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## Tipping Practice on Nursery Plants of *Camellia sinensis* L. During Their Growth Period

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**Abstract:** Hardening of tea saplings and siblings with frame was maintained by different growth stages i.e. (T1: Control, T2: 4-5 leaves stage, T3: 7-8 leaves stage, T4: 12-14 leaves stage, T5: 4-5 leaves stage in siblings) on six parameters during September 1999 to April 2000. Maximum plant height of 67.8 cm was obtained in T4 followed by 49.8 cm in T3. Where as T1: 33.2 cm, T2: 44.4 cm, T5: 47.8 cm showed respectively. Significantly branches were increased in T4: 8.37, followed by T3: 5.37. The rest of the treatments were at par with each other's statistically. Maximum leaves of 47.0 in T4 followed by T3 (31.4) were recorded. However T2 and T5 were remain the same statistically i.e. 28.4 each in both treatments. Similar results was produced in fresh leaves i.e. 33.82 in T4 followed by T3 which produced 16.4 almost half of the T4. The other treatments showed poor performance in this respect and remain non significant. Maximum root length was recorded in T5 (19.0 cm) where as the rest of the treatments were statistically non significant among each other. Where as the maximum root weight was recorded in T3 (10.39 gms), this attribute due the tap root system in siblings and adventitious root in saplings by nature in tea plant. It proves from the study that tipping practice should be carried out in the nursery at 12-14 leaves stage for healthy plants for transplantation in the field.

**Key words:** *Camellia sinensis* L., tea, growth, tipping, leaves stages, height, branches, length, fresh weight, Pakistan

### Introduction

Tea plant is self-sterile but is cross fertile and heterogeneous in nature. It can be propagated both by seed and cuttings. Moreover, it requires ideal conditions in the nursery for healthy growth because it has to be transplanted in the field for 70-100 years. Therefore, the improved and healthy planting material for transplanting with adequate number of branches and stem is the necessity of the time. Sleeved plants normally do not produce more than one stem (Willson, 1992).

Willson and Clifford (1992) reported that removal of the growing points from a stem induces branching from leaf axils lower down the stem leading to stem multiplication. Such type of practice carried out in the nursery stage so the plants have already several branches when planted out in the field. They further reported that apical bud and one below should be removed at five-leaf stage for the stimulation of branch formation. Be careful in 70 to 100 of years crop, it is a foolish thing to plant any thing but the best you can find. Tea plants are ready in the nursery when it retains a complete frame and to face further a new place of different environmental conditions for adoptability. In the nursery the foliage of young tea plants heavily shades the basal 10 cm of the stem.

The objective of thumb nailing/tipping of the young nursery plants to obtain healthy, vigorous, uniform plants properly trained and sufficiently hardened, which will be suitable for the field planting. Kathiravetpillai and Kulasegaram (1986) stated that the purpose of this method was to encourage the tea plants in the nursery to branch out so that a low spreading plant would be obtained at an early stage. They further stated that the most effective treatment was the dis-budding that involves the removal of terminal bud at 4-5-leaf stage in the nursery. Willson (1992) concluded that the apical bud and the one below should be removed when there is at least five leaves left on the plant. This should stimulate the plant growth. Kathiravetpillai and Kulasegaram (1986) reported that thumb nailing involves the removal of the bud and the first two leaves + stem could be done at the later stage of 7-8 leaves with out effecting roots development and the branches grow out was seen at the higher nodes than was with disbudding. The aim of the present study was to

investigate the proper method with suitable height for the growth/branching and frame of tea plants in the nursery before transplanting in the field.

### Materials and Methods

The study was conducted in the tea nursery of Agriculture Research Station (North) Mingora, Swat, during the years 1999-2000. Healthy nursery tea plants of 1 Y2 year old were selected for experimentation. Black sleeves of Saplings and siblings (size 4 × 9") were arranged in Randomized Complete Block Design with 5 replications during the month of September 1999. Each treatment consisted of 125-sleeves, soil having pH range of 5.5 in all sleeves. Banerjee (1993) stated that the ideal height at which tipping should be done is still a matter of considerable debate though the optimal height and stage of tipping must take cognizance of the growth characteristics of the cultivars. All cultural practices were practiced i.e. weeding; showering and other protection measure, covering with high shade through out the study period were continued uniformly.

Data regarding growth of the tea plants during eight month from September 1999 to April 2000 and other growth parameters were recorded and analyzed statistically by following the Duncan's Multiple Range Test (Steel and Torrie, 1970).

### Results and Discussion

The data regarding different parameters of tea plants for tipping in the nursery are presented in Table 1.

The data in the table indicated significantly highest growth rate with saplings at 12-14 leaves stage 67.8 centimeter, which was followed by 4-8 leaves stage of tipping. The lowest growth rate was obtained in control. However at the stage of 4-5 leaves in sibling's 47.8 cm growth rate was recorded. Which was statistically at par in significance at 5% level of probability with 7-8 leaves stage of saplings.

It was evident from the data that normally tea saplings or siblings produced only one main stem with out any branches as control shows 1.2 branches/plant. Once again data revealed that the maximum number of branches in saplings at

**Waheed *et al.*: Tipping practice on nursery plants of *Camellia sinensis* L. during their growth period**

Table 1: Tipping practice in nursery stage

Treatments	Plant height (cm)	No. of Branches per plant	No. of Leaves per plant	Fresh Leaves weight (gms)/ Plant	Root Length (cm) per Plant	Fresh Root weight (grams)
T1 Control	33.2d	1.2e	19.4b	5.66c	5.0d	3.36d
T2 4-5 leaves stage (saplings)	44.4c	3.04e	28.4d	11.2c	8.4a	3.83d
T3 7-8 leaves stage (saplings)	49.8b	5.73b	31.4c	16.4b	10.6a	10.39a
T4 12-14 leaves stage (saplings)	67.8a	8.37a	47.0a	33.82a	15.8c	7.42c
T5 4-5 leaves stage (siblings)	47.8b	3.04e	28.4d	7.04e	19.0b	6.26b
SE	0.93	0.12	0.67	0.38	0.22	0.17

12-14 leaves stage followed by the 7-8 leaves stage. All others treatments including control remains statistically non significant among each other's and remains the same. These results are in conformity with the results of Willson and Clifford (1992) and Kathiravetpillai and Kulasegaram (1986). The numbers of leaves per plant and fresh weight of leaves /plant remained highly significant statistically at 5% levels of probability and produced 47.0 and 33.82 leaves respectively. Followed by the saplings treated with 7-8 leaves stage, which shows the poor performance by fresh leaves weight character and remains significant among all other treatments. Results of 4-5 leaves stage (saplings) and 4-5 leaves stage in siblings were statistically at par with each other.

Table indicated the data on the root length statistically significant in siblings at 4-5 leaves stage followed by the 1.214 leaves stage. The Treatment 4-5 leaves stage (saplings) and 7-8 leaves stage of saplings was at par statistically among each other. Where as control remains non significant (5.0 cm) Similar findings were obtained by Kathiravetpillai and Kulasegaram (1986).

Fresh root weight of 10.39 grams was recorded in 7-8 leaves stage followed by the 12-14 leaves stage of saplings and 4-5 leaves stage of siblings. All other treatments were non significant among each other. This was attributed that siblings with tap root system increased the root length where as it

lose the fresh weight with the same height. In saplings adventurous root system clearly indicate the root length with its fresh root weight. Thus from the results of the study, it was concluded that thumb nailing/tipping practice should be done at 12-14 leaf stage in saplings and 4-5 leaves stage in siblings for transplantation in the field.

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