

# Germination and Growth of Tea Seed in Response to Different Sowing Dates

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## Introduction

Tea was introduced in Pakistan in mid-twenties. Earlier tea was supplied by East Pakistan which is now Bangladesh. After dismemberment in 1971, an acute shortage of tea was faced by Pakistan. Since that time, the increasing demand of tea is met by imports from a number of countries which involves a huge amount of foreign exchange. The annual consumption of tea in Pakistan is more than 90 million kgs, which costs more than US \$ 200 million on its import. To meet the growing demand for tea and to save the foreign exchange, efforts were made to produce tea locally. For this purpose, tea seed was imported from Indonesia, Srilanka and China and were sown at various locations in Murree, Azad Kashmir and Hazara. The agro-ecological conditions of the Daively in Hazara were found to be suitable for tea cultivation because of low pH (6.0 - 5.5) and sandy loam characteristics of the soils. The area receives rainfall ranging from 1000 mm to 1200 mm per annum with mean minimum and maximum temperatures of -1°C and 32°C respectively. It has been reported by Kathiravetpillai and Kulasegaram (1986) that tea can best be grown on loam and sandy loam soil with pH of about 5.0. Further, Mann (1935) found that tea could be grown on sites with mean monthly minimum temperature of -5°C to 20°C and maximum of 20°C to 30°C in both for tropical and semitropical regions.

Although tea bushes are growing successfully at Daively and Bedadi in District Mansehra, no work on the appropriate sowing time of tea seed has been done so far in Pakistan. It is generally reported that tea seed loses its viability at a very rapid rate if it is not stored properly and kept for a longer time (Anonymous 1972). The viability of seed depends on its overall characteristics i.e. size, weight, colour and period of storage. A study was carried out to test the viability of tea seed at Daively by sowing it on different dates soon after picking. The objective of the study was to develop a methodology as well as time of sowing tea seed without loss of its viability. Harler (1966) has pointed out that tea seed loses its viability under ordinary storage conditions and which reduces with the passage of time. Tea seed has been the only means of propagation of the plant for a long time till the development of vegetative propagation methods in

the late thirties. Further, tea seeds subjected to desiccation in storage are likely to produce a high percentage of twisted seedlings.

## Material and Methods

The study on sowing of tea seed was carried out at Experimental Tea Garden, Daively, Mansehra during 1986-87. Representative samples of mature and healthy seed of Chinese tea variety "Qi-Men" collected from Experimental Tea Garden in late October and early November 1986, were sown in raised beds in the randomized complete block design in four replications. The bed size was kept as 5.0 x 1.1 x 0.1 m. The seed was sown in the 2.0 cm wide holds at a depth of 1.5 cm in the ground, keeping the eye in an upward position. Row to row and seed to seed distance was 10 mm and 5 cm respectively. Sowing was done four times with one month interval on 10th of November and December, 1986 and 10th January and February, 1987.

Irrigation was applied in bed regularly at an interval of fifteen days. After the germination of seed, all measures were taken to protect the saplings from attack of insect pests and diseases. The data were recorded about the percentage of seed germination, plant height, stem girth, number of leaves per plant, length and number of primary roots. The mean values of germination and growth parameters were calculated at the end of the experiment. The data were analysed statistically.

## Results and Discussion

The data presented in Table 1 indicate that the difference between the means of seed germination percentage sown at different dates was highly significant. The germination in case of seed sown on November 10 was 78.9 percent, which reduced to 74.6, 54.1 and 33.1 percent for sowings on December 10, January 10 and February 10 respectively. These results agree with those reported in the literature which show that the best time for sowing tea seed in Tocklai (India) is from early November to end of December (Anonymous, 1972). Similarly, the saplings raised from seed sown on November 10 were also significantly taller with thicker stems than the plants raised from seed sown on January 10 or February 10.



Table 1

# EFFECT OF DIFFERENT SOWING DATES ON THE GERMINATION AND SEEDLING GROWTH OF TEA

Treatments	Total germination (%age)	Plant Height (cm)	Stem girth (cm)	No. of leaves/plant	Length of leaves (cm)	Breadth of leaves (cm)	No. of roots/plant	Length of roots/plant (cm)	No. of branches per plant
Nov., 1986	78.9Aa	13.8Aa	2.67Aa	14.0Aa	4.56Aa	2.35Aa	12.0Aa	8.2Aa	3.3Aa
Dec., 1986	74.6Bb	11.9ABa	2.48Aa	11.0Aab	4.04Aab	2.37Aa	10.2ABa	6.8Aa	2.0Aab
Jan., 1987	54.1Cc	7.1BCb	1.97Aa	8.5Aab	3.60Abc	2.44Aa	7.3BC	3.9Bb	1.8Ab
Feb., 1987	33.1Dd	5.8Cb	1.9Aa	7.5Ab	3.03Ac	2.64Aa	5.4C	3.0Bb	1.8Ab
S.E.	0.37	1.06	0.25	1.75	0.24	0.10	0.6	0.53	0.44

Note: Means followed by the same letter do not differ significantly at 5% (capital letters) and 5% (small letters) probability levels.

The maximum plant height was observed to be 13.8 cm followed by 11.9, 7.1 and 5.8 with mean stem girth of 2.67, 2.48, 1.97 and 1.9 in respect of November, December, January and February sowings respectively. The differences in number of leaves per plant in response to various sowing dates were significant at 5% probability level. A similar trend was observed in the case of length of leaves. There was no significant difference in breadth of leaves amongst the treatments. An observed slight increase in this parameter with advancing sowing dates may be attributed to increase in temperature.

Significantly higher number of roots per plant were also observed in saplings raised in November and December than the saplings of seed sown in February. The former produced 12.0 and 10.2 roots per plant as against 7.3 and 5.4 roots formed in saplings raised from January and February sown seeds. Tap roots exhibited similar sequence in its length. Root length of 8.2 cm was measured in November seed sown saplings, which was significantly higher than the January and February seed sown saplings, which were of 3.9 and 3.0 cm length respectively. No significant difference in root length was observed between November and December seed sown tea saplings.

Maximum number of branches per plant (3.3) were obtained by sowing the crop on November 10 followed by the sowing on December 10, which produced 2 branches per plant. This difference was statistically not significant. All the other treatments produced less branches at 5% level of significance than November 10 treatment.

## Conclusion

The findings of this study suggest that seed sown on November 10 gives better results in all parameters of the

seedlings. This is due to the fact that the mature seed collected in late October and early November was sown soon after its ripening. Sivapalan et al (1986) have also recommended that the tea seed should be sown within shortest possible period after its ripening. The results of this study have provided useful information to the tea growers in Pakistan in respect of sowing suitable time of tea seed. However, further studies on the physiological aspects of germination and growth in response to sowing dates are needed.

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