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Effect of integrated nutrient management on growth parameter in mustard (*Brassica juncea* L.) crop

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Abstract
Oil seed crops are particularly evident in the present era of energy scarcity since they play a significant role in India's agricultural sectors and export trade. However, in rainfed conditions, natural occurrences tend to cause large changes in oil seed crop productivity. The crude protein content of the seed cake ranges from 25 to 30%. Seven percent nitrogen, 1.82% phosphorus, and 1.0 to 1.2 percent potassium Oilseed crop productivity is greatly influenced by efficient crop management practices such as variety of high higher yield disease pest resistant varieties, proper crop rotation, timeous direct seeding, acceptable vegetation stand, stable nutrient uptake, need base tree security, water storage, and timely weed control. Nutrient management is one of the most significant agronomic methods for increasing the yield of oilseed crops. In a high input crop yield on their own. Integrated Fertilizer Application (INM) is a preferable option since it ensures high crop yield while still ensuring soil integrity and fertilizer efficiency. Based on the result of this research on fertilizer application, it can be concluded that applying 50 percent RDF + 25 percent N via FYM + 25 percent N via Vermi-compost + 30 kg S ha^{-1} managed to improve growth and yield attributes, due to increased yield and net accomplishment in mustard crops grown in Kanpur. It can also be inferred that combining physical and chemical sources has no considerable impact on quality, such as sulfur content and nutritive values.

Keywords: Integrated nutrient management, mustard (*Brassica juncea* L.), RDF, vermi-compost, FYM

1. Introduction

Oil seed crops are particularly evident in the present era of energy scarcity since they play a significant role in India's agricultural sectors and export trade. However, in rainfed conditions, natural occurrences tend to cause large changes in oil seed crop productivity. Two of the most vulnerable essential commodities are oilseeds and edible oils. India is one of the world's major producers of oilseeds, with an estimated 24.88 billion tons of nine farmed oilseeds produced in the country. (Anonymous, 2010) [4] In recent years, the rapeseed scenario has changed dramatically, with oilseeds being a net source of foreign exchange, resulting in the "Yellow Revolution." Oil seeds are a high-energy item.

The country saw a yellow revolution in the recent decade, with rapeseed and mustard production and productivity skyrocketing from 2.68 million tonnes and 660 kg ha^{-1} in 1985-86 to 6.69 million tonnes and 1057 kg ha^{-1} in 2006-07. (Anonymous, 2008) [3] Rajasthan, Madhya Pradesh, Uttar Pradesh, Gujarat, Ludhiana, Gurgaon, and Assamese are perhaps the most prominent canola manufacturing states.

Mustard (*Brassica juncea* L.), also called as rai, raya, laha, and raiya, has a wide range of applications. The greenish fragile leaf is used to make the popular "Sarson ka Saag" vegetable. The whole seed is used to make pickles, as well as to flavour vegetables and curries. Mustard oil is typically used in cooking, frying, and pickling. Vegetable ghee, hair oil, medication, soaps, lubricating oil, and tanin industries all use oil. After extraction, the oil cake is used as feedstuff and fertilizer.

The crude protein content of the seed cake ranges from 25 to 30%. Seven percent nitrogen, 1.82% phosphorus, and 1.0 to 1.2 percent potassium (Reddy and Reddi, 2011) India ranks first in terms of area and second in terms of production after China, supplying 28.3 and 19.8 percent of global rapeseed-mustard acreage and production, respective. Rapeseed and mustard are India's second and third more important oilseeds, behind groundnut, accounting for 27.8% of the Indian rapeseed industry (Anonymous, 2004a) [2].

Oilseed crop productivity is greatly influenced by efficient crop management practices such as variety of high higher yield disease pest resistant varieties, proper crop rotation, timeous direct seeding, acceptable vegetation stand, stable nutrient uptake, need base tree security, water storage, and timely weed control.

Nutrient management is one of the most significant agronomic methods for increasing the yield of oilseed crops. In a high input production system, neither liquid fertilizers nor biological sources can sustain soil fertility and crop yield on their own. Integrated Fertilizer Application (INM) is a preferable option since it ensures high crop yield while still ensuring soil integrity and fertiliser efficiency.

Integrated Nutrient Management requires a proper mix of carbonaceous nutrition, along with organic fertilizers which also cares for fertility and production efficiency, but also leads to significant reduction in the use of expensive chemical fertilisers and encourages the use of organic manure, while also enduring balance of nature by in using local resources that can produce desired yields and improves soil health over time. When organic fertilizers are used in association with organic manures, their efficiency is greatly increased. Due to increased physico-chemical characteristics of the soil, it reduces n losses from inorganic fertilisers, which replace biological activity in the soil (Kumarswamy *et al*., 2001) [7]. It is obvious that using synthetic fertilizers increases the buildup of key enzymes, which has a direct impact on the better soil index.

The proper use of biofertilizers to crops not only benefits farmers monetarily, but it also helps to increase and preserve soil fertility and ecosystem sustainability. Chauhan *et al*. (1996) [6] showed positive reactions of mint to Azospirillum and Rhizospheric inoculation. Phosphate adsorbing bacteria convert organic phosphate to soluble form and release more P into the soil solution, resulting in an increase in P ion production and dissemination. Plant a seed inoculated with PSB improve spike length, dry matter per metre row, quantity of reiterating per plant, seed and grain and straw yield much more than seeds that have not been inoculated (Baldev and Pareek, 1996) [5].

2. Materials and Methods

The present study namely "Effect of Integrated Nutrient Management on Mustard (*Brassica juncea* L.) Progress and Yield" carried out in Agricultural Research Farm, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur during the Rabi season of 2021-22.

The data of all experiments were analysed statistically by adopting the analysis of variance technique, according to Gomez and Gomez (1984). For the F test, the error due to replicates was also determined. When F value was found to be significant at 5% level of probability, critical difference (CD) was calculated.

3. Results and Discussion

The data gathered on mustard developmental features, such as plant stand at 15 DAS and at harvest, periodic plant height (cm) at 30, 60, 90 DAS and at harvest, and number of two secondary branching plant^{-1} at harvest, revealed that the plant responded differently to the treatments.

3.1 Population of plants

Table 3.1 shows the mean number of plants per metre row height recorded at 15 days after sowing (DAS) and harvest.

At 15 DAS and at harvest, the plant population per metre row length remains equivalent to the individual is based of continuous nutrition management.

Table 3.1: Plant population (per m row length).

Treatment combination	15 Days	At harvest
T1- 100% RDF	9	8.25
T2- 75% RDF + 25% N through FYM	9	9
T3- 75% RDN + 25% N through Vermi-compost	9.25	9
T4- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost	9	8.25
T5- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost + 30 kg S ha^{-1}	9.38	9
T6- 50% RDF + 50% N through FYM	9.5	9.25
T7- 50% RDF + 50% N through Vermi-compost	9.25	9
T8- 50% RDF + 25% N through FYM + 25% N through Vermi-compost	9.5	9
T9- 50% RDF + 25% N through FYM + 25% N through Vermi-compost + 30 kg S ha^{-1}	9.5	9.5
T10- 100% RDF + 30 kg S ha^{-1}	9.25	9.25
S.Em ±	0.53	0.43
C.D. at 5%	NS	NS
C.V. (%)	11.47	9.47

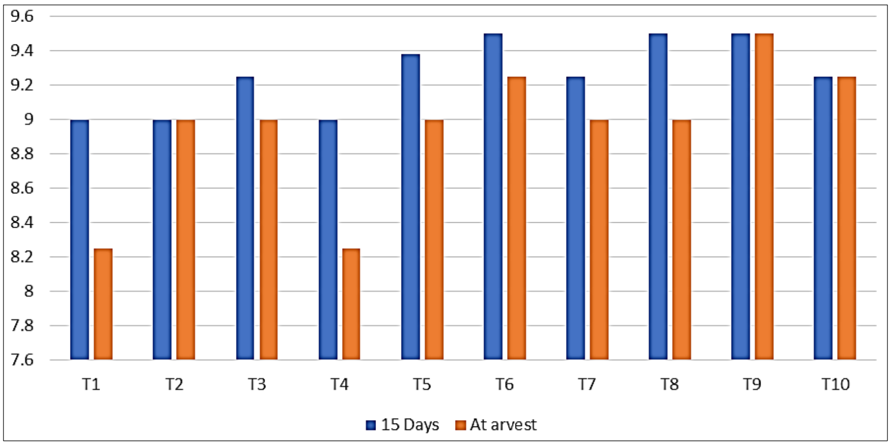

Fig 3.1: Plant population (per m row length).

3.2 Plant height

Table 3.2 shows data on plant height (cm) as a function of various integrated nutrient management treatments at 30, 60, 90, and harvest, as well as a depiction in Fig. 3.2. The data demonstrated a large effect of all treatments at all phases, except perhaps 30 DAS, where treatments had no effect on plant development.

Table 3.2: Plant height (cm) at 30, 60, 90 DAS and at harvest.

Treatment combination	30 DAS	60 DAS	90 DAS	At harvest
T1- 100% RDF	17.4	116.4	147.1	150.5
T2- 75% RDF + 25% N through FYM	16.2	122.1	147.2	154.2
T3- 75% RDN + 25% N through Vermi-compost	16.9	127	168.3	173.5
T4- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost	17.1	123	151.2	153.2
T5- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost + 30 kg S ha^{-1}	100.3	118	147.7	153.7
T6- 50% RDF + 50% N through FYM	18.2	132.8	177.3	181.2
T7- 50% RDF + 50% N through Vermi-compost	16.5	128.7	159.2	165.2
T8- 50% RDF + 25% N through FYM + 25% N through Vermi-compost	16	128.7	174.1	179.4
T9- 50% RDF + 25% N through FYM + 25% N through Vermi-compost + 30 kg S ha^{-1}	17.2	127.9	175.2	180.4
T10- 100% RDF + 30 kg S ha^{-1}	16.5	122.4	151	157
S.Em ±	0.74	5.29	8.02	7.51
C.D. at 5%	NS	15.21	23.08	21.62
C.V. (%)	8.88	8.65	10.24	9.3

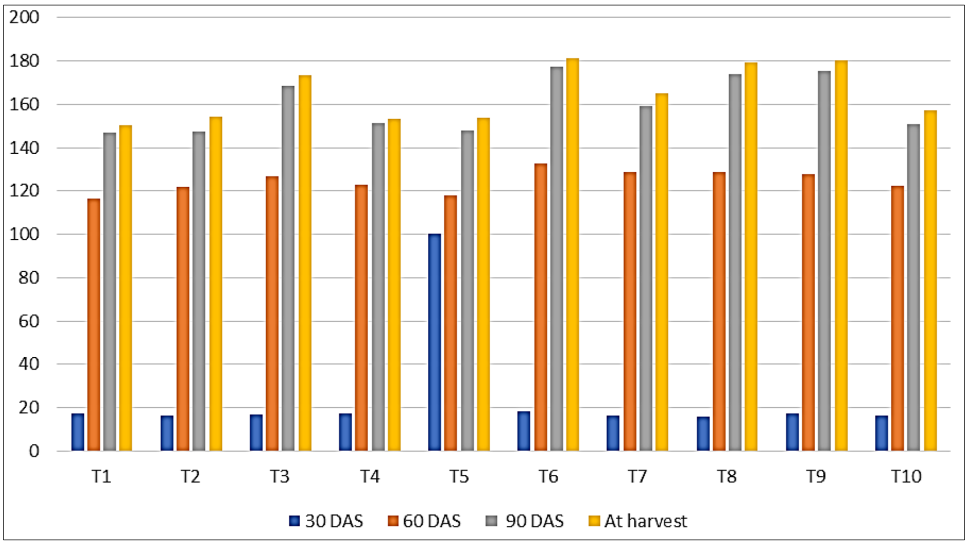

Fig 3.2: Plant height (cm) at 30, 60, 90 DAS and at harvest.

Growth parameters inequalities were found to be significant at 60 DAS, with treatment T6 gaining maximum plant height (132.8 cm) than the other treatments (T 5, T8, T9, T7, T3, and T4). Treatment T2 led to reduced plant height (122.1). At 90 DAS, a similar trend was seen. T6 produced maximum plant height (177.3 cm), which was comparable to T9, T8, T3, and T7 treatments. Spike length was much lower (140.9 cm) under T10 151.0, but it was comparable to T11, T1, T2, T4, T10, T5, and T7. At harvest, the difference in planted height followed the trend, with treatment T6 recording significantly higher seedling growth than controls T9, T8, T3, and T7.

3.3 Number of primary branches/plant

The perusal of data (Table 3.3) revealed that number of primary branches per plant increased up to 30 DAS stage, which remained more or less the same at 60 DAS.

Table 3.3: Number of primary branches/plant at 30, 60 and 90 DAS.

Treatment combination	30 DAS	60 DAS	90 DAS
T1- 100% RDF	2.5	4.6	4.7
T2- 75% RDF + 25% N through FYM	2.1	2.6	2.9
T3- 75% RDN + 25% N through Vermi-compost	2.3	2.7	3.1
T4- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost	2.6	4.7	4.9
T5- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost + 30 kg S ha^{-1}	2.5	4.4	4.6
T6- 50% RDF + 50% N through FYM	2.5	3.1	3.3
T7- 50% RDF + 50% N through Vermi-compost	2.4	3.2	3.4
T8- 50% RDF + 25% N through FYM + 25% N through Vermi-compost	2.3	3.3	3.4
T9- 50% RDF + 25% N through FYM + 25% N through Vermi-compost + 30 kg S ha^{-1}	2.7	3.2	3.4
T10- 100% RDF + 30 kg S ha^{-1}	2.4	3	3.2
S.Em ±	0.3	0.3	0.37
C.D. at 5%	NS	0.96	1.1

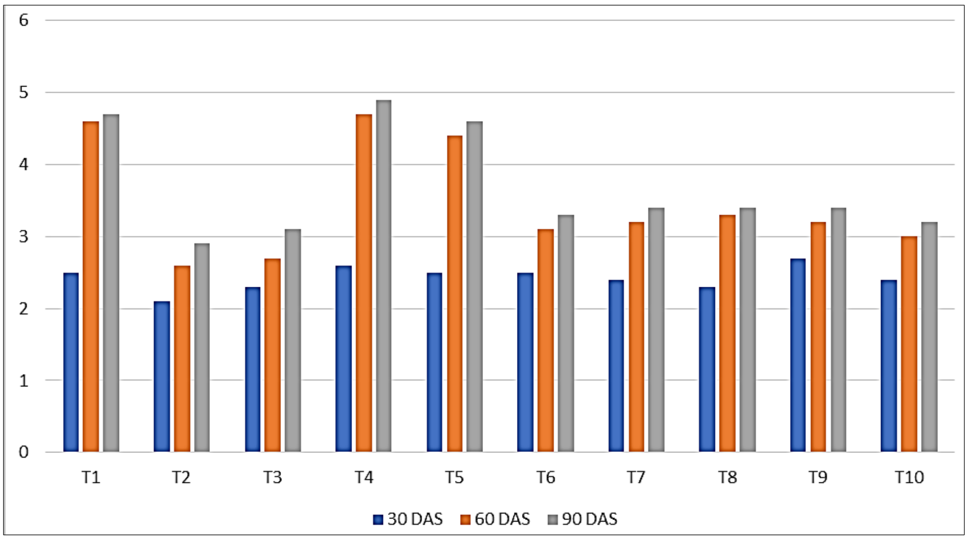

Fig 3.3: Number of primary branches/plant at 30, 60 and 90 DAS.

There was a significant difference in number of primary branches per plant due to different treatments except at 30-day stage. Treatment receiving 50% RDF + 25% N through FYM + 25% N through Vermi-compost + 30 kg S ha^{-1} (T9) resulted in maximum number of primary branches per plant (4.9) at 30 day stage with no significant difference among the treatments receiving recommended dose of fertilizers (T1) and 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost + 30 kg S ha^{-1} (T5) but was significantly superior over rest of the treatments. The lowest number of primary branches per plant were observed in the treatment receiving only 75% RDF + 25% N through FYM (T2) with non-significant difference amongst T3 T6, T7, T8 and T9 treatments. Similar trend was also noticed at 90 day stage.

3.4 Number of secondary branches/plant

The perusal of data (Table 3.4) revealed that number of secondary branches per plant increased up to 30 DAS stage, which remained more or less the same at 60 DAS and 90 DAS.

Table 3.4: Number of secondary branches/plant at 30, 60 and 90 DAS.

Treatment combination	30 DAS	60 DAS	90 DAS
T1- 100% RDF	2.5	5.5	5.6
T2- 75% RDF + 25% N through FYM	2.4	3.3	3.4
T3- 75% RDN + 25% N through Vermi-compost	2.3	3.4	3.6
T4- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost	2.8	5.7	5.8
T5- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost + 30 kg S ha^{-1}	2.6	5.4	5.5
T6- 50% RDF + 50% N through FYM	2.5	4	4
T7- 50% RDF + 50% N through Vermi-compost	2.4	4.2	4.4
T8- 50% RDF + 25% N through FYM + 25% N through Vermi-compost	2.3	3.7	3.8
T9- 50% RDF + 25% N through FYM + 25% N through Vermi-compost + 30 kg S ha^{-1}	2.5	4	4.1
T10- 100% RDF + 30 kg S ha^{-1}	2.3	3.6	4
S.Em ±	0.18	0.91	0.31
C.D. at 5%	NS	5.5	0.91

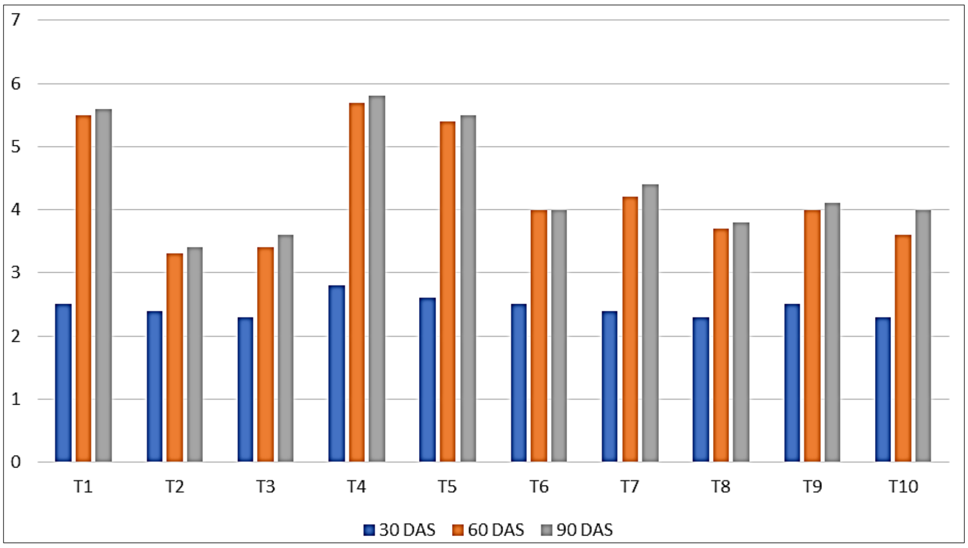

Fig 3.4: Number of secondary branches/plant at 30, 60 and 90 DAS.

The number of secondary branches per plant increased up to 90 days, but remained relatively constant after harvest, according to data obtained at the 30 and 60-das stages and 90 DAS (Table 3.4). At all growth phases except the 30-day period, the varied interventions had a substantial impact on the amount of secondary branches. At the 90-day stage and at harvest, the highest number of similar branches were observed with 75 percent RDF + 5t FYM ha(T4), which was on par with the required fertiliser dose (T1), and 75 percent RDF + 12.5 percent N through FYM + 12.5 percent N and via Application of bio + 30 kg S ha^{-1} (T5). These three treatments, however, remain better to the remainder of the treatments. The treatment of 75 percent RDF + 25% N via FYM (T2) yielded the lowest results of secondary branches per plant with no significant difference amongst T3, T6, T7, T8and T9 treatments.

3.5 Dry weight accumulation (g/plant)

The perusal of data (Table 3.5) revealed that Dry weight accumulation (g/plant) increased up to 60 DAS stage, which remained more or less the same at 90 DAS.

Table 3.5: Dry weight accumulation (g/plant) at 30, 60, 90 DAS and at harvest.

Treatment combination	30 DAS	60 DAS	90 DAS
T1- 100% RDF	4.4	15.3	15.3
T2- 75% RDF + 25% N through FYM	2.8	10.8	10.8
T3- 75% RDN + 25% N through Vermi-compost	3.2	11.2	11.2
T4- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost	4.5	15.5	15.5
T5- 75% RDF + 12.5% N through FYM + 12.5% N through Vermi-compost + 30 kg S ha^{-1}	4.2	14.8	14.8
T6- 50% RDF + 50% N through FYM	3.4	12.5	12.5
T7- 50% RDF + 50% N through Vermi-compost	3.5	12.7	12.7
T8- 50% RDF + 25% N through FYM + 25% N through Vermi-compost	3	11.4	11.4
T9- 50% RDF + 25% N through FYM + 25% N through Vermi-compost + 30 kg S ha^{-1}	3.1	11.6	11.6
T10- 100% RDF + 30 kg S ha^{-1}	3.6	11.8	11.9
S.Em ±	0.18	0.7	0.7
C.D. at 5%	0.54	2	2

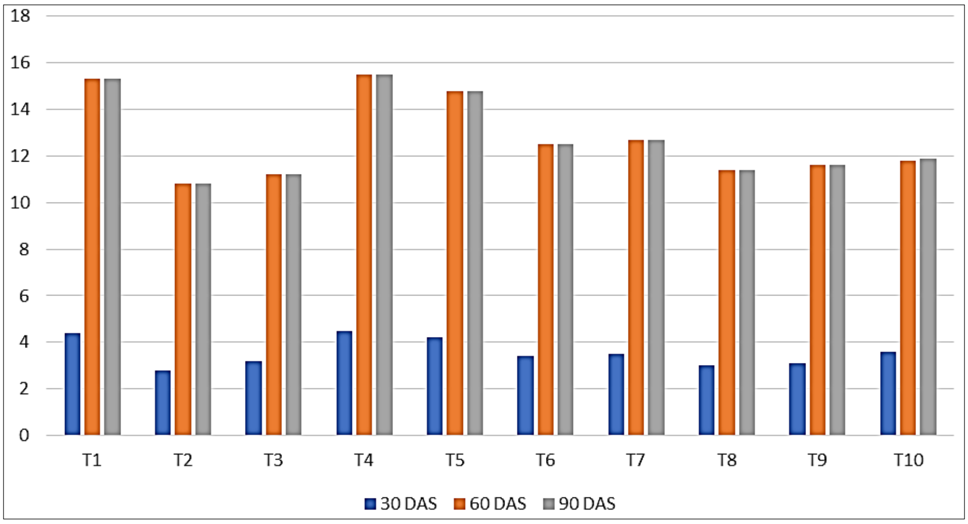

Fig 3.5: Dry weight accumulation (g/plant) at 30, 60, 90 DAS and at harvest.

At all periods of plant development, treatment options had a considerable impact on dry matter accumulation per plant. The application of lb per cent RDF + 5t FYM ha (T4) yielded the best results. Besides the recommended dose of fertilisers (T1), maximum dry buildup was clearly better to all other treatments at all growth stages (T5). At 30, 60, and 90 days, the treatment receiving 75 percent RDF+ 25 percent N through FYM (T2) had the least dry matter buildup, which was substantially equal to T3, T6, T7, T8, and T9 treatments.
Possible variations of organic amendments and conventional sources, as well as Azotobacter and PSB, were found to have a substantial effect on growth indicators. Despite the fact that multiple regimens had no discernible effect on plant height at 30 DAS, treatment T6 consistently increased plant height to 132.8 cm, 177.4 cm, and 181.2 cm at 60, 90, and harvest, respectively. At 60 DAS, it was equivalent to treatments T5, T8, T9, T3, T2, and T4; at 90 DAS, it was equivalent to treatments T9, T8, T3, and T7; and at harvest, it was comparable to treatments T9, T8, T3, and T7. T12 had the shortest plant height at 60 and 90 DAS, whereas T11 had the shortest plant height at harvest. T6 had a significantly larger number of primary (6.6) and secondary (12.1) branches per plant, followed by T9 and T3, which had a significantly lower number of primary (3.8) and secondary (6.1) branches per plant, respectively.

4. Summary and Conclusion

4.1 Summary

The flow study, named "Impact of coordinated supplement the board on mustard (*Brassica juncea* L.) advancement and yield," will be embraced during the Rabi time of 2021-22 at Rama Agricultural Farm, Faculty of Agricultural Sciences and Allied Industries, RAMA UNIVERSITY KANPUR UP. 100% RDF, 75% RDF + 25% N through FYM, 75% RDF + 25 percent N through Vermi-fertilizer, 75% RDF + 12.5 percent N through FYM + 12.5 percent N however the

Utilization of bio, 75% RDF + 12.5 percent N through FYM + 12.5 percent N through Vermi-fertilizer, 75% RDF + 12.5 percent N through FYM + 12.5 percent N through Vermi-fertilizer, 75% RDF + Vermi-fertilizer, half RDF + 25% N through FYM + 25% N through Vermi-manure + 30 kg S ha^{-1}, 100 percent RDF + 30 kg S ha^{-1}, each copied multiple times The main parts of the outcomes procured and examined in before parts are summarized as follows.

Potential varieties of natural corrections and regular sources, as well as Azotobacter and PSB, were found to significantly affect development markers. In spite of the way that different regimens significantly affected plant level at 30 DAS, treatment T6 reliably expanded plant level to 132.8 cm, 177.4 cm, and 181.2 cm at 60, 90, and reap, separately. At 60 DAS, it was identical to medicines T5, T8, T9, T3, T2, and T4; at 90 DAS, it was identical to medicines T9, T8, T3, and T7; and at reap, it was equivalent to medicines T9, T8, T3, and T7. T12 had the most limited plant level at 60 and 90 DAS, while T11 had the briefest plant level at gather. T6 had an essentially bigger number of essential (6.6) and optional (12.1) branches per plant, trailed by T9 and T3, which had a fundamentally lower number of essential (3.8) and auxiliary (6.1) branches per plant, individually.

4.2 Conclusion

Based on the result of this research on fertilizer application, it can be concluded that applying 50 percent RDF + 25 percent N via FYM + 25 percent N via Vermi-compost + 30 kg S ha^{-1} managed to improve growth and yield attributes, due to increased yield and net accomplishment in mustard crops grown in Kanpur. It can also be inferred that combining physical and chemical sources has no considerable impact on quality, such as sulfur content and nutritive values.

5. References

1. Anonymous. Rapeseed and canola oil, 2004, 10-11.
2. Anonymous. Oilseeds in India, 2004a, 67.
3. Anonymous. 2008. www.ficciagroindia.com/general/agri-stat
4. Anonymous, 2010. www.fcamin.nic.in
5. Baldev R, Pareek RG. Effect of phosphorus, sulphur and PSB on growth and yield of mustard. Agric. Sci. Digest. 1996;19:203-206.
6. Chauhan DR, Paroda S, Ram M. Response of Indian mustard (*Brassica juncea* L.) to biofertilizers, sulphur and nitrogen fertilization. Indian J Agron. 1996;41(1):620-623.
7. Kumarswamy. Organic, inorganic and integrated soil fertility. Kisan World, 2001, P23.