

INFLUENCE OF SPACING AND NITROGEN ON THE YIELD OF SESAMUM

G. VENKATESAN¹, R. ELANGO² and L. ARUNACHALAM³

An experiment was laid out in summer and monsoon of seasons 1978 and 1979 at the Tamil Nadu Agricultural University, Coimbatore, with four spacing and four levels of Nitrogen. Seed yields of 649 and 452 kg/ha were obtained with the widest spacing of 40 X 30 cm during summer seasons and 584 and 261 Kg/ha seed yields with the spacing of 30 X 30 cm in the monsoon seasons of 1978 and 1979 respectively. A spacing of 40 X 30 cm for summer and 30 X 30 cm for the monsoon season was found optimum. For getting higher yields 20 kg N/ha was found to be economical in sesamum for both the seasons at Coimbatore.

Sesamum (*Sesamum indicum* L.) is one of the most important oilseeds grown all over the world and nearly a quarter of the world's production is from India. In our country a low yield of 180 Kg/ha was recorded against a marked contrast of high yield of 1960 Kg/ha in Venezuela probably due to poor fertility of the land, uncertain climatic conditions and lack of high yielding varieties. The yield could be increased to some extent by adopting proper spacing and density and judicious fertilization in sesame (Seshadri, 1957). Hence an experiment was conducted at the Tamil Nadu Agricultural University to find out the best nitrogen and spacing requirement of this crop.

MATERIAL AND METHODS

The experiment was conducted at the Tamil Nadu Agricultural University, Coimbatore, for two years 1978 and 1979 in both the summer and mon-

soon seasons. There were a total of four spacings in the main plot viz. (i) 30 x 15 cm, (ii) 30 x 30 cm, (iii) 40 x 15 cm, (iv) 40 x 30 cm and four levels of N in the sub-plot treatment viz., 0, 20, 40 and 60 Kg N/ha and replicated four times. The initial soil fertility status of the soil was 156, 29 and 380 kg/ha of available N, P₂O₅ and K₂O respectively. The soil type was red sandy loam.

RESULTS AND DISCUSSION

The yield data for the two years in both summer and monsoon seasons were presented in the table 1. The yield data obtained during 1978 in summer and monsoon seasons were higher than the yield obtained during 1979 due to the favourable environmental conditions during the crop growth. There was no significant difference in yield due to various treatments during 1978 summer. The widest spacing viz., 40 cm between rows and 30 cm between plants in the

^{1, 3} Associate Professor, Tamil Nadu Agricultural University, Coimbatore-641 003.

row gave higher yield of 644 Kg/ha than the rest of the spacings.

Regarding the Nitrogen levels 40 Kg N/ha gave numerically higher yield of 643 Kg/ha during summer 1978. During 1979 summer season the widest spacing of 40 X 30 cm recorded the highest yield of 453 Kg/ha which was on par with 443 Kg/ha of 30 X 15 cm. In 1979, 40 kg N/ha gave the highest seed yield of 458 kg/ha and was on par with 20 kg N/ha and 60 kg N/ha yielding 442 and 423 kg/ha respectively. The control plot recorded 378 kg/ha of seed yield. The same trend was noticed in the monsoon season of 1978 and 1979. But during the monsoon season of 1979, the treatment 20 kg N/ha recorded significantly higher seed yield of 252 kg/ha and was on par with the 40 Kg N/ha and 60 Kg N/ha level. In all these years irrespective of the seasons, there was increase in seed yield upto 40 Kg N/ha thereafter the yield declined showing clearly that there was no response beyond 40 Kg N/ha level, Surajbhan and Amarsingh (1973) reported that there was good response of sesamum for N, P, and K fertilizers. Krishna Gowda (1974) reported that greater response of Dharwar Local gingelly for 40 Kg N+20 Kg of P_2O_5 + 10 Kg K_2O /ha. At Jalagaon also similar results with the application to 50 Kg N+ 25 Kg P_2O_5 /ha gave the highest yield. Sannaiyan and Arunachalam (1978) recommended the application of 25 Kg N+25 kg P_2O_5 /ha for rainfed sesamum.

Yield reduction was noticed due to the addition of fertilizer nitrogen

both in the light of spacing between the plants and the row distance in both the seasons and years. Probably this might be due to the mutual shading effect due to greater vegetative growth at the higher levels of nitrogen fertilizer. This was in agreement with the findings of Arunachalam (1976) who had reported that increased nitrogen fertilizer level, beyond 20 Kg N/ha in rainfed and summer seasons disturbed the optimal balance for Photosynthetic efficiency. So much so a reduction in the seed yield was obtained in sesamum.

Number of capsules per plant was recorded for a total of five plants selected at random in each treatment. It was observed that the widest spacing of 40 cm between rows and 30 cm between the plants recorded the highest mean number of capsules, 90.5 per plant during summer season while the spacing 30cmx30cm recorded the highest mean number of capsules, 91.5 per plant during the monsoon season. This has resulted in the highest yield in R2P2 and R1P2 during summer and monsoon seasons respectively. The reason for a generally higher yield during the summer season than the monsoon season could be attributed to the availability plenty of solar radiation besides less incidence of phyllody disease. Regarding the effect of fertilizer nitrogen 60 kg N/ha recorded the highest mean number of capsules of 98.6 per plant while the same level of nitrogen during the monsoon season did not increase the number of capsules per plant markedly. There was not much difference in the production of mean

number of capsules per plant between 20 kg N/ha and 40 kg N/ha which had recorded only 87 to 89.5 during summer and 87. 0 to 92. 0 during the monsoon season.

The seed yield was significantly influenced by spacing as well as nitrogen levels. The highest seed yield of 649 and 452 kg/ha were obtained in the widest spacing of 40x30 cm during summer and 584 and 261 kg/ha for the spacing of 30 cmx30 cm during the monsoon seasons of 1978 and 1979 respectively. Regarding the effect of nitrogen fertilizer on the yield of sesamum, it was seen that there was increased yield upto 40 kg N/ha during the summer and there was no similar increase in yield during the monsoon season beyond 20 kg N/ha level. The increased yield obtained at higher nitrogen level viz., 40 kg N/ha did not comensurate with the cost of the fertilizer. As such 40 x30

cm and 30 x30 cm could be recommended as optimal spacing for summer and monsoon seasons respectively and application of 20 kg N/ha was found to be the economical dose for both the seasons.

REFERENCES

- ARUNACHALAM, L. 1976. "Spacing in Sesamum Agronomy". M. Sc. (Ag) thesis Tamil Nadu Agricultural University, Coimbatore- 641003
- KRISHNA GOWDA, K. T. 1974. Agronomic investigation sesamum (*Sesamum indicum*). M. Sc (Ag), thesis. University of Agricultural Sciences, Bangalore.
- SESHADRI, C. R. 1957. Future of Oilseed research in *Sesamum indicum* Indian Oil seeds J. 1: 96-8.
- SENNAIYAN, P and ARUNACHALAM, L. 1978. Effect of N,P, K, fertilizers in rainfed gingelly TMV 3 (*Sesamum indicum* L.) Madras agric J. 65; 347-8.
- SURAJBHAN, AMER SING 1973. Studies on the fertilizer requirement of Sesame (*Sesamum orientale*, L.) in Central tract of Uttarpradesh Indian J Agri. Res. 7: 39-42.

TABLE 1 Seed Yield of Sesamum. Kg/ha

N levels	Summer									
	1978					1979				
Spacing	F ₀	F ₁	F ₂	F ₃	Mean	F ₀	F ₁	F ₂	F ₃	Mean
R ₁ P ₁	524	621	670	651	617	382	457	469	462	443
R ₁ P ₂	536	637	609	624	602	336	422	437	368	391
R ₂ P ₁	490	580	645	567	571	374	413	466	409	416
R ₂ P ₂	623	686	641	624	649	420	476	459	452	452
Mean	543	631	641	616	—	378	442	458	423	—

N levels	Monsoon									
	1978					1979				
Spacing	F ₀	F ₁	F ₂	F ₃	Mean	F ₀	F ₁	F ₂	F ₃	Mean
R ₁ P ₁	417	549	564	564	509	122	218	197	190	182
R ₁ P ₂	554	602	620	562	584	231	301	273	238	261
R ₂ P ₁	477	523	488	506	499	195	272	234	208	227
R ₂ P ₂	438	459	465	413	444	122	218	197	190	182
Mean	471	533	534	496	—	167	252	225	206	—

Spacing	1978					1979				
	R ₁ P ₂	R ₁ P ₁	R ₂ P ₁	P ₂ P ₂	Mean	R ₁ P ₂	R ₂ P ₁	R ₂ P ₂	R ₁ P ₁	Mean
Fertilizer :	F ₂	F ₁	F ₂	F ₀	—	F ₁	F ₂	F ₂	F ₂	—