**Journal of Food and Agriculture Research**
Vol. 4, No. 1, 2024, pp. 55-67

*URL: www.arfjournals.com*
*https://doi.org/10.47509/JFAR.2024.v04i01.03*

# Shoot Pruning and Potassium Spray Improves Morphological and Quality Attributes in Litchi

Mitali, Ratna Rai*, Omveer Singh, Pratibha, Nitin Panwar, Gopal Mani, Rakhi Gautam Saurabh Chandra Tamta and Mohit Chand

*Department of Horticulture (Fruit Science), College of Agriculture, G. B. Pant University of Agriculture and Technology, Pantnagar, U. S. Nagar, Uttarakhand-263145*
**Corresponding author E-mail: ratnarai1975@gmail.com*

***Abstract:*** The present investigation was conducted to study the effect of pruning and $KNO_3$ sprays on flowering, vegetative growth and quality attributes of litchi fruits (*Litchi chinensis* Sonn.). The experiment was laid out in Factorial Randomized Block Design with three replications. The treatments consisted of three factors: 3 dates of pruning, 2 levels of pruning intensity and 2 concentrations of $KNO_3$ sprays along with control. The treatment comprising pruning on 29$^{th}$ June at 40 centimeter pruning intensity with 4 per cent $KNO_3$ spray was found to be more effective in terms of maximum leaf area index, panicle length, number of flowers, pulp recovery and TSS: acidity ratio as compared to control. However, length of shoots was more in the treatment where pruning was done on 11$^{th}$ July with the removal of apical 40 cm shoot and 4% $KNO_3$ spray. The thickness of shoots was higher in control. The panicle width was maximum in the trees which were 40 cm pruned on 29$^{th}$ June followed by 2% $KNO_3$ spray. The results suggested that early pruning after harvesting of fruits followed by $KNO_3$ application is effective in enhancing production and quality of litchi crop in the subsequent year.

***Keywords:*** Litchi, Pruning, Potassium Nitrate, Flowering, Fruit Quality.

Received : 19 February 2024
Revised : 21 March 2024
Accepted : 29 March 2024
Published : 30 June 2024

**TO CITE THIS ARTICLE:**

Rai, M.R., & et al. 2024. Shoot Pruning and Potassium Spray Improves Morphological and Quality Attributes in Litchi. *Journal of Food and Agriculture Research,* 4: 1, pp. 55-67. *https://doi.org/10.47509/JFAR.2024.v04i01.03*

## 1. Introduction

Litchi (*Litchi chinensis*), is an important fruit crop of the soapberry family (Sapindaceae) and is extensively cultivated in the tropical to subtropical

regions of the world. Litchi is a very nutritive fruit and the major portion of the fruit is constituted by water (76–91 %). The fruit contains a number of health promoting bioactive compounds (phenolics/antioxidants), minerals (phosphorus, iron and calcium), vitamins (thiamine, niacin, riboflavin, vitamin C), sugars (glucose, fructose, sucrose), fats, protein, and flavoring components (limonene, geraniol, neral) which makes litchi a super fruit (Pareek, 2016).

Litchi possibly originated in Southern China and Northern Vietnam and later on spread to at least 20 nations (Menzel, 2001). India is the second largest producer of litchi after China which ranks first in the production (Sahni *et al*., 2020). The other important litchi growing countries are Vietnam, Thailand, Bangladesh, South Africa, Nepal etc (Pareek, 2016). Small scale production is also done in Australia, United States of America, Philippines and Indonesia (Cronje *et al*., 2023). In India, it was introduced by the end of the 17th century (Goto, 1960) and spread to the other parts of the country. In India, although commercially predominant in the Indo-Gangetic plains of Uttar Pradesh, Bihar, Uttarakhand and West Bengal, suitable climatic conditions in the subtropical states of Punjab, Himachal Pradesh and Jammu and Kashmir has further expanded its cultivation. The annual production of litchi in India is 746 thousand metric tons from an area of about 96 thousand hectares of land and productivity of 7.43 metric tons / hectare (Anonymous, 2023a). As per report of APEDA, (Anonymous, 2023b), Bihar contributed 42 % (308.06 thousand tonnes) followed by 12 % production in West Bengal (71.76 thousand tonnes) and 10 % production in Jharkhand (64.42 thousand tonnes). Uttarakhand produces 25,000 tonnes of fruit every year from a 10,000 hectares area mainly located in the Nainital, Udham Singh Nagar and Dehradun districts (Anonymous, 2023c).

The pattern of shoot and flush development directly affects flowering in litchi which eventually affects the flowering and fruiting in the year. Olesen *et al*. (2002) demonstrated the impact of pruning litchi at different times on the subsequent development of vegetative and reproductive flushes. They reported that in litchi particularly, flowering is affected by the cycle of shoot development.

Pruning is an important horticultural operation affecting the vegetative and floral behavior in many fruit crops (Wilkie *et al*., 2010). It not only restricts excessive vegetative growth but also maintains a balance between vegetative and reproductive stage of a tree. The photosynthetic translocation towards the roots gets enhanced which indirectly regulates flower bud formation and improves fruit size, fruit color and fruit quality during the fruit development stage. Pruning just after harvesting has been found to be beneficial for improving flowering in many fruit crops (Goren, 1990). Tip pruning after harvest synchronizes the

postharvest vegetative flush throughout the orchard (Goren and Gazit, 1993). The maturity of terminal shoots is directly related to floral initiation. If the terminal shoots are sufficiently mature at the time when conditions are ideally inductive then it causes late bud-break while if the terminal shoots are fully mature prior to the stage when conditions are ideally inductive, it causes early bud break and flowering is adversely affected. Removal of new shoots developing in late winter increases flowering in litchi (Chaitrakulsub *et al*., 1992), indicating that during the period when conditions are ideally inductive, the terminal shoots must be adequately mature. The effect of pruning on flower bud formation and quality of fruits has been studied by various workers in different fruit crops (Kumar *et al*., 2005; Rather, 2006 and Sonali *et al*., 2001).

In the subtropical areas, an inductive signal which is usually the cold spell in winter is required to synchronize flower initiation. Potassium nitrate has also been identified as an inductive agent for flower initiation and can effectively control erratic flowering in mango (Protacio, 2000). Potassium nitrate, although a major source for potassium also provides nitrogen to the plants. Nitrogen is said to be the most important nutrient affecting vegetative flushing (Menzel *et al*., 1995; Zheng *et al*., 2001). Potassium, on the other hand, is required for many physiological processes like maintaining water relations, increasing photosynthesis, assimilate transport and enzyme activation which have direct consequences on crop productivity. When potassium uptake is lower than demand, foliar potassium is mobilized to the fruit, which is detrimental for plant growth, and fruit set and quality (Besford and Maw, 1975). Pre-harvest sprays of potassium is one of the most important practices applied in the integrated fruit production systems, improving fruit quality (Mandal *et al*., 2012).The studies on impact of $KNO_3$ on shoot behavior, flowering panicle induction, fruit yield is meager in juvenile litchi orchard (Kumar *et al*., 2017). Therefore, the present experiment was undertaken to assess the effect of shoot pruning time, its intensity and concentration of $KNO_3$ on vegetative growth, flowering, yield and quality of litchi fruits.

## 2. Materials and Methods

### *2.1. Experimental site*

The experiment was carried out at Horticulture Research Centre, Patharchatta, Pantnagar. Geographically, Pantnagar is located in the *Tarai* region at the foothills of Himalayas between 29° N latitude, 79.3° E longitude and at an altitude of 243.84 meters above the mean sea level. The annual rainfall is

about 145 cm, which has a lot of variations throughout the year. The rainy season starts at the end of June and continues till September. Maximum rain is received from the south-west monsoon during the four months rainy season from June to September. The temperature variation is very large, as summer holds temperature maxima of around 42-45 $^{o}$C while in winters it falls heavily to 2-4 $^{o}$C.

## 2.2. Experimental Materials and Layout

The experiment was carried out on 15 year old litchi trees of cv. Rose Scented planted at 5×5 m distance in a square system. Trees of uniform vigor and size were selected for the experiment. The trial was laid out in Factorial Randomized Block Design with three replications. The treatments consisted of three factors: pruning time (29$^{th}$ June, 11$^{th}$ July, 23$^{rd}$ July and 04$^{th}$ August), pruning intensity (20 cm and 40 cm) and $KNO_3$ sprays (2 % and 4 %) and control (Table 1) . One tree served as a unit of treatment in each replication.

## 2.3. Application of $KNO_3$

Foliar application of $KNO_3$ was done by using foot sprayer (Aspee Maruti, model MRI 8) in the early hours between 7:00 to 8:00 am. Two sprays of $KNO_3$ were done on 30$^{th}$ October and 2$^{nd}$ December.

**Table 1: Treatments Detail**

| *Symbol* | *Treatment* |
|---|---|
| $T_1$ | Pruning on 29$^{th}$ June + pruning of 20 cm terminal shoot + 2% $KNO_3$ spray |
| $T_2$ | Pruning on 29$^{th}$ June + pruning of 20 cm terminal shoot + 4% $KNO_3$ spray |
| $T_3$ | Pruning on 29$^{th}$ June + pruning of 40 cm terminal shoot + 2% $KNO_3$ spray |
| $T_4$ | Pruning on 29$^{th}$ June + pruning of 40 cm terminal shoot + 4% $KNO_3$ spray |
| $T_5$ | Pruning on 11$^{th}$ July + pruning of 20 cm terminal shoot + 2% $KNO_3$ spray |
| $T_6$ | Pruning on 11$^{th}$ July + pruning of 20 cm terminal shoot + 4% $KNO_3$ spray |
| $T_7$ | Pruning on 11$^{th}$ July + pruning of 40 cm terminal shoot + 2% $KNO_3$ spray |
| $T_8$ | Pruning on 11$^{th}$ July + pruning of 40 cm terminal shoot + 4% $KNO_3$ spray |
| $T_9$ | Pruning on 23$^{rd}$ July + pruning of 20 cm terminal shoot + 2% $KNO_3$ spray |
| $T_{10}$ | Pruning on 23$^{rd}$ July + pruning of 20 cm terminal shoot + 4% $KNO_3$ spray |
| $T_{11}$ | Pruning on 23$^{rd}$ July + pruning of 40 cm terminal shoot + 2% $KNO_3$ spray |
| $T_{12}$ | Pruning on 23$^{rd}$ July + pruning of 40 cm terminal shoot + 4% $KNO_3$ spray |
| $T_{13}$ | Pruning on 4$^{th}$ August + pruning of 20 cm terminal shoot + 2% $KNO_3$ spray |
| $T_{14}$ | Pruning on 4$^{th}$ August + pruning of 20 cm terminal shoot + 4% $KNO_3$ spray |
| $T_{15}$ | Pruning on 4$^{th}$ August + pruning of 40 cm terminal shoot + 2% $KNO_3$ spray |
| $T_{16}$ | Pruning on 4$^{th}$ August + pruning of 40 cm terminal shoot + 4% $KNO_3$ spray |
| $T_{17}$ | Control (Neither pruned nor sprayed with $KNO_3$) |

## 3. Morphological Characters

### *3.1. Leaf Area Index*

The leaf area was measured in $cm^2$ by using leaf area meter (LI 3000C). The leaf area index was then calculated by the following formulae:

$$Leaf\ area\ index\ (LAI) = \frac{Total\ leaf\ area}{Ground\ area\ covered}$$

### *3.2. Shoot Length*

The length of newly emerged shoots from the tagged pruned shoots was measured in the 3rd week of January with the help of a measuring tape and was expressed in centimeters (cm).

### *3.3. Shoot width*

The width of newly emerged shoots was measured at the base by using vernier calipers and was expressed in centimeters (cm).

### *3.4. Panicle length and width*

The length and width of 20 panicles per tree selected from different directions were measured with the help of a measuring scale and were expressed in centimeters (cm).

### *3.5. Total Number of flowers per panicle*

The total number of flowers per tagged panicle was counted.

## 4. Quality Characters

### *4.1. Pulp Recovery*

The recovery of aril (pulp) was measured by first taking the fruits in grams on an electronic balance .The aril, seed and peel of the fruits were separated. The pulp (aril) was then weighed and recovery was calculated in percentage by using the following formulae:

$$Pulp\ recovery(\%) = \frac{Weight\ of\ aril}{Weight\ of\ fruits} \times 100$$

### 4.2. TSS: Acidity Ratio

The TSS: Acidity was worked out by dividing the TSS value of the fruit juice by acidity obtained in the respective treatments.

## 5. Results and Discussion

### 5.1. Leaf Area Index

Leaf area index is an important ecological indicator of plant growth status, canopy structure and crop biomass. The data regarding leaf area index showed significant effect of treatments over control (Table 2). The maximum leaf area index (161.600 $m^2/m^2$) was recorded in the trees pruned on 29th June at 40 centimeter intensity and sprayed with 4 per cent $KNO_3$ ($T_4$) and was statistically *at par* with the treatments $T_3$,$T_7$,$T_{12}$,$T_8$ and $T_{11}$. The minimum leaf area index (104.557 $m^2/m^2$) was observed in control ($T_{17}$). The results indicated that when 40 cm apical part of the shoots was removed up to 23rd July, irrespective of concentration of $KNO_3$, maximum leaf area index was obtained. Leaf area index tells the proportion of green coverage of the plant in comparison to the ground. It is also an indicator of the photosynthesis, respiration and transpiration activity in plants. The cultural practices like shoot pruning may help in increasing the LAI. Optimal LAI is directly related to the canopy carbon gain. In the present investigation, the trees which were pruned earlier produced leaves with higher LAI and consequently had better photosynthetic efficiency.

### 5.2. Shoot length and width

Pruning in fruit trees improves flowering and fruit quality by maintaining an appropriate balance between vegetative and reproductive growth. In the present investigation, the treatments had a significant effect on length of shoots (Table 2). The maximum shoot length (37.803 cm) and shoot width (0.827 cm) was recorded in control ($T_{17}$) while the minimum shoot length (15.528 cm) and shoot width (0.557 cm) was observed in trees pruned on 4th August at 20 centimeter intensity and sprayed with 2 per cent $KNO_3$ ($T_{13}$) and in trees pruned on 4th August at 20 centimeter intensity and sprayed with 4 per cent $KNO_3$ ($T_{14}$), respectively In all the treatments where pruning was done on 4th August, (irrespective of intensity and concentration of $KNO_3$ spray), less growth (shoot length and width) in new shoots was observed ($T_{13}$,$T_{14,}$ $T_{15,}$ $T_{16}$). Pruning in any plant is done as per the physiology and development pattern of growth of that particular plant. Litchi bears panicles on the mature shoots and therefore, the shoots that develop early in the season mature first. Pruning of apical parts

just after harvesting initiates new growth in litchi plants which get sufficient time for maturity and thus produce panicles in the subsequent year. Potassium nitrate ($KNO_3$) is reported to be the most efficacious form of potassium for foliar application (Howard *et al*., 1998). Our results are in conformity with the findings of Saritha *et al*. (2021) who observed that different levels of pruning and application of plant nutrients significantly affected the shoot length in apple beer. Pruning influences the vegetative parameters, flowering and fruiting behavior, quality of fruits, structural strength along with imparting dwarfing effect in plants (Sneha *et al*., 2017). In the present study, more width of the newly emerged shoots was observed in the trees pruned in June and July. Shukla *et al*. (2007) also reported maximum stem diameter in early pruned trees of ber cv. Kaithali. Demirtas *et al.* (2010) also reported significant effect of pruning time on shoot diameter of apricot. Another observation with respect to severity of pruning depicted that the higher intensity of pruning (removal of 40 cm apical portion) increased the thickness of shoots. Similar results have been reported by Lal and Mishra (2007) and Kumar *et al*. (2014) who found maximum shoot diameter in severely pruned trees of mango and ber, respectively.

**Table 2: Effect of treatments on leaf area index, shoot length and shoot width in litchi cv. Rose Scented**

| *Treatments* | *Leaf area index (LAI) ($m^2/m^2$)* | *Shoot length (cm)* | *Shoot width (cm)* |
|---|---|---|---|
| $T_1$ | 147.920 | 23.322 | 0.760 |
| $T_2$ | 149.880 | 25.822 | 0.770 |
| $T_3$ | 159.490 | 27.127 | 0.763 |
| $T_4$ | 161.600 | 28.960 | 0.783 |
| $T_5$ | 146.770 | 27.127 | 0.740 |
| $T_6$ | 147.483 | 28.188 | 0.740 |
| $T_7$ | 155.510 | 28.953 | 0.760 |
| $T_8$ | 153.697 | 29.832 | 0.807 |
| $T_9$ | 142.650 | 23.123 | 0.720 |
| $T_{10}$ | 140.877 | 25.798 | 0.710 |
| $T_{11}$ | 150.717 | 27.923 | 0.760 |
| $T_{12}$ | 154.960 | 29.328 | 0.760 |
| $T_{13}$ | 132.057 | 15.528 | 0.570 |
| $T_{14}$ | 133.497 | 16.023 | 0.557 |
| $T_{15}$ | 139.140 | 16.790 | 0.587 |
| $T_{16}$ | 138.953 | 17.147 | 0.573 |
| $T_{17}$ | 104.557 | 37.803 | 0.827 |
| CD at 5% | 12.104 | 3.814 | 0.029 |
| S. Em. ± | 4.183 | 1.318 | 0.010 |

## 5.3. Panicle Length and Width

Annual tip pruning provides reliable synchronized flowering and maintains all the plants in the same height for many years (Davenport, 2006). The pruning and $KNO_3$ treatments significantly affected the panicle size in the next year flowering (Table 3). The maximum panicle length (37.260 cm) was recorded in trees pruned on 29th June at 40 centimeter intensity and sprayed with 4 per cent $KNO_3$ ($T_4$) and it was statistically *at par* with the treatments $T_5$, $T_6$, $T_7$, $T_8$, $T_9$, $T_{10}$, $T_{11}$ and $T_{12}$. The minimum panicle length (24.993 cm) was observed in trees pruned on 4th August at 20 centimeter intensity and sprayed with 2 per cent $KNO_3$ ($T_{13}$) and it was *at par* with $T_{14}$, $T_{15}$ and $T_{16}$. In general, it was observed that when pruning intensity was 40 cm, the panicle length was higher as compared to 20 cm shoot removal and control. The results are in conformity with the findings of Singh *et al*. (2010) who reported increase in length of panicle with increase in pruning severity up to certain extent in mango. It might be due to variations in gross changes in endogenous hormonal levels. Shinde *et al*. (2002) and Pratap *et al*. (2003) observed that there was higher activity of gibberellic acid like substances during floral bud induction in pruned trees of mango.

The maximum panicle width (24.17 cm) was recorded in trees pruned on 29th June at 40 centimeter and sprayed with 2 per cent $KNO_3$ ($T_3$) and this treatment was statistically *at par* with $T_4$, $T_5$, $T_6$, $T_7$, $T_8$, $T_9$, $T_{10}$, $T_{11}$ and $T_{12}$. The minimum panicle width (11.457 cm), on the other hand, was observed in trees pruned on 4th August at 40 centimeter intensity and sprayed with 2 per cent $KNO_3$ ($T_{15}$) and was *at par* with $T_{13}$, $T_{14}$, and $T_{16}$. Late pruning i.e. in August reduced the panicle size as compared to June and July pruning. Similarly foliar application of 4% $KNO_3$ was found to be more beneficial in increasing the panicle size in the subsequent year. The results of the study showed that optimal pruning along with $KNO_3$ application at the right time is helpful in restoring floriferousness. It might also help in the establishment of ideal balance in root: shoot ratio as well as endogenous hormonal contents i.e. growth promoter: inhibitor ratio. Aghav *et* al. (2022) also reported that apical shoot pruning was significantly effective in increasing the length and width of the panicle in mango.

## 5.4. Number of Flowers Per panicle

The data presented in Table 3 indicated that the treatments were significantly effective on production of more flowers per panicle as compared to the control. The maximum number of flowers per panicle (1033.853) was recorded in the trees pruned on 29th June at 40 centimeter intensity and sprayed with 4 per cent $KNO_3$ ($T_4$) which was statistically *at par* with the treatments $T_8$, $T_6$, $T_7$,

$T_3$, $T_2$ and $T_5$. Overall, it was clearly visible that early pruning up to 11th July resulted in production of more flowers. The minimum number of flowers per panicle (344.627) was noted in trees pruned on trees pruned on 4th August at 20 centimeter intensity and sprayed with 2 per cent $KNO_3$ ($T_{13}$) which was *at* par with the treatments $T_{14}$, $T_{15}$, and $T_{16}$ reflecting that as the pruning date advanced towards August, number of flowers produced in the subsequent year reduced. The auxin synthesis at the apex of the branches is reduced by pruning of shoots, so that the assimilates and cytokinins are directed to the axillary buds of branches creating favorable conditions for flowering (Taiz and Zeiger, 2012). Effect of time of tip pruning of shoots on flowering intensity in mango has also been observed by Aghav *et* al. (2022). Similarly, application of 4 % $KNO_3$ produced more flowers as compared to 2 per cent. Kumar *et al*. (2017) also reported that trees sprayed with $KH_2PO_4$ (1 %) + $KNO_3$ (1 %) not only showed better flowering over control trees but also produced more female flowers in litchi.

**Table 3: Effect of treatments on panicle length, panicle width and number of total flowers per panicle, in litchi cv. Rose Scented**

| *Treatments* | *Panicle length (cm)* | *Panicle width (cm)* | *Number of total flowers per panicle* |
|---|---|---|---|
| **$T_1$** | 32.77 | 18.087 | 747.020 |
| **$T_2$** | 33.153 | 18.083 | 816.813 |
| **$T_3$** | 34.527 | 24.170 | 871.083 |
| **$T_4$** | 37.260 | 21.737 | 1033.853 |
| **$T_5$** | 34.020 | 21.327 | 798.347 |
| **$T_6$** | 35.653 | 21.993 | 933.710 |
| **$T_7$** | 35.007 | 20.720 | 877.087 |
| **$T_8$** | 37.023 | 19.497 | 974.763 |
| **$T_9$** | 33.360 | 19.627 | 718.080 |
| **$T_{10}$** | 34.753 | 21.643 | 792.843 |
| **$T_{11}$** | 35.910 | 19.510 | 717.840 |
| **$T_{12}$** | 37.157 | 19.250 | 707.370 |
| **$T_{13}$** | 24.993 | 15.970 | 344.627 |
| **$T_{14}$** | 25.950 | 15.203 | 390.737 |
| **$T_{15}$** | 26.873 | 11.457 | 348.130 |
| **$T_{16}$** | 27.797 | 14.323 | 437.090 |
| **$T_{17}$** | 31.620 | 17.977 | 659.630 |
| CD at 5 % | 3.633 | 5.548 | 240.767 |
| S. Em. ± | 1.255 | 1.917 | 83.202 |

## 5.5. Pulp Recovery

The effect of treatments on pulp recovery (Table 4) was significantly higher over control. The pruning of shoots and KNO3 sprays resulted in increased pulp recovery percentage over control. The maximum pulp recovery (74.266 %) was noted in fruits harvested from trees pruned on 29th June at 40 centimeter intensity and sprayed with 4 per cent $KNO_3$ ($T_4$) which was *at par* with the treatments $T_1$, $T_2$, $T_3$, $T_6$, $T_8$, $T_9$ and $T_{10}$. The minimum pulp recovery (63.581 %) was recorded in fruits harvested from control trees and it was *at par* with the treatments where pruning was done in August ($T_{13}$ and $T_{14}$). Spraying the trees particularly with 4 % $KNO_3$ was also found to increase the pulp recovery as compared to 2 per cent. Kumar *et al*. (2017) also reported that combined spray of 1 % mono-potassium phosphate and 1 % potassium nitrate led to highest fruit weight and pulp recovery in litchi.

## 5.6. TSS: Acidity Ratio

Significant effect of treatments was observed on TSS: acidity ratio (Table 4). The maximum TSS: acidity ratio (43.657) was observed in fruits harvested from trees pruned on 29th June at 40 centimeter intensity and sprayed with 4 per cent $KNO_3$ ($T_4$) which was *at par* with almost all the treatments except $T_1$, $T_3$, $T_{13}$ and control. The minimum TSS: acidity ratio (33.172) was recorded in fruits harvested from control. The results are supported with the findings of Pratap *et al.* (2009) and Kaundal *et al*. (2002) who reported significant influence of pruning intensity on TSS: acidity ratio in mango and peach, respectively. Enhancement in the quality of litchi fruits through pruning and chemical sprays has also been reported Chandola *et al*. (2020).

**Table 4: Effect of treatments on pulp recovery and TSS: acidity ratio in litchi cv. Rose Scented.**

| *Treatments* | *Pulp recovery (%)* | *TSS: acidity ratio* |
|---|---|---|
| $T_1$ | 71.203 | 36.095 |
| $T_2$ | 71.182 | 39.890 |
| $T_3$ | 71.476 | 37.817 |
| $T_4$ | 74.266 | 43.657 |
| $T_5$ | 68.764 | 41.387 |
| $T_6$ | 71.021 | 40.653 |
| $T_7$ | 69.458 | 42.031 |
| $T_8$ | 74.212 | 41.180 |
| $T_9$ | 70.627 | 38.490 |
| $T_{10}$ | 70.614 | 38.939 |

| *Treatments* | *Pulp recovery (%)* | *TSS: acidity ratio* |
|---|---|---|
| $T_{11}$ | 68.333 | 40.944 |
| $T_{12}$ | 69.600 | 41.460 |
| $T_{13}$ | 66.973 | 36.969 |
| $T_{14}$ | 70.274 | 40.011 |
| $T_{15}$ | 70.917 | 41.544 |
| $T_{16}$ | 72.012 | 41.410 |
| $T_{17}$ | 63.581 | 33.172 |
| CD at 5 % | 3.712 | 5.215 |
| S. Em. ± | 1.283 | 1.802 |

## 6. Conclusion

The investigation results suggest that early post-harvest pruning on 29th June at 40 centimeter pruning intensity and 4 per cent $KNO_3$ ($T_4$) were found to be more effective in terms of maximum leaf area index, pulp recovery (%), TSS: acidity ratio and number of total flowers per panicle of litchi fruits in the subsequent season. The harvesting period of litchi cv. Rose Scented can be extended under *tarai* conditions by proper manipulation of pruning time, intensity and $KNO_3$ sprays.

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