Himachal Journal of Agricultural Research 49(2): 253-256 (2023)

Short Communication

Effect of method of planting and harvesting time on yield attributes and yield of turmeric (*Curcuma longa* L.) varieties

Vaishali, V.K. Sharma and P. Pathania

Department of Agronomy, College of Agriculture

Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176 062, India.

*Corresponding author:vaishalidh97@gmail.com

Manuscript Received: 19.10.2022; Accepted: 01.07.2023

Abstract

A field experiment was conducted during 2021-2022 (May-January) to study the performance of turmeric varieties as influenced by planting methods and time of harvesting at the Bhadiarkhar Research Farm, Department of Agronomy, College of Agriculture, CSK HPKV, Palampur. The experiment was laid out in split-plot design comprising of two genotypes (Palam Lalima and Palam Pitamber) and two planting methods (Flat and Ridge) in main-plots and time of harvesting (210, 225, 240 and 255 days after planting) in sub-plots. The soil of the experimental field was acidic in reaction, low in available nitrogen, and high in available phosphorus and medium in available potassium. Variety Palam Pitamber was significantly superior over variety Palam Lalima in respect of fresh weight of mother, primary and secondary rhizomes, fresh (176.70 q/ha) and dry rhizome yield (36.59 q/ha). Planting methods could not influence the yield attributes and yield. Harvesting at 255 days after planting produced maximum fresh rhizome yield (180.7 q/ha) of turmeric which was statistically at par with 240 days after planting but was significantly better than the earlier harvesting dates. Similar trend was also observed for dry rhizome yield.

Key words: Turmeric, yield attributes, fresh yield, dry yield, planting method

Turmeric (*Curcuma longa* L.) belongs to family Zingiberaceae is one of the important herbaceous plant grown and used in India since ancient times as spice or condiment. Use of turmeric can be traced back nearly 4000 years to the Vedic culture in India, when turmeric was the principal spice and also had religious significance. Turmeric of commerce is the dried underground rhizome mainly used in culinary preparations, textile, cosmetic and pharmaceutical industries. Curcuminoids in turmeric have anti-inflammatory, antimutagen, anticancer, antibacterial, anti-oxidant, antifungal, antiparasitic and detoxifying properties (Choudhary and Rahi 2018). Its rhizome contains 1.8-5.4 per cent curcumin, 69.49 per cent carbohydrate, 6.30 per cent protein, 5.10 per cent oil and 3.50 per cent mineral and other important elements (Bulbula 2021). In India, it occupies an area of about 257.4 thousand hectares with a production of 946.20 thousand metric tonnes per annum with an average yield of 3.7 metric tonne/ha (Anonymous 2020), which is rather low when compared with states like Andhra Pradesh and Tamil Nadu. In Himachal Pradesh, turmeric is cultivated on an area of 274.0 hectare with a production of 430 tonnes and the average yield of 1650 kg/ha (Anonymous 2019).

Identification of high yielding varieties and method of planting plays a vital role in improving the production and quality of turmeric. The planting method is a tool for managing the soil that is used to modify the surroundings of the plant roots. In order to prepare seed beds using the flat bed method, the top soil is turned over and levelled. In the ridge method, top soil is taken and concentrated in a specified region to purposely raise the seedbed above the surrounding ground.

Time of harvesting is an essential factor as the optimum harvest time brings about proper growth and development of rhizomes resulting in a maximum crop yield. Farmers keep the rhizomes not harvested at end of season which negatively influence the quality of turmeric. However, the time of maturity of turmeric may vary in different agro-climatic zones of the country. Therefore, it is essential to determine the optimum time for harvesting turmeric to produce quality turmeric in respect of its dry matter, essential/volatile oil and curcumin content. Early harvesting leads to lesser yield with less curcumin content and vice versa for the late harvesting, though it depends and varies with the cultivar and environmental conditions.(Kumar and Gill 2009).

Present investigation was conducted at Bhadiarkhar Research Farm, Department of Agronomy, College of Agriculture, CSKHPKV, Palampur during 2021-2022. The experimental site was silty clay loam in texture, acidic in reaction (5.7), medium in organic carbon (0.73per cent), low in available nitrogen (235.0 kg/ha), high in available phosphorus (29.2 kg/ha) and medium in available potassium (128.6 kg/ha).The experiment was laid out in split-plot design comprising of two genotypes (Palam Lalima and Palam Pitamber) andtwo planting methods (Flat and Ridge) in main-plots and time of harvesting (210, 225, 240 and 255 days after planting) in sub-plots. The results obtained are presented and discussed below:

Yield attributes

Variety Palam Pitamber recorded significantly higher mother, primary and secondary rhizome weight per plant (69.01 g, 82.06 g and 18.55 g, respectively) than variety Palam Lalima. Whereas, planting methods could not influence the fresh weight of rhizome per plant (g) significantly. The results are in agreement with the findings of Kumar and Gill (2009) and Kumar and Gill (2010). The effect of different harvesting dates on fresh weight of mother, primary and secondary rhizome per plant (g) was significant. With each delay in harvesting, the fresh weight of mother, primary and secondary rhizome per plant (g) increased. Among different dates of harvesting, maximum fresh weight of mother, primary and secondary rhizome per plant was observed at 255 DAP which was statistically at par with harvesting at 240 DAP but was significantly better than earlier harvesting dates i.e. 210 & 225 DAP (Table 1).

Interaction between main and sub plot treatments failed to significantly influence the yield attributes of turmeric.

Table 1. Yield attributes (g/plant) of turmeric as influenced by varieties, planting methods and time of harvesting

Treatments	Fresh weight perplant		
	Mother rhizome	Primary finger	Secondary finger
Varieties			
Palam Lalima	61.38	72.24	11.54
Palam Pitamber	69.01	82.06	18.55
SEm±	1.50	1.00	0.61
CD (P=0.05)	5.19	3.46	2.11
Planting methods			
Flat	63.77	75.57	14.61
Ridge	66.62	78.73	15.48
SEm±	1.50	1.00	0.61
CD (P=0.05)	NS	NS	NS
Time of harvesting			
210 DAP	58.25	66.72	11.36
225 DAP	64.32	75.52	14.87
240 DAP	67.63	81.38	16.57
255 DAP	70.58	84.99	17.38
SEm±	1.56	1.80	0.84
CD (P=0.05)	4.58	5.27	2.45

Fresh rhizome yield (q/ha)

The data on fresh rhizome yield was recorded at harvest (Table 2). Variety Palam Pitamber recorded significantly higher (15.6 per cent) fresh rhizome yield (176.70 q/ha) over the variety Palam Lalima (152.77 q/ha). Significant variation in fresh rhizome yield in different varieties has also been reported by Naidu and Purushotham (2013). However, fresh rhizome yield (q/ha) was not significantly influenced by different planting methods of turmeric. A consistent and significant increase in fresh rhizome yield was observed with delay in harvesting from 210 days after planting to 240 days after planting and further delay in harvesting to 255 days after planting did not showed significant increase in yield. The crop harvested at 255 days after planting recorded 2.4 per cent, 12.0 per cent and 28.3 per cent higher fresh rhizome yield over the crop harvested at 240, 225 and 210 days after planting, respectively. The results are also in agreement with the findings of Satheesan and Ramdasan (1988)

Dry rhizome yield (q/ha)

The dry rhizome yield was recorded after the boiling and drying of the fresh rhizomes of turmeric. Data on dry rhizome yield (q/ha) as influenced by varieties, planting methods and time of harvesting have been presented in Table 2.Variety Palam Pitamber significantly outyielded Palam Lalima by about 15.8 per cent. (Table 2) The higher dry yield in the variety Palam Pitamber seems to have been contributed by higher fresh rhizome yield and dry matter production. These findings are in conformity with the findings of Harsha (2019).Different planting methods could not influence the dry rhizome yield (q/ha) significantly. The results are in agreement with the findings of Parkash and Brar (2015).

Among different dates of harvesting, maximum dry rhizome yield was observed at 255 days after planting which was statistically at par with the crop harvested at 240 days after planting but was significantly better than earlier harvesting dates i.e. 210 days after planting and

Table 2. Fresh anddry rhizome yield (q/ha) as influenced by varieties, planting methods and time of harvesting

Treatments	Fresh rhizome yield	Dry rhizome yield
Varieties		
Palam Lalima	152.77	31.58
Palam Pitamber	176.70	36.59
SEm±	2.19	0.50
CD (P=0.05)	7.60	1.73
Planting methods		
Flat	162.11	33.53
Ridge	167.36	34.63
SEm±	2.19	0.50
CD (P=0.05)	NS	NS
Time of harvesting		
210 DAP	140.8	29.13
225 DAP	161.3	33.35
240 DAP	176.3	36.47
255 DAP	180.7	37.38
SEm±	2.29	0.48
CD (P=0.05)	6.70	1.42

DAP: Days after planting

225 days after planting. The crop harvested at 255days after planting registered 2.4 per cent, 12.0 per cent and 28.3 per cent higher fresh rhizome yield over the crop harvested at 240, 225 and 210 days after planting, respectively. The results are in line with the findings of Kumar and Gill (2009). None of the interactions under study significantly influence the fresh and dry rhizome yield.

Conclusion

Turmeric variety Palam Pitamber produced higher mother, primary and secondary rhizome weight per plant. Turmeric variety Palam Pitamber produced fresh as well as dry rhizome yield as compare to variety Palam Lalima. Methods of planting could not influence the fresh and dry rhizome yield significantly. Harvesting of turmeric at 255 days after planting proved to be the best for higher fresh as well as dry rhizome yield.

Conflict of interest: The authors have no conflict of interest.

References

Anonymous 2020. Area, production and productivity of turmeric in India. www.indiaagri.com/table/agriculture/area/turmeric/35420/data.aspx.

Anonymous. 2019. Ministry of Agriculture and Family Welfare, Government of India.

Bulbula DD. 2021. Comprehensive review on turmeric (*Curcuma Longa* L.) as medicinal plant and its nutraceuticals quality to human. Cancer Therapy and Oncology International Journal **18** (3): 2473-554X.

Choudhary AK and Rahi S. 2018. Organic cultivation of high yielding turmeric (*Curcumalonga* L.) cultivars: A viable alternative to enhance rhizome productivity, profitability, quality and resource-use efficiency in monkey-menace areas of north-western Himalayas. Industrial Crops and Products **124**: 495-504.

Harsha KN. 2019. Standardization of agrotechniques for cultivation of turmeric (*Curcuma longa* L.) in mid hills of North West Himalayas. Ph D Thesis, p 9. Department of Agronomy, Forages and Grassland Management, College of Agriculture, CSKHPKV, Palampur, India.

Kumar B and Gill BS. 2009. Effect of method of planting and harvesting time on growth, yield and quality of turmeric (*Curcuma longa* L.). Journal of Spices and Aromatic Crops **18** (1): 22–27.

Kumar B and Gill BS. 2010. Growth, yield and quality of turmeric (*Curcuma longa* L.) as influenced by different planting method, plant density and planting material. Journal of Spices and Aromatic Crops **19**: 42-49.

Naidu LN and Purushotham K. 2013. Evaluation of turmeric (*Curcuma longa* L.) varieties for rainfed cultivation. Journal of Horticultural Sciences **8** (1): 118-120.

Prakash O and Brar AS. 2015. Effect of planting methods and plant population on growth yield and quality of turmeric (*Curcuma longa* L). Indian Journal of Ecology **42** (2): 490-492.

Satheesan KV and Ramadasan A. 1988. Changes in carbohydrate levels and starch/sugar ratio in three (*Curcuma domestica* Val.) cultivars grown in monoculture and as an intercrop in coconut garden. Journal of Plantation Crops **16**: 45-51.