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Micronutrient variation of chui jhal (Piper chaba) vine

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Abstract:

The research was carried out at the BIRTAN regional station, Barishal and PSTU, Patuakhali, Bangladesh during April 2023 to June 2023 to evaluate the better performance of vine cutting and assessment of mineral constituents and vitamin C contents of chui jhal. The experiment was laid in out in a Completely Randomized Design (CRD). In this experiment chui jhal cuttings were divided into three parts such as Base, Middle and Tip part which performance was observed on time of sprouting and rooting and survivability of several months such as April, May and June and July. The fast sprouting (14.48 days) was found in base part and the rapid rooting (18.92 days) was found in base part of the vine. In April, May, June and July the highest percentage of survivability (39.99, 53.33 and 79.99 76.66 % respectively) were recorded in middle part of the vine. Laboratory experiment was accomplished for the assessment of vitamin-C and mineral constituents of different plant parts. Regarding Vitamin-C contents the highest concentration was found in Tip part (3.09 %). The highest concentrations (0.22, 0.91, 1.13, 1.76, 0.60 and 0.34%, respectively) of sodium, calcium, magnesium, sulphur, nitrogen and phosphorus elements were found in the base, tip, base, tip parts. This research suggests that the Middle part of vine is recommended for multiplication, while Base and Tip part is best for mineral constituents and Tip part for vitamin C contents.

Keywords: Chui jhal, Mineral, Multiplication, Vitamin, Vine

INTRODUCTION

Piper chaba is one kind of spice known as chui or chui jhal which is a flowering vine in the family Piperaceae. Chaba is a herbaceous plant, commonly known as "King of Bitters," in the family Piperaceae. Piperaceae has about 350 species (Ward et al.,2003). Piper species are widely distributed in the tropical and subtropical regions of the world. It is also known as java long pepper or Choi jhal, found in warmer areas of Asia like Srilanka, Malaysia, Indonesia, and Singapore. Chui jhal is a perennial, branched and glabrous creeper cultivated in India, Malaysia and Bangladesh for its many medicinal properties (Md Taufiq-Ur-Rahman *et al.,* 2005). It grows abundantly in southeastern

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Asia. i.e., India, Sri Lanka, Pakistan, Java, Malaysia, and Indonesia, while it cultivated extensively in India, China, and Thailand (Deepa et al., 2014).

Piperaceae family, locally known as Chui Jhal is an economically important edible flowering vine that can be found throughout the warmer regions of Asia, including Bangladesh (Islam et al., 2019). It is grown in plenty in the southern part particularly in Jessore, Khulna, Satkhira and Bagerhat areas (Ghani et al., 2003). Chui jhal is a creeper plant that spreads on the ground. It may also grow around large trees. This plant has the different names in the different countries like in Bengoli: Choi Jhal or Chui Jhal (Khulna-Jessore region of Bangladesh, Tripura-West Bengal region of India), English: Java long pepper, Hindi: Chaba and Thai: Dee Plee. Chui jhal is extensively imported to meet its demand in India (Ved et al., 2007). Chui Jhal or Choi Jhal, is commonly used as a culinary (spice) herb in India and Bangladesh. People in Bangladesh's south-western districts like Khulna Division cut down the stem, roots, peel the skin and chop it into small pieces - and cook them with meat and fish, especially with mutton and beef curry. Chui jhal meat curry is a very popular dish in Khulna region. In Bangladesh and India, the decoction of the roots of Chui jhal (Fam: Piperaceae) is used for colic pain, dyspepsia and gastralgia (Krishnan et al., 1986). The root of Chui jhal is alexiteric; useful in asthma, bronchitis, and consumption. Stem is used to reduce post-delivery pain in mothers and also useful in rheumatic pains and diarrhoea. (Yusuf et al., 1994). Leaves and bark are used for diabetes, malaria and jaundice. The bark is used for making an external application for pain and chest. The fruit has stimulant and carminative properties, and is used in haemorrhoidal affections. Extracts of Chui jhal have also been found to exhibit anti-diarrhoel and diuretic activities (Rahman et al., 2005).

Plant propagation is the process by which new plants grow from various sources, including seeds, cuttings, and other plant parts. Plant propagation can be divided into two basic types: sexual (reproductive), asexual (vegetative). The traditional, simple and usual method of Chui jhal is vine cutting. But research works on the vine cutting of Chui jhal in Bangladesh are very limited.

Chui jhal is enriched with vitamin and mineral contents. However, limited literature was found about vitamin and mineral constituents of Chui jhal plant. So, there are many scopes to evaluate the propagation performance, vitamin and mineral constituents of Chui jhal plant. Thus, to investigate propagation performance and assessment of vitamin C and mineral constituents.

MATERIALS AND METHODS

Plant material and experimental site

The Chui jhal vine was collected from the Spices Research Sub-center, BARI, Faridpur and BIRTAN regional station, Barishal. The experiment was conducted at the Post-harvest Laboratory of Horticultural Department, PSTU which located in AEZ-13 dumki upazila, Patuakhali district 8602, 22.46424°N 90.38252°E.

Propagation by vine cuttings of chui jhal

For the selection of vine cutting, healthy and diseases free mother plant of chui jhal vine was selected. The semi-hard wood cuttings were taken from fully mature vine, about 6-month-old and the suckers which are arise from the base of the stem as per suggestion of (Saroj et al., 2008). In the present research there are three types of stems were used such as a) Base of stem which was about 12-month-old, b) Middle of stem which was about 8-month-old, c) Tip of stem which was about 6-month-old. The cuttings were 4-6 bud,

having approximate size 20-25 cm with 1.0-1.2 cm diameter as reported by Saroj et al. (2008) in the month of September. In the present research the cuttings were 3-5 bud, having approximate size 20-30 cm with 0.8-1 cm diameter in the month of July. The cuttings were collected before planting. The cuttings were separated from mother plant by cutting at their segments with the help of secateurs and were kept three nodes in each cutting. The same types of plant used on effect of time of sprouting, time of rooting, number of leaves, length of new shoot, number of roots, length of roots.

Assessment of vitamin-C contents and mineral constituents of chui jhal

The mineral constituents were determined by different method such as sodium was determined by Flame photometric method, calcium and magnesium were determined by Complexometric method, phosphorus and sulphur were determined by UV visible spectrophotometric method, nitrogen was determined by Kjeldahl method and vitamin C was determined by Titrimetric method. Calcium and magnesium were determined by the versanate EDTA complexometric titration method while the iron and zinc were determined using atomic absorption spectrophotometer as described by (Carpenter & Hendricks, 2003).

Statistical analysis

The data obtained from the experiment on various parameters were statistically analyzed by statistix 10 computer package program. Various parameters under study were statistically analyzed according to the principles of experimental design to find out the variation resulting from experimental treatments. The means of all treatments were calculated and analysis of variance (ANOVA) of each parameter was performed. Comparison of the treatment means was done by Least Significant Difference (LSD) at 5% level of probability.

RESULTS AND DISCUSSION

Effect of plant parts and time of cutting on survivability of chui jhal

The percentage of survival of chui jhal vine cuttings was found to be significantly influenced by various plant sections (Table 1). In April, May, June and July the highest percentage of survivability (39.99, 53.33 and 79.99 76.66 % respectively) were recorded in middle part which were significantly superior to base part followed by (36.66, 49.99, 73.32 and 73.32 % respectively) and the lowest percentage of survivability in tip part (33.33, 46.66, 66.66 and 69.99 % respectively). Cutting in June survived very well, this might be due to high humidity, rainfall and active growing period of the plant. Singh et al. (2015) showed that the maximum survival percentage (77.37%) was observed under rainy season planting time. Thimann *et al.* (1989) reported that the survival percentage increased steadily from cuttings taken in April and May, reached a peak in June and July and then began to decline which was more or less agreed to this experiment. It was observed that the survivability range was similar in June and July. Based on this data the survivability observation was stopped in July.

Table 1. Effect of plant parts and time of cutting on survivability of chui jhal

Plant parts	Survivability (%) at different MAC			
	April	May	June	July
Base	36.66 b	49.99 b	73.32 b	73.32 b
Middle	39.99 a	53.33 a	79.99 a	76.66 a
Tip	33.33 c	46.66 c	66.66 c	69.99 c
Level of significance	*	**	**	**
LSD at 5 %	1.69	2.47	2.17	2.14
CV (%)	4.93	5.25	3.14	3.07

** Significant at 1% level of probability, * Significant at 5% level of probability, B = Base part, M = Middle part, T = Tip part, LSD = Least significance difference, CV = Coefficient of variation, MAC =Month after cuttings

Effect of plant parts on time of sprouting of chui jhal vine cuttings

The data demonstrated in the Figure 1 indicated that time of sprouting per cutting was significantly influenced by different plant parts. The fast sprouting (14.48 days) was found in base part followed by middle part (14.70 days) and the slow sprouting (15.02 days) in tip part. Akshay et al. (2018) reported that days taken to sprout of *Piper nigrum* was (19.27 days) which was more or less close to above experiment result.

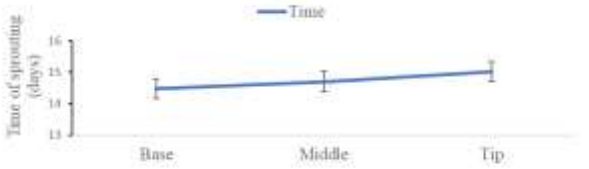

Figure 1. Effect of different plant parts on time of sprouting of chui jhal vine cuttings at several days after cuttings. Vertical bars represent standard error.

Effect of plant parts on time of rooting of chui jhal vine cuttings

The data displayed in the Figure 2 indicated that time of rooting per cutting was significantly influenced by different plant parts. The rapid rooting (18.92 days) was found in base part followed by middle part (19.02 days) and the gradual sprouting (19.30 days) was found in tip part.

Akshay et al. (2018) reported that first days taken to root initiation in (38.67 days) which was more or less agreed to above experiment result.

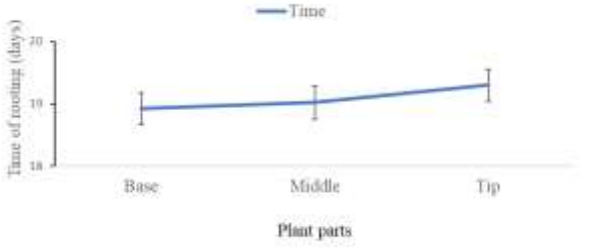

Figure 2. Effect of different plant parts on time of rooting of chui jhal vine cuttings at several days after cuttings. Vertical bars represent standard error.

Assessment of vitamin C in different plant parts of chui jhal vine

As can be seen from the data in Figure 3 different plant portions had a significant effect on the concentration of vitamin C contents per cutting. In Vitamin-C contents the highest concentration was found in Tip part (3.09 %) which was significantly superior over the rest of plant parts followed by Base part (3.05 %) and the lowest concentration was found in middle part (2.60 %). Aishwarya et al. (2016) reported the dried betel leaves contain vitamin-C (1.11 %) which was more or less accordant with this experiment.

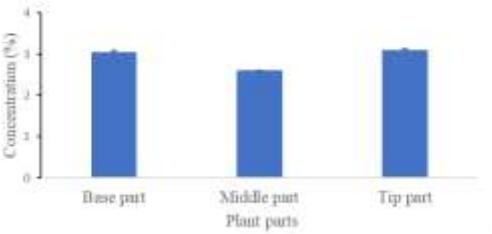

Figure 3. Assessment of concentration of vitamin C on different plant parts of chui jhal vine cuttings. Vertical bars represent standard error.

Assessment of concentration of mineral constituents on different plant parts of chui jhal vine

The findings shown in the Figure 4 indicated that different plant sections had an important effect on the concentration of mineral elements per cutting. In Sodium and Magnesium constituents the highest concentration was found in base part (0.22, 1.13 % respectively) which was significantly superior over the rest of plant parts followed by middle part (0.11, 0.96 % respectively) and the lowest concentration was found in tip part (0.06, 0.11 % respectively). In case of Calcium constituents, the highest concentration was found in tip part (0.91 %) which was significantly superior over the rest of plant parts followed by base part (0.72 %) and the lowest concentration was found in middle part (0.70 %). In Sulphur and Nitrogen constituents the greatest concentration was found in Tip part (1.76, 0.60 % respectively) which was significantly superior over the rest of plant parts followed by middle part (1.07, 0.20 % respectively) and the lowest concentration was found in base part (0.97, 0.13 % respectively). In Phosphorus constituents the highest concentration was found in base part (0.34 %) which was significantly superior over the rest of plant parts followed by tip part (0.23 %) and the lowest concentration was found in middle part (0.11 %). Verma et al. (2010) reported that *Piper betel* contain, calcium (0.02-0.05 %), nitrogen (2.0-7.0 %), phosphorus (0.05-0.6 %). Aishwarya et al. (2016) showed that *Peper betel* contain, sodium (0.02 %), Shills et al. (2006) reported *Piper nigrum* contain (0.032 %) magnesium which was more or less same with this experiment results.

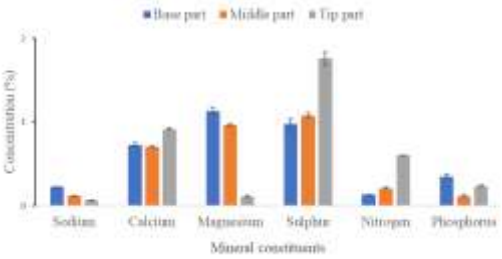

Figure 4. Assessment of concentration of mineral constituents on different plant parts of chui jhal vine cuttings. Vertical bars represent standard error.

CONCLUSION

Significant variations were observed in propagation performance with plant parts and time of cutting on survivability, sprouting and rooting of chui jhal In April, May, June and July MAC. In case of different plant parts, the best performance the plant parts and time of cutting on survival higher percent of success in base part and lower in tip part in July month. Fast time of sprouting was revealed in base part and slow in tip part, in terms of time of rooting early rotting was presented in base part and delay rooting in tip part. The middle part showed the lowest content of vitamin C and the tip section contained the highest concentration. Research showed that different plant sections significantly affected mineral concentrations. The base part had the highest concentrations of sodium, magnesium, nitrogen, and phosphorus, whereas the tip section had the highest concentrations of calcium and sulphur. The lowest concentration found in the base (sulphur and nitrogen), the middle (calcium and phosphorus), and the tip (sodium and magnesium). July can be suggested as an ideal month for successful propagation, with the tip section being richest in vitamin C and the base section containing the highest mineral content.

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REFERENCES

1. Md Taufiq-Ur-Rahman, Shilpi, JA., Ahmed, M., and Hossain, CF. 2005. Preliminary pharmacological studies on *Piper chaba* stem bark. J Ethnopharmacol, 99:203–209
2. Deepa, M., and Padmaja, CK. 2014. Preliminary phytochemical analysis and thin layer chromatography of the extracts of Excoecaria agallocha L. International Journal of Pharmaceutical Sciences and Research. 5(10):4535.
3. Ghani, A. 2003. Medicinal Plants of Bangladesh. Asiatic Society of Bangladesh, Dhak. Edn 2:267-268.
4. Ved, DK., and Goraya, GS. 2007. Demand and supply of medicinal plants in India. NMPB, New Delhi and FRLHT
5. Krishnan, MKS. 1986. The useful plants of India. Publication and Information Directorate, CSIR, New Delhi, India
6. M. Yusuf, J.U., Chowdhury, M.A., Wahab, and J. Begum. 1994. Medicinal plants of Bangladesh BCSIR, Dhaka, Bangladesh. 193.

7. Iftekhar, M.S., and Islam, M.R. 2004. Degeneration of Bangladesh Sundarbans mangroves: a management issue. Int. For. Rev. 6:123-135.
8. Rahman, M.T.U., Shilpi, J.A., Ahmed, M., and Hossain, C.F. 2005. Preliminary pharmacological studies on Piper chaba stem bark," Journal of Ethnopharmacology, vol 99:203-209.
9. Saroj, PL., Awasthi, OP., Bhargava, S., and Singh, UV. 2008. Standardization of pomegranate propagation b cutting under mist system in hot arid region. Indian Journal of Horticulture. 65(1):25-30.
10. Carpenter, S., and Hendricks, P. 2003. In: Pear- son Laboratory techniques in food analysis Butterworth and co. publishing Ltd. 10- 17.
11. Singh, AK., Singh, R., Mittal, AK., Singh, YP., and Jauhari, S. 2003. Effect of plant growth regulators on survival rooting and growth characters in long pepper (*Piper longum* L.*).* Prog. Hort. 35:208-211.
12. Thimann, K. V., and DELISLE, A. L. (1989). The vegetative propagation of difficult plants. J. Arnold Arbor., 20, pp.116-36.
13. Chauhan, ES., and Aishwarya, J. 2016. Proximate and phytochemical scrutiny of Piper betel leaves powder. Int. J Ayu. Pharm. Chem. 5(2):197-204.
14. Shills, M.E., M. Strike, A.C. Ross, H. Caballero, and R.J. Cousings. 2006. Modern nutrition health and disease. 10 edn. Lippincott Williams and Wilkings, A Wolters Khumer company. 280-281.