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Effect of Plant Growth Regulator on Flowering and Yield Attributes of Litchi

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Abstract

The study was carried out at the Horticulture Research Centre (HRC) Fruit Orchard, Regional Agricultural Research Station (RARS), Jamalpur, Bangladesh, during 2024–2025 to assess the influence of Plant Growth Regulator (PGR) (GA_3) on flowering and yield attributes of litchi. The age of Litchi plants were 14–15 years old. The treatments are T_1 = GA_3 @ 50 mg/L on panicle before flower opening, T_2 = GA_3 @ 50 mg/L at 15 days after fruit set, T_3 = GA_3 @ 50 mg/L at 21 days after fruit set, T_4 = GA_3 @ 50 mg/L at 28 days after fruit set, T_5 = GA_3 @ 100 mg/L on panicle before flower opening, T_6 = GA_3 @ 100 mg/L at 15 days after fruit set , T_7 = GA_3 @ 100 mg/L at 21 days after fruit set, T_8 = GA_3 @ 100 mg/L at 28 days after fruit set and T_9 = Control (water spray only). All treatments were applied after flowering. The flowering date of studied trees varied from 20.02.2025 to 16.03.2025. The early flowering occurred in the control treatment (T_9) and late flowering was exhibited in T_7 treatment. Among nine treatments, four treatments flowered in February 2025 and five treatments in March 2025. As a consequence, GA_3 was found to be significant in case of all parameters. The T_1 treatment induced significantly maximum (935) number of fruits per plant closely followed by T_4 treatment (680), T_2 treatment (670) and the minimum (150) in the T_9 treatment. Maximum (18.80 g) individual fruit weight was found in T_7 treatment closely followed by treatments T_3 & T_8 (18.60 g) and minimum (14.50 g) in control treatment (T_9). Maximum fruit weight/plant (15.39 kg) was noted in T_1 treatment followed by T_4 treatment (12.25 kg), T_2 treatment (11.97 kg) and lowest fruit weight/plant (2.79 kg) in control treatment (T_9). Percentage of rotted fruit ranged from 20.12% to 46.76% by the effect of GA_3 application. The highest rotted fruit was found in the control treatment (T_9) and minimum (20.12%) in T_7 treatment. Percentage of cracked fruit ranged from 8.68% to 54.62% by the effect of GA_3 application. Fruit cracking of Litchi is 8.68% in T_8 treatment followed by T_2 treatment 8.76% was found to be significantly lowest, respectively. According to particular studies, GA_3 can lower the proportion of fruit cracking. By the effect of GA_3, T_4 treatment induced significantly minimum (1.39 g) aril weight at harvesting closely followed by T_8 treatment (2.02 g). The maximum (4 g) aril weight at harvesting was presented with control (T_9). The highest TSS (19%) observed in the T_4 treatment and lowest (14%) in the T_3, T_6 and T_9 (control) treatments. An increase in total soluble solids could indicate that GA_3 facilitates the transport of sugars across membranes.

Keywords: Litchi, Plant Growth Regulator (PGR), GA_3, growth, flowering, physical fruit quality, fruit yield

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INTRODUCTION

The litchi (*Litchi chinensis* Sonn.) is the most significant fruit in the Sapindaceae family. It spread widely over the tropical and subtropical regions after originating in Southern China. One of the most significant subtropical evergreen fruit trees that grow in Bangladesh is litchi. These days, almost every district in Bangladesh grows litchi. The limited economic potential of litchi farming in various litchi-growing regions is caused by a number of problems, including a shortage of proper propagation material, poor fruit set [1], excessive fruit drop [2], fruit cracking [3], and poor fruit quality [4]. Litchi produces the highest yield in one year but little or no crop the following year [5]. Organic compounds known as plant growth regulators (PGRs) can promote, hinder, or otherwise influence any physiological activity in plants when present in very small quantities. PGRs are not nutrients that provide energy or mineral elements. PGR refers to both synthetic molecules and chemical analogs, such as phytohormones, which are naturally occurring substances that promote plant development [6]. Fruit output can change dramatically with effective plant growth regulator use. The current plant growth regulators that have been successfully employed on litchi include paclobutrazol, gibberellin, ethephon, NAA, and others. These plant growth regulators effectively limit growth, induce flowering, and promote fruit setting, ripening, and fruit quality preservation [7]. Plant growth regulators (PGRs) have been used frequently throughout the year to increase economic benefits in the production of litchi by changing the behavior of fruit or fruit plants [8]. Plant growth regulators have had a positive impact on the yield and quality of litchi fruit [2]. PGR application leads to an increase in flowering, fruiting, and fruit retention. The abscission layer, which forms as the cell sap supply route to the fruit, eventually separates into thin cork cells, causing the fruit to drop [9]. Gibberellins were shown to affect both cell division and cell expansion, according to early researchers like Adams et al. (1975) [10]. Naphthalene acetic acid (NAA), one of the auxins that significantly affect plant growth, is effective depending on the dose and timing of application. Even though it is only needed in very small quantities, NAA application in various concentrations successfully controls fruit drops in most fruit plants. Based on the above-mentioned context, an experiment has been executed to assess the influence of PGR (GA_3) on flowering and yield attributes of litchi under Jamalpur conditions in Bangladesh.

MATERIALS AND METHOD

The study was carried out at the Horticulture Research Centre (HRC) Fruit Orchard, Regional Agricultural Research Station (RARS), Jamalpur, Bangladesh, during 2024–2025 to assess the influence of PGR (GA_3) on flowering and yield attributes of litchi. The age of Litchi plants was 14–15 years old. The plants were transplanted, maintaining 8.0 x 8.0 m spacing. The experiment implemented a Randomized Complete Block Design (RCBD) with three replications. The study comprised nine (9) treatments. Plant growth regulator (PGR) GA_3 is used. The treatments are T_1 = GA_3 @ 50 mg/L on panicle before flower opening, T_2 = GA_3 @ 50 mg/L at 15 days after fruit set, T_3 = GA_3 @ 50 mg/L at 21 days after fruit set, T_4 = GA_3 @ 50 mg/L at 28 days after fruit set, T_5 = GA_3 @100 mg/L on panicle before flower opening, T_6 = GA_3 @ 100 mg/L at 15 days after fruit set, T_7 = GA_3 @100 mg/L at 21 days after fruit set, T_8 = GA_3 @ 100 mg/L at 28 days after fruit set, and T_9 = Control (only water spray). GA_3 was sprayed in accordance with the protocols. Spraying of GA_3 was performed according to the treatments application such as GA_3 @ 50 mg/L on panicle before flower opening (T_1) was applied on 22.02.2025; GA_3@ 50 mg/L at 15 days after fruit set (T_2) was applied on 14.04.2025; GA_3@ 50 mg/L at 21 days after fruit set (T_3) was applied on 05.05.2025; GA_3@ 50 mg/L at 28 days after fruit set (T_4) was applied on 30.04.2025; GA_3@ 100 mg/L on panicle before flower opening (T_5) was applied on 22.02.2025; GA_3@ 100 mg/L at 15 days after fruit set (T_6) was applied on 22.04.2025; GA_3@ 100 mg/L at 21 days after fruit set (T_7) was applied on 05.05.2025; GA_3@ 100 mg/L at 28 days after fruit set (T_8) was applied on 07.04.2025 and Control (water spray only) (T_9) was applied on 22.02.2025. Fertilizers and manures were applied in accordance with Table 1. Intercultural operations like weeding, irrigation, pruning after fruit harvest, and disease and insect management were done as per requirement. Data on plant height, canopy spread (N–S & E–W), base girth, number of branches/plants, tree volume, date of flowering, date of spray, date of harvest, number of fruits per plant, individual fruit weight, weight of fruit per plant, number of fruits per panicle, panicle length, number of rotted fruits, number of cracked fruits, fruit length, fruit breadth, aril length, aril breadth, aril weight, and TSS were duly recorded. Data was statistically analyzed using the open-source program "R" [11].

Table 1. Fertilizer dose of litchi.

Age of tree (Year)	Nutrient recommendation (g/tree/year)						Organic fertilizer (of) (kg/tree/year)
	N	*P*	*K*	*S*	*Zn*	*B*	
Before Planting (Pit)	–	100	–	–	–	–	10
0–1	138	–	–	15	10	2.0	–
2–4	184	80	100	30	15	2.5	5
05–7	230	120	200	40	20	5	7
8–10	345	240	400	50	25	5	10
11–15	552	320	600	50	30	7.5	15
16–20	690	400	750	50	30	10	20
>20	920	560	750	50	30	12.5	25

Method of Application

- Before planting, the recommended OF, P, S, Zn, and B were applied in the pit as a basal dose 15–20 days before planting of the sapling and mixed thoroughly with the soil, followed by irrigation.
- In the first year, the OF and N were applied at a time around the tree during September and mixed thoroughly with the soil.
- In the subsequent years, all fertilizers (as per recommendation) were applied in three equal splits during March–April, June, and October. Fertilizer were applied around the tree up to the canopy spread, leaving 1.0–1.5 m from the base of the tree thoroughly mixed with the soil, then irrigated.

RESULTS AND DISCUSSION

Effect of PGR on Plant Characteristics, Flowering Time and Spray Schedule of Litchi

The plant characteristics and flowering time affected by PGR and the spray schedule of litchi are shown in Table 2. The maximum plant height (9.00 m) as well as maximum canopy spread (N–S) (8.50 m) and (E–W) (8.00 m) and tree volume (1309.32 m³) were recorded in T_5 treatment. The minimum plant height (4.30 m) was observed in the T_3 treatment. The narrower canopy spread (N–S) (4.05 m) was found in T_2 & T_3 treatments, and the slenderer canopy spread (E–W) (3.85 m) was found in T_2 treatments. The wider base girth (110 cm) was recorded in T_2 & T_3 treatments, and the narrower base girth was noted in T_3 treatment. The number of branches/plants varied from 2 to 4. The small tree volume (142.47 m³) was manifested in T_2 treatment. The flowering date varied from 20.02.2025 to 16.03.2025. All treatments were applied after flowering. The early flowering occurred in the control treatment (T_9), and late flowering was exhibited in the T_7 treatment. Among nine treatments, four treatments flowered in February 2025 and five treatments in March 2025. GA_3 application at the wrong time (pre-floral induction) can inhibit flowering by promoting vegetative growth and reducing floral initiation. However, application during the flowering stage can influence flower sex expression and promote female flowers.

Table 2. Effect of PGR on plant characteristics, flowering time and spray schedule of litchi.

Treatments	Plant height (m)	Canopy spread (m)		Base girth (cm)	Number of branches/plants	Tree volume (m³)	Date of flowering	Date of spray
		(N–S)	*(E–W)*					
T_1	6.77 abc	5.73 c	5.67 c	58.33 b	3	462.12 b	25.02.25	22.02.25
T_2	4.35 c	4.05 d	3.85 d	43.50 b	2	142.47 b	25.02.25	14.04.25
T_3	4.30 c	4.05 d	3.90 d	50.00 b	2	144.57 b	12.03.25	05.05.25
T_4	5.85 bc	6.05 c	6.35 bc	65.50 b	3	470.49 b	15.03.25	30.04.25
T_5	9.00 a	8.50 a	8.00 a	82.50 ab	3	1309.32 a	25.02.25	22.02.25
T_6	4.55 c	5.70 c	5.50 c	70.00 b	4	299.70 b	15.03.25	22.04.25
T_7	8.05 ab	5.95 c	5.85 bc	77.50 ab	3	583.41 ab	16.03.25	05.05.25
T_8	8.10 ab	6.80 bc	7.10 ab	110.00 a	3	818.80 ab	01.03.25	07.04.25

T_9	6.87 abc	7.73 ab	6.70 abc	110.00 a	3	860.31 ab	20.02.25	22.02.25
Level of significance	**	**	**	**	NS	**	–	–
CV (%)	2.59	3.30	2.49	7.20	2.4	8.43	–	–

Note: T_1 = GA_3 @ 50 mg/L on panicle before flower opening, T_2 = GA_3 @ 50 mg/L at 15 days after fruit set, T_3 = GA_3 @ 50 mg/L at 21 days after fruit set, T_4 = GA_3 @ 50 mg/L at 28 days after fruit set, T_5 = GA_3 @ 100 mg/L on panicle before flower opening, T_6 = GA_3 @ 100 mg/L at 15 days after fruit set, T_7 = GA_3 @ 100 mg/L at 21 days after fruit set, T_8 = GA_3 @ 100 mg/L at 28 days after fruit set and T_9 = Control (water spray only).

Effect of PGR on Physical and Yield Attributes

The physical and yield attributes affected by PGR are shown in Table 3. All the parameters differed significantly from each treatment statistically. Date of harvest varied from 17.05.2025 to 26.05.2025. As a consequence, GA_3 was found to be significant in the case of the number of fruits per plant (Figure 1). The T_1 treatment induced a significant maximum (935) number of fruits per plant, closely followed by the T_4 treatment (680), the T_2 treatment (670), and the minimum (150) in the T_9 treatment. The maximum (6) number of fruits per panicle was presented in the T_1, T_4, T_5, and T_8 treatments and the minimum (4) in the T_7 & control (T_9) treatments. The fact that nitrogen is a component of chlorophyll and that auxin and gibberellic acid aid in the production of chlorophyll, which regulates the accumulation of an appropriate C:N ratio and governs plant flowering and fruiting, may be the reason for the greater number of fruits per panicle and plant. Gibberellin and auxin are also thought to be important for photosynthetic activity and improved metabolite translocation for fruit development. These findings closely align with those of Suman et al., 2021, in Guava [12] and Kumar et al., 2018, in Mango [13].

Table 3 (a). Effect of PGR on yield and yield-contributing characteristics of litchi

Treatments	Date of harvest	Number of fruits/ plant	Individual fruit wt. (g)	Fruit yield/plant(kg)	No. of fruits/ panicle	Panicle length (cm)	Rotted fruits (%)	Cracked fruits (%)
T_1	17.05.25	935 a	16.40 c	15.39 a	6 a	36.00 a	27.51 bc	12.79 b
T_2	26.05.25	670 b	17.80 ab	11.97 b	5 b	30.10 bc	28.91 bc	8.76 b
T_3	26.05.25	323 c	18.60 a	5.99 cd	5 b	33.30 ab	32.59 b	24.14 b
T_4	26.05.25	680 b	18.00 ab	12.25 b	6 a	24.00 de	26.49 bc	13.97 b
T_5	18.05.25	350 c	16.70 bc	5.86 cd	6 a	35.00 a	21.55 c	15.99 b
T_6	18.05.25	290 cd	16.40 c	4.75 de	5 b	30.40 bc	32.93 b	10.01 b
T_7	26.05.25	355 c	18.80 a	6.71 cd	4 c	24.70 de	20.12 c	12.54 b
T_8	26.05.25	580 b	18.60 a	8.40 c	6 a	26.80 cd	34.68 b	8.68 b
T_9	17.05.25	150 d	14.50 d	2.79 e	4 c	22.60 e	46.76 a	54.62 a
Level of significance	–	**	**	**	**	**	**	**
CV (%)	–	7.73	4.37	2.12	4.89	7.10	6.43	5.89

Note: T_1 = GA_3 @ 50 mg/L on panicle before flower opening, T_2 = GA_3 @ 50 mg/L at 15 days after fruit set, T_3 = GA_3 @ 50 mg/L at 21 days after fruit set, T_4 = GA_3 @ 50 mg/L at 28 days after fruit set, T_5 = GA_3 @ 100 mg/L on panicle before flower opening, T_6 = GA_3 @ 100 mg/L at 15 days after fruit set, T_7 = GA_3 @ 100 mg/L at 21 days after fruit set, T_8 = GA_3 @ 100 mg/L at 28 days after fruit set, and T_9 = Control (water spray only).

Individual fruit weight was shown to be significantly affected by GA_3, with a maximum (18.80 g) in the T_7 treatment, closely followed by treatments T_3 & T_8 (18.60 g), and a minimum (14.50 g) in the control treatment (T_9) (Figure 2). Fruit weight and volume may have increased as a result of GA_3 spraying because of better photosynthetic activity and their transport to the fruit. These results are consistent with those from Singh et al., 2019 [13], Bhadauria et al., 2018 in aonla [14], and Kumar et al., 2018 in mango [13].The T_1 treatment had the highest fruit weight/plant (15.39 kg), followed by the T_4 treatment (12.25 kg), the T_2 treatment (11.97 kg), and the control treatment (T_9) (2.79 kg) had the lowest (Figure 3). The quantity of fruits per plant and individual fruit weight (g) are significantly positively correlated (y = 0.0015x+16.595; R^2 = 0.00677) (Figure 4). Applying GA_3 in accordance with treatments will increase the number of fruits per plant and the weight of each individual fruit [15].

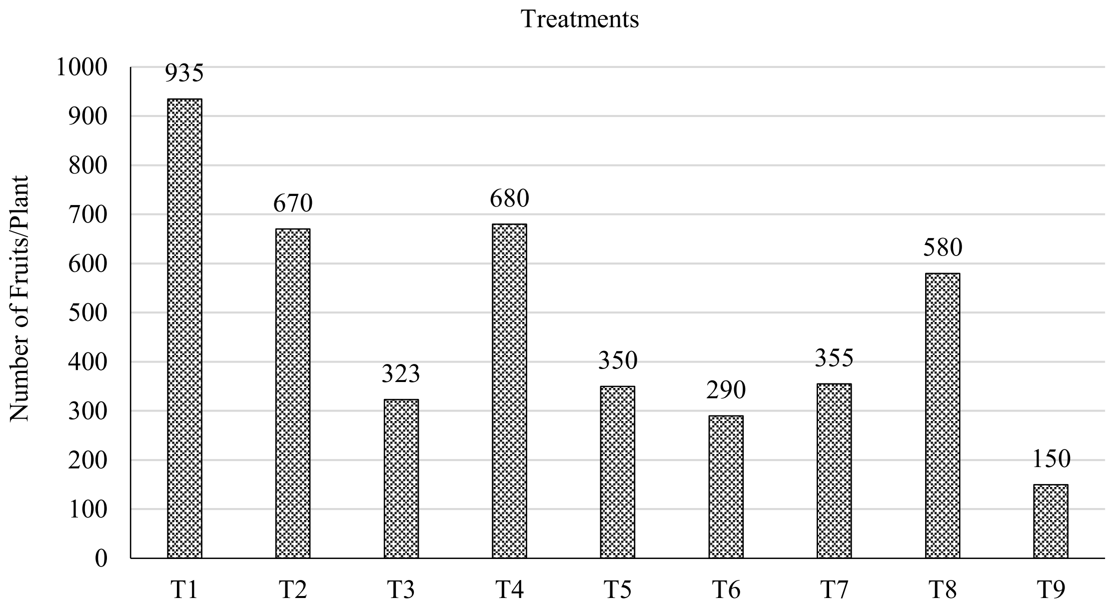


Figure 1. Effect of GA3 on amount of fruits/plant.

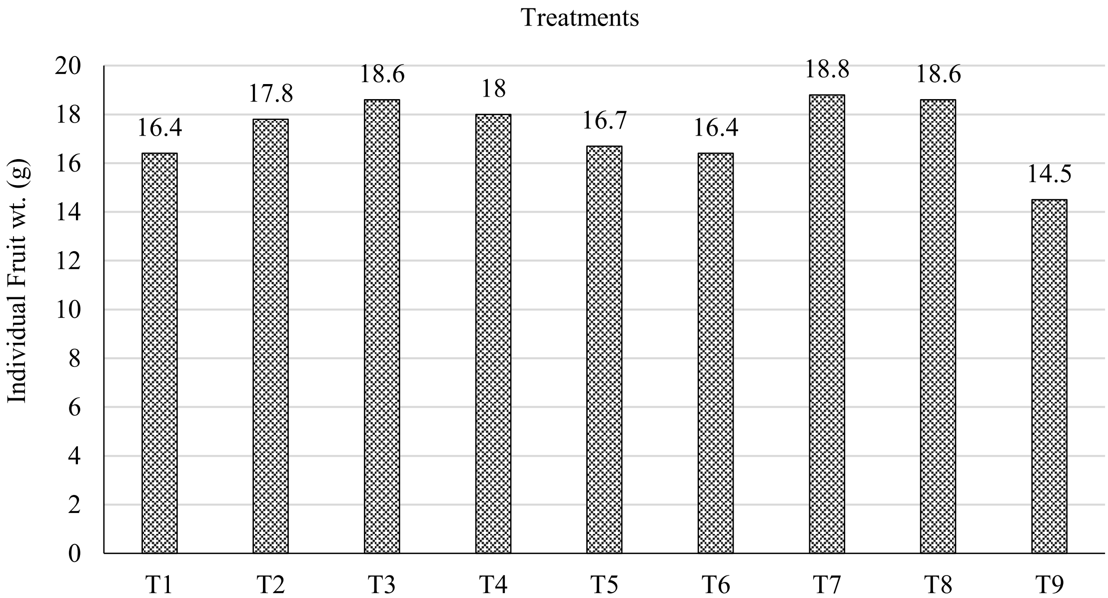


Figure 2. Effect of GA3 on individual fruit weight (g).

In respect to different GA_3 concentrations on panicle length, all treatments are an expression of the plants that were influenced by the GA_3 growth regulator over the control. GA_3 was found to have a significant effect, causing a maximum panicle length of 36 cm. T5 treatment (35 cm) and T_3 treatment (33.30 cm) closely followed. The minimum (22.60 cm) panicle length was presented with control (T_9) during the experiment. The foliar sprays of chemical viz., GA_3, would have promoted the synthesis of chlorophyll and hence led to an increase in chlorophyll content, which in turn resulted in increased vegetative growth. These results are in keeping with the findings of Tripathi et al., 2022, in Ber [16] and Tripathi and Shukla, 2010 [17].

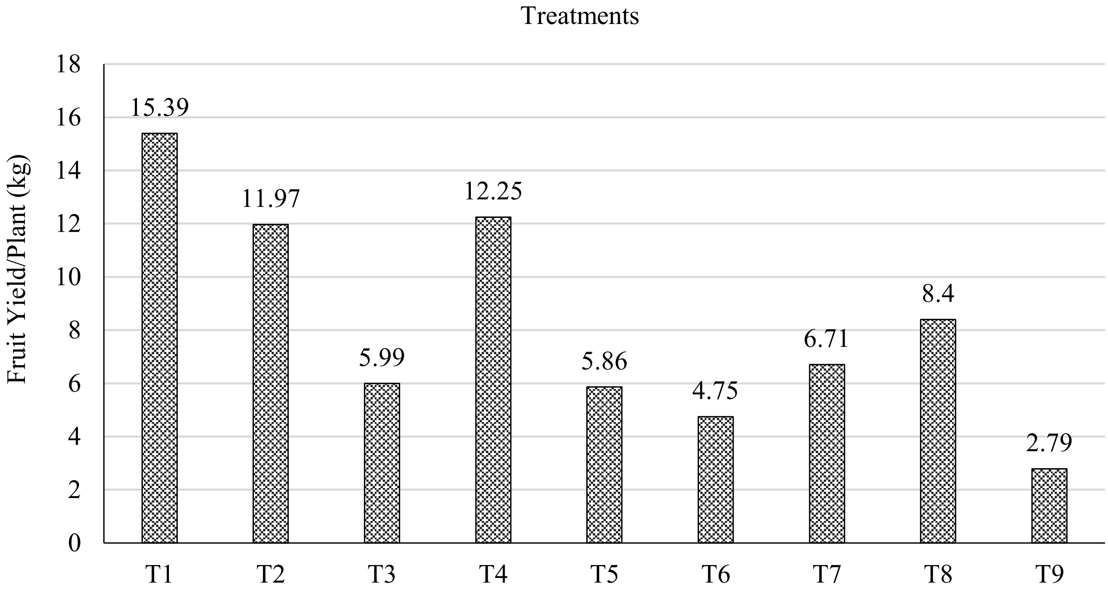


Figure 3. Effect of GA3 on fruit yield/plant (kg).

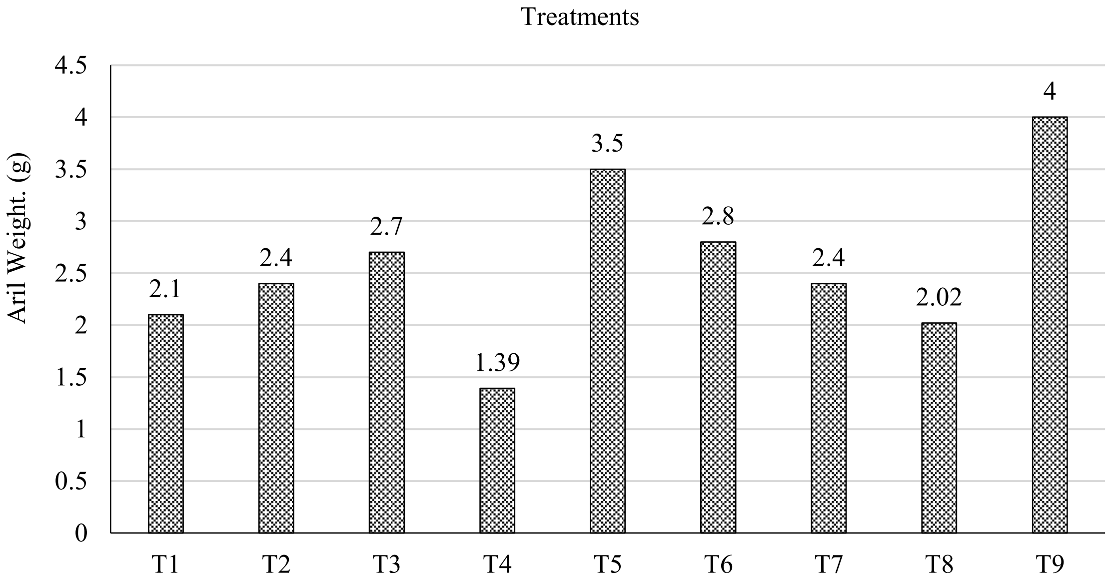
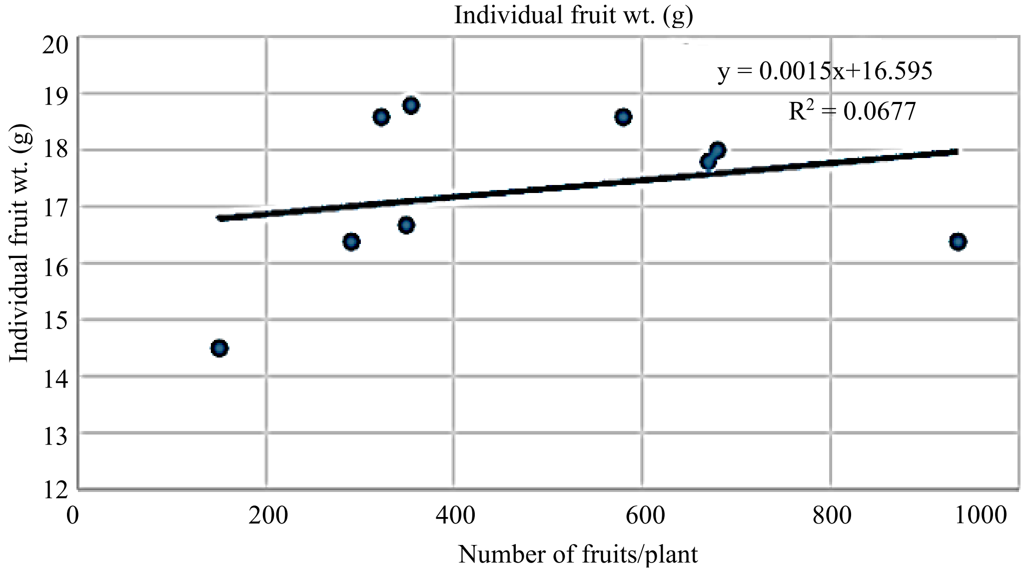
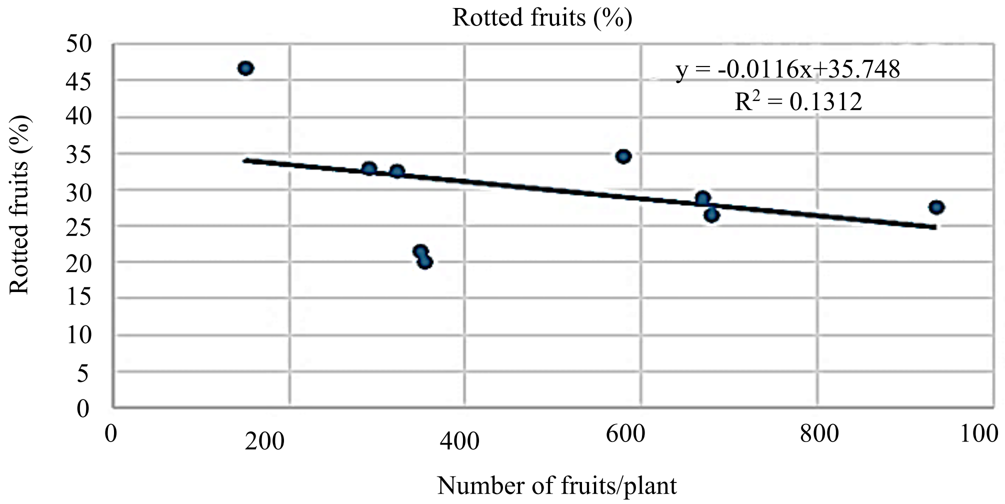


Figure 4. Effect of GA3 on Aril weight (g).

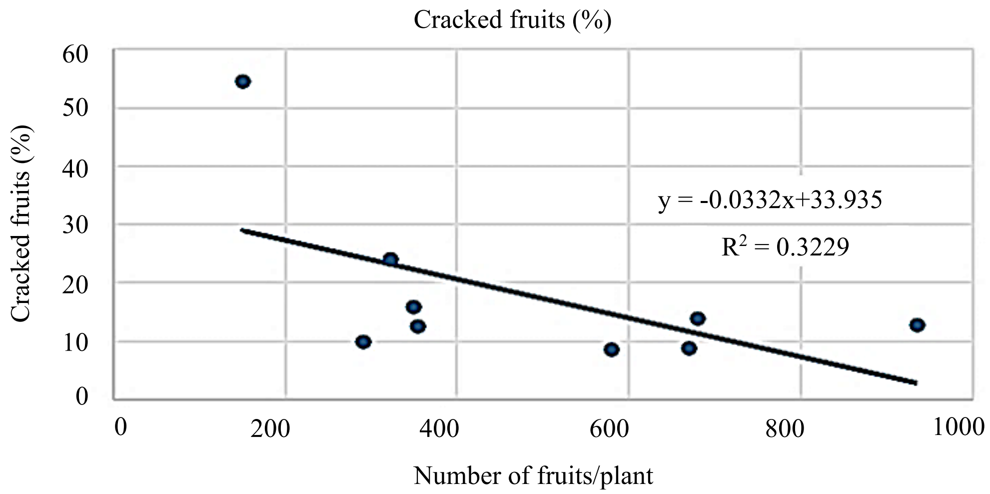
Percentage of rotted fruits ranged from 20.12 to 46.76% for GA_3 application among the treatments. The highest rotted fruits were found in the control treatment (T_9) and minimum (20.12%) in T_7 treatment. From the findings, the plants treated had less rotted fruits as compared to the control treatment plant. There is a significant and negative correlation between number of fruits per plant and rotted fruits (%) ($y = -0.0116x+35.748$; $R^2 = 0.1312$) (Figure 5). Ultimately, highest rotted fruits (%) decrease the total number of fruits per plant. The impact of GA_3 application on the percentage of cracked fruits varied from 8.68 to 54.62%. Fruit cracking of Litchi is 8.68% in T_8 treatment (GA_3 at 100 mg/L at 28 days after fruit set) followed byT_2 treatment (GA_3 at 50 mg/L at 15 days after fruit set) 8.76% was found to be significantly lowest, respectively. The number of fruits per plant and the percentage of cracked fruits are significantly and negatively correlated ($y = -0.0332x+33.935$; $R^2 = 0.3229$) (Figure 5). The overall number of fruits per plant ultimately decreases with the largest percentage of cracked fruits. Some studies have found that GA_3 can help reduce the percentage of fruit cracking in litchi.


Individual fruit wt. (g)
y = 0.0015x+16.595
R² = 0.0677
Individual fruit wt. (g)
20
19
18
17
16
15
14
13
12
0
200
400
600
800
1000
Number of fruits/plant

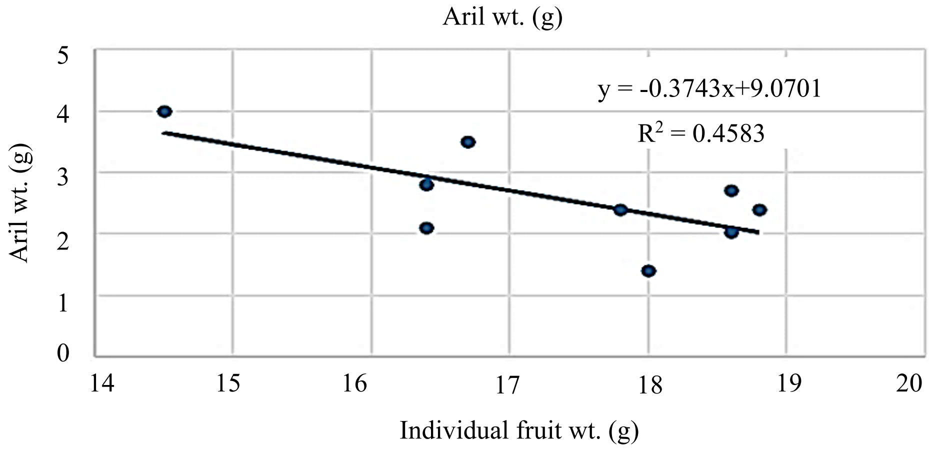
(a)


Rotted fruits (%)
y = -0.0116x+35.748
R² = 0.1312
Rotted fruits (%)
50
45
40
35
30
25
20
15
10
5
0
0
200
400
600
800
100
Number of fruits/plant

(b)


Cracked fruits (%)
y = -0.0332x+33.935
R² = 0.3229
Cracked fruits (%)
60
50
40
30
20
10
0
0
200
400
600
800
1000
Number of fruits/plant

(c)



(d)

Figure 5. The influence of GA_3 on the correlation between the number of fruits per plant and the weight of individual fruit (g), the percentage of rotten fruits, the percentage of cracked fruits, and the weight of individual fruit (g) compared to the weight of the aril (g) (a–d).

Fruit length was significantly affected by GA_3 application. The T_6 treatment had the largest fruit length (3.36 cm), closely followed by the T_5 treatment (3.33 cm), whereas the T_2 treatment and the control treatment had the lowest fruit length (3.01 cm and 3.09 cm, respectively). Fruit length rose significantly when GA_3 was sprayed at any concentration as compared to the control. According to the findings, fruit length improved when GA_3 at 100 mg/L was used 15 days after fruit set. Furthermore, compared to the control, spraying GA_3 at any concentration greatly boosted yield. Even yet, trees treated with 50 mg/L of GA_3 on their panicles before flower opening had the best yield. These results are in agreement with the reports of Kumar et al., 2018 [13], in mango; Priyadarshi et al., 2018 [18]; and Gupta et al., 2022, in litchi [19]. By the impact of GA_3, fruit breadth was found to be significant, and T_1 treatment induced the maximum (3.28 cm) fruit breadth, closely followed by T_3 treatment (3.23 cm). The control (T_9) had the smallest fruit breadth (2.62 cm). More metabolites are being made, and the plant is moving more food and minerals from other areas to the growing fruits, which might demonstrate why the fruits get bigger when GA_3 is used. This is because fruits are known to be very active areas where metabolism happens. The growth of bigger fruits using GA_3 could be because it helps with hormone balance, more cell division, and longer, larger cells. These results are in accordance with Kaur, 2017 [20]; Priyadarshi et al., 2018 [18]; and Animesh and Bikash, 2009 in Litchi [21].

Aril length was observed to be strongly influenced by GA_3, and T_7 treatment produced a significantly minimal aril length (1.89 cm) at harvesting, closely followed by T_4 treatment (2.00 cm). The control (T_9) was shown with the maximum aril length of 3.50 cm. These findings align with those published in Litchi by Priyadarshi et al. (2018) [18] and Kaur (2017) [20]. Aril breadth was shown to be considerable as a result of GA_3, and T_4 treatment greatly reduced aril breadth at harvesting (0.90 cm), closely followed by T_5 treatment (1.26 cm). At harvesting, the maximum aril breadth (1.58 cm) was displayed alongside the control (T_9). These results are consistent with those by Priyadarshi et al., 2018, in Litchi [18]; Kaur, 2017, in Litchi [20]; Ramezani, 2009, in Olive fruit [22]; Singh, 2017, in Phalsa [23]; and Tripathi, 2008, in Strawberry [24]. By the effect of GA_3, aril weight was found to be significant, and T_4 treatment induced significantly minimum (1.39 g) aril weight at harvesting, closely followed by T_8 treatment (2.02 g). The maximum (4.00 g) aril weight at harvesting was presented with control (T_9). These findings are in accordance with the reports of Singh et al., 2017, in Phalsa [24], Singh et al., 2017, in Mango [25], and Priyadarshi et al., 2018, in Litchi [18]. There is a significant and negative correlation between individual fruit weight (g) and aril weight (g) ($y = –0.3743x+9.0703$; $R^2 = 0.4583$) (Figure 5). Higher individual fruit weight (g) is comparable with lower aril weight (g). Lower individual fruit weight (g) and higher aril weight (g) were observed in the control treatment. This result shows that applying GA_3 reduces the aril weight to varied degrees.

Fruits' total soluble solids (TSS) content was measured after GA_3 was applied topically (Table 3). The T_4 treatment had the highest TSS (19%), while the T_3, T_6, and T_9 (control) treatments had the lowest TSS (14%). An increase in total soluble solids could indicate that GA_3 facilitates the transport of sugars across membranes. The rapid transport of sugars from leaves to growing fruits and the rapid metabolic conversion of starch and pectin into soluble molecules may be responsible for the increase in TSS concentration.

Table 3 (b). Effect of PGR on yield and yield-contributing characteristics of Litchi (contd.)

Treatments	**Fruit length (cm)**	**Fruit breadth (cm)**	**Aril length (cm)**	**Aril breadth (cm)**	**Aril wt. (g)**	**TSS (%)**
T_1	3.26 abc	3.28 a	2.03 c	1.43 bc	2.10 e	15.50 b
T_2	3.01 d	3.10 a	2.07 c	1.44 b	2.40 d	14.50 b
T_3	3.13 bcd	3.23 a	2.11 c	1.43 bc	2.70 c	14.00 b
T_4	3.06 cd	3.02 ab	2.00 c	0.90 e	1.39 f	19.00 a
T_5	3.33 ab	2.79 bc	2.51 b	1.26 d	3.50 b	14.50 b
T_6	3.36 a	3.12 a	2.02 c	1.38 bc	2.80 c	14.00 b
T_7	3.17 abcd	3.02 ab	1.89 c	1.36 bcd	2.40 d	15.50 b
T_8	3.18 abcd	3.08 a	2.63 b	1.32 cd	2.02 e	14.50 b
T_9	3.09 cd	2.62 c	3.50 a	1.58 a	4.00 a	14.00 b
Level of significance	*	**	**	**	**	**
CV (%)	3.59	4.79	7.39	4.37	4.08	6.06

Note: T_1 = GA_3 @ 50 mg/L on panicle before flower opening, T_2 = GA_3 @ 50 mg/L at 15 days after fruit set, T_3 = GA_3 @ 50 mg/L at 21 days after fruit set, T_4 = GA_3 @ 50 mg/L at 28 days after fruit set, T_5 = GA_3 @ 100 mg/L on panicle before flower opening, T_6 = GA_3 @ 100 mg/L at 15 days after fruit set , T_7 = GA_3 @ 100 mg/L at 21 days after fruit set, T_8 = GA_3 @ 100 mg/L at 28 days after fruit set and T_9 = Control (water spray only).

CONCLUSION

Using a plant growth regulator made a substantial distinctiveness in all the measurements studied. According to the results from these studies, using GA_3 helped improve flowering, growth, and the quality of litchi fruits. The best results were seen when GA_3 was applied at a concentration of 50 mg/L on the panicle before the flowers opened, and again at 50 mg/L 28 days after the fruit set. This treatment led to the highest number of fruits, better fruit retention, and better physical features like size, weight, and the yield of fruit each plant produced. It is suggested that the application of GA_3 @ 50 mg/L on panicles before flower opening and at 28 days after fruit set should be encompassed in litchi cultivation for enhanced growth, yield, and quality of fruits.

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