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# EVALUATION OF SENNA

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**ABSTRACT**

In the evaluation of senna types during the year 1981-82 the pod yield was significantly correlated with plant height, number of branches, length of racemes, number of pods set per raceme at 100 days, length of pods, yield of pods at 25 days and and sennoside content of pods at 25 days. High GCV estimates was observed for total yield of leaves. Plant height and length of leaves exhibited the highest positive direct effect on leaf yield where as plant height, number of branches and number of pods set per raceme exhibited the highest positive direct effect on pod yield

KEY WORDS : *Cassia angustifolia*, Evaluation.

Senna (*Cassia anqustiflia* Vahl.) is grown as a cash crop mainly in Tirunclveli and Ramanathapuram districts and to lesser extent in Madurai, Salem and Tiruchirapalli districts of Tamil Nadu in about 10,000 ha. The leaves and pods of senna contain laxative principles *viz.*, Sennoside A and B which are widely used in pharmaceutical industry as laxative, sitmulant, vermifuge, cathartic and are specially suitable in cases of habitual constipation. Considering these importance, evaluation of 29 senna accessions were carried out to select suitable type for commercial cultivation.

## MATERIALS AND METHODS

Twenty ninetypes of senna comprising of 23 selections and 6 hybrid derivatives were evaluated (Table 1). The experiment was conducted during March to September (1981-82) season in the Department of Spices and Plantation Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore. A randomised block design with two replications was adopted. Healthy seeds of each type were sown in a single row spaced 60 cm apart. Within each row, the spacing was 45 cm between plants. One plant per hill was maintained. The biometrical observations such as height of plants at different periods (90, 120 and 150 days after sowing (DAS), number of branches, floral counts, total yield of leaves stripped at 90, 110, 130 and 150 DAS per plant and total yield of pods harvested at 25, 40 55, 70 and 85 days after fruitset were recorded. The data recorded were statistically analysed to study the variability and association of biometric traits. The sennoside content was determined from dried senna leaves and pods by following British Pharmaceutical codex method.

## RESULTS AND DISCUSSION

A comparison of differences between PCV and GCV estimates for yield of leaves, yield of pods and length of racemes exhibited wide variations. This may perhaps be due to to high susceptibility of these traits to environmental influence where as number of days for fruitset (days from sowing to fruitset), final height, number of leaves perplant and number of days for peak flowering were least affected by environment (Table 2). Radha Manoharan (1978) also reported the least involvement of environment on the

**Table 1. Accession number of twenty nine types of senna**

| Accession number | Accession number |
|---|---|
| IPS 12/XIII | IPS 11/IV |
| IPS 18/XVIII | IPS 21/XI |
| IPS 14/VII | 917/78 ($F_2$)* |
| Poona Bulk | 482/78 ($F_2$)* |
| 469/78 ($F_2$)* | Alexandrian Bulk |
| IPS 12/X | IPS 19/V |
| 470/78 ($F_2$)* | 724 Synchronous senna |
| IPS 8/I | IPS Synchronous senna |
| IPS 15/IX | 470/78($F_3$) 1754* |
| IPS 17/I | IPA 18/XVI |
| IPS 17/VI | IPS 18/XVII |
| IPS 3/I | 472/78($F_2$)* |
| IPS 11/VIII | IPS 14/VIII |
| IPS 12/I | IPS 17/XII |
| IPS 15/II | |

* 5, 7, 18, 19, 24 & 27 are hybrid derivatives

**Table 2. Variance and coefficient of variability**

| Characters | Phenotypic variance | Genotypic variance | PCV (per cent) | GCV (per cent) | PCV-GCV |
|---|---|---|---|---|---|
| $X_1$ - Height of plants at 90 days | 11.29 | 8.27 | 9.12 | 7.81 | 1.31 |
| $X_2$ - Height of plants at 120 days | 34.02 | 13.57 | 10.50 | 6.63 | 3.87 |
| $X_3$ (i) Height of plants at 150 days | 29.93 | 22.89 | 8.47 | 7.41 | 1.06 |
| (ii) Final height of plants | 66.62 | 62.79 | 11.55 | 11.22 | 0.33 |
| $X_4$ - Number of branches | 34.56 | 25.88 | 16.72 | 14.46 | 2.26 |
| $X_5$ (i) Number of days for commencement of flowering | 12.95 | 6.70 | 7.45 | 5.36 | 2.09 |
| (ii) Number of days for peak of flowering | 19.21 | 16.58 | 6.04 | 5.61 | 0.43 |
| $X_6$ (i) Number of racemes | 21.37 | 17.77 | 32.61 | 29.74 | 2.87 |
| (ii) Length of racemes | 16.72 | 12.60 | 24.52 | 21.29 | 3.23 |
| $X_7$ Number of flower per raceme | 5.88 | 4.94 | 20.09 | 18.41 | 1.68 |
| $X_8$ Number of leaves per plant | 8611.02 | 8316.16 | 23.17 | 22.77 | 0.40 |
| $X_9$ Number of days for fruitset | 18.20 | 16.92 | 5.30 | 5.11 | 0.19 |
| $X_{10}$ Number of pods set per raceme | 2.14 | 1.75 | 20.98 | 18.95 | 2.03 |
| $X_{11}$ (i) Total yield of leaves per plant-wet weight | 3844.57 | 3767.00 | 38.40 | 38.01 | 0.39 |
| (ii) Total yield of leaves per plant-dry weight | 750.42 | 715.70 | 39.16 | 38.25 | 0.91 |
| $X_{12}$ (i) Total yield of pods/plant-wet weight | 326.29 | 297.87 | 13.37 | 12.78 | 0.59 |
| (ii) Total yield of pods/plant-dry weight | 9.91 | 5.37 | 12.61 | 9.28 | 3.33 |
| $X_{13}$ (i) Length of pods | 0.14 | 0.10 | 6.91 | 5.95 | 0.96 |
| (ii) Width of pods | 0.008 | 0.006 | 5.09 | 3.35 | 1.74 |
| $X_{14}$ (i) Length of single leaf | 1.46 | 1.07 | 9.83 | 8.43 | 1.40 |
| (ii) Width of single leaf | 0.26 | 0.03 | 6.86 | 2.17 | 4.69 |

**Table 3. Phenotypic (P) and genotypic (G) correlation coefficient among the seven characters on leaf yield (dry weight basis) in senna**

| Characters | | $X_2$ | $X_3$ | $X_4$ | $X_5$ | $X_6$ | $X_7$ | Total yield of leaves/plant |
|---|---|---|---|---|---|---|---|---|
| Plant height at 150 days ($X_1$) | P | 0.1005 | 0.3387** | 0.2324 | 0.0531 | 0.0369 | 0.1512 | -0.0081 |
| | G | 0.0908 | 0.5419** | 0.3354** | 0.0116 | 0.0532 | -0.0058 | -0.0144 |
| Number of branches at 90 days ($X_2$) | P | | -0.0524 | 0.2132 | 0.4011** | 0.5430** | 0.3561** | 0.4984** |
| | G | | -0.1694 | 0.1961 | 0.4932** | 0.6587** | 0.8373** | 0.5570** |
| Length of leaves ($X_3$) | P | | | 0.2250 | -0.0633 | -0.0913 | 0.0209 | 0.1509 |
| | G | | | 0.3565** | -0.1986 | -0.2971 | -0.2140 | 0.2712* |
| Number of leaves per plant at 140 days ($X_4$) | P | | | | 0.2722* | 0.3604** | 0.1085 | 0.1764 |
| | G | | | | 0.3036* | 0.3314* | 0.2467 | 0.3289* |
| Leaf yield at 90 days (dry weight) ($X_5$) | P | | | | | 0.1693 | -0.0093 | 0.1960 |
| | G | | | | | 0.2633 | 0.0680 | 0.2691* |
| Sennoside content of leaves at 90 dyas ($X_6$) | P | | | | | | 0.2966* | 0.6610** |
| | G | | | | | | 0.6325** | 0.7335** |
| Sennoside content of pods at 25 days ($X_7$) | P | | | | | | | 0.3504** |
| | G | | | | | | | 0.8546** |

* - Significant at 5% level; ** - Significant at 1% level

**Table 4. Path coefficient analysis showing the direct and indirect effects of seven characters on leaf yield (dry weight basis) in senna**

| Characters | $X_1$ | $X_2$ | $X_3$ | $X_4$ | $X_5$ | $X_6$ | $X_7$ | Total correlation with yield |
|---|---|---|---|---|---|---|---|---|
| Plant height at 150 days ($X_1$) | 0.7317 | -2.6377 | 5.1516 | -3.7968 | 0.1925 | 0.4823 | -0.1386 | -0.0144 |
| Number of branches at 90 days ($X_2$) | 0.0665 | -9.0353 | -1.6107 | -2.2202 | 8.1979 | 5.0368 | 0.1220 | 0.5570 |
| Length of leaves ($X_3$) | 0.3965 | 4.9194 | 9.5064 | -4.0361 | -3.3008 | -2.2715 | -4.9427 | 0.2712 |
| Number of leaves per plant at 140 days ($X_4$) | 0.2454 | -5.6940 | 3.3891 | -11.1213 | 5.0460 | 2.5342 | 5.9296 | 0.3289 |
| Leaf yield at 90 days (dry weight) ($X_5$) | 0.0085 | -0.3212 | -1.8879 | -3.4171 | 2.6206 | 1.6310 | 1.6353 | 0.2691 |
| Sennoside content of leaves at 90 dyas ($X_6$) | 0.0462 | -4.1269 | -2.8242 | -3.7523 | 3.5454 | 7.6460 | 0.1993 | 0.7335 |
| Sennoside content of pods at 25 days ($X_7$) | -0.0042 | -0.3119 | -2.0341 | -2.7934 | 1.1310 | 4.8359 | 0.0314 | 0.8546 |

* Based on genotypic correlation coefficients; Residual effect = 0.3843
Figures underlined show direct effects

expression of the character, days to 50 per cent flowering in cowpea.

Phenotypic and genotypic correlation among the seven yield- contributing characters of leaf yield (dry weight basis) and also among the components themselves are furnished in Table 3. In the present investigation, the genotypic correlation coefficients were generally higher than the phenotypic correlation coefficients. A similar trend was observed in beans by Pande *et al. (1975) and Bennett et al*, (1977), in field pea by Singh *et al.* (1977), in cowpea by Angadi (1976) and in lablab by Halan (1978). It indicates that though there was a high inherent association among different characters, the environment might have modified the expression of genotypes. From these studies it is evident that leaf yield was strongly correlated with number of branches, length of leaves, number of leaves, leaf yield on 90 days and sennoside content of pods at 25 days.

Critical analysis of results obtained from genotypic correlation and path analysis indicated that the characters plant height, length of leaves, leaf yield at 90 days (dry weight) and sennoside content of leaves at 90 days had significant positive correlation and high magnitude of positive direct effects on leaf yield (dry weight). It is therefore suggested that the preference should be given to these characters in the selection programme to isolate superior lines with genetic potentiality for higher leaf yield (Table 4).

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