

EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON GROWTH ATTRIBUTES, YIELD ATTRIBUTES AND YIELD OF SUMMER SESAME (*Sesamum indicum* L.)

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ABSTRACT

A field experiment was conducted at College Farm, Navsari Agricultural University, Navsari (Gujarat) during summer 2017. The result revealed that application of novel organic liquid (1%) at 30 and 50 DAS and 100 % RDF produced significantly higher plant height, number of branches per plant, number of capsules per plant, seed yield per plant, seed yield and straw yield of summer sesame.

KEY WORDS: FYM, Humic acid, Novel organic liquid, Sesame, Yield

INTRODUCTION

Sesame (*Sesamum indicum* L.) is the oldest indigenous oilseed crop, with longest history of cultivation in India. Sesame being an important oilseed crop as it has own merits like fast growth rate, short duration, less water requirement and wide adaptability under varying soil type. Therefore, it is cultivated in different agro climatic regions of India. In India, sesame was cultivated in an area of 17.78 lakh hectare realizing production of 8.11 lakh tonnes, leading to productivity of 456 kg/ha during 2014-15 (Anonymous, 2016). Gujarat occupies about 2.36 lakh hectare areas with production of 1021 lakh tonnes, and the productivity of sesame went to 513 kg/ha.

Nutrient management is an old concept practiced in traditional agriculture because of the low nutrient turn over in soil plant system. Nutrient management approach involving inorganic fertilizers, organic manures, foliar fertilizers will go a long way in build up soil fertility on sustainable basis, since the system will supply almost all the nutrient in a judicious way, besides increasing the nutrient use efficiency and improving the physio-chemical property of soil. However, meagre work has been done on effect of integrated nutrient management on quality and yield of sesame, hence above experiment was conducted.

MATERIALS AND METHODS

The present study was conducted on Block – F, plot no. 23 of the College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari during summer 2017. The experimental field was fairly levelled and uniform in fertility. The soil of South Gujarat is locally known as “Deep black soil”. The experimental field was clayed in texture and showed low, medium and very high rating for available nitrogen (182 kg/ha), phosphorus (32 kg/ha), potassium (346 kg/ha), respectively. The soil was slightly alkaline (pH 7.8) with normal electric conductivity (0.36 dS/m). Total twelve (12) treatment combinations of three foliar spray of organic and inorganic fertilizer (F₁: Controlled, F₂: Banana *pseudostem* based novel organic liquid (Novel organic liquid) (1%) at 30 and 50 DAS and F₃: Humic acid (0.05%) at 30 and 50 DAS) and four fertilizer combinations with organic and inorganic (N₁: 100% RDF (50-25-00 NPK kg/ha), N₂: 75% RDF, N₃: 75% RDF + 25% N from FYM and N₄: 75% RDF + 25% N from Bio-Compost) were tried in a factorial randomized block design with three replications. Before sowing field is ploughed and levelled properly and applied FYM, Bio-compost and NPK through chemical fertilizer was applied as per treatment. 100% phosphorus and 50% nitrogen was applied basal and remaining 50% nitrogen was applied as top dressing after 30 DAS as per treatments. Sowing of sesame variety Gujarat Til-3, used 2.5 kg/ha seed with 45 × 15 cm spacing. Plant height, number of branches per plant, number of capsules per plant and seed yield per plant recorded from five plants were selected at random from each net plot of all replications and seed and straw yield is recorded from net plot area.

RESULTS AND DISCUSSION

The results revealed that significantly the higher plant height and

numbers of branches per plant (Table 1) were recorded under novel organic liquid (1%) at 30 and 50 DAS (F₂) which was statistically equivalent to humic acid (0.05%) at 30 and 50 DAS (F₃). Novel organic liquid contains essential plant nutrients along with growth regulators. The foliar fed nutrients are possibly efficiently absorbed by the plant leading to the differentiation in increase plant height and number of branches per plant. Jondhale *et al.* (2014) and Singhal *et al.* (2015). Further, plant height and numbers of branches per plant was found statistically higher in nutrient management treatments N₁ (100% RDF) and it was found at par with treatment N₃ and N₄. The beneficial effect of application of 100% RDF associated with higher photosynthesis activity and protein synthesis, which promote cell division and elongation that in turn accelerates the vegetative growth. The overall effect of all nutrients on growth parameters was positive which resulted higher growths. These results are in agreement with Jaishankar and Wahab (2005).

Foliar fertilization and nutrient management treatments were significantly improve yield attributes. Application of novel organic liquid (1%) at 30 and 50 DAS (F₂) significantly increased the seed yield per plant and number of capsules per plant as compared to control. Novel organic liquid contains higher amount of majority of the essential plant nutrients especially N, P, K, Fe, Zn, Mn and Mg. etc. which ultimately increase yield attributes. Similar results also obtained by Jondhale *et al.* (2014), Singhal *et al.* (2015) and Lingaraju *et al.* (2016). Moreover, significantly higher values of all above mentioned parameters were achieved under 100% RDF (N₁) over all other treatments and most of parameters were statistically at par with 75% RDF + 25% N from FYM (N₃) and 75% RDF + 25% N from Bio-Compost (N₄). This was largely

attributed to better growth of plant which resulted in adequate supply of photosynthates for development of sink. Combination of inorganic and organic sources of nutrient might leads to improvement in reproductive character viz., number capsules per plant and seed yield per plant. The positive response in terms of yield attributes to inorganic and organic fertilizer have also been closely reported by Ghosh *et al.* (2013), and Sen *et al.* (2015).

With regard to yield viz., seed and straw yield were significantly affected and novel organic liquid (1%) at 30 and 50 DAS (F₂) showed its superiority, which was at par with humic acid (0.05%) at 30 and 50 DAS (F₃). Further, straw yield and seed yield were significantly influenced by different nutrient management treatments and were recorded higher under treatment receiving 100% RDF over other treatments (N₁). Straw yield and seed yield being found at par with N₃.

The interaction effects of foliar fertilization and nutrient management systems was found non-significant for all these studied traits viz., plant height, number of branches per plant, number of capsules per plant, seed yield per plant, seed yield and straw yield.

CONCLUSION

Based on the results of the field experimentation, it seems quite logical to conclude that application of novel organic liquid (1%) at 30 and 50 DAS and 100 % RDF produced significantly higher plant height, number of branches per plant, number of capsules per plant, seed yield per plant, seed yield and straw yield of summer sesame.

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Table 1: Effect of foliar application and nutrient management on plant height (cm), number of branches per plant, number of capsules per plant, seed yield per plant (g), seed yield (kg/ha) and straw yield (kg/ha) of sesame at harvest

Treatments	Plant Height (cm)	Number of Branches Per Plant	Number of Capsules Per Plant	Seed Yield Per Plant (g)	Seed Yield (kg/ha)	Straw Yield (kg/ha)
A) Foliar Spray (F)						
F ₁ = Controlled	90.23	2.87	56.05	5.23	713	1483
F ₂ = Novel organic liquid (1%) at 30 and 50 DAS	98.23	3.23	60.72	5.82	795	1683
F ₃ = Humic acid (0.05%) at 30 and 50 DAS	92.55	3.03	59.70	5.43	750	1610
S. Em ±	1.77	0.08	1.29	0.15	19.97	45.32
C.D. (P=0.05)	5.19	0.23	3.78	0.43	58	133
B) Nutrient Management (N)						
N ₁ = 100% RDF	98.76	3.20	61.80	5.81	805	1694
N ₂ = 75% RDF	88.76	2.84	54.91	5.13	701	1464
N ₃ = 75% RDF + 25% N from FYM	94.24	3.16	60.22	5.77	786	1671
N ₄ = 75% RDF + 25% N from Bio-Compost	92.93	2.98	58.36	5.27	719	1540
S. Em ±	2.05	0.09	1.49	0.17	23.06	52.33
C.D. (P=0.05)	5.99	0.27	4.37	0.50	67	153
C) Interaction						
F × N	NS	NS	NS	NS	NS	NS
C.V. %	6.56	9.00	7.62	9.24	9.19	9.86

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