Plant Archives Vol. 25, No. 2, 2025 pp. 1571-1578 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2025.v25.no.2.228

IMPACT OF FERTILIZER DOSAGE AND TIME OF APPLICATION ON YIELD AND QUALITY OF MANGO (*MANGIFERA INDICA* L.) CV. KESAR

Shinde M. B.[1]*, Shinde V. N[1]., Mavinalli Santosh[2], Pardeshi S. S.[1] and Abhishek[3]
[1]Department of Horticulture, College of Agriculture, Latur (VNMKV Parbhani) Maharashtra, India
[2]Department of Fruit Science, University of Horticulture Science, Bagalkot, Karnataka, India
[3]Department of Genetics and Plant Breeding, University of Horticultural Science Bagalkot, Karnataka, India
*Corresponding author E-mail: shindemeghna2001@gmail.com
(Date of Receiving : 01-08-2025; Date of Acceptance : 05-10-2025)

ABSTRACT

Mango (*Mangifera indica* L.) is one of the most important tropical fruit crops, often referred to as the "king of fruits." Being a perennial and high nutrient-demanding crop, balanced fertilizer application plays a critical role in regulating vegetative growth, flowering, fruit set, yield, and fruit quality. Nutrient requirements vary across different phenological stages, and improper or imbalanced fertilization often leads to poor yield and inferior fruit quality. A field experiment was conducted during 2024-25 on a well-established ten-year-old mango orchard at the Department of Horticulture, College of Agriculture, Latur, to Impact of Fertilizer Dosage and Time of Application on Yield and Quality of Mango (*Mangifera indica* L.) cv. Kesar The experiment was carried out on factorial randomized block design with two factors first factor was fertilizer dose (D_1: 1000 g N, 500 g P, and 500 g K per tree, D_2: 1500 g N, 500 g P, and 750 g K per tree, D_3: 2000 g N, 500 g P, and 1000 g K per tree) and second factor is time of application of fertilizer dose on (M_1: 50% of N and 100% of P, K in month of June and 50% of N in month of August, M_2: 50% of NK and 100% of P in month of June and 50% of N and 50% of K in month of August, M_3: 50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November) experiment having a three replications. The treatments were applied as per the plan and observation on flowering, fruit, yield and quality parameters were recorded. The results revealed that the application of fertilizer dose at 2000 g N, 500 g P, and 1000 g K per tree has recorded highest fruit length(8.62 cm), fruit diameter (8.09 cm), fruit weight (278.05 g), yield per tree (99.32 kg), yield per hectare (t/ha) and T.S.S (%). In terms of timing, application of fertilizer with 50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November showed the highest fruit length(9.40 cm), fruit diameter (8.18 cm), fruit weight (296.12 g), yield per tree (108.08 kg), yield per hectare (t/ha) and T.S.S (%). Based on the findings, it is recommended to apply fertilizer at a rate of 2000 g N, 500 g P, and 1000 g K per tree, with 50% of N and 100% of P applied in June, 50% of N and 50% of K in August, and the remaining 50% of K in November for commercial mango production.

Key words **:** (Mango, Kesar, Fertilizer, Fruiting, Yield)

Introduction

Mango *(Mangifera indica* L.) belongs to the family Anacardiaceae and is the oldest and choicest fruit in the world. Native to South Asia, the mango has a rich history that spans over four thousand years. Mango is believed to have originated in the Indo-Burma region, specifically in the eastern part of India, Bangladesh, and Myanmar. Mango is the most important commercial fruit crop of tropical and subtropical regions of the world, especially in Asia, and is considered the "king of fruit" in the warm world (Singh, 1996). Mango is called the "king of fruits" because of its rich source of nutrients, luscious, aromatic flavour, good amount of dietary fibre and carbohydrates, and a delicious taste in which sweetness and acidity are delightfully blended. It is the most popular, the choicest fruit and occupies a prominent place among the fruits of the world and is the most

important fruit crop in India, having great cultural, socio-economic and religious significance.

Mango production, yield and quality are influenced by several factors, including nutritional as well as environmental factors. Imbalanced fertilization is considered to be one of the major problematic factor for the low productivity. It is estimated that the production of ten tonnes of mango fruit removes annually 67 kg N, P_2O_5 and 73 kg K_2O/ha from the soil (Anon., 2004). In India, productivity of mango is low as compared to Israel and Australia. It is due to the poor orchard management practices like inadequate or lack of nutrient management practices, training and pruning practices, water management and pest disease management. Out of that, nutrient management in mango is one of the important practices for improving yield and quality of fruit.

In certain mango growing locations, fertilizer application is uneven or insufficient, which resulting in nutritional shortages particularly potassium. The different phases of plant growth show varying nutrient demand levels; thus, an effective fertilization strategy for mango trees should take that into account. Additionally, it is challenging to create an efficient fertilization plan for mango trees because they are biennial, producing a high production one year and a low yield the following (Avilan, 1971). Taking the right steps to attain the ideal soil nutrient status will help maintain mango trees at different stages and guarantee optimal production in a sustainable manner. As a result, applying nutrients at the correct time and in the right amount, while keeping in mind the importance of phenological phases, might be a valuable strategy for achieving good output on such soils.

Materials and Methods

The present study entitled, "Impact of Fertilizer Dosage and Time of Application on Yield and Quality of Mango (*Mangifera indica* L.) Cv. Kesar." was conducted in experimental cum research mango orchard, Department of Horticulture, College of Agriculture, Latur, VNMKV, Parbhani during the year 2024-25. The experiment was carried out on factorial randomized block design with two factors first factor was fertilizer dose D and second factor is time of application of fertilizer dose on M experiment having three replications and nine combinations of treatments.

Table 1: Treatment details

D	N(g/tree)	P(g/tree)	K(g/tree)
D_1	1000	500	500
D_2	1500	500	750
D_3	2000	500	1000

M_1	50% of N and 100% of P, K in month of June and 50% of N in month of August.
M_2	50% of NK and 100% of P in month of June and 50% of N and 50% of K in month of August.
M_3	50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November.

Observations Recorded

Length of fruits (cm)

Five uniform-sized fruits were selected at random from each treatment for evaluation. A standard Vernier caliper was used to measure the length of the fruits. The mean of the observed values was calculated and expressed in cm.

Diameter of fruits (cm)

The fruit diameter of the five uniformly selected fruits from each treatment was measured at the individual fruit's widest cheeks using Vernier calipers. The mean diameter is calculated from the observed values and expressed in mm.

Fruit weight (g)

Five uniformly selected fruits from each treatment were weighed individually using an electronic weighing balance and the average mean value is calculated and expressed in g.

Fruit yield per tree (kg)

The weight of the harvested fruits at each picking was recorded from each experimental tree. The values at each picking were summed and recorded as the final yield which is expressed in kg/tree.

Fruit yield per hectare (t/ha)

The yield per hectare was calculated by multiplying the value of yield/tree (kg) by the total number of plants/hectare and dividing the result by 1000 and recorded as yield per hectare in tonnes.

Total Soluble Solids (TSS) (%)

All fruits from each treatment were crushed to create a uniform sample, from which the juice was then extracted using muslin cloth. This extract was utilized to determine Total soluble solids (T.S.S.) in percentage using a handheld refractometer. A few drops of juice were carefully applied to the prism's surface, followed by placing the hinged part back in position. The refractometer was then positioned against sunlight and the reading was recorded by adjusting the eyepiece rotation at room temperature.

Result and Discussion

Table 2: Effect of dose and time of application of fertilizer on length of fruit, diameter of fruit and weight of fruits

Treatments	Length of fruit(cm)	Diameter of fruit(cm)	Weight of fruits(kg)
Fertilizer Dose			
D_1	7.90	7.02	218.58
D_2	8.62	7.21	244.41
D_3	8.94	8.09	278.05
S.E ±	0.23	0.28	11.07
C. D. at 5%	0.71	0.85	33.18
Time of Application			
M_1	7.70	6.78	207.33
M_2	8.36	7.36	237.59
M_3	9.40	8.18	296.12
S.E ±	0.23	0.28	11.07
C. D. at 5%	0.71	0.85	33.18
Interaction (D x M)			
D_1M_1	6.67	6.88	204.31
D_1M_2	8.49	7.49	213.89
D_1M_3	8.56	6.69	237.54
D_2M_1	8.14	6.05	207.75
D_2M_2	8.06	7.06	210.16
D_2M_3	9.67	8.51	315.32
D_3M_1	8.31	7.42	209.93
D_3M_2	8.53	7.53	288.73
D_3M_3	9.97	9.33	335.50
S.E ±	0.41	0.49	19.18
C. D. at 5%	NS	NS	NS
General Mean	8.49	7.44	247.02

Length of fruit (cm)

Effect of dose (D)

The effect of different dose of fertilizer on length of fruit was differed significantly. The length of fruit of mango was significantly increased by fertilizer application. The length of fruit (8.94 cm) was recorded maximum with the dose of fertilizer D_3 (2000 g N, 500 g P, and 1000 g K per tree) followed by (8.62 cm) was obtained with the dose fertilizer D_2 (1500 g N, 500 g P, and 750 g K per tree) and minimum length of fruit (7.90 cm) was obtained with the dose of fertilizer D_1 (1000 g N, 500 g P, and 500 g K per tree) respectively. This increased fruit length in treatment D_3 could be ascribed to greater nutrient usage inside the plant as well as increased nitrogen translocation to the top (Muthulakshmi *et al*., 2007). Rathore and Chandra (2002) in Ber, Jat and Kacha (2014) in guava, and Makhmale *et al*., (2016) in mango reported similar results.

Effect of time (M)

The data revealed that the variation in length of fruit was also found significant. Maximum length of fruit (9.40 cm) was recorded at application of fertilizer on M_3 (50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November) followed by (8.36 cm) was noted at application of fertilizer on M_2 (50% of NK and 100% of P in month of June and 50% of N and 50% of K in month of August) and minimum length of fruit (7.70 cm) was noted at application of fertilizer on M_1

(50% of N and 100% of P, K in month of June and 50% of N in month of August) respectively. The above findings are in agreement with Salik *et al*. (2000) in kinnow, Ghosh *et al*. (2004) in custard apple.

Interaction Effect (DxM)

The interaction effect of dose and time of fertilizer application on length of fruit were also found non-significant.

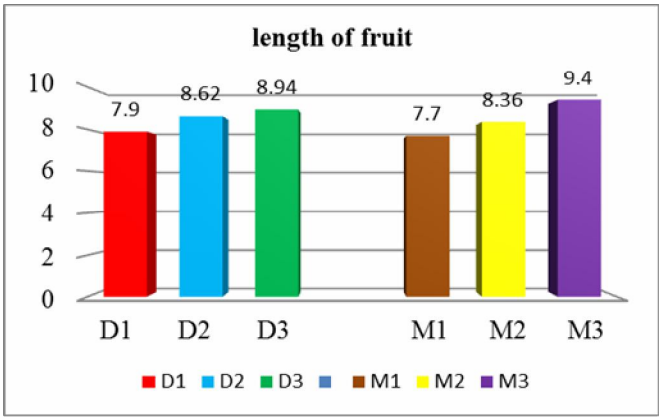

Fig. 1: Effect of dose and time of application of fertilizer on length of fruit

Diameter of fruit (cm)

Effect of dose (D)

The effect of different dose of fertilizer on diameter of fruit was differed significantly. The diameter of fruit of mango was significantly increased by fertilizer application however, the effect was more pronounced in the higher concentrations than the lower concentration. The diameter of fruit (8.09 cm) was recorded maximum with the dose of fertilizer D_3 (2000 g N, 500 g P, and 1000 g K per tree) followed by (7.21 cm) was recorded with the dose of fertilizer D_2 (1500 g N, 500 g P, and 750 g K per tree) and minimum diameter of fruit (7.02 cm) was obtained with the dose of fertilizer D_1 (1000 g N, 500 g P, and 500 g K per tree) respectively. Rathore and Chandra (2002) observed similar results in Ber, Jat and Kacha (2014) in guava, and Makhmale *et al*., (2016) in mango.

Effect of time (M)

The data revealed that the variation in diameter of fruit was also found significant as influenced by different time of fertilizer application. Maximum diameter of fruit (8.18 cm) was recorded at application of fertilizer M_3 (50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November) followed by (7.36 cm) was noted at application of fertilizer on M_2 (50% of NK and 100% of P in month of June and 50% of N and 50% of K in month of August) and minimum diameter of fruit (6.78 cm) was noted at application of fertilizer on M_1(50% of N and 100% of P, K in month of June and 50% of N in month of August) respectively.

Interaction Effect (DxM)

The interaction effect of dose and time of fertilizer application on diameter of fruit were also found non-significant.

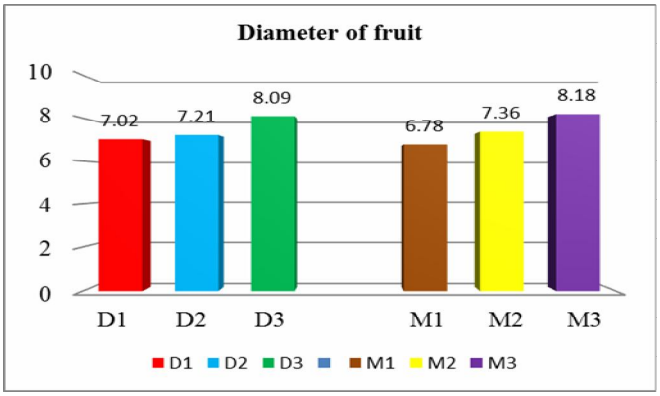

Fig. 2: Effect of dose and time of application of fertilizer on diameter of fruit

Weight of Fruit (g)

Effect of dose (D)

The effect of different dose of fertilizer on weight of fruit was differed significantly. The weight of fruit of mango was significantly increased by fertilizer application, however, the effect was more pronounced in the higher concentrations than the lower concentration. The weight of fruit (278.05 g) was recorded maximum with the dose of fertilizer D_3 (2000 g N, 500 g P, and 1000 g K per tree) followed by (244.41 g) was recorded with the dose of fertilizer D_2 (1500 g N, 500 g P, and 750 g K per tree) and minimum weight of fruit (218.58 g) was obtained with the dose of fertilizer D_1 (1000 g N, 500 g P, and 500 g K per tree) respectively. Rao *et al*. (2017) obtained maximum fruit length, width and weight when plants were supplemented with 100 per cent RDF in guava. Devi (2018) also observed significantly maximum fruit weight in treatment receiving 100 per cent recommended dose in mango cv. Pant Sinduri.

Effect of time (M)

The data revealed that the variation in weight of fruit was also found significant as influenced by different time of fertilizer application. Maximum weight of fruit (296.12 g) was recorded at application of fertilizer on M_3 (50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November) followed by

(237.59 g) was noted at application of fertilizer on M_2 (50% of NK and 100% of P in month of June and 50% of N and 50% of K in month of August)and minimum weight of fruit (207.33 g) was noted at application of fertilizer on M_1 (50% of N and 100% of P, K in month of June and 50% of N in month of August) respectively. Singh and Rajput, 1977 and Chandrakumar *et al*., (2001) in banana and Sharma *et al*., (2005) in papaya also found similar findings.

Interaction Effect (DxM)

The interaction effect of dose and time of fertilizer application on weight of fruit were also found non-significant.

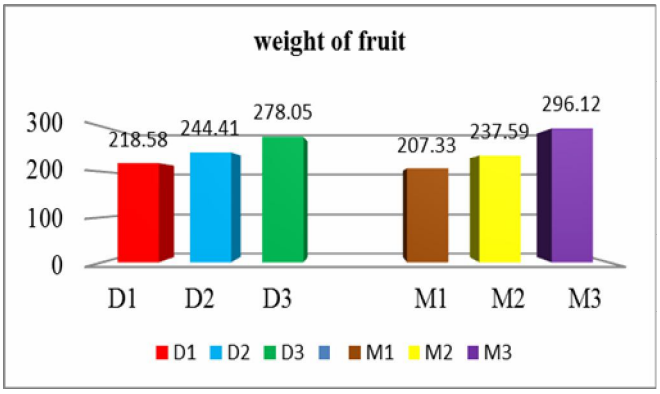

Fig. 3: Effect of dose and time of application of fertilizer on weight of fruit

Table 3: Effect of dose and time of application of fertilizer on yield per tree, yield per hectare and T.S.S of fruit of mango cv. Kesar

Treatments	Yield per tree(kg)	Yield per hectare (t/ha)	T.S.S (%)
Fertilizer Dose			
D_1	59.03	5.90	18.27
D_2	78.38	7.84	18.52
D_3	99.32	9.93	18.72
S.E ±	6.1	0.61	0.55
C. D. at 5%	18.5	1.85	1.64
Time of Application			
M_1	55.47	5.55	18.12
M_2	73.17	7.32	18.65
M_3	108.08	10.81	18.73
S.E ±	6.1	0.61	0.55
C. D. at 5%	18.5	1.85	1.64
Interaction (D×M)			
D_1M_1	47.83	4.78	17.62
D_1M_2	58.58	5.86	18.70
D_1M_3	70.68	7.07	18.50
D_2M_1	56.31	5.63	18.10
D_2M_2	60.12	6.01	18.66
D_2M_3	118.70	11.87	18.79
D_3M_1	62.29	6.23	18.66
D_3M_2	100.82	10.08	18.59
D_3M_3	134.84	13.48	18.90
S.E ±	10.70	1.07	0.95
C. D. at 5%	NS	NS	NS
General Mean	78.91	7.89	18.50

Yield per tree (kg)

Effect of dose (D)

The effect of different dose of fertilizer on fruit yield per tree was differed significantly. The weight of fruit of mango was significantly increased by fertilizer application, however, the effect was more pronounced in the higher concentrations than the lower concentration. The fruit yield per tree (99.32 kg) was recorded maximum with the dose of fertilizer D_3 (2000 g N, 500 g P, and 1000 g K per tree) followed by (78.38 kg) was recorded with the dose of fertilizer D_2 (1500 g N, 500 g P, and 750 g K per tree) and minimum fruit yield per tree (59.03 kg) was obtained with the dose of fertilizer D_1(1000 g N, 500 g P, and 500 g K per tree) respectively. Such findings were also supported by Srinivas *et al.* (2010), who observed a significant increase in yield with per cent fertilizer dose in passion fruit. Similarly, Bhirugnanshi *et al.* (2012) found that different fertigation levels significantly influenced mango yield under subtropical conditions. Sharma *et al.* (2013) and Bhagwa *et al.*

(2012) observed similar trends in guava and pomegranate, where higher NPK levels enhanced yield traits such as fruit number and size. In mango, Prakash *et al*. (2015) noted that the number of fruits and final yield were significantly increased with 100 per cent NPK application.

Effect of time

The data revealed that the variation in fruit yield per tree was also found significant as influenced by different time of fertilizer application. Maximum fruit yield per tree (108.08 kg) was recorded at application of fertilizer on M_3 (50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November) followed by (73.17 kg) was noted at application of fertilizer on M_2 (50% of NK and 100% of P in month of June and 50% of N and 50% of K in month of August)and minimum fruit yield per tree (55.47 kg) was noted at application of fertilizer on M_1 (50% of N and 100% of P, K in month of June and 50% of N in month of August) respectively. according to Quaggio *et al*. (2002). Sidhu and Thakur (2006) observed similar results in grapes, Quaggio *et al*. (2002) in lemon, and Makhmale *et al*. (2016) in mango.

Interaction Effect (DxM)

The interaction effect of dose and time of fertilizer application on fruit yield per tree were also found non-significant.

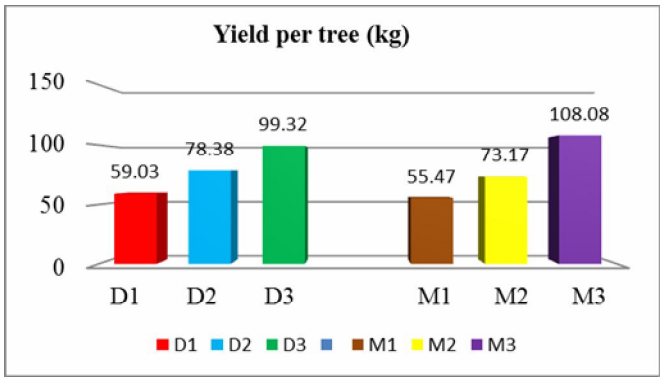

Fig. 4: Effect of dose and time of application of fertilizer on yield per tree

Yield per hectare (t/ha)

Effect of dose (D)

The effect of different dose of fertilizer on fruit yield per hectare was differed significantly. The weight of fruit of mango was significantly increased by fertilizer application however, the effect was more pronounced in the higher concentrations than the lower concentration. The fruit yield per hectare (9.93 t/ha) was recorded maximum with the dose of fertilizer D_3 (2000 g N, 500 g P, and 1000 g K per tree) followed by (7.84 t/ha) was obtained with the dose of fertilizer D_2 (1500 g N, 500 g P, and 750 g K per tree) and minimum fruit yield per hectare (5.90 t/ha) was obtained with the dose of fertilizer D_1 (1000 g N, 500 g P, and 500 g K per tree) respectively. This observation are in agreement with the earlier findings of fertilizer influence on of fruit yield per tree in hectare Yadav *et al*. (2011) noted increased yield in pomegranate cv. *Ganesh* with higher doses of NPK through fertigation. Reddy *et al*. (2017) reported that increasing NPK levels in guava resulted in significantly higher fruit yield and improved quality. Thakur (2003) found a yield increase in mango cv. *Amrapali* under fertigation using 100 per cent recommended dose of fertilizer.

Effect of time (M)

The data revealed that the variation in fruit yield per hectare was also found significant as influenced by different time of fertilizer application. Maximum fruit yield per hectare (10.81 t/ha) was recorded at application of fertilizer on M_3 (50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November) followed by (7.32 t/ha) was noted at application of fertilizer on M_2 (50% of NK and 100% of P in month of June and 50% of N and 50% of K in month of August) and minimum fruit yield per hectare (5.55 t/ha) was noted at application of fertilizer on M_1 (50% of N and 100% of P, K in month of June and 50% of N in month of August) respectively.

These results are in conformity with the findings of Pathak and Pundir in pomegranate cv. Jyothi, Chatzitheodorou *et al*.(2004) in peach cv. "Spring Time" and "Red Haven". Singh *et al*. (2009) in mango. Sheikh *et al*. (2009) in pomegranate Mitra *et al*. (2010) and Thirupathi (2014) who noted increased fruit yield with the spilt application of nutrients.

Interaction Effect (DxM)

The interaction effect of dose and time of fertilizer application on fruit yield per hectare (t/ha) were also found non-significant.

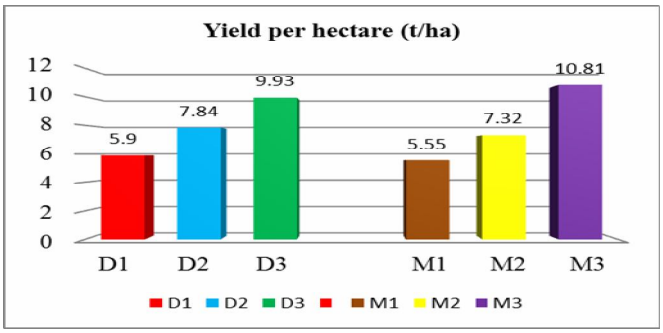

Fig. 5: Effect of dose and time of application of fertilizer on yield per hectare

TSS (%)

Effect of dose (D)

Effect of fertilizer application on total soluble solid was found significant as influenced by different dose of fertilizer application. Higher total soluble sugar (18.72 %) was noted in dose of fertilizer application D_3 (2000 g N, 500 g P, and 1000 g K per tree) on the other hand lower total soluble sugar (18.27 %) was noted in dose of fertilizer application D_1(1000 g N, 500 g P, and 500 g K per tree) respectively. Mahadevan *et al*. (2017) observed significant effect of fertigation on TSS in guava cv. Sardar. Goud *et al*. (2017) found significant effect of fertigation on TSS in Nagpur mandarin. Devi (2018) found significantly maximum TSS in treatment receiving 100 per cent recommended dose in mango cv. Pant Sinduri. Chandrashekar *et al*. (2021) also found significantly maximum TSS in treatment receiving 100 per cent recommended dose in mango cv. Baneshan.

Effect of time (M)

Effect of fertilizer application on total soluble solid was found significant as influenced by different time of fertilizer application. Higher total soluble solid (18.73 %) was noted at the fertilizer application on M_3 (50% of N and 100% of P in month of June and 50% of N, 50% of K in month of August and 50% of K in month of November) on the other hand, lower TSS (18.12 %) was recorded at the fertilizer application on M_1 (50% of N and 100% of P, K in month of June and 50% of N in month of August) respectively.

This observation are in agreement with the earlier findings of fertilizer influence on total soluble solids by Ghosh *et al*.(2004), the highest levels of N and P resulted in the greatest increase in TSS in custard apple. Boora and Singh (2000) found similar results in sapota.

Interaction Effect (DxM)

The interaction effect of dose and time of fertilizer application on TSS were also found non-significant.

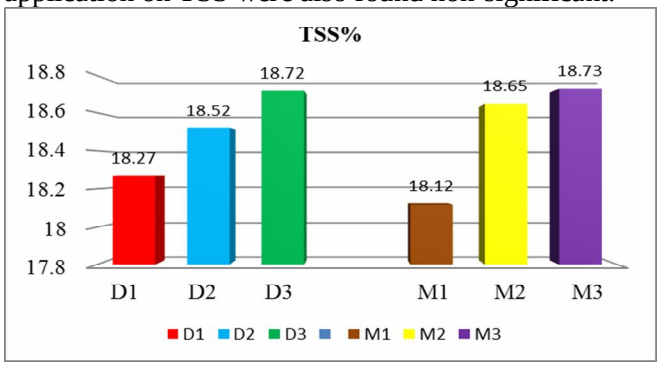

Fig. 6: Effect of dose and time of application of fertilizer on TSS of fruit

References

Avilan, R. (1971). Fertilization in mango. *FAO Soils Bulletin*, **15**, 193–199.

Bhagwa, R.D. *et al*. (2012). Yield response of pomegranate to different levels of fertigation. *Journal of Horticultural Research*, **12**(3), 144–148.

Bhirugnanshi, M.K. *et al*. (2012). Response of mango to fertigation under subtropical conditions. *Indian Journal of Horticulture*, **69**(4), 498–500.

Chandrakumar, S. S., Thimmegowda, S., Srinivas, S. K., Reddy, B. M. and Devakumar, N. (2001). Performance of Robusta banana under nitrogen and potassium fertigation. *South Indian Hort*., 49 (Special): 92-94.

Chatzitheodorou, I. T., Sotiropoulos, T. E. and Mouhtaridou, G. I., 2004, Effect of nitrogen, phosphorus and potassium fertlilisers and manures on fruit yield and fruit quality of peach cvs. "Spring Time" and "Red Haven". *Agric. Res*. **2**: 35-43.

Devi, P. (2018). Effect of fertigation on vegetative growth, yield and quality of mango cv. Pant sinduri. M. Sc Thesis, Department of Horticulture, GB Pant University of Agriculture and Technology, Uttarakhand. 106p.

Ghosh, S.N., Manna, S. and Mathew, B. (2004). Yield and quality of custard apple in relation to fertilization under a rainfed laterite soil. *J. Maharashtra Agric. Univ.*, **29** (3): 342-344.

Jat, G. and Kacha, H. L. (2014). Response of guava to foliar application of urea and zinc on fruit set, yield and quality. *J. Agri. Search*., **1**: 86-91.

Makhmale, S., Makwana, A. N., Kore, P. and Barad, A. V. (2016). Effect of different fertigation treatments on yield and quality of mango cv. Kesar raised under ultra-high-density planting (UHDP) system. *Int. J. Farm Sci*., **6** (4): 1-7.

Muthulakshmi, S., Balmohan, T. N., Amutha, R. and Baby, R. (2007). Fertigation studies in papaya. *Res. J. Agric. & Biol. Sci*., **3**(12):260-263.

Pathak, S. P. and Pundir, J. P. S. (1981). Studies on response of different does of NPK on yield and quality of pomegranate. Udyanika, **4**: 7-11.

Prakash, V. *et al*. (2015). Nutrient management and yield enhancement in mango. *International Journal of Agricultural Sciences*, **11**(2), 376–378.

Quaggio, J. A., Mattos, D. Jr, Cantarella, H., Almeida, E.L.E., Cardoso, S. A. B., Lemon yield and fruit quality affected by NPK fertilizers, 2002, *Scientia Horticulturae.*, **96**(151-162).

Rao, K.V.R., Gangwar, S., Bajpai, A., Chourasiya, L. and Soni, K. (2017). Influence of growth, yield and quality (Psidium guajava L.) by drip irrigation and fertigation. *Journal of applied and Natural Science*, **9**: 642-45.

Rathore, R. S. and Chandra, A. (2002). Effect of application of nitrogen on nutrient content, yield and quality of ber. *Orrisa J. Hort*., **30**(4): 46-50.

Reddy, Y. T. N., Kurian, R. M., & Singh, G. (2017). Role of NPK and micronutrients in flowering and fruiting of mango (*Mangifera indica* L.). *Indian Journal of Horticulture*, **74(3)**, 358–362.

Salik, M. R., Muhammad, F. and Shakir, A.S. (2000). Effect of time of fertilizer application on the productivity of

Kinnow (*Citrus reticulata Blanko*), *Pak. J. Bio. Sci*., **3**(9): 1375-1376.

Sharma, B.R. *et al*. (2013). Effect of nitrogen fertigation on growth and yield of guava. *Progressive Horticulture*, **45**(2), 287–290.

Sharma, H. G., Dubey, P., Agrawal, N. and Satpute, P. (2005). Effect of fertigation through water soluble fertilizers on growth, yield and quality of papaya. 213 *International Conference on Plasticulture and Precision Farming*. 17-21 November, 2005, New Delhi, p 250.

Sheikh, M. K. and Manjula, N. (2009). Effect of split application of N and K on growth vand fruiting in Ganesh Pomegranate (*Punica granatum* L.). Proc. I st IS on Pomegranate, *Acta Hort*., 818.

Sidhu, A. S. and Thakur, A. (2006). Effect of different levels of nutrients on quality and fruit yield of grapes cv. Perlette. *Haryana J. Horti. Sci*., **35** (3&4): 221-222.

Singh, N.P. and Rajput, C.B.S. (1977). Chemical composition of guava fruits as influenced by nitrogen application. *Progressive Hort*., **9** (2): 67-70.

Srinivas, K. *et al*. (2010). Influence of fertigation on fruit yield in passionfruit. *Indian Journal of Horticulture*, **67**(2), 212–215.

Thirupathi, N. (2014). Studies on the effect of N, P and K on growth, yield and quality of guava (*Psidium guajava* L.) cultivars under meadow system of planting., M.Sc Thesis, Dr. Y.S.R. Horticulture University, Venkataraman-nagudem, Hyderabad, India, p. 142

Yadav, R. K., Kumar, P., & Sharma, H. G. (2017). Effect of nutrient management on vegetative growth parameters of mango (*Mangifera indica* L.) cv. Amrapali. *Journal of Pharmacognosy and Phytochemistry*, **6(6)**, 1328–1331.