EVALUATION OF TURMERIC (*Curcuma longa* L.) GENOTYPES FOR MID AND FAR WESTERN TERAI OF NEPAL

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ABSTRACT

For evaluation of turmeric (Curcuma longa L.) genotypes for mid and far western terai of Nepal, a study was carried out at the Regional Agriculture Research Station Khajura, Nepalgunj during the year 2008/09 and 2009/10 .Eight genotypes of turmeric namely CI9701, CI9801, CI9803, CI9804, CI9807, CI9808, CI0209, Pokhara sano were evaluated in a randomized complete block design (RCBD) with 3 replications. Fertilizers were applied @75:50:50 kg/ha (NPK) and 30t/ha compost. Observations of growth and yield attributing characters were taken. The rhizome yield in genotypes CI9803 (20.75t/ha) and CI0209 (19.82t/ha) were respectively higher than other tested genotypes where as lowest rhizome yield was recorded in CI9807 (14.20t/ha). On the basis of the results obtained, it can be concluded that genotype CI9803 and CI0209 of turmeric was promising for cultivation in mid and far western terai of Nepal. However it requires further investigation. For recommendation

Key words: Genotypes, evaluation, rhizome, curcuma.

INTRODUCTION

Turmeric (*Curcuma longa* L.) is an important condiment and useful dye, with varied uses in drugs and cosmetic industries. It is used medicinally for external application and taken internally as a stimulant. In Nepal it is grown from terai to mid hills in a wide range of agro-climatic conditions. Productivity of the crop is very low as compared to neighboring country. In Nepal, 32369 ton of turmeric was produced (Agriculture Dairy, 2068). In some of the pocket areas, this crop is grown commercially (Annual Report, NGRP,2004/05-2006/07). There is an ample scope to increase its production and productivity in Nepal. Turmeric takes 8-10 months to harvest therefore; small farmers in Nepal can hardly afford to grow it as a sole crop. Turmeric is a slow growing rhizomatous crop which consumes greater amount of nutrients both soil and applied fertilizers and also require heavy application of organic manures. A.K. Sadanandan *et. al.* (1998). Similarly K.K Krisnamurthi *et. al.* (1999) reported that the productivity of turmeric and its quality can be enhanced by application of organic manure. The major production constraint observed in farmer field was lack of technical know-how on cultivation, suitable variety, long duration crop and post harvest processing to maintain the quality (B.P. Sharma, 1998).Variety of the crop is an inherent property either to boost up or lowers the yield of the crop providing other factors of production constraint to all genotypes. Therefore, varietal evaluation trial of turmeric genotypes was designed to assess the promising turmeric genotypes from yield and quality point of view.

MATERIALS AND METHODS

An experiment on varietal evaluation study of turmeric was carried out at Regional Agriculture Research Station Khajura, Nepalgunj in fiscal year 2008/09 and 2009/10. Planting time was in mid April. Eight promising lines were evaluated under randomized complete block design (RCBD) with three replications. The plot size was maintained as 3x1.8m^2 and spacing 30x30cm. Planting materials were received from National Ginger Research Program Kapoorkot Salyan. Fertilizers were applied @75:50:50 kg/ha (NPK) and 30 t/ha compost. All compost, half dose of nitrogen, full dose of phosphorous and potash were applied as basal, remaining half of nitrogen were applied to the crop in two split doses. First half of nitrogen was applied 30 days after germination of crop and the remaining after 60 days. Mulching was given after planting. Observations were recorded on days to germination, tiller number/clump, plant height cm, leaf number/tiller, finger number/clump, yield kg/clump, rhizome yield kg/plot and yield t/hectare. Data were analyzed in MSTATC.

RESULTS AND DISCUSSION

Days to germination: In 2009, highly significant difference was observed among the tested genotypes. Significantly earlier germination was recorded by genotype CI 0209 (19.7days) late germination in genotype CI9803 (28.7). In year 2010, significant difference was not observed, early CI9808 (34.0) and late genotype Pokhara sano, CI980CI9801(38.0).The two year mean data table showed that the early genotype was CI0209(27.85) and late was CI9807(35.0).

Tiller number per clump: In both years, a highly significant difference was observed in tillers per clump among the tested genotypes. In 2009, highest tiller number per clump was recorded in CI9803(3.3) followed by CI9701(2.9) whereas lowest number of tiller per clump was recorded in CI9808,CI9803 and CI0209(2.3). In year 2010, significantly highest tiller per clump was recorded in CI9804 (3.3) followed by CI 9701, CI9801 (3.1). By the scrutiny of the two years mean data, maximum number of tiller was recorded in CI9804 (3.05) and minimum in genotypeCI9808(2.60).

Plant height: The data on plant height data showed highly significant difference among the tested genotypes in both years. In year 2009, significantly tallest genotype was found as CI0209(48.1cm) followed by CI9807(43.5cm) and shortest as genotype Pokhara sano(25.1cm).In 2010, tallest plant was found as genotypes CI9803(48.1cm) followed by CI9804(41.2cm) and shortest height as Pokhara sano(26.4cm).The mean of two year data showed the highest plant height in CI9803(44.9cm) followed by CI0209(40.40cm) whereas minimum height in genotype Pokhara sano(25.75cm).

Leaf number per tiller: Leaf number per tiller was highly significant among the tested genotype. In year 2009, significantly highest number of tiller was recorded in CI0209 (7.0) followed by CI9807 (6.8), whereas minimum in CI9803 (4.4).In year 2010, significantly maximum number of leaf was recorded in CI9803(5.8) followed by CI0209(5.5),whereas minimum in CI9801(4.4).The mean data showed highest number of leaf per tiller was in genotypeCI0209(6.30) and minimum in Pokhara sano(4.5)

Table-1: Yield and yield attributing characteristics of turmeric genotypes

Treatment	Days to Germination			Tillers number/ clump			Plant height (cm)			Leaf number / tiller		
	2066	2067	Mean	2066	2067	Mean	2066	2067	Mean	2066	2067	Mean
CI9701	23.7	36.0	29.8	2.9	3.1	3.0	25.9	41.1	33.5	5.0	5.6	5.3
CI9801	26.7	38.0	32.3	2.6	3.1	2.8	31.1	28.7	29.9	4.7	4.4	4.5
CI9803	28.7	36.0	32.3	3.3	2.6	2.9	41.7	48.1	44.9	4.4	5.8	5.1
CI9804	27.3	35.0	31.1	2.8	3.3	3.0	37.7	41.2	39.4	6.3	4.8	5.5
CI9807	32.0	38.0	35.0	2.7	2.9	2.8	43.5	29.1	36.3	6.8	4.7	5.7
CI9808	27.7	34.0	30.8	2.3	2.9	2.6	31.1	34.8	32.9	6.2	5.0	5.6
CI0209	19.7	36.0	27.8	2.3	2.4	2.3	48.1	32.7	40.4	7.1	5.5	6.3
Pokhra Sano	24.3	38.0	31.1	2.7	3.0	2.8	25.1	26.4	25.7	4.5	4.5	4.5
F-Test	**	NS		**	**		**	**		**	**	
CV (%)	7.4	7.46		9.3	6.51		11.9	11.68		7.8	6.68	
LSD (0.05)	3.3	-		0.42	0.32		7.2	6.95		0.75	0.56	

Table. 2: Yield and yield attributing characteristics of turmeric genotypes

Treatment	Finger number /clump			Yield(kg)/ clump			Yield(kg) /plot			Yield t/ ha		
	2066	2067	Mean	2066	2067	Mean	2066	2067	Mean	2066	2067	Mean
CI9701	2.8	3.7	3.2	0.09	0.23	0.16	5.35	11.0	8.2	10.6	20.38	15.1
CI9801	3.1	3.0	3.0	0.09	0.21	0.15	5.29	11.4	8.4	10.2	21.18	15.7
CI9803	3.4	3.3	3.3	0.08	0.40	0.24	5.30	16.5	10.9	11.0	30.61	20.7
CI9804	2.9	3.5	3.2	0.08	0.21	0.15	5.79	12.0	8.8	11.2	22.20	16.7
CI9807	3.5	3.0	3.2	0.07	0.18	0.13	3.80	12.0	7.9	7.2	21.17	14.2
CI9808	2.7	3.3	3.0	0.06	0.25	0.16	3.92	13.9	8.9	7.8	25.91	16.8
CI0209	3.7	2.8	3.2	0.15	0.22	0.19	3.92	11.5	7.7	18.3	21.33	19.8
Pokhra sano	3.4	2.9	3.1	0.10	0.23	0.17	5.77	12.3	9.0	12.4	22.17	17.3
F-Test	NS	**		NS	*		**	*		**	*	
CV (%)	12.0	7.15		35.0	30.2		23.0	20.8		22.0	20.87	
LSD (0.05)	-	0.385		-	0.1		2.2	4.4		4.1	8.1	

Finger number per clump: In 2009, significant difference was not observed in finger number per clump among the tested genotypes. The highest number of finger per clump was recorded in genotype CI0209 (3.7) and lowest in CI9808 (2.7). In 2010, highly significant difference among the tested genotype was observed. Maximum number of finger per clump was recorded in CI9701 (3.7) whereas minimum in CI0209 (2.8).The mean of two year data showed highest number of finger per clump in CI9803 (3.35) followed by CI9807 (3.25) and lowest in genotypeCI9808 (3.0).

Yield (kg) / clump: In 2009, yield per clump did not show significant difference. It ranged from 0.07-0.15 kg per clump by CI9807, CI0209 respectively. In year 2010, yield per clump was significantly different among the tested genotypes, maximum in CI9803 (0.40) and minimum in CI9807 (0.18).The mean data of yield per clump showed highest in CI9803 (0.24) and minimum by CI9807 (0.13)

Yield (kg)/plot: In 2009, data showed highly significant differences in yield among the tested genotypes. Significantly maximum yield per plot was recorded in CI9804(5.79) followed by Pokhara sano (5.77) where as minimum in CI9807(3.8kg).In year 2010, significantly highest yield was recorded in CI9803(16.53) followed by CI9808(13.92)whereas minimum in CI9807(11.01).The mean of two years data showed highest yield per plot yield in CI9803(10.91kg) followed by Pokhara sano (9.04),whereas minimum in CI0209(7.72kg).

Yield ton /hectare: In year 2009, yield (ton per ha) was highly significant among the tested genotype. Significantly highest yield was observed by genotype CI0209 (18.31t/ha) followed by Pokhara sano (12.45t/ha) whereas minimum yield was recorded by CI9807 (7.23t/ha). In year 2067, significantly maximum yield was recorded by genotypeCI9803 (30.61t/ha) whereas lowest yield by CI9701 (20.38).The two year mean data showed highest yield in genotype CI9803 (20.75t/ha) followed by CI0209 (19.82t/ha) which was at par with CI9803,where as lowest yield ton per hectare was recorded by genotype CI9807 (14.20t/ha).

CONCLUSION

The rhizome yield of turmeric indicated that there was a great variation among the tested genotypes. The genotype CI9803 (20.75t/ha) and CI0209 (19.82t/ha) could be recommended for commercial cultivation in mid and far western terai of Nepal.

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