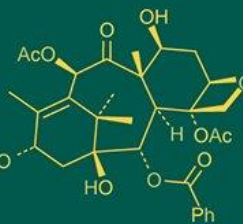
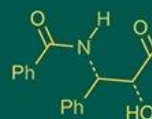
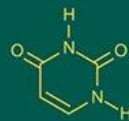
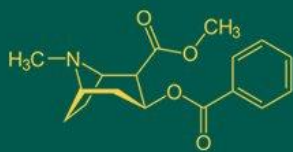


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693

ISSN Online: 2617-4707

NAAS Rating (2025): 5.29

IJABR 2025; SP-9(11): 942-945

www.biochemjournal.com

Received: 02-10-2025

Accepted: 05-11-2025

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Studies on pruning and time of application of paclobutrazol on growth and yield of mango (*Mangifera indica* L.) cv. Kesar

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DOI: <https://www.doi.org/10.33545/26174693.2025.v9.i11SI.6349>

Abstract

The investigation entitled “Studies on Pruning and Time of Application of Paclobutrazol on Growth and Yield of Mango (*Mangifera indica* L.) cv. Kesar” was carried out during 2024-25 at the Fruit Research Station, Chhatrapati Sambhajanagar. The experiment consisted of three pruning treatments (P₁: pruning of all terminal shoots at 2.5 cm, P₂: pruning of unwanted/diseased branches, P₃: pruning of unwanted/diseased branches + terminal shoots at 2.5 cm) and three timings of paclobutrazol application (T₁: 15 July, T₂: 30 July, T₃: 15 August), arranged in FRBD with nine treatment combinations. Observations were recorded on growth, flowering, fruit drop, fruit retention and yield.

The results showed that P₃T₂ (Pruning of unwanted/diseased branches along with terminal shoots at 2.5cm + application of paclobutrazol on 30th July) recorded the earliest flowering, lowest fruit drop at all stages, highest fruit retention at all stages and maximum yield. P₃ and T₂ individually also performed better than other treatments. Paclobutrazol application on 30 July with combined pruning was most effective. The study concluded that P₃T₂ was the best treatment for improving growth and yield of mango cv. Kesar.

Keywords: Mango, *Mangifera indica*, paclobutrazol, pruning, flowering, fruit retention

Introduction

Mango (*Mangifera indica* L.) is an important tropical and subtropical fruit crop of India belonging to the family Anacardiaceae. India is the largest producer of mango, and cultivars such as Alphonso, Kesar, Dashehari and Langra are commercially important. Mango productivity is influenced by canopy management, pruning intensity and growth-regulating chemicals. Excessive vegetative growth suppresses flowering, while regulated pruning improves canopy structure, light penetration and fruiting wood development. Paclobutrazol is a growth retardant that inhibits gibberellin synthesis, reduces vegetative vigour and induces flowering. Its effectiveness depends on correct timing and dosage. The present study was undertaken to evaluate the effect of pruning and time of paclobutrazol application on growth, flowering and yield of mango cv. Kesar.

Materials and Methods

The study was carried out at the Fruit Research Station, Himayat Bagh, Chhatrapati Sambhajanagar, during 2024-25 on nine-year-old Kesar mango trees spaced at 5 × 4 m. The experiment was laid out in FRBD with three pruning treatments (P₁, P₂, P₃) and three paclobutrazol timings (T₁, T₂, T₃), forming nine treatment combinations replicated thrice. Paclobutrazol @ 3 ml/m canopy was applied through soil drenching. Observations were recorded on flowering parameters, fruit drop, fruit retention and yield. Data were statistically analyzed using standard procedures for FRBD.

Results and Discussion**Flowering Parameters**

Minimum days required for flower initiation were recorded in P₃ (55.05 days), followed by P₁ (56.95 days), while maximum days were recorded in P₂ (58.20 days). Among paclobutrazol timings, minimum days were recorded in T₂ (54.01 days), followed by T₃

(56.12 days), and maximum in T₁ (60.08 days). The earliest flowering was recorded in P₃T₂ (53.00 days). This indicates that combined pruning and paclobutrazol application on 30th July enhanced early floral induction. Similar findings were reported by Kulkarni (1988) [12].

Fruit Drop (%)

Fruit Drop at Pea Stage

Pruning had a non-significant effect on fruit drop at pea stage, with values 79.21% (P₁), 79.28% (P₂) and 79.03% (P₃). Paclobutrazol timings showed significant effect, with minimum fruit drop in T₂ (78.69%), followed by T₃ (79.21%) and maximum in T₁ (79.62%). Minimum fruit drop was recorded in P₃T₂ (78.65%), followed by P₁T₂ (78.68%) and P₂T₂ (78.73%). Maximum fruit drop occurred in P₂T₁ (79.74%).

Fruit Drop at Marble Stage

Pruning significantly affected fruit drop at marble stage, with minimum fruit drop in P₃ (58.93%), followed by P₁ (63.76%) and maximum in P₂ (65.32%). Paclobutrazol timings showed minimum fruit drop in T₂ (55.50%), followed by T₃ (62.61%) and maximum in T₁ (69.90%). Minimum fruit drop was recorded in P₃T₂ (50.90%), followed by P₁T₂ (57.76%) and P₂T₂ (57.85%). Maximum fruit drop occurred in P₂T₁ (73.55%).

Fruit Drop at Maturity Stage

Pruning significantly influenced fruit drop at maturity stage, with minimum fruit drop in P₃ (58.59%), followed by P₁ (60.92%) and maximum in P₂ (65.75%). Paclobutrazol timing T₂ recorded minimum fruit drop (53.75%), followed by T₃ (61.20%) and maximum in T₁ (70.30%). The minimum fruit drop was observed in P₃T₂ (50.41%), followed by P₁T₂ (53.36%). Maximum fruit drop occurred in P₂T₁ (75.48%). Similar observations were reported by Karuna *et al.* (2007) [11].

Fruit Retention (%)

Fruit Retention at Pea Stage

Pruning was non-significant at pea stage with values P₃ (21.27%), P₁ (20.95%) and P₂ (20.74%). Paclobutrazol timing T₂ recorded the highest retention (21.78%), followed by T₃ (21.00%) and lowest in T₁ (20.38%). Maximum retention occurred in P₃T₂ (22.08%) and minimum in P₂T₁ (20.26%).

Fruit Retention at Marble Stage

Pruning significantly affected retention, with maximum retention in P₃ (41.07%), followed by P₁ (33.47%) and minimum in P₂ (32.62%). Paclobutrazol timing T₂ recorded the maximum retention (44.50%), followed by T₃ (37.39%) and minimum in T₁ (25.27%). Maximum retention occurred in P₃T₂ (49.10%), followed by P₁T₂ (42.24%) and P₂T₂ (42.15%). Minimum was in P₂T₁ (20.26%).

Fruit Retention at Maturity Stage

Pruning significantly affected retention at maturity, with maximum retention in P₃ (41.41%), followed by P₁ (39.08%) and minimum in P₂ (34.25%). Paclobutrazol timing T₂ recorded maximum (46.25%), followed by T₃ (38.80%) and minimum in T₁ (29.70%). Maximum retention occurred in P₃T₂ (49.59%), followed by P₁T₂ (46.64%). Minimum was in P₂T₁ (24.52%). Similar findings were reported by Singh and Saini (2001) [4] and Narvariya *et al.* (2014) [13].

Yield Parameters

Number of Fruits/Plants

Pruning significantly influenced yield. Maximum number of fruits per plant was observed in P₃ (96.01), followed by P₁ (86.51) and P₂ (82.34). Among paclobutrazol timings, T₂ recorded the highest number of fruits/plant (116.79), followed by T₃ (80.33) and minimum was in (67.75). Highest fruits per plant was recorded in P₃T₂ (122.65), followed by P₁T₂ (116.93). Minimum yield occurred in P₂T₁ (63.51).

Yield/Plant (Kg/Plant)

Maximum yield (kg/plant) was recorded in P₃ (20.33), followed by P₁ (19.14) and P₂ (18.48). Paclobutrazol timing T₂ recorded maximum yield (kg/plant) (23.97) followed by T₃ (18.39) and minimum in T₁ (15.59). Maximum yield was recorded in P₃T₂ (24.10 kg/plant), followed by P₁T₂ (24.01 kg/plant). Minimum yield occurred in P₂T₁ (15.32 kg/plant).

Yield/Plant (t/ha)

In pruning yield was highest in P₃ (10.15 t/ha) followed by P₁ (9.57 t/ha) and P₂ (9.24 t/ha). Among paclobutrazol timings T₂ recorded maximum yield (11.98 t/ha) followed by T₃ (9.19 t/ha) and minimum in T₁ (7.79 t/ha). Highest yield per hectare was recorded in P₃T₂ (12.05 t/ha) followed by P₁T₂ (12.00 t/ha). Minimum yield occurred in P₂T₁ (7.66 t/ha).

Table 1: Effect of pruning & time of application of paclobutrazol on number of days required for flower initiation, Number of days required for 50% flowering, Number of days taken for 100% flowering of mango cv. Kesar

Treatments	Number of days required for flower initiation	Number of days required for 50% flowering	Number of days taken for 100% flowering
Factor A: Pruning (P)			
P ₁	56.95	72.17	100.28
P ₂	58.20	73.39	102.06
P ₃	55.05	70.37	89.61
SE m±	0.29	0.16	0.35
CD at 5%	0.88	0.49	1.05
Factor B: Time of application of Paclobutrazol (T)			
T ₁	60.08	75.37	106.28
T ₂	54.01	68.89	85.22
T ₃	56.12	71.67	100.44
SE m±	0.29	0.16	0.35
CD at 5%	0.88	0.49	1.05
Interaction: Pruning × Time of application of Paclobutrazol (P×T)			

P ₁ T ₁	60.33	76.00	105.67
P ₁ T ₂	54.19	68.50	93.17
P ₁ T ₃	56.33	72.00	102.00
P ₂ T ₁	63.11	77.34	108.83
P ₂ T ₂	54.83	70.50	94.83
P ₂ T ₃	56.67	72.33	102.50
P ₃ T ₁	56.80	72.77	104.33
P ₃ T ₂	53.00	67.67	67.67
P ₃ T ₃	55.36	70.67	96.83
SE m±	0.50	0.28	0.60
CD at 5%	1.51	0.85	1.82

Table 2: Effect of pruning and time of application of paclobutrazol on Fruit drop (%) at pea, marble & maturity stage of mango cv. Kesar

Treatments	Fruit drop (%)		
	Pea stage	Marble stage	Maturity stage
Factor A: Pruning (P)			
P ₁	79.21	63.76	60.92
P ₂	79.28	65.32	65.75
P ₃	79.03	58.93	58.59
SE m±	0.17	0.18	0.19
CD at 5%	NS	0.53	0.57
Factor B: Time of application of (T)			
T ₁	79.62	69.90	70.30
T ₂	78.69	55.50	53.75
T ₃	79.21	62.61	61.20
SE m±	0.17	0.18	0.19
CD at 5%	0.51	0.53	0.57
Interaction: Pruning × Time of application of Paclobutrazol (P×T)			
P ₁ T ₁	79.60	71.28	69.29
P ₁ T ₂	78.68	57.76	53.36
P ₁ T ₃	79.37	62.24	60.11
P ₂ T ₁	79.74	73.55	75.48
P ₂ T ₂	78.73	57.85	57.49
P ₂ T ₃	79.37	64.57	64.27
P ₃ T ₁	79.53	64.87	66.15
P ₃ T ₂	78.65	50.90	50.41
P ₃ T ₃	78.90	61.01	59.22
SE m±	0.29	0.30	0.33
CD at 5%	0.88	0.91	1.00

Table 3: Effect of pruning & time of application of paclobutrazol on Fruit retention (%) at pea, marble, maturity stage of mango cv. Kesar

Treatments	Fruit retention (%)		
	Pea stage	Marble stage	Maturity stage
Factor A: Pruning (P)			
P ₁	20.95	33.47	39.08
P ₂	20.74	32.62	34.25
P ₃	21.27	41.07	41.41
SE m±	0.17	0.17	0.19
CD at 5%	NS	0.51	0.57
Factor B: Time of application of Paclobutrazol (T)			
T ₁	20.38	25.27	29.70
T ₂	21.78	44.50	46.25
T ₃	21.00	37.39	38.80
SE m±	0.17	0.17	0.19
CD at 5%	NS	0.51	0.57
Interaction: Pruning × Time of application of Paclobutrazol (P×T)			
P ₁ T ₁	20.40	20.40	30.71
P ₁ T ₂	21.35	42.24	46.64
P ₁ T ₃	21.10	37.76	39.89
P ₂ T ₁	20.26	20.26	24.52
P ₂ T ₂	21.32	42.15	42.51
P ₂ T ₃	20.63	35.43	35.73
P ₃ T ₁	20.47	35.13	33.85
P ₃ T ₂	22.08	49.10	49.59
P ₃ T ₃	21.27	38.99	40.78
SE m±	0.30	0.30	0.33
CD at 5%	0.91	0.89	1.00

Table 4: Effect of pruning and time of application of paclobutrazol on Number of fruits per plant, Yield/plant (kg/plant), Yield/plant (t/ha) of mango cv. Kesar

Treatment	Number of Fruits/plants	Yield/plant (kg/plant)	Yield/plant (t/ha)
Factor A: Pruning (P)			
P ₁	86.51	19.14	9.57
P ₂	82.34	18.48	9.24
P ₃	96.01	20.33	10.15
SE m±	0.59	0.37	0.18
CD at 5%	1.77	1.11	0.55
Factor B: Time of application of Paclobutrazol (T)			
T ₁	67.75	15.59	7.79
T ₂	116.79	23.97	11.98
T ₃	80.33	18.39	9.19
SE m±	0.59	0.37	0.18
CD at 5%	1.77	1.11	0.55
Interaction: Pruning × Time of application of Paclobutrazol (P×T)			
P ₁ T ₁	68.14	15.47	7.73
P ₁ T ₂	116.93	24.01	12.00
P ₁ T ₃	74.46	17.95	8.98
P ₂ T ₁	63.51	15.32	7.66
P ₂ T ₂	110.80	23.80	11.90
P ₂ T ₃	72.72	16.32	8.16
P ₃ T ₁	71.59	15.98	7.99
P ₃ T ₂	122.65	24.10	12.05
P ₃ T ₃	93.79	20.89	10.42
SE m±	1.02	0.64	0.32
CD at 5%	3.07	1.92	0.96

Conclusion

P₃T₂ (pruning of unwanted/diseased branches and terminal shoots at 2.5 cm with paclobutrazol application on 30th July) was the most effective treatment, recording earliest flowering, lowest fruit drop at pea, marble and maturity stages, highest fruit retention at all stages and maximum fruit yield. P₃ and T₂ individually were superior over P₁ and P₂, and T₁ and T₃. The study revealed that P₃T₂ treatment reported best for improving growth, flowering and yield of mango cv. Kesar.

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