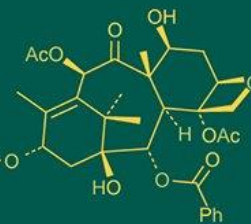
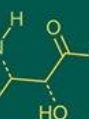
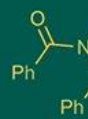


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## Effect of pruning and fruit thinning on growth, yield and quality of watermelon

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### Abstract

This experiment evaluated the impact of pruning and fruit thinning on growth, yield and quality of watermelon. The experiment was conducted in Randomized Block Design (RBD) with seven treatments consisting of no pruning and retaining 1, 2 and 3 fruits vine<sup>-1</sup>, pruning and retaining 1, 2 and 3 fruits vine<sup>-1</sup> and control (no pruning and no thinning) replicated thrice. Results found that the growth parameters viz., length of vine were recorded significantly maximum with treatment (T<sub>1</sub>) no pruning and retaining 1 fruit vine<sup>-1</sup> number of leaves vine<sup>-1</sup>, number of primary branches, chlorophyll index, node at which first female flower appeared, days to first female appearance were recorded significantly maximum with treatment (T<sub>4</sub>) pruning and retaining 1 fruit vine<sup>-1</sup>. Yield parameters viz., days required for edible maturity, average fruit weight were noticed significantly maximum with treatment (T<sub>4</sub>) pruning and retaining 1 fruit vine<sup>-1</sup>. Yield parameters viz., fruit yield vine<sup>-1</sup> and yield per hectare were noticed significantly maximum with individual treatment (T<sub>6</sub>) pruning and retaining 3 fruits vine<sup>-1</sup>.

**Keywords:** Watermelon, pruning, thinning, growth, yield, quality

### Introduction

Watermelon (*Citrullus lanatus* (Thunb.) Matsum. & Nakai) is an economically important warm-season crop of the family Cucurbitaceae, widely cultivated in tropical and subtropical regions. The fruit contains about 92% water and is a good source of sugars, minerals, vitamin C, lycopene, β-carotene and citrulline, contributing to its nutritional and commercial importance. Ensminger and Ensminger (1986) [5] reported the high-water content of watermelon, while Edwards *et al.* (2003) [4] highlighted its contribution of vitamin C, vitamin A and lycopene. Wehner *et al.* (2001) [12] described watermelon as a vigorous annual vine with spreading stems, lobed leaves, yellow flowers and fruits varying from round to oblong with thick green rind and fleshy interior. Mehta (1959) [6] reported that warm, dry conditions with adequate sunlight favour watermelon growth and fruit development. Bianchi *et al.* (2018) [2] stated that sucrose, glucose and fructose are the major sugars responsible for watermelon sweetness, whereas Hall (2004) emphasized its value as a source of essential minerals. Pruning and fruit thinning are important practices for regulating the source-sink relationship, vegetative growth, fruit load and assimilate distribution. Zaaroor-Presman *et al.* (2020) [11] reported that fruit thinning and stem pruning can influence fruit size and quality by modifying the balance between vegetative growth and developing fruits. Similarly, Ferreira *et al.* (2016) observed that pruning and fruit thinning affect fruit size and composition through modification of the source-sink relationship. Therefore, maintaining an optimum fruit load through appropriate pruning and fruit thinning can improve assimilate partitioning, fruit development, yield and quality in watermelon.

### Materials and Methods

The present investigation entitled “Effect of pruning and fruit thinning on growth, yield and quality of watermelon” was conducted during the summer season of 2025 at the Instructional Farm, Department of Vegetable Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra. The experiment was laid out in a Randomized Block Design (RBD) comprising seven treatments with three replications. The treatments included no pruning with retention of one, two and three fruits vine<sup>-1</sup>, pruning with retention of one, two and three fruits vine<sup>-1</sup> and an untreated control without pruning or fruit thinning. Recommended

cultural practices, including irrigation, weeding and plant protection, were followed uniformly throughout the crop period according to crop requirements. All the observations of growth and yield characters were taken during study period. The harvested watermelons were picked up and were separated and analyzed.

## Result and Discussion

### Effect of pruning and fruit thinning on growth parameters in watermelon

The growth parameter like length of main vine was maximum throughout the growth period (252.61 cm) at 90 DAT in treatment (No pruning and retention of 1 fruit vine<sup>-1</sup>). The higher vine length under no pruning is attributed to uninterrupted apical growth of the main vine. Similar findings were reported by Dahal *et al.* (2024) [3] in watermelon and Nayak *et al.* (2018) [9] in cucumber.

Maximum number of leaves vine<sup>-1</sup> (266.45) were observed in treatment (Pruning and retention of 1 fruit vine<sup>-1</sup>) at 90 DAT, respectively. It is evident that higher leaf number resulted from reduced apical dominance, increased lateral branching, and better assimilate allocation, with lower fruit load reducing competition for vegetative growth. Similar findings were reported by Dahal *et al.* (2024) [3] and Anwar *et al.* (2019) [1] in watermelon, Nayak *et al.* (2018) [9] in cucumber, and Naafe *et al.* (2022) [7] in bottle gourd.

Maximum number of primary branches (8.90) was observed in treatment (Pruning and retention of 1 fruit vine<sup>-1</sup>), which was statistically found at par with (8.34) in treatment (pruning and retaining 2 fruits vine<sup>-1</sup>). The higher number of primary branches may be attributed to pruning-induced reduction in apical dominance. Removal of the actively growing shoot portion can promote the activation and development of lateral buds, thereby increasing branching. Similar findings were reported by Dahal *et al.* (2024) [3] in watermelon, Nayak *et al.* (2018) [9] in cucumber, and Naafe *et al.* (2022) [7] in bottle gourd.

Minimum internodal distance (5.52 cm) was observed in treatment (Pruning and retention of 3 fruits vine<sup>-1</sup>) at 60 DAT, which was statistically found at par with (5.53) and (5.67) in treatment (pruning and retaining 2 fruits vine<sup>-1</sup>) and (pruning and retaining 1 fruit vine<sup>-1</sup>). Shorter internodal distance under pruning may be due to reduced apical dominance and restricted shoot elongation, resulting in compact vine growth. Similar findings were reported by Zaaroor-Presman *et al.* (2020) [11] and Dahal *et al.* (2024) [3] in watermelon.

Maximum chlorophyll index was observed (60.78 SPAD units) in treatment (Pruning and retention of 1 fruit vine<sup>-1</sup>) at 60 DAT, which was statistically found at par with (60.70) and (60.76) in treatment (pruning and retaining 2 fruits vine<sup>-1</sup>) and treatment (pruning and retaining 2 fruits vine<sup>-1</sup>), respectively. Higher chlorophyll index under pruning with lower fruit load may be due to improved canopy management and reduced assimilate competition, supporting chlorophyll retention and photosynthetic activity. Similar findings were reported by Zaaroor-Presman *et al.* (2020) [11] in watermelon.

The minimum node at which the first female flower appeared was observed (8.01) in treatment (Pruning and retention of 1 fruit vine<sup>-1</sup>), which was statistically found at par with (8.05) and (8.07) in treatment (pruning and retaining 2 fruits vine<sup>-1</sup>) and treatment (pruning and retaining 3 fruits vine<sup>-1</sup>). Lower node position of the first

female flower under pruning may be due to reduced apical dominance, enhanced lateral growth, promoting earlier female flower differentiation. Similar results were reported by Dahal *et al.* (2024) [3] and Anwar *et al.* (2019) [1] in watermelon.

The minimum days required for the appearance of the first female flower was observed (36.52 days) in treatment (Pruning and retention of 3 fruits vine<sup>-1</sup>), which was found at par with (36.55 days) and (36.58 days) in treatment (pruning and retaining 2 fruits vine<sup>-1</sup>) and (pruning and retaining 1 fruit vine<sup>-1</sup>). Earlier appearance of the first female flower under pruning may be due to reduced apical dominance and better assimilate availability, promoting earlier female flower initiation. Similarly, Dahal *et al.* (2024) [3] reported that pinching influenced flowering behaviour and reproductive characteristics in watermelon.

### Effect of pruning and fruit thinning on yield parameters in watermelon

Treatment (Pruning and retention of one fruit vine<sup>-1</sup>) recorded the minimum days to edible maturity (71.55 days) and the highest average fruit weight (4.01 kg), which was found at par with (72.62), (72.81) and (73.34) in treatments (pruning and retaining 1 fruit vine<sup>-1</sup>), (pruning and retaining 3 fruits vine<sup>-1</sup>) and (no pruning and retaining 1 fruit vine<sup>-1</sup>) respectively. This may be due to reduced fruit load and improved source-sink balance, allowing greater photosynthate allocation to the retained fruit and promoting faster maturity and fruit development. Similar findings were reported by Anwar *et al.* (2019) [1], Zaaroor-Presman *et al.* (2020) [11], Dahal *et al.* (2024) [3] in watermelon, and Naafe *et al.* (2022) [7] in bottle gourd.

The maximum number of fruits vine<sup>-1</sup> (3.32) was recorded in treatment (control), where pruning and fruit thinning were not practiced. This may be due to the retention of all naturally developed fruits, resulting in a higher fruit count vine<sup>-1</sup>. Similar findings were reported by Zaaroor-Presman *et al.* (2020) [11] and Dahal *et al.* (2024) [3] in watermelon.

The highest average fruit weight (4.01 kg) was recorded in treatment (pruning and retention of one fruit vine<sup>-1</sup>). This may be attributed to reduced competition for photosynthates, water and nutrients, along with improved assimilate distribution and canopy efficiency due to pruning. Similar findings were reported by Ndereyimana *et al.* (2021) [10] and Zaaroor-Presman *et al.* (2020) [11], who observed that pruning and fruit-load management significantly influenced fruit weight and development in watermelon.

The highest fruit yield vine<sup>-1</sup> (7.14 kg) and per hectare (793.98 q/ha) were recorded in treatment (pruning and retention of three fruits vine<sup>-1</sup>). This may be attributed to improved canopy management and efficient assimilate partitioning through pruning, along with an optimum fruit load that balanced fruit number and individual fruit weight. Similar findings were reported by Ndereyimana *et al.* (2021) [10] and Zaaroor-Presman *et al.* (2020) [11], who observed that stem pruning and fruit-load management improved fruit number, fruit weight and overall yield in watermelon.

### Effect of pruning and fruit thinning on quality parameters in watermelon

The maximum TSS (11.73 °Brix) recorded in treatment (pruning and retaining 1 fruit vine<sup>-1</sup>), which was found at par with (11.39 °Brix) and (11.62 °Brix) in treatment (pruning and retaining 2 fruits vine<sup>-1</sup>) and (no pruning and retaining 1

fruit vine<sup>-1</sup>). Similar findings were reported by Ambethgar *et al.* (2026) and Zaaroor-Presman *et al.* (2020) <sup>[11]</sup>, who observed improved fruit quality and TSS with pruning and fruit-thinning practices in watermelon.

The maximum reducing sugar (5.92%) recorded in treatment (pruning and retaining 1 fruit vine<sup>-1</sup>), which was found at par with (5.58%) and (5.51%) in treatment (no pruning and retaining 1 fruit vine<sup>-1</sup>) and (pruning and retaining 2 fruits vine<sup>-1</sup>). The maximum non-reducing sugar (3.36%) recorded in treatment (pruning and retaining 1 fruit vine<sup>-1</sup>). The maximum total sugar (9.28%) recorded in treatment (pruning and retaining 1 fruit vine<sup>-1</sup>), which was found at par with (8.70%) in treatment (no pruning and retaining 1 fruit

vine<sup>-1</sup>). Similar findings were reported by Ambethgar *et al.* (2026), who observed increased reducing, non-reducing and total sugars in watermelon under strategic pruning.

The non-significant effect of pruning and fruit thinning on ascorbic acid content may be due to the fact that vitamin C accumulation is influenced more by genotype, fruit maturity and environmental conditions than by fruit load and canopy management. Similar findings were reported by Zaaroor-Presman *et al.* (2020) <sup>[11]</sup>, who evaluated stem pruning and fruit thinning in watermelon and observed that vitamin C was influenced more strongly by rootstock than by pruning or thinning treatments.

**Table 1:** Effect of pruning and fruit thinning on growth parameters in watermelon

| Treatments                                                           | Length of main vine (cm) 90 DAT | Number of leaves 90 DAT | Number of primary branches 90 DAT | Internodal distance (cm) 60 DAT | Chlorophyll index 60 DAT | Node at which 1 <sup>st</sup> male and female flower appeared | Days to first female flower appearance |
|----------------------------------------------------------------------|---------------------------------|-------------------------|-----------------------------------|---------------------------------|--------------------------|---------------------------------------------------------------|----------------------------------------|
| T <sub>1</sub> (No pruning & retaining 1 fruit vine <sup>-1</sup> )  | 252.61                          | 246.47                  | 7.70                              | 6.54                            | 58.88                    | 9.27                                                          | 38.53                                  |
| T <sub>2</sub> (No pruning & retaining 2 fruits vine <sup>-1</sup> ) | 245.26                          | 240.50                  | 7.26                              | 6.64                            | 58.98                    | 9.23                                                          | 38.41                                  |
| T <sub>3</sub> (No pruning & retaining 3 fruits vine <sup>-1</sup> ) | 240.53                          | 235.17                  | 6.80                              | 6.39                            | 58.81                    | 9.34                                                          | 38.50                                  |
| T <sub>4</sub> (Pruning & retaining 1 fruit vine <sup>-1</sup> )     | 235.91                          | 266.45                  | 8.90                              | 5.67                            | 60.83                    | 8.01                                                          | 36.72                                  |
| T <sub>5</sub> (Pruning & retaining 2 fruits vine <sup>-1</sup> )    | 233.16                          | 256.06                  | 8.34                              | 5.53                            | 60.70                    | 8.05                                                          | 36.75                                  |
| T <sub>6</sub> (Pruning & retaining 3 fruits vine <sup>-1</sup> )    | 232.49                          | 248.71                  | 7.94                              | 5.52                            | 60.76                    | 8.07                                                          | 36.55                                  |
| T <sub>7</sub> (Control no pruning & no thinning)                    | 241.15                          | 234.81                  | 6.21                              | 6.32                            | 58.86                    | 9.49                                                          | 38.32                                  |
| 'F' Test                                                             | Sig.                            | Sig.                    | Sig.                              | Sig.                            | Sig.                     | Sig.                                                          | Sig.                                   |
| S.Em ±                                                               | 1.65                            | 1.89                    | 0.22                              | 0.14                            | 0.27                     | 0.05                                                          | 0.08                                   |
| CD (5%)                                                              | 5.07                            | 5.83                    | 0.67                              | 0.43                            | 0.83                     | 0.16                                                          | 0.26                                   |

**Table 2:** Effect of pruning and fruit thinning on yield parameters in watermelon

| Treatments                                                           | Days required for edible maturity | Number of fruits per plant | Average fruit weight (kg) | Fruit yield (Kg/plant) | Fruit yield per hectare (tons) |
|----------------------------------------------------------------------|-----------------------------------|----------------------------|---------------------------|------------------------|--------------------------------|
| T <sub>1</sub> (No pruning & retaining 1 fruit vine <sup>-1</sup> )  | 73.34                             | 1.00                       | 3.82                      | 3.79                   | 419.17                         |
| T <sub>2</sub> (No pruning & retaining 2 fruits vine <sup>-1</sup> ) | 74.39                             | 2.00                       | 3.21                      | 5.72                   | 634.86                         |
| T <sub>3</sub> (No pruning & retaining 3 fruits vine <sup>-1</sup> ) | 77.29                             | 3.00                       | 2.79                      | 6.75                   | 747.85                         |
| T <sub>4</sub> (Pruning & retaining 1 fruit vine <sup>-1</sup> )     | 71.55                             | 1.00                       | 4.01                      | 3.99                   | 440.04                         |
| T <sub>5</sub> (Pruning & retaining 2 fruits vine <sup>-1</sup> )    | 72.62                             | 2.00                       | 3.32                      | 6.01                   | 667.11                         |
| T <sub>6</sub> (Pruning & retaining 3 fruits vine <sup>-1</sup> )    | 72.81                             | 3.00                       | 2.95                      | 7.14                   | 793.98                         |
| T <sub>7</sub> (Control no pruning & no thinning)                    | 77.69                             | 3.32                       | 2.46                      | 6.41                   | 713.55                         |
| 'F' Test                                                             | Sig.                              | Sig.                       | Sig.                      | Sig.                   | Sig.                           |
| S.Em ±                                                               | 0.51                              | 0.03                       | 0.03                      | 0.02                   | 2.87                           |
| CD (5%)                                                              | 1.56                              | 0.08                       | 0.11                      | 0.05                   | 8.84                           |

**Table 3:** Effect of pruning and fruit thinning on quality parameters in watermelon

| Treatments                                                           | Fruit length (cm) | Fruit diameter (cm) | Reducing sugar (%) | Non- Reducing sugar (%) | Total sugars (%) | Ascorbic acid (mg/100 gm) |
|----------------------------------------------------------------------|-------------------|---------------------|--------------------|-------------------------|------------------|---------------------------|
| T <sub>1</sub> (No pruning & retaining 1 fruit vine <sup>-1</sup> )  | 30.35             | 15.09               | 5.58               | 3.12                    | 8.70             | 8.72                      |
| T <sub>2</sub> (No pruning & retaining 2 fruits vine <sup>-1</sup> ) | 29.30             | 14.10               | 4.98               | 2.82                    | 7.80             | 8.89                      |
| T <sub>3</sub> (No pruning & retaining 3 fruits vine <sup>-1</sup> ) | 27.53             | 13.41               | 4.61               | 2.51                    | 7.03             | 8.45                      |
| T <sub>4</sub> (Pruning & retaining 1 fruit vine <sup>-1</sup> )     | 31.19             | 15.92               | 5.92               | 3.36                    | 9.28             | 8.89                      |
| T <sub>5</sub> (Pruning & retaining 2 fruits vine <sup>-1</sup> )    | 29.86             | 14.62               | 5.51               | 3.10                    | 8.61             | 8.81                      |
| T <sub>6</sub> (Pruning & retaining 3 fruits vine <sup>-1</sup> )    | 27.98             | 13.92               | 5.35               | 2.86                    | 8.21             | 8.80                      |
| T <sub>7</sub> (Control no pruning & no thinning)                    | 26.86             | 12.95               | 4.59               | 2.41                    | 7.00             | 8.89                      |
| 'F' Test                                                             | Sig.              | Sig.                | Sig.               | Sig.                    | Sig.             | NS                        |
| S.Em ±                                                               | 0.30              | 0.20                | 0.17               | 0.03                    | 0.19             | 0.26                      |
| CD (5%)                                                              | 0.93              | 0.62                | 0.51               | 0.09                    | 0.58             | -                         |

### Conclusion

On the basis of the present findings, it can be concluded that pruning and fruit-load management had a significant effect on the growth, flowering and yield parameters of watermelon. With respect to growth parameters, treatment (No pruning and retention of 1 fruit vine<sup>-1</sup>) was found to be superior for length of the main vine. However, (Pruning and retention of 1 fruit vine<sup>-1</sup>) was found to be the best in respect of number of leaves vine<sup>-1</sup>, number of primary branches, chlorophyll index, node at first female flower appearance, days to edible maturity, average fruit weight. The minimum internodal distance and earliest appearance of the first female flower were observed under (Pruning and retention of 3 fruits vine<sup>-1</sup>). The maximum number of fruits vine<sup>-1</sup> was recorded in Control (no pruning and no fruit thinning). In respect to yield parameters, fruit yield vine<sup>-1</sup> and fruit yield per hectare were found to be highest in (Pruning and retention of 3 fruits vine<sup>-1</sup>).

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