



# Performance of different turmeric cultivars under coconut plantation for sub Himalayan Terai region of West Bengal

ARUN KUMAR SIT\* AND JAGADISH ROYBARMAN

Central Plantation Crops Research Institute, Research Centre, Mohitnagar, JALPAIGURI (W.B.) INDIA  
(Email : sitarunkumar@yahoo.com)

**Abstract :** A total of fifteen turmeric cultivars were evaluated in coconut plantation under sub Himalayan terai region of West Bengal. Growth parameters, yield and yield attributing characters were recorded. The cultivar Sudarsana produced maximum yield of 20.9 t in one hectare of coconut plantation and the performance of this variety was differed statistically than the other varieties under study. Cultivar like Suguna, Suranjana and Suvarna also performed well in coconut plantation in terms of yield and they produced 17.1, 16.0 and 15.9 t fresh turmeric in one hectare of coconut plantation, respectively. More yield of these varieties were contributed by leaf number, leaf length, number of secondary finger, length, width and weight of primary and secondary finger and clump weight.

**Key Words :** Turmeric, Cultivar, Sudarsana, Suvarna, Coconut, Intercrop

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## INTRODUCTION

Turmeric (*Curcuma longa* L) belongs to the family Zingiberaceae. It is mainly used as a condiment in vegetables, meat and fish preparation for its colour and flavour. It is also used as a preservative. The medicinal value of this crop is well known to all class of people of the world. It is believed that turmeric is stomatic, tonic, blood purifier, anthelmintic, antacid, antiperiodic and carminative. It is being used in treating gall stones and gall complaints. Moreover, Indian women use turmeric paste to make their skin more glorious and against skin problems. Thus, it is an important spice and condiment crop grown in tropical and subtropical part of the World. India ranks first in terms of area and production of turmeric. In India, turmeric is mainly grown in Andhrapradesh, Tamilnadu, Odisha, Assam, Kerala, West Bengal and almost all states except some states of extreme North India in open as well as in partial shade condition. Turmeric is an essential intercrop of plantation garden like arecanut and coconut. Wherever, arecanut or coconut plantation is there, it is cultivated as intercrop at pre and post bearing stages of the crop. Coconut

palms are spaced at a distance of 7.5-8 m. In this type of plantation, up to three years of planting of seedlings the entire area is used for intercropping as the shade is almost negligible. As the palms grow, there is progressive ground coverage by the crown up to an age of 20 yrs. After that with the increase of palm height, there is increase penetration of more quantum of sunlight through canopy. More over, about 25 per cent of ground is effectively used by coconut palm at bearing stage. Hence, there is a plenty of scope to grow intercrops in interspace of coconut garden for better utilization of land and sunlight. Different workers studied different intercrops in different places. Edison *et al.* (2006) reported that turmeric can be successfully cultivated in coconut garden of more than 8 years plantation. It was found that coconut yield was increased to more than 30 per cent when different intercrop like taro was taken. Coconut is also an important plantation crop grown in West Bengal. Different intercrops like turmeric, colocasia, elephant foot yam, ginger and amaranth were recommended for their cultivation in coconut garden. But it is essential to know that which variety of turmeric is good for cultivation in coconut garden. Hence, a study was made with

\* Author for correspondence.

different turmeric varieties in coconut garden to find out the best variety (s) in terms of yield in sub Himalayan terai region of West Bengal.

## MATERIALS AND METHODS

The experiment was conducted at coconut garden of CPCRI, research centre, Mohitnagar during 2008-09. The garden was experienced with sandy loam soil of Teesta Alluvial basin with pH 5.9. The area receives an average annual rainfall of 3000mm. Inter-space of coconut plantation var. D X T of 25 years old and spaced at 7.5 m was used for turmeric cultivation. Raised soil bed of 20 cm height, 1.2 m width and 4 m long was made at interspace leaving the coconut basin of 2 m diameter. The experiment was laid out in randomized block design with three replications. A total of 15 turmeric cultivars viz., Suguna, Sudarsana, Prava, Prathiva, Kasturi, Suvarna, Aleppy, CL-214, CLS-2A, CLS-3D, Roma, BSR-1, Rajendra Sonia, Suranjana and Local were planted randomly in each replication. Fingers of 8-10 g were sown at a spacing of 40 x 30 cm and at a depth of 5 cm after seed treatment with 0.3 per cent bavistin solution for 20 minutes. During final bed preparation 3-4 kg FYM/sq. m and basal dose of NPK (half of recommended urea and full dose of single super phosphate and muriate of potash) was applied. Rhizomes were sown during the month of May after one month of harvesting. After sowing the beds were mulched with arecanut leaf. Recommended agronomic practices were followed (Nambiar, 2001). Randomly ten plants were selected and plant height, number of tiller/clump, leaf number, leaf length and width, crop duration, number of primary and secondary finger/ clump, length and width of primary and secondary finger, weight of primary and secondary finger/clump, clump weight, plot yield, hectare yield (in one ha of coconut plantation) and dry yield per hectare of coconut plantation were recorded. Dry yield was taken after boiling and drying of fingers and mother rhizome. Average data were statistically analyzed by the methods given by Panse and Sukhatme (1995)

## RESULTS AND DISCUSSION

Growth and yield data of different turmeric cultivar planted under coconut plantation are tabulated in Table 1. All the characters studied for 15 turmeric varieties varied significantly except width of primary finger. Maximum plant height (163.5 cm) was recorded in var. Rajendra Sonia which was followed by Prava (162.2 cm) and the plant height of Sudarsana, Suguna, Local, CLS-2A was at par whereas, maximum number of tillers per plant (1.75) was recorded in BSR-1 which was immediately followed by Kasturi (1.67). The performance of varieties like Rajendra Sonia, CLS-2A, Prava, Suvarna was at par and these varieties varied significantly with the other varieties in number of tiller/plant. Leaf number/plant, leaf length and width were also recorded significantly. Sudarsana produced maximum number of leaf (10.3/plant) and

also maximum leaf length (69.3 cm), while only eight number of leaf was produced by CLS-2A and Roma. Maximum leaf width (12.6 cm) was observed in Suguna followed by Prathiva (12.17 cm) whereas, minimum leaf width was noticed in Rajendra Sonia (10). Observation on crop duration for all the cultivar was recorded and the result varied significantly. Crop duration for all the varieties ranged between 299.0 days (Suguna) to 280 (Local-3D). Primary and secondary finger of turmeric play an important role on yield of the crop. There is a positive correlation of these two characters on yield. All the varieties studied varied significantly for these two characters. Maximum number of primary fingers (10.3/clump) was recorded in Local followed by Suguna (10.1/clump). Whereas, minimum number of primary finger was noticed in Rajendra Sonia (5.7 clump). Weight of primary finger was recorded more (40.67 g) in Sudarsana followed by Suguna (34.1g) whereas, minimum weight was observed in Prava (15.3g). In case of secondary finger, maximum number (24) was produced by the variety BSR 1 which was followed by Prathiva (22) and Sudarsana (20). The variety Sudarsana produced longer (11.3 cm) primary fingers and shortest (6.3 cm) primary finger was produced by Prathiva. Width of primary finger was recorded maximum (7.75cm) in CLS-2A followed by Suranjana (7.53) and minimum width (5.3cm) of primary finger was noticed in Rajendra Sonia. It is noticed that where the number of secondary finger was more, there, the width of secondary finger was less. It may be due to the varietal characteristics. Clump weight of any variety plays an important role on plant vigour, number of primary and secondary fingers, length and width of fingers and yield of the variety. If clump weight is more, the yield is more. In this study, clump weight was recorded maximum (0.65kg) in Sudarsana followed by Suranjana (0.62 kg). The varieties produced less yield had the lowest clump weight. The lowest clump weight (0.30 kg) was recorded in variety Prava. The yield of different turmeric varieties per hectare of coconut plantation were calculated on the basis of mean plot yield. Maximum fresh yield per hectare (20.9t) of coconut plantation was recorded from the variety Sudarsana which differed significantly from the other varieties under study. More fresh yield of Sudarsana was attributed by the better performance of yield attributing characters like leaf number, leaf length, number of secondary finger, length, width and weight of primary and secondary finger and clump weight. The performance of the varieties, Suguna, Suranjana and Suvarna was statistically at par and produced 17.0t 16.0t and 15.9t per hectare, respectively. Hore *et al.* (2003) reported a fresh yield of 21-26t/ha from Suguna under coconut condition. Sit *et al.* (2004) reported that the cultivar Suguna produced maximum yield than the other ten varieties under study under arecanut plantation in sub Himalayan terai region of West Bengal. In case of cultivar Suguna, more clump weight, more weight of primary and secondary finger, more number of primary finger and leaf width contributed to more yield. Higher yield of

Table 1. Growth and yield parameters of different tumeric cultivars under coconut plantation

Treatments	Variety	Plant height (cm)	No. of tiller/plant	Leaf number/plant	Leaf length (cm)	Leaf width (cm)	Crop duration (days)	Number of primary finger/plant	Number of secondary finger/plant	Length of primary finger (cm)	Width of primary finger (cm)
T <sub>1</sub>	Suguna	151.4	1.25	8.7	68.00	12.58	299.0	10.1	13.2	11.0	7.00
T <sub>2</sub>	Sudarsana	157.9	1.17	10.3	69.33	11.58	283.3	8.3	20.0	11.3	7.44
T <sub>3</sub>	Prava	162.2	1.58	9.8	68.33	11.83	292.0	7.0	11.7	8.7	6.17
T <sub>4</sub>	Prathiva	147.8	1.42	9.8	63.83	12.17	295.0	9.7	22.0	6.3	6.50
T <sub>5</sub>	Suvama	144.6	1.58	9.3	61.50	10.42	282.0	6.5	10.5	9.0	7.25
T <sub>6</sub>	Alleppy	136.3	1.41	7.3	53.75	9.83	292.0	9.4	12.0	9.4	6.45
T <sub>7</sub>	Kasturi	149.1	1.67	8.5	62.58	10.17	285.0	6.2	10.6	9.2	6.61
T <sub>8</sub>	CL-2	133.9	1.25	9.0	54.58	11.08	293.0	7.8	11.7	8.0	7.00
T <sub>9</sub>	CLS-2A	152.8	1.58	8.5	64.17	10.00	294.0	6.5	12.7	9.6	7.75
T <sub>10</sub>	CLS-3D	149.8	1.33	8.0	62.42	10.92	287.0	7.0	9.8	10.3	7.33
T <sub>11</sub>	Local	150.6	1.25	7.5	61.58	11.00	280.0	10.3	12.2	6.7	6.50
T <sub>12</sub>	Roma	137.1	1.33	8.0	55.88	9.97	296.0	7.8	16.0	7.7	6.72
T <sub>13</sub>	BSR-1	149.0	1.75	8.3	64.92	10.17	287.0	8.7	24.0	7.7	5.50
T <sub>14</sub>	BSR-1	163.5	1.58	9.4	71.25	10.00	294.0	5.7	14.0	8.3	5.33
T <sub>15</sub>	Rajendra Sonia	135.3	1.25	8.6	63.58	11.42	287.3	7.7	15.9	10.4	7.53
S.E. ±		4.35	0.11	0.31	1.94	0.44	2.44	0.44	1.75	0.65	0.32
C.D. (P=0.05)		13.92	0.3	0.98	6.23	1.41	7.85	1.43	5.64	2.09	1.02
CV		5.87	15.1	7.02	6.16	8.07	1.68	13.2	24.2	14.8	NS
Treatments	Variety	Length of secondary finger (cm)	Width of secondary finger (cm)	Weight of primary finger/Clump (g)	Weight of secondary finger/clump (g)	Clump weight (kg)	Plot yield (kg)	Yield/ha (t)	Dry yield/ha (t)		
T <sub>1</sub>	Suguna	5.1	4.22	34.10	8.67	0.50	15.27	17.1	4.5		
T <sub>2</sub>	Sudarsana	5.3	4.33	40.67	10.00	0.65	18.71	20.9	5.6		
T <sub>3</sub>	Prava	4.7	4.10	15.33	6.35	0.30	12.14	13.5	2.8		
T <sub>4</sub>	Prathiva	2.8	3.25	17.50	6.75	0.35	12.95	14.4	3.1		
T <sub>5</sub>	Suvama	3.8	3.17	25.00	5.50	0.42	14.26	15.9	3.6		
T <sub>6</sub>	Alleppy	3.8	3.42	22.00	6.35	0.49	12.19	13.6	3.5		
T <sub>7</sub>	Kasturi	5.1	3.94	21.11	6.72	0.37	10.58	11.8	3.5		
T <sub>8</sub>	CL-2	4.3	4.83	23.33	5.78	0.48	11.57	12.9	2.7		
T <sub>9</sub>	CLS-2A	5.7	5.50	22.33	8.35	0.40	11.77	13.2	2.9		
T <sub>10</sub>	CLS-3D	4.4	4.33	20.17	7.65	0.35	10.51	11.7	3.3		
T <sub>11</sub>	Local	3.7	2.83	20.68	7.18	0.45	10.90	12.2	2.5		
T <sub>12</sub>	Roma	4.2	3.50	18.66	6.65	0.48	10.85	12.1	3.0		
T <sub>13</sub>	BSR-1	3.0	3.15	19.69	7.35	0.55	10.72	12.0	2.4		
T <sub>14</sub>	Rajendra Sonia	3.2	3.67	21.50	6.15	0.36	12.14	13.5	3.0		
T <sub>15</sub>	Suvama	7.2	5.28	31.00	12.20	0.62	14.34	16.0	4.1		
S.E. ±		0.30	0.52	2.51	0.88	0.03	0.86	0.96	0.32		
C.D. (P=0.05)		0.96	1.66	8.09	2.84	0.102	2.76	3.08	1.02		
CV		13.7	26.1	21.7	23.7	14.3	13.7	13.7	1.15		

NS=Non-significant

cultivar Suranjana and Suvarna was also due to better performance of some yield attributing characters. Lowest yield per hectare of coconut plantation (11.7t) was produced by CLS-2A. The study indicates that the yield of turmeric under coconut plantation depended on higher plant height, leaf number, leaf length, number of primary and secondary fingers, length, width and weight of primary and secondary fingers, and clump weight. Higher yield of other varieties like Suguna, Suranjana and Suvarna was also depended with the yield attributing parameters. The dry yield of different turmeric cultivars followed the trend of fresh rhizome production. Maximum dry yield (5.6 t) per hectare of coconut plantation was recorded from the cultivar Sudarsana followed by Suguna (4.5t) and Suranjana (4.1t). Recovery percentage from fresh weight to dry weight varied from 20 per cent (Rajendra Sonia) to 28.8 per cent (Aleppy). A recovery per cent of 26 was obtained from the best variety Sudarasana grown under coconut plantation.

From the study it is concluded that the turmeric cultivar Sudarsana, Suguna and Suranjana performed well under coconut plantation in sub Himalayan terai region of West Bengal. The more yield was attributed by plant height, number and weight of primary and secondary fingers/plant, and mother rhizome weight. Hence, these three varieties can be recommended for cultivation as intercrop under coconut plantation in sub Himalayan terai region of West Bengal.

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