kg), RGC 936 (3.42) whereas minimum pod yield per plant was recorded in RGC 1002 (2.41 kg). Five cultivars registered numerically higher yield compared to check HG 563. A perusal of results on pod yield per plot related that that HG 365 (3.89 kg), HG 884 (3.86 kg), RGC 1017 (3.46 kg), RGC 1033 (3.45kg), HG 563 (3.44 kg), RGC 936 (3.42 kg), RGC 1003 (3.34 kg) and RGC 1038 (3.25 kg) were high pod yielders in the in present study.

The present findings are in agreement with the findings of Mehta *et al.* (1993) and Khatun *et al.* (2010) who reported similar variations in chick pea.

Seed yield per plot (kg)

The data for seed yield per plot showed mean of 1.57 kg and ranged from (1.48 kg) (RGC197, RGC 986, HG 870 and HG 884 to 1.85 kg (HG 365) (Table 3). Maximum seed yield per plot was recorded for HG 365 (1.85 kg) which was on par with RGC 1033 (1.82 kg) and RGC 1003 (1.62 kg), whereas the minimum seed yield per plant was found in RGC 197 (1.48 kg) which was on par with RGC 1055 (1.49 kg), HG 2-20 (1.51 kg), RGC 1038, RGC 1002 (1.53 kg), HG 563 (1.58 kg) and RGC 1003 (1.62 kg). A perusal of mean value of yield and yield contributing characters showed that RGC 1055 (1.49 kg), HG 2-20 (1.51 kg), RGC 1002 and RGC 1038 (1.53 kg), HG 365 (1.85 kg) were found high yielding cultivars in present study. A total of five varieties were found superior the check variety HG 563 in respect of seed yield per plot. They were RGC 936 (1.60 kg), RGC 1017 (1.61 kg), RGC 1003 (1.62 kg), RGC 1033 (1.82 kg).

It is interesting to note that both pod and seed yield exhibited more or less similar trend, since, the top ranking and least ranking cultivars appeared to be the similar ones in either higher ranks or lower ranks. Varieties that were capable of producing more pods were also showing a much higher quantum of seed per plot, perhaps due to the reason that they only could be better in the number of seeds per pod and hundred seed weight as well. Similar result were reported by Nigude *et al.* (2004) in cow pea.

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