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Short Communication

Response of sesamum (*Sesamum indicum* L) varieties to different levels of nitrogen and sulphur in loamy sand soils of north Gujarat

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Sesamum *(Sesamum indicum L)* is one of the most important oil seed crops grown extensively in India. Among the major oil seed crops viz. groundnut, sesamum, castor, rapeseed, mustard and linseed, sesamum stand to next after groundnut so far as production edible oil is concerned. Sesamum seed contains 40-60 per cent edible oil and 20-50 per cent protein. Sesamum oil is used directly in pharmaceutical industry, in manufacture of soaps and also used as hair oil and lotion. The productivity of the sesamum is low which can be boosted up by adopting suitable variety, improved agronomic practices and balanced and judicious use of chemical fertilizers. Varieties play an unique role in maximization of yield by improvising fertilizer use efficiency. Thus, selection of suitable cultivar is of prime importance as the genetic potential variety limits the expression of its yield. Of the various agronomic factors known to augment the sesamum yield, fertilizers play a vital role. Nitrogen is the most important expensive nutrient in crop production and its application in appropriate amount greatly enhances the yield of crop. Sulphur is indispensable for the synthesis of certain amino acids like methionine, cysteine and also constitute of glutathione which plays an important role in plant respiration and in the synthesis of essential oils. Since sesamum is being oilseed crop, the requirement of sulphur of this crop is substantial. There is no information available regarding nitrogen and sulphur nutrition to sesamum cultivar in this zone.

The present experiment was conducted during *Kharif* season of 2004 at the Agronomy Instructional Farm, S.D. Agricultural University, Sardarkrushinagar to study the effect of varieties, nitrogen and sulphur on growth, yield attributes, yield and quality of sesamum. The soil of experimental field was loamy sand (Typic *Ustipsamments*) in texture, slightly alkaline in reaction (pH 7.8), low in organic carbon (0.33 %), available nitrogen (172 kg ha^{-1}) and available sulphur (8.0 mg kg^{-1}) where as medium in available phosphorus (51 kg ha^{-1}). The experiment was laid out in randomized block design with three replications. The treatment consisted of 2 varities (Gujarat Til-1 and Gujarat Til- 2), 4 levels of nitrogen (10, 20, 30 and 40 kg N^{-1}) and 3 levels of sulphur (10, 20 and 30 kg S ha^{-1}). The half quantity of nitrogen through urea and entire quantity of sulphur through gypsum as per treatment along with recommended dose of phosphorus (50 kg ha^{-1}) through DAP was applied before sowing as a basal dose. The crop was sown at 45 cm spacing on 4th July, 2004 using 2.5 Kg ha^{-1} seed rate.

Effect of Varities

Growth and yield attributing characters viz. dry matter accumulation, length of capsule, number of seeds capsule $^{-1}$ and test weight were significantly higher in Gujarat Til -2 as compared to Gujarat Til-1 (Table-1). However, plant height, numbers of branches plant $^{-1}$ and capsule plant $^{-1}$ were remained unaffected due to verities. Between two varities, through the maximum value of oil content in seed was recorded in Gujarat Til-2 as compared to Gujarat Til-1, it was found non significant. Oil content was found non-significant due to varieties but higher value (48.8 %) was obtained in Gujarat Til-2.

Effect of Nitrogen

Growth and yield attributing characters viz. plant height, number of branches plant $^{-1}$, number of seeds capsule $^{-1}$ and test weight were influenced significantly due to different levels of nitrogen (Table-1). Application of 100 kg N ha^{-1} recorded maximum value of plant height and branches plant $^{-1}$ which was at par with 75 kg N ha^{-1}. However, significantly the highest number of seeds capsule $^{-1}$ (73.5) and test weight (4.09 g) were recorded under 100 kg N ha^{-1}. The seed and stalk yields of sesamum increased with each incremental levels of nitrogen up to 75 kg N ha^{-1} . The per cent increase in seed and stalk yield due to 75 kg N ha^{-1} was to tune of 9.2 and 7.7 over 25 kg N ha^{-1} , respectively. These results are in conformity with those obtained by Mandal *et al* (1) and Patel (2). The maximum value of oil content (48.9%) in seed with 75 kg N ha^{-1} which was at par with 100kg N ha^{-1} (48.7 %).

Table 1. Growth, yield attributes and yields of sesamum as influenced by varieties and levels of nitrogen and sulphur

Treatment	Plant height (cm)	Branches Plant^{-1}	Capsules Plant^{-1}	Length of capsule (cm)	Seeds capsule^{-1}	Test weight(g)	Seed yield (kg ha^{-1})	Stalk yield (kg ha^{-1})	Oil content (%)
Varieties									
V_1 : Gujarat Til-1	97.7	3.77	53.8	2.55	67.8	3.23	573	2090	48.5
V_2 : Gujarat Til-1	99.4	3.85	51.9	2.95	73.0	3.73	567	2208	48.8
CD at 5 %	NS	NS	NS	0.09	0.6	0.08	24	83	NS
Nitrogen level									
N_1 : 25 kg ha^{-1}	95.6	3.66	52.1	2.70	66.7	2.76	524	2071	48.0
N_2 : 50 kg ha^{-1}	98.2	3.77	52.9	2.70	70.5	3.38	541	2084	48.5
N_3 : 75 kg ha^{-1}	99.0	3.87	52.4	2.78	71.0	3.69	572	2231	49.4
N_4 : 100 kg ha^{-1}	101.3	3.93	54.6	2.81	73.5	4.09	571	2209	48.7
CD at 5 %	2.9	0.20	NS	NS	0.8	0.12	34	118	0.7
Sulphur level									
S_1 : 10 kg S ha^{-1}	97.8	3.76	52.4	2.73	69.2	3.30	524	2073	48.2
S_2 : 20 kg S ha^{-1}	98.2	3.82	52.7	2.72	70.6	3.49	561	2176	48.8
S_3 : 30 kg S ha^{-1}	99.6	3.84	53.4	2.79	71.5	3.65	571	2197	48.9
CD at 5 %	NS	NS	NS	NS	0.7	0.10	30	101	0.6
CV %	4.4	7.63	9.2	7.0	1.8	5.0	9.2	8.1	2.0

Effect of Sulphur

Number of seeds capsule $^{-1}$ and test weight increased significantly with each successive increase in S levels from 10 to 30 kg ha $^{-1}$. The higher seed (571 kg ha $^{-1}$) and stalk (2197 kg ha^{-1}) yields and oil content of seed (49.4%) were recorded with treatments applied 30 kg S ha^{-1} which was found at par with that of 20 kg S ha^{-1}. The increased in seed and stalk yield due to 30 kg S ha^{-1} over 10 kg S ha^{-1} was to the tune of 8.9 and 5.9 per cent, respectively. The improvement in yield with increased supply of sulphur may be due to enhanced photosynthesis as S is a part of amino acid, which involved in the formation of chlorophyll and activation of enzymes and seed formation. Soils being deficient in available sulphur (8.0 mg kg^{-1}) respond well to applied sulphur in terms of increased growth and yield attributes and finally yield of sesamum. These findings are in agreement with those of Ghost *et al.* (3), Tiwari *et al.* (4) and Patel (2). The maximum oil content in seed was recorded with 30 kg S ha^{-1} (48.9 %) which was at par with that of 20 kg S ha^{-1}. An increasing oil content in seed may be attributed to the role of sulphur in synthesis of amino acids, especially sulphur containing amino acids especially sulphur containing amino acid and ultimately oil content. The above results are in accordance with Yadav *et al.* (5) and Patel (2).

References

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