GAU Res. J. 2000. 25 (2) : 24-26

# Study of the Analytical Growth Parameters and Productivity of Different Genotyp of Methi (*Trigonella foenum graecum* L.)

**R. N. S. Banafar**

Department of Horticulture, College of Agriculture, Indore (M. P.)

## ABSTRACT

**Fenugreek (*Trigonella foenum graecum* L.), commonly known as methi, is one of the common leafy vegetables and its seeds form an important spices besides used in Ayurvedic and Unani medicines. An experiment with nine genotypes was conducted at JNKVV, RAK Research Farm, Sehore with 30 kg N, 40 kg $P_2O_5$ and 20 kg $K_2O$/ha under irrigation conditions in *rabi* season.**

**From the data it was observed that genotype (CS-381) gave significantly highest dry weight/plant till 100 days of crop growth, followed by plume-23 and plume-55 which were at par. Maximum leaf area and LAI was also in CS-381, followed by plume-57 and plume-20, but significantly maximum CGR was in CS-381, while there was no significant difference in RGR among all the entries, but maximum was in Jabalpur local followed by plume-20. Significantly highest seed yield was noted in plume-55 followed by plume-5. The results indicated that plume-55 and plume-57 had better expression of physiological parameters and the sink. For green leafy vegetable, CS-381 was the best followed by plume-57, plume-20 and plume-47 but for grain yield as spices, plume-55 was the best followed by plume-57.**

*(Received on 25th Octo. 1999)*

## INTRODUCTION

Methi is one of the most important leafy vegetables of Indian dishes and its seed is one of the well known and commonly used spices. In our country most of the population is vegetarian. Under such conditions leafy vegetables/crops are the only valuable source of iron and protein alongwith other nutrients. Variations in the yield of different parts of a plant to a certain extent depends upon the parameters of growth and productivity of the crop and hence the study of physiological growth analytical paremeters of the crop is important. This will help in understanding the contribution of different growth parameters and their relationship with the sink to raise the productivity of methi. The growth analysis concept was first started in the early 20th century in Egypt on cotton crop and further by the British scientists Blackman and Black (1968) for estimating net photosynthetic production of crops. With this approach in view the present experiment was carried out.

## MATERIALS AND METHODS

The present investigation taken up during the *rabi* season of 1994-95 at RAK Research Farm, Sehore. Nine genotypes were grown in a complete randomized block design with four replications. Sehore is situated on 23.9' N latitude and 79.58' E longitude having the altitude of 411.78 metres above the mean sea level. The sowing was done on 10th November. Net plot size was 4.20 m x 3.0 m spacing the rows at 30 cm and plants 20 cm apart. Before

sowing, the seeds were treated with thirum @ 3 g per kg seed. The fertilizers were applied @ 30 kg nitrogen, 40 kg phosphorus and 20 kg potash per hectare through urea, single superphosphate and muriate of potash, respectively, for observations ten plants were selected in a row from each treatment and replication. The observations were recorded on fresh and dry weight/plant, leaf area, leaf area index per plant, crop growth rate, relative growth rate as per standard formulae and seed yield per hectare was also recorded. The different parameters were subjected for statistical analysis for final conclusions.

## RESULTS AND DISCUSSION

In general it was observed that the fresh weight and whole plant biomass of plants increased rapidly upto flowering in all the genotypes. CS-381, Plume-55, Plume-57 had significantly maximum fresh and whole plant biomass. This may be due to the increase in size and number of leaflets and branches. At final stages the maximum fresh and dry weight was noted in CS-381. This may be due to higher crop growth rate and net estimation rate in this variety. Also, the moisture content of plant caused the variation in the fresh weight of plants of different genotypes.

In plume-23 fresh and dry weight increased suddenly, which was due to high assimilation of photo-synthates at final stage suggesting that the genotype is physiologically more efficient in growth and productivity.

*TABLE 1*

**Mean fresh weight, dry weight, leaf area and leaf area index, CGR and yield crop stage.**

| *Sr. No.* | *Variety* | *Fresh weight* | *Dry weight* | *Leaf area* | *Leaf area index* | *CGR* | *RGR* | *Yield kg/ha* |
|---|---|---|---|---|---|---|---|---|
| 1. | Plume-20 | 46.40 | 10.20 | 1072.78 | 17.87 | 25.80 | 30.00 | 1221 |
| 2. | Plume-23 | 54.95 | 13.62 | 831.58 | 13.85 | 30.27 | 28.71 | 1500 |
| 3. | Plume-47 | 44.45 | 11.50 | 1064.08 | 17.73 | 25.37 | 28.57 | 1051 |
| 4. | Plume-55 | 54.70 | 12.65 | 897.63 | 14.96 | 27.90 | 28.27 | 2313 |
| 5. | Plume-57 | 38.30 | 10.72 | 1075.89 | 17.93 | 23.65 | 27.09 | 2003 |
| 6. | IC-5487 | 36.32 | 10.72 | 1058.70 | 17.64 | 22.35 | 29.45 | 1347 |
| 7. | CS-381 | 61.80 | 13.80 | 1140.51 | 19.00 | 30.52 | 26.75 | 1648 |
| 8. | Jabalpur Local | 44.12 | 11.47 | 998.67 | 16.64 | 25.34 | 30.17 | 1081 |
| 9. | Lucknow Local | 35.27 | 9.80 | 811.40 | 13.52 | 21.64 | 29.48 | 1134 |
| | S.Em. ± | 2.99 | 0.74 | 52.19 | 0.87 | 2.24 | 2.54 | 63.64 |
| | C.D. 5% | 8.70 | 2.18 | 152.36 | 2.53 | 6.76 | 7.68 | 185.80 |

Leaf area index progressively increased with the age of the plants in all the varieties. Higher leaf area index was noted in CS-381 (19.00) and lowest in Lucknow local (13.52) at 100 days. Higher LAI may be attributed to the higher number of triplicates and their larger leaf area tend to be more common determinant of plant growth than the photosynthetic capacity of individual leaf (Watson, 1952) so that effective exposure of the leaf surface becomes critical. High density affords green leaf area per unit land

area and therefore a greater potential for yield but the photosynthetic rate of individual leaf will tend to be reduced to mutual shading. Watson (1952) reported similar results.

The relative growth rate (RGR) i. e. the rate of increase in weight over a fixed time interval. Though, it was highest in Jabalpur local (30.17 mg-g-1 day-1) followed by plume-20 (30.0 mg-g-1 day-1) while CS-381 gave lowest. But statistically all the nine genotypes were at par for RGR. The reduction in RGR with age of the plant might be due to shading effects of leaves and senescence of the lower leaves and also due to climatic condition. Evidence has steadily occurred and Ondok and Kvet (1971) also recorded similar trends in RGR.

The crop growth rate represented the total dry matter productivity of the plant community per unit and area over a certain time open. At the final stage the CGR was significantly highest in CS-381 followed by plume-23 and plume-55 and all being at par but much reduced CGR was observed in other varieties. This might be due to slow rate of absorption of nutrient and RGR responsible for the growth in initial stages which later on could have more potential of uptake rate of essential nutrients. The similar facts have also been reported by other research workers viz., Watson (1958), Wallace and Munger (1965) in bean crop.

The grain yield depends on number of pods per plant number of seeds per pod and test weight of seed as well as the efficiency of sink of the genotype. In variety plume-55 all yield attributing characters were superior than the other varieties and therefore the seed yield per hectare was highest (2313 kg). It was minimum in variety Plume-47 (1051 kg) followed by Jabalpur local (1081 kg/ha).

## REFERENCES

Blackman, C. G. and Black, J. N. (1968). Physiological and ecological studies in the analysis of plant environment. *Ann. Bot.* **23** : 51-63.

Ondok, J. P and Kvet, J. (1971). Integral and differential formulae in growth analysis. *Photosynthetic* **5** : 358-363.

Wellace, D. H. and Munger, H. M. (1965). Studies of the physiological basis for yield differences I. Growth analysis of six dry bean varieties. *Crop Sci.* **5.** : 343-347.

Watson, D. J. (1952). The physiological basis of variation in yield. *Adv. Agron.* **4** : 101-145.

Watson, D. J. (1958). The dependence of net assimilation rate on leaf area index. *Ann. Bot.* **22** : 35-54.