



A CASE STUDY

Evaluation of different methods of turmeric (*Curcuma longa* L.) plantation

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Abstract : A study on different methods of turmeric (*Curcuma longa* L.) planting was carried out at farmers' field of district Hoshiarpur to evaluate the growth and yield of turmeric. The mean length of turmeric rhizomes for T₁ (planting of turmeric manually at 30cm × 20cm spacing), T₂ (planting of turmeric manually at 45cm × 15cm spacing) and T₃ (planting of turmeric with semi-automatic potato planter at a spacing of 60cm × 15cm) after uprooting was 7.85cm, 7.91cm and 8.20cm, respectively while the mean diameter of turmeric rhizomes for T₁, T₂ and T₃ after uprooting was 3.05cm, 2.64cm and 3.45cm, respectively. The number of rhizomes per kg for T₁, T₂ and T₃ were 34, 30 and 24, respectively. The yield of turmeric rhizome was highest (130.0 q/acre) in T₃ which was 17.65 per cent and 8.33 per cent more as compared to T₂ and T₁, respectively because the rhizomes were grown on ridges and the overall size of rhizomes was bigger.

Key Words : Turmeric, Growth, Planting method, Yield

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INTRODUCTION

Turmeric (*Curcuma longa* L.) is an important spice crop. India occupies 147000 ha area under turmeric cultivation and produces 659400 tonnes annually. India produces 75 per cent of world's turmeric and is the largest exporter in trade (Fageria *et al.*, 2013). It can be a good and viable diversification option for rice under Punjab situation, where the ground water level is going down every year. Its cultivation is gaining importance on account of the establishment of the processing plant. Planting method is a soil management tool which affects plant growth and yield (Chattopadhyay *et al.*, 1993). Gill *et al.* (2002) reported that plant height, number of leaves per plant, tillers per plant, number and weight of rhizome and fresh rhizome yield was significantly higher in ridge than flat planting method. Optimum plant density of a crop varies considerably depending upon climatic conditions of the

growing area and fertility status of the soil. Plant distance is an important factor for higher production and gives equal opportunity to the plants for their survival and best use of other inputs. The full yield potential of an individual plant is achieved when sown at wider spacing, whereas yield per unit area is maximum when individual plants are subjected to severe competition (Holliday, 1960). The type and weight of planting material used affects the vigour of the plant and crop yield per unit area as well as the cost of production (Philip, 1985). The present study was hence, planned to evaluate the different methods of turmeric plantation and uprooting.

MATERIAL AND METHODS

The different planting methods of turmeric were conducted at farmers' fields and Krishi Vigyan Kendra, Hoshiarpur during 2013-14 which are described below :

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Methods of turmeric plantation	Seed rate (q/acre)
T ₁ : Planting of turmeric manually at 30cm × 20 cm spacing	8.6
T ₂ : Planting of turmeric manually at 45cm × 15 cm spacing	7.9
T ₃ : Planting of turmeric with rotary type magazine semi-automatic potato planter at a spacing of 60 cm×15 cm	6.6

In rotary type magazine semi-automatic potato planter, four persons sitting on the machine filled the revolving magazines with turmeric rhizomes manually. It consists of a frame, furrow openers, seed box, revolving magazines, seats and a ground wheel for transmitting the power to the shaft. The machine is mounted on a 3-point linkage of a tractor. The specifications of semi-automatic potato planter used for turmeric plantation are given in Table A. Fig A shows the

Table A : Specifications of semi-automatic potato planter used for turmeric plantation

Overall dimensions, cm	284 × 165 × 125
Drive to working parts	From ground wheel
Metering mechanism	Revolving magazine hand fed
Ridge forming device	Ridgers
Seed hopper capacity, kg	80
Type of furrow opener	Shovels
Row to row spacing, cm	60
Number of rows	4
Working width, cm	240



Fig. A : Turmeric plantation with semi-automatic potato planter

plantation of turmeric with the semi- automatic potato planter. The straw mulch 2.5 q per acre had been applied after planting turmeric to conserve moisture and reduce weed population. The well rotten farm yard manure @ 10-12 tonne per acre had been applied before planting because turmeric respond favorably to farm yard manure. Light and frequent irrigations were applied. In order to check weeds, one or two hoeings had been given. Harvesting was done manually and with potato digger.

RESULTS AND DISCUSSION

The plant emergence of turmeric with all the three treatments was good enough. The details of field performance of semi-automatic potato planter used for turmeric plantation are shown in Table 1. The machine worked satisfactorily and covered about 1.6-2.0 ha/day. The damage to turmeric rhizomes was negligible. The turmeric rhizome missing was about one per cent. Table 2 shows the mean length, mean diameter, number of rhizomes per kg and yield of uprooted turmeric rhizomes planted with different methods.

Table 1 : Machine performance in the field for turmeric plantation

Effective field capacity, ha/day	1.6-2.0
Rhizome missing, %	1
Rhizome damage, %	Negligible
Power requirement , hp	35-45
Labour requirement (No's)	5
Rhizome to rhizome spacing, cm	15
Depth of planting, cm	Up to 20
Optimum speed of operation, km/h	1.0-1.5
Savings in comparison to traditional method	
Labour requirement, %	40-50
Cost of operation,%	15-20

The mean length of turmeric rhizomes for T₁, T₂ and T₃ after uprooting was 7.85 cm, 7.91 cm and 8.20 cm, respectively. While the mean diameter of turmeric rhizomes for T₁, T₂ and T₃ after uprooting was 3.05 cm, 2.64 cm and 3.45 cm, respectively. The number of rhizomes per kg for T₁, T₂ and T₃ were 34, 30 and 24, respectively (Table 2). Among the three treatments, the length and diameter for turmeric rhizomes sown with semi-automatic potato planter were highest because in this case, the rhizomes were grown on ridges and had additional space

Table 2 : Different parameters of uprooted turmeric rhizomes planted with different methods

Methods of turmeric plantation	Mean length of rhizomes	Mean diameter of rhizomes	No. of rhizomes/kg	Mean yield of rhizomes
T ₁ : Planting of turmeric manually at 30cm × 20 cm spacing	7.85 cm	3.05 cm	34	120.0 q/acre
T ₂ : Planting of turmeric manually at 45cm × 15 cm spacing	7.91 cm	2.64 cm	30	110.5 q/acre
T ₃ : Planting of turmeric with semi-automatic potato planter at a spacing of 60 cm x 15 cm	8.20 cm	3.45 cm	24	130.0 q/acre



Fig. 1 : Turmeric crop stand planted by semi- automatic potato planter

area for its superior growth (Fig. 1). The number of rhizomes per kg were lowest (24) for T_3 because the rhizome size was larger when grown on ridges while it was highest (34) for T_1 because the rhizome size was smallest when grown on flat fields. Fig. 2 shows the turmeric rhizomes uprooted planted with T_1 , T_2 and T_3 . The mean yield of turmeric rhizome was larger (130.0 q/acre) in T_3 which was 17.65 per cent and 8.33 per cent more as compared to T_2 and T_1 , respectively. As the rhizomes were grown on ridges in T_3 , the overall size of rhizomes was highest due to additional space area for its growth and the yield was maximum in T_3 . In addition to this, there was in saving of seed cost in T_3 as compared to planting of turmeric at 30 cm \times 20 cm (T_1) and 45 cm \times 15 cm (T_2). Substantial saving in irrigation water was also achieved in T_3 as compared to T_1 and T_2 as in T_3 , water could be quickly applied in the furrows. For uprooting of turmeric rhizome, potato digger was used with some modification in it. The front blade of potato digger was fixed at some lower level so that the blade will pass below the turmeric rhizome so that uprooting should become easy. The labour costs for manual planting of turmeric was Rs.12500/ha and for uprooting was Rs. 38000/ha (total cost of



Fig. 2 : Uprooted turmeric rhizomes planted with different methods

planting and uprooting was Rs. 50500/ha) while with machines, the total cost involved is Rs. 6400/ha. The cost of cultivation of turmeric can be reduced to about Rs. 44100/ha *i.e.* labour cost involved in planting and uprooting.

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