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Effect of foliar application of new generation PGR's on fruit yield of mango (*Mangifera indica* L.) cv. Amrapali

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Abstract

An investigation was conducted between 2024-2025 at the Horticultural Research Farm, B. A. College of Agriculture, Anand Agricultural University, Anand, to evaluate the "Effect of foliar application of new generation PGR's on fruit yield of mango (*Mangifera indica* L.) cv. Amrapali". The experiment was laid out in Completely Randomized Design repeated thrice with seven treatments viz., T₁: 200 mg/L Salicylic acid, T₂: 300 mg/L Salicylic acid, T₃: 2.0 mg/L Brassinosteroid, T₄: 4.0 mg/L Brassinosteroid, T₅: 50 ml/L Triacontanol, T₆: 100 ml/L Triacontanol and T₇: Water spray. Foliar application of different new generation PGR's were given as per treatments on mango plants with the help of foot sprayer. Three sprays were given, the first spray was applied at marble stage and the second and third sprays were subsequently applied at one-month intervals following the preceding application. Existing trees of mango with equal age (22 years), canopy and growth were selected. Among the different treatments maximum number of fruits per panicle (at marble stage) (14.53), minimum fruit drop percentage at marble stage (46.17%), highest number of fruits per panicle (at harvest stage) (4.09), minimum fruit drop percentage at harvest stage (83.49%), number of fruits per tree (363.67), fruit yield (65.62 kg/tree), fruit weight (180.47 g), fruit length (10.64 cm), equatorial diameter (7.12 cm) and fruit volume (130.33 cc) were found in 100 ml/L triacontanol followed by 300 mg/L salicylic acid.

Keywords: Yield, Mango, New generation PGR's, *Mangifera indica*, Amrapali

Introduction

Mango (*Mangifera indica* L.), belonging to the family *Anacardiaceae*, is one of the most economically important and widely cultivated fruit crops of the tropical and subtropical regions. Mango is a nutritionally rich fruit and an excellent source of vitamins, minerals, and dietary fiber. It is particularly high in β -carotene, vitamin A, and vitamin C, along with appreciable amounts of vitamin B-complex and essential minerals. On average, 100 g of fresh mango pulp contains 81.7 g water, 16 g carbohydrates, 0.7 g protein, 0.4 g fat, and 0.1 g fiber. Among the improved mango hybrids, 'Amrapali' is a developed through hybridization between 'Dashehari' and 'Neelum' at the Indian Agricultural Research Institute (IARI), New Delhi, in 1978. Brassinosteroids, triacontanol and salicylic acid have emerged as important plant growth regulators due to their positive influence on fruit development and yield. Several studies have demonstrated their effectiveness in improving photosynthetic activity, nutrient assimilation, stress tolerance and post-harvest performance of fruit crops. The judicious use of these PGRs has shown promising results in minimizing yield losses and enhancing the economic returns from mango cultivation Patel *et al.*, (2021) [5].

Materials and Methods

An investigation was conducted between 2024-2025 at the Horticultural Research Farm, B. A. College of Agriculture, Anand Agricultural University, Anand, to evaluate the effect of foliar application of new generation PGR's on fruit yield of mango (*Mangifera indica* L.) cv. Amrapali. The experiment was laid out in Completely Randomized Design repeated thrice with seven treatments viz., T₁: 200 mg/L Salicylic acid, T₂: 300 mg/L Salicylic acid, T₃: 2.0

mg/L Brassinosteroid, T₄: 4.0 mg/L Brassinosteroid, T₅: 50 ml/L Triaccontanol, T₆: 100 ml/L Triaccontanol and T₇: Water spray. Foliar application of different new generation PGR's were given as per treatments on mango plants with the help of foot sprayer. Three sprays were given, the first spray was applied at marble stage and the second and third sprays were

subsequently applied at one-month intervals following the preceding application. Existing trees of mango with equal age (22 years), canopy and growth were selected.

Results and Discussion

Table 1: Effect of different new generation PGR's on fruit yield of mango cv. Amrapali

Sr. No.	Treatment Details	Number of fruits per panicle at pea stage	Number of fruits per panicle at marble stage	Fruit drop percentage per panicle at marble stage	Number of fruits per panicle at harvest stage	Fruit drop percentage per panicle at harvest stage
T ₁	200 mg/L Salicylic acid	25.70	12.75	50.35	3.15	87.61
T ₂	300 mg/L Salicylic acid	26.95	13.92	48.26	3.97	85.23
T ₃	2.0 mg/L Brassinosteroid	26.17	12.62	51.66	3.25	88.90
T ₄	4.0 mg/L Brassinosteroid	26.35	12.54	52.20	3.38	89.18
T ₅	50 ml/L Triaccontanol	25.92	12.84	50.45	3.60	87.55
T ₆	100 ml/L Triaccontanol	26.96	14.53	46.17	4.09	83.49
T ₇	Water spray	25.60	11.67	53.02	2.67	89.91
	S.E.m.±	1.33	0.55	1.20	0.11	1.32
	CD (P = 0.05)	NS	1.67	3.63	0.33	4.00
	CV%	8.79	7.34	4.12	5.39	2.62

Table 2: Effect of different new generation PGR's on fruit yield of mango cv. Amrapali

Sr. No.	Treatment Details	Number of fruits per tree	Yield per tree (kg)	Fruit weight (g)	Fruit length (cm)	Equatorial diameter (cm)	Fruit volume (cc)
T ₁	200 mg/L Salicylic acid	333.29	53.53	157.45	9.14	6.02	113.33
T ₂	300 mg/L Salicylic acid	345.51	59.82	173.13	10.02	6.71	129.33
T ₃	2.0 mg/L Brassinosteroid	320.43	51.56	155.87	9.86	5.75	123.67
T ₄	4.0 mg/L Brassinosteroid	314.66	49.47	155.52	9.20	6.12	118.00
T ₅	50 ml/L Triaccontanol	333.08	56.87	169.96	9.08	6.05	119.33
T ₆	100 ml/L Triaccontanol	363.67	65.62	180.47	10.64	7.12	130.33
T ₇	Water spray	305.66	45.42	146.41	8.53	5.32	111.33
	S.E.m.±	10.01	1.94	3.90	0.23	0.15	1.50
	CD (P = 0.05)	30.35	5.89	11.82	0.68	0.45	4.54
	CV%	5.24	6.15	4.15	4.12	4.17	2.15

Effect of different new generation PGR's on fruit yield of mango cv. Amrapali

Number of fruits per panicle at pea stage

The perusal of data (Table 1) shows the data collected on number of fruits per panicle at pea stage. The results were found non-significant with regards to number of fruits per panicle before spraying, which may be attributed to the absence of plant growth regulator application at this stage and the uniform cultural practices followed for all treatments.

Number of fruits per panicle at marble stage

The perusal of data (Table 1) indicated that results related to number of fruits per panicle at marble stage as influenced by various treatments. Foliar application of salicylic acid, brassinosteroid and triaccontanol had a significant effect on the number of fruits per panicle at marble stage. The treatment T₆ (100 ml/L Triaccontanol) had maximum number of fruits per panicle at marble stage (14.53), which was at par with treatment T₂ (13.92). Whereas, the control treatment showed minimum number of fruits per panicle at marble stage in T₇ (11.67). Among all the treatments, 100 ml/L triaccontanol had higher results. This might be due to application of triaccontanol reduces synthesis of ABA and abscission layer at fruit neck hence reduce fruit drop. Similar results found by Patel *et al.*, (2021) ^[5], Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3] and Gaikwad (2021) ^[1] in mango.

Fruit drop percentage per panicle at marble stage

Fruit drop percentage per panicle at marble stage cv. Amrapali as influenced by various new generation PGR's treatments, is presented in Table 1. The results indicated statistically significant differences among treatments. The data revealed that the minimum fruit drop percentage was recorded with T₆ (100 ml/L triaccontanol) *i.e.* (46.17%) followed by T₂ (48.26%), while maximum fruit drop percentage (53.02%) was observed in control T₇. The minimum fruit drop percentage was observed in triaccontanol which enhance photosynthesis and carbohydrate availability, which strengthens fruit retention and reduces abscission. The similar finding was reported by Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3] and Gaikwad (2021) ^[1] in mango.

Fruit drop percentage per panicle at harvest stage

The data concerning to the number of fruits per panicle at harvest stage of mango as affected by various different new generation PGR's treatments is presented in Table 1. Statistically significant differences were observed among the treatments. The maximum number of fruits per panicle at harvest stage (4.09) was recorded with T₆ (100 ml/L triaccontanol) which was at par with T₂ (3.97), whereas minimum fruits (2.67) was observed in control T₇. The highest number of fruits per panicle at harvest stage recorded with triaccontanol because it enhancing photosynthetic efficiency and assimilate translocation, which improves fruit set and reduces early fruit drop, resulting in higher fruit retention. These results are

consistent with findings of Patel *et al.*, (2021) ^[5], Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3] Gaikwad (2021) ^[1] and Patel *et al.* (2021) ^[5] in mango.

Number of fruits per tree

The data concerning to the number of fruits per tree of mango as affected by various different new generation PGR's treatments is presented in Table 2. Statistically significant differences were observed among the treatments. The maximum number of fruits per tree (363.67) was recorded with T₆ (100 ml/L triacontanol) followed by T₂ (345.51), whereas minimum fruits (305.66) was observed in control T₇. The highest number of fruits per tree recorded with triacontanol because it enhancing photosynthetic efficiency and assimilate translocation, which improves fruit set and reduces early fruit drop, resulting in higher fruit retention. These results are consistent with findings of Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3], Gaikwad (2021) ^[1] and Patel *et al.* (2021) ^[5] in mango.

Yield per tree (kg)

The data concerning to the yield per tree (kg) of mango as affected by various different new generation PGR's treatments is presented in Table 2. Statistically significant differences were observed among the treatments. The maximum yield per tree (65.62 kg) was recorded with T₆ (100 ml/L triacontanol) followed by T₂ (59.82 kg), whereas minimum fruits (45.42 kg) was observed in control T₇. The highest yield per tree recorded with triacontanol because it enhancing photosynthetic efficiency and assimilate translocation, which improves fruit set and reduces early fruit drop, resulting in higher fruit retention. These results are consistent with findings of Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3], Gaikwad (2021) ^[1] and Patel *et al.* (2021) ^[5] in mango.

Fruit weight (g)

The data pertaining to the fruit weight of mango as affected by various different new generation PGR's treatments is presented in Table 2. Statistically significant differences were observed among the treatments. The maximum fruit weight (180.47 g) was recorded under with T₆ (100 ml/L triacontanol) followed by T₂ (173.13 g), whereas minimum fruit weight (146.41 g) was observed in control T₇. The increase in fruit weight in triacontanol may be attributed to enhanced cell division and cell enlargement in developing fruits due to triacontanol application. These findings are supported by work of Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3], Gaikwad (2021) ^[1] and Patel *et al.* (2021) ^[5] in mango.

Fruit length (cm)

The data regarding the fruit length of mango as affected by various different new generation PGR's treatments is presented in Table 2. Statistically significant differences were observed among the treatments. The maximum fruit length (10.64 cm) was recorded under with T₆ (100 ml/L triacontanol) followed by T₂ (10.02 cm), whereas minimum fruit length (8.53 cm) was observed in control T₇. The increase in fruit length in T₆ may be attributed to the stimulatory effect of triacontanol on physiological and metabolic activities of the plant. It enhances photosynthetic efficiency and assimilate production, resulting in greater availability of carbohydrates to developing fruits. It also

promotes cell division and cell enlargement, which supports better fruit growth. These findings are supported by work of Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3], Gaikwad (2021) ^[1] and Patel *et al.* (2021) ^[5] in mango.

Equatorial diameter (cm)

The data related to the equatorial diameter of mango as affected by various different new generation PGR's treatments is presented in Table 2. Statistically significant differences were observed among the treatments. The maximum equatorial diameter (7.12 cm) was recorded under with T₆ (100 ml/L triacontanol) followed by T₂ (6.71 cm), whereas minimum equatorial diameter (5.32 cm) was observed in control T₇. The increase in equatorial diameter in T₆ may be attributed to the stimulatory effect of triacontanol on physiological and metabolic activities of the plant. It enhances photosynthetic efficiency and assimilate production, resulting in greater availability of carbohydrates to developing fruits. It also promotes cell division and cell enlargement, which supports better fruit growth. These findings are supported by work of Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3], Gaikwad (2021) ^[1] and Patel *et al.* (2021) ^[5] in mango.

Fruit volume (cc)

The data regarding to the fruit volume of mango as affected by various different new generation PGR's treatments is presented in Table 2. Statistically significant differences were observed among the treatments. The maximum fruit volume (130.33 cc) was recorded under with T₆ (100 ml/L triacontanol) followed by T₂ (129.33 cc), whereas minimum fruit volume (111.33 cc) was observed in control T₇. The increase in fruit volume in T₆ may be attributed to the stimulatory effect of triacontanol on physiological and metabolic activities of the plant. It enhances photosynthetic efficiency and assimilate production, resulting in greater availability of carbohydrates to developing fruits. It also promotes cell division and cell enlargement, which supports better fruit growth. These findings are supported by work of Momin *et al.* (2016) ^[2], Paralkar (2018) ^[3], Gaikwad (2021) ^[1] and Patel *et al.* (2021) ^[5] in mango.

Conclusion

Based on the findings of the present investigation, it can be concluded that foliar application of triacontanol at 100 ml/L, with the first spray applied at the marble stage followed by two subsequent sprays at one-month intervals, was the most effective treatment for improving the yield parameters of mango cv. Amrapali. Therefore, to getting higher yield of fruits of the mango cv. Amrapali should be sprayed with triacontanol at 100 ml/L with three foliar sprays applied at the marble stage followed by two subsequent sprays at one-month intervals.

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