Original Research Article

Performance of Turmeric (*Curcuma longa L.*) variety Megha Turmeric-1 in various districts of Assam

ABSTRACT

Aim: An experiment was conducted in the farmers' field of various locations representing four agro climatic zonesof Assam to assess the performance of Turmeric variety Megha Turmeric-1.

Place and duration of the study: The study was conducted by the KrishiVigyanKendras of KarbiAnglong, Udalguri, Barpeta, Darrang, Dibrugarh, Sivasagar and Sonitpur under Assam Agricultural University.

Results: The study revealed that the plant was 175.24 cm tall with 10 numbers of leaves on main shoot. Additionally, the leaf lamina length and width were found to be 54.08 cm and 15.18 cm respectively from the study.The leaf disposition was erect with distant venation and wavy leaf margin. Moreover, the rhizomes were found to have distant inter nodal pattern along with tertiary rhizomes. The crop recorded higher yield 249.63 q/ha against the local varieties in all the locations.

Conclusion: From the study, it can be inferred that the farmers may adoptMegha Turmeric-1 over their local varieties for better yield and returns.

Keywords:*Megha Turmeric-1, Assam, Turmeric, Morphological characters*

INTRODUCTION

Spices are playing vital role in Indian diets and recipes since time immemorial. Records have been found in Vedas as early as 6000 BC about the ancient uses of spices (Angles, 2001). And since then, India is well known for production and trade of quality spices which invited the foreigners mainly the European countries to invade India which is also known as the "Spice Bowl of the World". Mostly, the southern India is a treat for spice lovers because most of the delicacies are based on spice modules and this is the reason for high production of spices in this region. Turmeric (*Curcuma longa*) is one of such major spice crop native to Southeast Asia (Chickarmane*et. al.*,2003) grown throughout the country with enormous medicinal properties in it. It is referred as Indian saffron and commonly called as *Haldi*. India

Comment [l1]: Not found in the ref.

is the largest consumer, producer, consumer and exporter of turmeric in the world.The global production of turmeric is around 11 lakh tonnes per annum India dominates the world production scenario contributing 80 % followed by China (8 %), Myanmar (4 %), Nigeria (3 %) and Bangladesh (3 %). In 2021-22, India had exported 1.71 lakh tonnes of turmeric compared to 1.37 lakh tonnes on the previous year. Major turmeric importing countries are Bangladesh, UAE, Morocco, Iran and USA.In India, the leading state with highest production is Telangana (294.56 thousand tonnes) followed by Maharashtra (190.09 thousand tonnes) and Andhra Pradesh (79.73 thousand tonnes).

Comment [I2]: spelling

Comment [I3]: spelling

Comment [I4]: spelling

Comment [I5]: space

Comment [I6]: spelling

Comment [I7]: spelling

The demand for Turmeric is due to its deep yellow colour and pungent aromatic flavourwhich is due to the presence of Curcumin. It is a natural polyphenol found in the rhizomes (Aggarwal*et al.*, 2003) and a volatile oil 'termerol'. In addition it is also used as medicine and cosmetic and as dye in textile industries (Pruthi, 1976). It is also helpful for its properties like antioxidant, anti-inflammatory (Lestari *et al.*, 2014), antimutagenic, antimicrobial (Reddy *et al.*, 2005), and anticancer properties (Wright *et al.*,2013). Moreover, it also helps in boosting immunity which has been evident in the recently hit pandemic, COVID-19. In addition, it has also been reported that Turmeric is effective in management of inflammatory and degenerative eye conditions (Mazolani and Togni, 2013), treatment of kidneys (Trujillo *et al.*, 2013)

Comment [I8]: spelling

Assam holds 12th position in terms of production (19.17 thousand tonnes) and 6th in terms of area (17.11 thousand hectares) amongst the Indian states under Turmeric (Anon, 2018). The soil and climate is very much suitable for Turmeric cultivation in this region with an average annual rainfall of 2818 mm and average daily temperature of 30 °C. Very few farmers in Assam follow scientific practice and at the same time are not aware of the high yielding and hybrid varieties instead of the local varieties and as a result there is a potential for increasing the production margin by better practices. Therefore, keeping the above fact in view a study has been conducted by testing Turmeric hybrid in 07 (seven) different locations to study its performance in terms of growth, yield and returns.

Comment [I9]: spelling

MATERIALS AND METHODS

The experiment was conducted by the KrishiVigyanKendras (KVKs) representing 04 (four) agro-climatic zones of Assam (Table 1. The experimental areas considered) during 1920-21.In the study the performance of Turmeric variety - Megha Turmeric 1 has been tested against the local check of their respective locations.

Table 1. Experimental locations

Sl. No.	Agro-climatic Zone	KVKs involved in conducting the study
1	Upper Brahmaputra Valley Zone	Dibrugarh and Sivasagar
2	North Bank Plain Zone	Sonitpur, Darrang, Udalguri
3	Lower Brahmaputra Valley Zone	Barpeta
4	Hill Zone	KarbiAnglong

The variety Megha Turmeric-1 was developed by the ICAR Complex for NEH region, Meghalaya through clonal selection form Lakadong. It has a potential yield of 270 q/ha with 350-425 g of average rhizome yield per clump. The variety is rich in curcumin content (6.8 %), essential oil (5.5 %), and dry matter (16.37 %). Moreover, Megha Turmeric-1 has high tolerance towards leaf spot and leaf blotch diseases (Yadav*et al*., 2009). According to the study done by Anandaraj*et al.* (2014), the variety is capable for dry yield across environments and henceforth can be a good genetic source in breeding programmes for high dry yield and curcumin content.

In the study,Megha Turmeric-1 has been cultivated following all the practices as per recommended package of Assam Agricultural University, 2019. During the study, plant height (cm), duration (days), dry matter content (%), number of leaves on main shoot, leaf laminalengthand width (cm), primary rhizome length (cm), leaf disposition, leaf venation pattern, leaf margin, shape and habit of rhizomes, number of rhizomes, inter node pattern, yield (q/ha) economics along with B:C ratio were recorded in all the locations and presented with the average mean data.

RESULTS AND DISCUSSIONS

The Turmeric variety Megha Turmeric-1 was found to perform very well in all the districts where it has been tested. The variety suited well to the Assam climatic conditions. The mean evaluated data from the study are represented in Table. 2 (Mean performances of various morphological characters) and Table. 3 (Mean observation on Yield, Economics and B:C ratio of Megha Turmeric-1.

Performances of various morphological characters

The Megha Turmeric-1 has shown encouraging results in comparison to the local varieties. The mean data for plant height was 175.24 cm whereas, for dry matter content it was 18.01 %. The variety on an average took crop duration of 293.33 days. On the other hand, 10 number of leaves were recorded on the main shoot which is closer to the results reported by Das, 2015. In addition, the length and width of the leaf lamina were found to be 54.08 cm and 15.18 cm respectively. The results are similar with the findings of Angami*et. al.,* 2017.

In the study some additional observations were also noted down which was found to be same in all the locations. The parameters were leaf disposition which was found to be erect, leaf venation pattern was distant, wavy leaf margin, compact and curved rhizome and distant inter nodal pattern was evident with the presence of tertiary rhizome. Similar results were also reported by Aarthi*et. al.,* 2018.

Table 2: Mean performances of various morphological characters

Sl. No.	Particulars	Data
1	Plant height (cm)	175.24
2	Duration of wilting (days)	293.33
3	Dry matter content (%)	18.01
4	Number of leaves on main shoot	10
5	Leaf Laminalength (cm)	54.08
6	Leaf Lamina width (cm)	15.18
7	Primary Rhizome Length (cm)	13.55

Yield, Economics and B:C ratio

The data on yield, B:Cratio are represented in Table 3. The mean data for yield of Megha Turmeric-1 was recorded 249.63 q/ha along with a B:C ratio of 4.48.

Table 3: Mean observation on Yield, Economics and B:C ratio of Megha Turmeric-1

Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B:C
249.63	146958	666144	502519	4.48

CONCLUSION

Based on the results obtained from the present investigation, it can be concluded that the Turmeric variety "Megha Turmeric-1" is well suited for growing in the agro climatic conditions of Assam. Therefore, the farmers can opt for this variety rather than using local varieties for higher yield and productivity with higher returns.

References

Aarthi S, Suresh J, Prasath D. Morphological characterization of Indian turmeric (*Curcuma longa* L.) genotypes using DUS descriptor. Journal of Plantation Crops.2018;46(3):173-179

Aggarwal BB, Kumar A, Bharti AC.Anticancer potential of curcumin: Preclinical and clinical studies. Anticancer Research.2003;23:363–398

Anandaraj M, Prasath D, Kandiannan K, Zachariah TJ, Jha AK, Singh BK, et al. Genotype by environment interaction effects on yield and curcumin in turmeric (*Curcumalonga* L.). Industrial Crops and Products.2014;53:358-364.

Angami T, Kalita H, Touthang L, Chandra A, Devi HL, Baruah S, et al. Assessing the suitability of turmeric seed rhizome sizes on biometric and qualitative traits under mid hill conditions. Journal of Experimental Biology and Agricultural Sciences.2017;5(5):632-635

AnglesS, Sundar A, Chinnadurai M. Impact of globalization on production and export of turmeric in India – An economic analysis. Agricultural Economics Research Review.2011;24:301-308.

Anonymous.Horticultural statistics at a glance. Government of India Ministry of Agriculture & Farmers' Welfare Department of Agriculture, Cooperation & Farmers' Welfare Horticulture Statistics Division. 2018

Chickarmane S, Rehse T, Prayer KM.Tracing the cultural and botanical origins of turmeric (*Curcuma longa* L.). Poster.Botany. 2003;conf.org.in

Das S. Systemic studies on the different germplasms of Turmeric (*Curcuma longa* L.) in West Bengal. International Journal of Current Research.2015;7(12):24660-24663

Comment [l10]: Not found in the Text

Comment [l11]: Not found in the text

Lestari ML, IndrayantoG. Curcumin. Profiles Drug Subst. Excip.Relat.Methodol.2014;39:113–204.

Mazzolani F, Togni S. Oral administration of a curcumin-phospholipid delivery system for the treatment of central serous chorioretinopathy: A 12-month follow-up study. Clinical Ophthalmology. 2013;7:939–945. doi: 10.2147/OPTH.S45820.

Pruthi JS. Spices and Condiments. National Book Trust, New Delhi, India, 1976;pp: 226

Reddy RC,Vatsala PG, Keshamouni VG, Padmanaban G, Rangarajan PN. Curcumin for malaria therapy. Biochem.Biophys. Res. Commun. 2005;326:472–474. doi: 10.1016/j.bbrc.2004.11.051.

Trujillo J, Chirino YI, Molina-Jijón E, Andérica-Romero AC, Tapia E, Pedraza-Chaverrí J. Renoprotective effect of the antioxidant curcumin: Recent findings. Redox Biol. 2013;1:448–456. doi: 10.1016/j.redox.2013.09.003.

Wright LE, Frye JB, Gorti B, Timmermann BN, Funk JL. Bioactivity of turmeric-derived curcuminoids and related metabolites in breast cancer. Curr. Pharm. Des. 2013;19:6218–6225. doi: 10.2174/1381612811319340013.

Yadav RK, Sanwal SK, Deka BC, Ngachan SV, Sarma P, and Buragohain J. Vegetable improvement in north eastern region. ICAR-RC-NEH Region, Umiam, Meghalaya. 2009;70:76 -80.

****

Comment [l12]:

Comment [l13]: Not found in the text