# Sesbania grandiflora - Comparative Study of the Growth and Cost for Three Years

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## SUMMARY

This experiment was undertaken to find out the suitability of spacing and the year of felling of *Sesbania grandiflora*, which has been proved to be suitable for manufacture of paper alongwith bamboo or long fibre species. Three different spacings were adopted and the experiment continued for three years, recording the results of felling of the plots of all the three spacings every year. The results were computed and it is observed that spacing of 0.6096 m x 0.6096 m and its yield after three years gives the best result considering the economics.


## INTRODUCTION

This experiment is in continuation of the study of *Sesbania grandiflora*, the first year findings of which have been published in IPPTA souvenir 1974 ([1]). This is the concluding article where comparative study of the best spacing and year of felling in terms of yield and cost is statistically analysed.

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## EXPERIMENTAL

The observations and analysis in detail are as follows :

TABLE—IA

VARIOUS FINDINGS OF SESBANIA GRANDIFLORA

| Treatment combination* | Mean annual (Oven dry) yield in kgs per sq. mt. | Mean annual yield (oven dry) in tons per ha. | Mean expenditure in Rs. per tonne (oven dry) | Mean expenditure per ha. per year Rs. | Average survival % |
|---|---|---|---|---|---|
| AS1 | 2.338 | 23.88 | 534 | 12485 | 70.92 |
| AS2 | 2.568 | 25.68 | 266 | 6831 | 98.44 |
| AS3 | 1.928 | 19.28 | 287 | 5533 | 94.45 |
| BS1 | 2.074 | 20.74 | 350 | 7259 | 41.33 |
| BS2 | 1.878 | 18.78 | 213 | 4000 | 68.75 |
| BS3 | 0.786 | 7.86 | 401 | 3152 | 52.78 |
| CS1 | 1.548 | 15.48 | 336 | 5201 | 27.55 |
| CS2 | 2.151 | 21.51 | 142 | 3054 | 57.81 |
| CS3 | 1.547 | 15.47 | 148 | 2290 | 77.78 |

* Where A represents 1st year and S1 represents spacing 0.3048 m x 0.3048 m or 1 foot x 1 foot.

B ,, 2nd year and S2 ,, spacing 0.6096 m x 0.6096 m or 2 feet x 2 feet.

C ,, 3rd year and S3 ,, spacing 0.9144 m x 0.9144 m or 3 feet x 3 feet.

Hence, AS1 denotes the treatment where the spacing of plants is 0.3048 m x 0.3048 m or 1 foot x 1 foot and felled after first year and so on.

TABLE—IIA

ANALYSIS OF MEAN ANNUAL YIELD PER SQ. MT.

| Treatment combination | Mean Annual Yield in kgs oven dry per sq. mt. | | | | Sum | Mean |
|---|---|---|---|---|---|---|
| | I | II | III | IV | | |
| AS1 | 2.036 | 2.036 | 2.263 | 3.016 | 9.351 | 2.33775 |
| AS2 | 2.370 | 2.674 | 3.160 | 2.067 | 10.271 | 2.56775 |
| AS3 | 1.215 | 2.384 | 1.870 | 2.243 | 7.712 | 1.92800 |
| BS1 | 1.687 | 2.188 | 2.767 | 1.655 | 8.297 | 2.07425 |
| BS2 | 1.882 | 1.527 | 2.012 | 2.091 | 7.512 | 1.87800 |
| BS3 | 0.837 | 0.582 | 0.696 | 1.029 | 3.144 | 0.78600 |
| CS1 | 1.912 | 1.244 | 1.396 | 1.639 | 6.191 | 1.54775 |
| CS2 | 2.334 | 2.718 | 2.161 | 1.392 | 8.605 | 2.15125 |
| CS3 | 1.267 | 1.766 | 1.297 | 1.856 | 6.186 | 1.54650 |
| Block Total | 15.540 | 17.119 | 17.622 | 16.988 | 67.269 | |

After computing mean square etc., the details are tabulated in Table—IIIA.

TABLE—IIIA

| Source of variation | Degrees of freedom | Sum of squares | Mean squares | F-ratios |
|---|---|---|---|---|
| Blocks | 3 | 0.2669798 | 0.0889932 | 0.4810653 |
| Treatments | 8 | 0.8537142 | 1.1067142 | 5.9825008 |
| Error | 24 | 4.4398060 | 0.1849919 | |
| Total | 35 | 13.5605000 | | |

Standard deviation $= \sqrt{0.1849919} = 0.4301068$

Standard error (S.E.) of treatment means $= \frac{0.43101068}{\sqrt{4}} = 0.2150534$

S.E. of the treatment means is 0.2150534 kg.

The value of t for 24 d.f. and a probability of 0.05 level is 2.066 approximate. Therefore a difference of

$$0.2150534 \times \sqrt{2} \times 2.066 = 0.6283355 \text{ kg}$$

will only be exceeded once in twenty times if there is really no difference between the treatment means and difference greater than this between two means can be considered as significant.

It is clear that between treatment means of AS1, AS2, BS1 and CS2, there is no significant difference between any two of the treatment means. This means that mean yields of spacing 0.3048 m x 0.3048 m and 0.6096 m x 0.6096 m cut after first year, spacing of 0.3048 m x 0.3048 m cut after second year and spacing of 0.6096 m x 0.6096 m cut after third year have no significant differences between the two means at 5 percent probability level.

The expenditure per kg. oven dry of yield has been analysed statistically. The details are as follows :

TABLE—IVA

| Treatment combination | Expenditure per kg oven dry in Rs. | | | | Sum | Means |
|---|---|---|---|---|---|---|
| | I | II | III | IV | | |
| AS1 | 0.597 | 0.597 | 0.537 | 0.403 | 2.134 | 0.534 |
| AS2 | 0.281 | 0.249 | 0.211 | 0.323 | 1.064 | 0.266 |
| AS3 | 0.426 | 0.217 | 0.276 | 0.230 | 1.149 | 0.287 |
| BS1 | 0.412 | 0.318 | 0.251 | 0.420 | 1.401 | 0.350 |
| BS2 | 0.209 | 0.260 | 0.196 | 0.188 | 0.853 | 0.213 |
| BS3 | 0.360 | 0.518 | 0.433 | 0.293 | 1.604 | 0.401 |
| CS1 | 0.260 | 0.409 | 0.365 | 0.311 | 1.345 | 0.336 |
| CS2 | 0.123 | 0.106 | 0.133 | 0.206 | 0.568 | 0.142 |
| CS3 | 0.175 | 0.126 | 0.171 | 0.120 | 0.592 | 0.148 |
| Total | 2.843 | 2.800 | 2.573 | 2.494 | 10.710 | |

After computing mean squares etc. the details are tabulated in Table—VA.

TABLE—VA

| Source of variation | Degrees of freedom | Sum of squares | Mean square | F—ratios |
|---|---|---|---|---|
| Blocks | 3 | 0.0096654 | 0.0032218 | 0.6360657 |
| Treatments | 8 | 0.5016730 | 0.0627091 | 12.380379 |
| Error | 24 | 0.1215166 | 0.0050652 | |
| Total | 35 | 0.6328550 | | |

$$S.D. = \sqrt{0.0050652} = \text{Rs. } 0.0711702$$

Rs. 0.0711702 is the standard deviation (S.D.) of individual plots.

So Standard error (S.E.) of treatment means $= \frac{0.0711702}{\sqrt{4}}$

S.E. of the treatment means is Rs. 0.0355851.

The value of 't' for 24 d.f. and a probability at 0.05 level is 2.066 approximately. Therefore a difference of $0.0355851 \times \sqrt{2} \times 2.066 =$ Rs. 0.1039713 will only be exceeded once in twenty times if there is really no difference between the treatment means and difference greater than this between two means can be considered as significant.

It is clear that between treatment seems of expenditure, BS2, CS2 and CS3 there is no significant difference.

Hence planting in the pattern of BS2 (0.6096 m x 0.6096 m) or CS2 (0.6096 m x 0.6096 m) or CS3 (0.9144 m x 0.9144 m) is best suited from economic point of view.

## CONCLUSION

Since the object is to find the optimum spacing and proper age of exploitation of *Sesbania grandiflora*, it could be concluded that there is no significant differences between AS1, AS2, BS1 and CS2. **However, considering the economic point of view, CS2 is the best spacing and year of felling i.e. spacing of 0.6096 m x 0.6896 m with the felling after three years.**

## REFERENCES

1. Kaikini, N.S., Shivanagi, N.V., Narvekar, M.D., IPPTA Souvenir, 1974, p. 22.