The Pharma Innovation Journal 2023; 12(5): 4575-4577

www.ThePharmaJournal.com

The Pharma Innovation

**ISSN (E): 2277-7695**
**ISSN (P): 2349-8242**
**NAAS Rating: 5.23**
TPI 2023; 12(5): 4575-4577

www.thepharmajournal.com
Received: 23-02-2023
Accepted: 28-03-2023

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# A study on the effect of number of nodes and type of cuttings on growth physiology of passion fruit (*Passiflora edulis* Sims)

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**Abstract**
An experiment was conducted to study the effect of number of nodes and type of cuttings on survival percentage and growth parameters in passion fruit (*Passiflora edulis* Sims) during the year 2022-2023 at North Farm of School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu. The study revealed that the survival percentage was maximum in semi hardwood cuttings with four node (84%) and it also recorded maximum number of leaves per plant (3.36), maximum shoot length (5.30 cm), maximum root length (12.94 cm), and maximum leaf area (38.84 $cm^2$). The semi hardwood cuttings with five nodes recorded the earliest rooting (26.60 days) compared to other types of nodes and cuttings.

**Keywords:** Passion fruit, semi hardwood, softwood, cuttings, node

## Introduction
Passion fruit, *Passiflora edulis Sims* belongs to Passifloraceae family and it is indigenous to the warmer, moister parts of the Amazon region of Brazil, as well as potentially Paraguay and Northern Argentina (Thokchom *et al*., 2017) [1]. It is a woody, robust and perennial climbing vine (Bemkaireima *et al*., 2012) [2]. In India, 45.82 thousand tonnes of passion fruits are produced annually on an area of 9.11 thousand acres (Joseph and Sobhana, 2020) [3]. The Nilgiris, Wayanad, Kodaikanal, Coorg, Malabar, Nagaland, Mizoram, and Manipur in India are among the regions where passion fruit grows wild (Chadha, 2002) [4]. In order to increase the passion fruit plantations, quality planting material must be made available. The lack of available knowledge on practical propagation techniques for passion fruit restricts its commercial production (Dos Anjos *et al*., 2022) [5]. Although seeds can be used to grow passion fruit, more high-quality planting materials must be produced for commercial production. Stem cuttings can produce plants that are true to type to their mother plants. With the above background the study was done to evaluate the effect of number of nodes and type of cuttings on survivability and growth parameters in passion fruit (*Passiflora edulis* Sims).

## Materials and Methods
The present investigation was conducted to study the effect of number of nodes and type of cuttings on survivability and growth parameters in passion fruit (*Passiflora edulis* Sims) during the year 2022-2023 at North Farm of School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu. The experiment was laid out in Completely Randomized Design (CRD) with eight treatments replicated five times and five cuttings were taken for each replication. The following are the treatments used in the experiment, $T_1$- Semi hardwood cuttings with two nodes, $T_2$- Semi hardwood cuttings with three nodes, $T_3$- Semi hardwood cuttings with four nodes, $T_4$- Semi hardwood cuttings with five nodes, $T_5$- Softwood cuttings with two nodes, $T_6$- Softwood cuttings with three nodes, $T_7$- Softwood cuttings with four nodes, $T_8$- Softwood cuttings with five nodes. Cuttings were obtained from the healthy and vigorous mother plants of Passion fruit grown at the North Farm of Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu.

**Table 1:** Effect of number of nodes and type of cuttings on growth physiology of Passion fruit

| Treatments | Survival % | Number of days taken for rooting (Days) | Root length (cm) | Number of roots per cutting | Shoot length (cm) | Number of leaves per plant | Leaf Area ($cm^2$) |
|---|---|---|---|---|---|---|---|
| $T_1$ | 60.00 | 34.24 | 9.88 | 3.53 | 3.02 | 2.46 | 31.84 |
| $T_2$ | 64.00 | 32.04 | 10.92 | 4.36 | 3.44 | 2.70 | 32.72 |
| $T_3$ | 84.00 | 28.24 | 12.94 | 4.04 | 5.30 | 3.36 | 38.84 |
| $T_4$ | 88.00 | 26.60 | 11.92 | 3.63 | 4.66 | 3.15 | 38.24 |
| $T_5$ | 28.00 | 45.20 | 6.76 | 2.80 | 2.02 | 1.20 | 25.70 |
| $T_6$ | 32.00 | 45.24 | 7.06 | 2.20 | 1.98 | 1.30 | 26.42 |
| $T_7$ | 32.00 | 38.48 | 6.94 | 2.40 | 2.24 | 1.60 | 27.38 |
| $T_8$ | 36.00 | 36.36 | 6.10 | 1.60 | 1.96 | 1.60 | 24.48 |
| SE.d | 6.00 | 0.31 | 0.38 | 0.28 | 0.19 | 0.24 | 0.83 |
| CD (0.05) | 12.28 | 0.64 | 0.77 | 0.57 | 0.39 | 0.48 | 1.69 |

## Result and Discussion

### Survival Percentage

The present investigation revealed that the number of nodes and type of cuttings have significant influence on the survivability and growth parameters of passion fruit cuttings which are presented in Table 1. Maximum survival percentage was recorded in the semi hardwood cuttings with five nodes which was on par with the semi-hardwood cuttings with four nodes (88.0% and 84.0% respectively). The maximum survivability may be due to the increased carbohydrate reserve present in them which was also reported in the studies done by Joseph and Sobhana (2020) [3]. The above result is also supported by the findings of Khan *et al*. (2006) [6] who found that softwood cuttings lose water, dry out and die compared to other matured cuttings.

### Effect of nodes and type of cuttings on root parameters

With respect to number of days taken for rooting, the earliest rooting (26.60 days) was noticed in the semi-hardwood cuttings with five nodes followed by semi hardwood cuttings with four nodes (28.24 days). The result is in accordance with the findings of Yesuf *et al*. (2021) [7] where the number of nodes and growing media had significant impact on the root production. The longest root (12.94 cm) was observed in the semi-hardwood cuttings with four nodes followed by semi-hardwood cuttings with five nodes (11.92 cm). With respect to the number of roots, more number of roots were observed in semi-hardwood cuttings with three nodes (4.36) that was on par with semi-hardwood cuttings with four nodes (4.04). Similar results were obtained by Hamooh (2005) [8] in grape vine cuttings.

### Effect of nodes and type of cuttings on shoot parameters

The shoot length was maximum (5.30 cm) in the semi-hardwood cuttings with four nodes followed by semi-hardwood cuttings with five nodes (4.66 cm). The higher shoot length may be due to the better root system which enabled to absorb more nutrients from the media. The above result is in accordance with the findings of Deol and Khosla (1983) [9] and Kahramanoglu (2018) [10]. The number of leaves per plant was highest (3.36) in the semi-hardwood cuttings with four nodes that was on par (3.15) with semi-hardwood cuttings with five nodes. Leaf area was also recorded maximum (38.84 $cm^2$) in the semi-hardwood cuttings with four nodes which was on par (38.24 $cm^2$) with semi-hardwood cuttings with five nodes. The results are in conformity with the findings of Kasim *et al*. (2019) [11] where it was found that origin of the branch had significant impact on the parameters such as shoot length, number of leaves and leaf area in Passion fruit.

## Conclusion

From the current study, it is concluded that semi-hardwood cuttings gave better results compared to softwood cuttings of Passion fruit and among the different number of nodes studied, four and five nodes were found to be the best with respect to survival percentage and growth physiology of passion fruit cuttings.

## Acknowledgement

The authors are thankful to the School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore for the support and facilities provided during the research work.

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