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# Standardization of Sowing Time of Chinese Onion (*Allium chinense*) for Hill Zone of Assam

**Hunmili Terangpi [a++*], U. Borthakur [a#], M. Maibangsa [b#] and M. Bathari [c++]**

*[a] Department of Horticulture, AAU-ZRS, Diphu, Assam, India.*
*[b] Department of Agricultural Economics and Farm Management, AAU-ZRS, Diphu, Assam, India.*
*[c] Department of Entomology, AAU-ZRS, Diphu, Assam, India.*

***Authors' contributions***

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

A miniature type of onion known as Chinese onion is widely grown in Karbi Anglong hill district of Assam which is used by the local tribes mainly for its medicinal value as well as in culinary purposes. A field experiment was conducted at AAU-Zonal Research Station, Diphu, Karbi Anglong, Assam with the objective to standardize the planting time of this crop. Planting was done at two-month interval during July 2020 to May 2021. The experiment was laid out in randomized block design with four replications and six treatments as planting time. Data regarding growth and yield was recorded and analysed statistically. The data on growth and yield characters like Plant height(cm), No. of leaf per plant, Leaf length (cm), leaf breadth (mm), No. of cloves per bulb, bulb length(cm), bulb breadth(cm) and yield/hectare were recorded. The result revealed that plant height, number of leaves per plant, bulb length and bulb yield was significantly influenced by the

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[++] *Junior Scientist;*
[#] *Principal Scientist;*
**Corresponding author: E-mail: hunmili.terangpi@aau.ac.in, hterangpi@gmail.com;*

planting time. The highest plant height of 19.62 cm was recorded in T2(Sept) planting, while it was lowest in T4(Jan) planting (17.65 cm). The highest number of leaves per plant was recorded in T2(Sep) planting with 8.25 followed by T1(July) planting with 8 numbers. The highest leaf length (18.37 cm) was recorded in T2 (Sept) planting followed by 17.82 cm T5(March)and 17.62 cm T3(Nov) planting respectively.
The bulb length was found to be highest in September planting (T2) with 1.6 cm and the lowest was recorded in T3 (Nov) with 1.4 cm. The highest bulb yield per hectare 30.16q was obtained from T3 (Nov) planting and the lowest 17q was found in T4 (Jan)planting. From the present investigation it can be concluded that for better vegetative growth and higher yield of Chinese onion, the optimum time of planting is the month of September.

*Keywords: Chinese onion; sowing time; growth; yield.*

## 1. INTRODUCTION

Chinese onion (*Allium chinense*), popularly known as Jirlang/ Arlengharsun/ Inglongharsun inKarbi is an important indigenous spice crop for the tribal people of Karbi Anglong district. It belongs to the genus Allium and is placed in the Alliaceae family [1]. It is commonly known as Chinese onion, Chinese scallion, or Oriental onion. It is categorized with onion, chives and garlic as the edible Alliums, which have been used for their typical flavour and broad medical values since ancient times.

*Allium chinense* is native to China, cultivated and naturalized in the Himalayas. It is found mainly in the Tropical and Sub-Tropical areas of Japan, China and many other parts of Eastern Asia. It is cultivated in some parts of North-Eastern regions of India more particularly in Nagaland, Manipur and Karbi Anglong district of Assam. It is popularly cultivated as a vegetable for its bulbs and leaves. Bulbs are eaten as raw or cooked. It has an excellent crispy texture with strong onion flavour. In North-East regions of India, the bulbs are eaten as chutney. The fresh tender leaves are used in stew and used for garnishing in salads.

*Allium chinense* is a biennial herb producing a cluster of leaves 15-35 cm long. Bulb are ellipsoidal at top tapering into leaf-blades and bulb coated with several membranous whites to purplish covering. The bulb resembles a small onion, but the bulb is formed by the thickened leaf-sheaths only. It contains 86 g water, 3.1 g protein, 0.3 g fibre, 0.12 g soluble carbohydrate and 0.7 g ash per 100g of fresh bulb. High allicin content (9.8 mg of allicin per gram of fresh weight) is responsible for most of the pharmacological property of Chinese onion. It helps in preventing cancer and may help in lowering blood sugar, cholesterol and blood pressure. In Chinese traditional medicine the bulbs are used to cure mental stress, heart problem, and tumors etc., and are also incorporated in several medicinal preparations as reported by Cooper and Johnson, [2].

*Allium chinense* is also known for insects and moles repelling characteristics, while it's extract is used for moth control [3].

Bulb growth in onion and garlic is highly affected by the planting time as reported by several authors. Murmu et al., [4] reported that the planting period is the critical aspect that influences garlic development and output. Early planting resulted in huge bulbs, which resulted in higher weight.

Despite having the immense nutritional and medicinal importance, research works on this unique plant species is still lacking. Therefore, the present investigation to evaluate the suitable planting time of Chinese onion was undertaken as a step towards standardizing the agronomic practices of this crop for hill zone Assam.

## 2. MATERIALS AND METHODS

The planting materials for the study were collected locally from farmer's field. The experiment was carried out with six different planting times as treatments i) T1 (July) ii) T2(Sep) iii) T3 (Nov) iv) T4(Jan) v) T5 (March) vi) T6(May). The experiment was laid out in Randomized Block Design with four replications. The crop is propagated vegetatively by bulbs which are planted after a storage period of 1-2 months to overcome dormancy. The bulblets are separated and planted at a spacing of 20 cm inter row x 10 cm intra rowThe bulblet/clove were dibbled at 2.5 cm depth of soil. The unsprouted cloves and damaged plants were replaced with

healthy plants. All the cultivation practices were followed as per the standard package of practices of *Allium sativum*. Harvesting was done depending upon the maturity of the plant. All the growth and bulb characters were recorded and analyzed statistically.

## 3. RESULTS AND DISCUSSION

### 3.1 Growth Characters

Significant differences were observed for the growth parameters like Plant height, number of leaves per plant, leaf length and leaf breadth (Table 1). The highest plant height of 19.62 cm was recorded in T2(Sept) which is at par with T3(Nov) planting (19.17 cm). The shortest plant height (17.65 cm) was recorded in T4(Jan) planting. Planting in early winter availed favourable environment, longer cool period and shorter day-length, which enhanced meristematic elongation of garlic plant resulting higher plant height. Similar results were reported by Shruva et al. [5], Rahim et al [6], Siddique et al. [7] in *Allium sativum*. The late planting made poor vegetative growth resulting in stunted growth.

The effect of planting time on the number of leaves per plants was found to be significant. Results showed that the highest number of leaf number per plant was recorded in T2(Sept) planting with 8.25 followed by T1(July) planting with 8 number of leaves. On the other hand, the lowest number of leaves per plant was recorded in T3(Nov) planting with 6.5 number of leaves. This is possibly due to the fact that early winter planting received longer period for vegetative growth and development that increased number of leaves compared to delayed planting in winter and summer. These findings agree with the results of Anwar et al., [8], Azad, AK. [9]; Hossain, B. [10]; Swati et al., [11]; Rahman et al. [12].

The differences in leaf length due to planting time was found to be significant. Results revealed that leaf length became shorter when planted in cooler months. The highest leaf length (18.37 cm) was recorded in T2 (Sept) planting followed by 17.82 cm in T5(March) and 17.62 cm T3(Nov) planting respectively. The favourable environment, longer cool period and shorter day-length were available for an early planted crop which enhanced plant growth and development resulting in longer leaf. Similar results were reported by Shin *et al* 1988 in Garlic. The shortest leaf length (16.90 cm) was found at T4(Jan) planting.

The highest leaf breadth (2.9 mm) was recorded in T4 (Jan) and T6(May) planting and the lowest (2.4 mm) in T5(March).

### 3.2 Bulb Characters

Data pertaining numbers of cloves per bulb were analyzed statistically and showed significant differences due to the treatments. It is obvious from results (Table 2) that number of cloves per bulb was highest (5.50) in T3(Nov) planted crop followed by T1(July). These results are in conformity with Schaffer [13] and Jamroz et al. [14]. Similar results were also reported by Siddique and Rabbani [15], Ahmad et al. [16]. The lowest number of cloves per bulb was recorded in T2(Sep) and T5(March) planting crop with 4.75 numbers. It was observed that late and early planting results in lower number of cloves per bulb which might be due to non favourable climatic condition for development of bulb formation.

The bulb length was found to be highest in early crop T2 (Sep) with 1.6 cm and the lowest was recorded in T3 (Nov) with 1.4 cm. The bulb diameter was recorded highest in T1 (July) and T5 (March) with 0.72 cm and the lowest diameter (0.62 cm) was found in T3 (Nov) planting. The data revealed that the highest diameter was obtained when the crop was planted in July and March. This could be due to warmer climatic condition which favours the crop to grow vigorously resulting in an increased accumulation of carbohydrates and other metabolites, which ultimately increased the bulb diameter. The highest bulb yield per plot (336 g) was obtained from T3 (Nov) and the lowest yield 194 g was found in T4 (Jan) planting.

The highest yield per hectare was obtained in T3(Nov) planting time with 30q per hectare and the lowest yield 17q. was recorded in T4(Jan) treatment. The higher yield obtained from the early planting was probably due to efficient metabolism and increased the sink capacity. Late planting resulted in lower yield which may be explained in a way that the plants did not get a long cool growing period which was essential for proper development of vegetative growth. Rahim et al. (2003); Singh et al. [17]; Adekpe et al. [18] and Vidya Gunda [19] in garlic also reported that early planting results in higher yield compared to later plantings [20-24].

**Table 1. Growth characters**

| Treatments | Plant height (cm) | No. of leaves/plant | Leaf length (cm) | Leaf breadth (mm) |
|---|---|---|---|---|
| T1(July) | 18.54 | 8.00 | 16.92 | 2.5 |
| T2(Sept) | 19.62 | 8.25 | 18.37 | 2.6 |
| T3(Nov) | 19.17 | 6.50 | 17.62 | 2.8 |
| T4(Jan) | 17.65 | 6.75 | 16.90 | 2.9 |
| T5(March) | 18.20 | 6.75 | 17.82 | 2.4 |
| T6(May) | 17.00 | 6.75 | 16.55 | 2.9 |
| CD at 5% | 0.93 | 0.85 | 1.26 | 0.4 |

**Table 2. Bulb characters**

| Treatments | No. of cloves / bulb | Bulb length (cm) | Bulb diameter (cm) | Yield/plot (g) | Yield/ ha (q) |
|---|---|---|---|---|---|
| T1(July | 5.25 | 1.50 | 0.72 | 221.50 | 19.75 |
| T2(Sep) | 4.75 | 1.60 | 0.65 | 246.25 | 22.00 |
| T3(Nov) | 5.50 | 1.40 | 0.62 | 336.50 | 30.16 |
| T4(Jan) | 5.25 | 1.50 | 0.65 | 194.50 | 17.00 |
| T5(March) | 4.75 | 1.50 | 0.72 | 210.75 | 18.50 |
| T6(May) | 5.25 | 1.53 | 0.65 | 242.75 | 21.44 |
| CD at 5% | 0.80 | 0.13 | 0.10 | 84.71 | 1.64 |

## 4. CONCLUSION

From the present investigation It may be concluded that the planting time had significant influence on 0 growth and yield of Chinese onion. Under agroclimatic condition of hill zone of Assam, September and November planting proved to be the most suitable in terms of growth and yield of the crop. Therefore, from the present investigation it was concluded that sowing in the month of September and November is suitable for cultivation of Chinese onion for obtaining higher yield.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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