

Performance of Semi *Rabi* Sesame to Different Sowing Windows and Nutrient Levels under Central Vidharbha Region

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ABSTRACT: A field experiment was conducted during semi *rabi* season of 2022-23 at Agronomy Farm, College of Agriculture, Nagpur, to study the effect of different sowing windows and nutrient levels on growth, yield and economics of semi *rabi* sesame under Central Vidharbha Region with two factors *viz.*, four sowing windows [D₁ (35th MW), D₂ (36th MW), D₃ (37th MW) and D₄ (38th MW)] and three nutrient levels [N₁ (75% RDF), N₂ (100% RDF) and N₃ (125% RDF)] with twelve treatment combinations. Crop sown during 35th MW (27th Aug- 2nd Sept) recorded significantly highest plant height, number of branches plant⁻¹, dry matter accumulation plant⁻¹, number of capsule plant⁻¹, seed yield plant⁻¹, seed and straw yield (kg ha⁻¹). It also recorded highest gross as well as net monetary return and B:C ratio. Application of 125% RDF (31.25:31.25 Kg N:P ha⁻¹) recorded highest values of all the growth and yield contributing characters. Similarly, significantly higher values of gross and net monetary return and B:C ratio were recorded with application of 125% RDF as compare to 75% and 100% RDF.

Keywords: Semi *rabi* sesame, sowing windows, nutrient levels.

INTRODUCTION

Sesame (*Sesamum indicum* L.) which is known variously as til, sisim, benniseed, sesame hawari etc. is one of the most important oil seed crops grown extensively in India. Sesame is the oldest indigenous oil plant with longest history of its cultivation in India. The oils are major components of human diet. Sesame oil is used for culinary purpose, in confectionery, healthcare industry and other purpose. Omega-6 fatty acid desaturase also got from sesame which is helpful for heart patients (Jin and Chung 2001).

India ranks first in area (45%), production (32%) and export (40%) of sesame in the world. The total area of sesame in India during 2020-21 was 17.22 lakh hectare with total production of 8.16 lakh tonnes and productivity was 474 kg ha⁻¹ (Anonymous, 2021). In Maharashtra, the total area of sesame during 2021 was 28 thousand hectare with total production of 6.3 lakh and productivity was 227 kg ha⁻¹ (Anonymous, 2021). The major growing districts of sesame in Maharashtra are Jalgaon, Nashik, Dhule, Pune and Solapur. Nagpur and Amravati revenue divisions are the most important sesame growing areas in Vidharbha region of Maharashtra state. Sesame yield is highly variable depending upon the growing environment and nutrient levels. Sesame, being a neglected crop now days, farmers are not very much keen to apply fertilizers to this crop, although it gives a good response to the added

fertilizer. In view of above the present investigation is planned to evaluate the response of semi *rabi* sesame to different sowing windows and nutrient levels.

MATERIALS AND METHODS

A field experiment was conducted during semi *rabi* season of 2022-23 at Agronomy Farm, College of Agriculture, Nagpur, Maharashtra state, India. The field was fairly uniform and leveled. Soil of the experimental site was clay in texture, medium in available nitrogen, low in available phosphorous and rich in available potash. Organic carbon content was medium and soil reaction was slightly alkaline. The experiment was laid out in split plot design with two factors *i.e.* four sowing dates [D₁ (35th MW), D₂ (36th MW), D₃ (37th MW) and D₄ (38th MW)] as main plot treatment and three nutrient levels [N₁ (75% RDF), N₂ (100% RDF) and N₃ (125% RDF)] as sub plot treatment, thus making twelve treatment combinations, replicated thrice. The distance between two replications was 1.00 m and distance between two plots was 0.60 m. The gross and net plot size were 3.6 m × 5.0 m and 3.0 m × 4.5 m, respectively.

Research trial on semi *rabi* Sesame, College of Agriculture, Nagpur was sown manually, keeping 30 cm distance between the rows. Nitrogen was applied in two equal splits, while entire phosphorus was applied as basal dose. The data on growth and yield were recorded as per the standard procedure.

RESULTS AND DISCUSSION

A. Growth attributes

Sowing windows significantly influenced the different growth characters *viz.*, plant height, number of branches plant⁻¹ and dry matter accumulation plant⁻¹. All the above growth characteristics were higher when crop sown during 35th MW during all growth stages. Higher plant height (109.12 cm), number of branches plant⁻¹ (4.73) and dry matter accumulation plant⁻¹ (29.74 g) in 35th MW might be due to congenial climatic condition like moisture, temperature and other weather parameters coincided with the growth stages of semi *rabi* sesame. These results are in close agreement with the findings of Gade (2012); Muneshwar *et al.* (2019). Fertilizer application also influenced the plant height, number of branches plant⁻¹ and dry matter accumulation plant⁻¹ significantly. Highest plant height (110.50 cm) was recorded with application of 125% RDF which was significantly superior to 100% and 75% RDF. Similarly, application of 125% RDF recorded significantly highest branches plant⁻¹ (4.75) and dry matter accumulation plant⁻¹ (29.67 g). Higher amount of nitrogen and phosphorus might have resulted into more activities of meristematic tissues of the plant, increased cell size and cell number, which ultimately might have probably resulted into increased growth attributes. Similar results were also obtained by Kushwaha (2013).

B. Yield attributes

Yield attributing characters *viz.*; number of capsule plant⁻¹ (33.74), seed yield plant⁻¹ (4.22 g) along with seed yield (866.34 kg ha⁻¹) and straw yield (2557 kg ha⁻¹) were also highest when the crop sown during 35th

MW. The weather conditions prevailed during the growth and development of crop sown during 35th MW might be favorable for the crop which might have resulted in production of more number of branches plant⁻¹ providing more sites for reproductive structure *viz.*, number of capsules plant⁻¹, number of seed capsule⁻¹. These findings are similar with Raut *et al.* (2020); Yisa *et al.* (2023).

Various fertilizer levels also affected the yield attributing characters of semi *rabi* sesame. Number of capsule plant⁻¹ (32.92), seed yield plant⁻¹ (4.08 g), seed yield (883.17 kg ha⁻¹) and straw yield (2510 kg ha⁻¹) was maximum with application of 125% RDF, which was significantly superior over application of 100% and 75% RDF. The results obtained in the present study are supported by the works of Patel *et al.* (2015).

C. Economics

Highest gross and net monetary returns of Rs. 69307 ha⁻¹ and Rs. 49475 ha⁻¹ respectively, were recorded during 35th MW which was superior over later sowing windows. In case of fertilizer application, highest gross monetary returns of Rs. 70653 ha⁻¹ and net monetary returns of Rs. 50388 ha⁻¹ were recorded with application of 125% RDF. Highest B:C ratio of 3.49 was recorded during 35th MW and application of 125% RDF also recorded highest B:C ratio of 3.48. The results are in conformity with the findings of Shinde *et al.* (2014).

The interaction effect between different sowing windows and nutrient levels was not significant in respect of growth attributes, yield and economics of semi *rabi* sesame.

Table 1: Growth, yield and economics of semi *rabi* sesame as influenced by different sowing windows and nutrient levels.

Treatments	Mean plant height (cm) at harvest	Mean number of branches plant ⁻¹ at harvest	Dry matter accumulation plant ⁻¹ (g) at harvest	Number of capsules plant ⁻¹	Seed yield plant ⁻¹ (g)	Seed Yield (kg ha ⁻¹)	Straw yield (kg ha ⁻¹)	Gross monetary returns (Rs. ha ⁻¹)	Net monetary returns (Rs. ha ⁻¹)	B:C ratio
A	Sowing windows									
D ₁ - 35 th MW	109.12	4.73	29.74	33.74	4.22	866.34	2557	69307	49475	3.49
D ₂ - 36 th MW	105.81	4.22	28.43	31.12	3.65	837.70	2475	67013	47181	3.37
D ₃ - 37 th MW	104.93	4.00	27.71	30.23	3.43	827.55	2420	66204	46372	3.33
D ₄ - 38 th MW	104.71	3.97	27.21	29.94	3.35	810.22	2394	64818	44986	3.26
SE(m) ±	0.75	0.12	0.31	0.62	0.18	5.21	23.69	416.89	416.89	-
CD at 5%	2.60	0.40	1.06	2.14	0.63	18.03	81.98	1442.40	1442.40	-
B	Nutrient management									
N ₁ - 75% RDF	102.00	3.83	27.33	30.17	3.33	782.58	2403	62607	43208	3.22
N ₂ - 100% RDF	105.83	4.00	27.75	30.58	3.50	840.58	2472	67247	47415	3.39
N ₃ - 125% RDF	110.50	4.75	29.67	32.92	4.08	883.17	2510	70653	50388	3.48
SE(m) ±	0.61	0.16	0.17	0.59	0.14	4.71	10.41	376.84	376.84	-
CD at 5%	1.82	0.48	0.51	1.78	0.43	14.12	31.19	1129.59	1129.59	-
C	Interaction									
SE (m) ±	1.21	0.32	0.34	1.18	0.29	9.42	20.81	753.68	753.68	-
CD at 5%	NS	NS	NS	NS	NS	NS	NS	NS	NS	-
GM	106.11	4.19	28.25	31.22	3.64	835.44	2461	66836	47004	3.36

CONCLUSIONS

Sowing window of 35th MW (27th Aug- 2nd Sept) resulted in higher growth and yield of semi *rabi* sesame compared to later sowing windows during semi *rabi*

season. Application of 125% RDF recorded higher growth and yield attributes than other lower nutrient level, 125% RDF recorded higher grain and straw yield ha⁻¹.

Sowing window of 35th MW (27th Aug - 2nd Sept) recorded highest gross monetary returns, net monetary returns and B:C ratio. Similarly, application of 125% RDF (31.25:31.25 Kg N:P ha⁻¹) recorded highest gross monetary returns, net monetary returns and B:C ratio in semi *rabi* sesame.

FUTURE SCOPE

The present findings are based on one year research and needs further 1 or 2 years experimentation for validation of influence of sowing windows and nutrient level on semi *rabi* sesame.

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Conflict of Interest. None.

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