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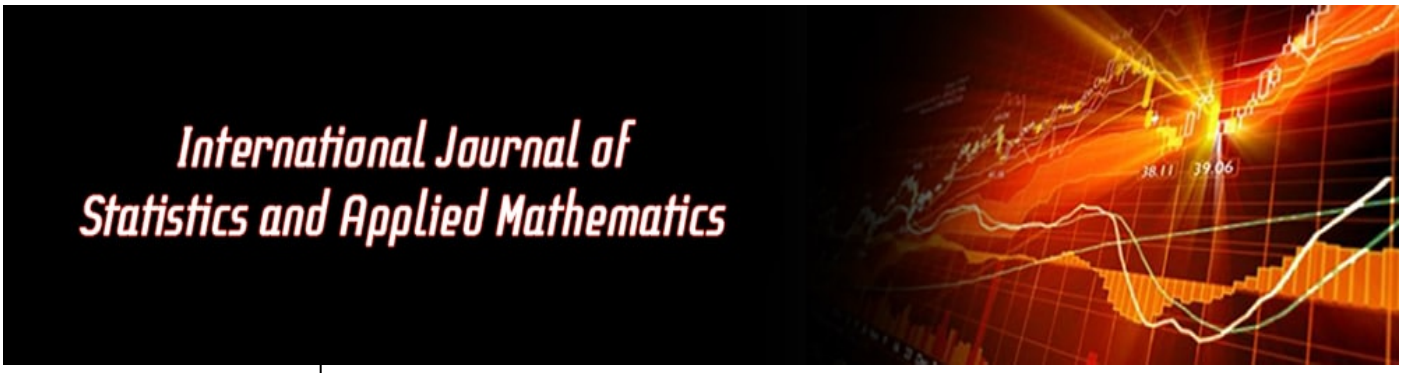

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Evaluation of greater yam (*D. alata*) genotypes in southern Chhattisgarh for yield and yield attributing characters

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Abstract
The greater yam (*Dioscorea alata* L.) is the most widely distributed yam species in the world. In India it is grown in AP, MP, CG, Orissa, Kerla, Rajsthan and many other states for its tuber. Field experiment was conducted during *Kharif* season of 2020-21 at AICRP on tuber crops project, Saheed Gundadhur College of Agriculture & Research Station, IGKV, Jagdalpur, C.G to determine and evaluate the growth, yield and quality performance of greater yam genotypes under South Chhattisgarh condition. Treatments comprised of 8 different genotypes and the experiment was laid out in randomized complete block design with three replications. The evaluation performance of different genotypes was assessed by analyzing data on yield, yield attributing and quality parameters. Results demonstrated that there is significant difference on performance of different greater yam genotypes. Based on the mean performance, Sree Karthika recorded for higher dry matter and starch %, TGy 17-10 observed maximum tuber yield per plant and per hectare (3.19 kg & 39.42 t) followed by Sree Karthika (2.39 kg & 29.55 t). The studies suggest that it can possible to isolate superior genotypes during the selection process based on evaluation.

Keywords: Greater yam, Genotypes, evaluation, yield

Introduction
Greater yam (*Dioscorea alata* L., 2n=40) belongs to family *Dioscoreaceae* and comes under major tuber crops. In Chhattisgarh it is locally known as Ratalu, Nagar Kanda, Uska Kanda, Upka Kanda, Ghorana Kanda etc. It is nutritionally rich, monocotyledonous, climbing tuber crops mainly grown in *Kharif* season having wide range of adoptability, distributed throughout the India. It is good source of carbohydrate and one of the richest sources of energy along with several vitamins and minerals. Yams were grown in India since very ancient times and *D. alata* is said to be of Indian Origin (George and Sunitha, 2018) [6]. Freshly harvested tubers of Greater yam are consumed as boiled, baked, fried and as a vegetable like potato. The total area of Greater yam of Chhattisgarh is 216.60 ha with 5833.07 tonnes production and 23.94 t ha^{-1} productivity (Shankar and Singh, 2018) [11-12]. The average tuber yield of grater yam in Chhattisgarh is very low as compare to other states of India due to non-popularity as commercial crop, cultivation of local and poor quality indigenous greater yam varieties. To identify promising and stable variety for production in Chhattisgarh it is important to evaluate the performance of greater yam genotypes for future cultivation.

Materials and Methods
The study was conducted at Research and Instructional Farm of S. G. College of agriculture & Research Station, Indira Gandhi Krishi Vishwavidyalaya, Jagdalpur (C.G.), during the *Kharif* season of 2020-2021 under crop improvement programme of AICRP on Tuber Crops. The experiment comprised of total 8 entries of greater yam *viz.* TGy 17-3, TGy 17-4, TGy 17-5, TGy 17-8, TGy 17-10 including check Sree Karthika and Local. All this genotypes were evaluated in a Randomized Complete Block Design, with three replications. Each entry was planted in the spacing of 90*90 cm. Pits size of 30*30*30 cm prepared at the distance of 90 cm.

A distance of 60 cm maintained between the plots. During the courses of this experiment, no serious disease or insect pest infestations were noticed and thus crop protection measures were not employed. All the recommended cultural practices were taken to grow a healthy crop. For each character under study, data were recorded on five randomly taken plants from each plot and expressed on plant basis. The mean of five plants used for statistical analyses. Observation on important characters *viz*., tuber length (cm), tuber diameter (cm), tuber yield per plant (kg), tuber yield per hectare (t/ha), dry matter content of tuber, starch (%) were recorded. Organoleptic test also conducted after tuber harvesting using 0-9 hedonic scale. The data were subjected to statistical and biometrical analysis (Singh and Chaudhary, 1985) [13].

Results and Discussion

The analysis of variance of all the characters under study is presented in Table 1. This analysis of variance revealed that mean sum of squares due to entries was significant for all characters. This is an indication of existence of sufficient variability among the genotypes for tuber yield and its components traits. Significant mean sum of squares due to tuber yield and attributing characters revealed existence of considerable variability in material studied for improvement for various traits. These findings are in general agreement with the findings of Similar results were reported by Adeigbe *et al.* (2015) [1] and Shankar *et al.* (2018) [11-12].

The mean values of different yield parameters with respect to genotypes are presented in Table 2. The genotypes significantly differed for all the characters that observed during experiment. The genotype TGy 17-10 observed for maximum tuber length 39.33 cm followed by Sree Karthika (36.50 cm) which is at par with TGy 17-10. While, genotype Sree Karthika recorded maximum tuber diameter of 12.32 cm followed by TGy 17-8 (9.89 cm). Higher tuber yield per plant and per hectare observed in TGy 17-10 (3.19 kg & 39.42 t/ha) followed by Sree Karthika (2.39 kg & 29.55 t/ha). The results are in agreement with that of Bahera *et al.* (2009) [2], Adeigbe *et al.* (2015) [1] and Shankar *et al.* (2018) [11-12] in greater yam. Similarly Nageswari and Palaniswamy (2011) [8] reported in cassava, Pushpalata *et al.* (2011) [9] in sweet potato.

In terms of dry matter and starch (Table 3), higher % of dry matter and starch recorded in Sree Karthika (37.06% & 24.64%) followed by 36.07% dry matter observed in local and 19.29% starch in TGy 17-6. The results obtained are in accordance with the findings of Baah *et al.* (2009) [3] in *Dioscorea* spp, Reddy *et al.* (2017) [10] in sweet potato and Jyothi (2016) [7] in greater yam. In organoleptic test Sree Karthika and TGy 17-6 recorded overall score of 7.97 and 7.78 in 0-9 hedonic scale. All the entries screened out for anthracnose disease and scored 1 revealing there are very less symptoms of anthracnose disease. Table 4 showing morphological characters observed in 8 different genotypes of greater yam. Regarding tuber cortex colour all genotypes showed dark purple colour except TGy 17-3, TGy 17-4 and local recorded yellowish colour. All genotypes exhibited white colour tuber flesh colour except yellowish white observed in TGy 17-4. Varied type tuber shape recorded *viz*., oval, liner, digitate, cylindrical and irregular.

Performance studies revealed that the genotypes TGy 17-10 and Sree Karthika were found promising for tuber yield. In order to improve the tuber yield per plant and other important attributes genotypes falling in distant characters may be utilized in future breeding programme.

Table 1: Analysis of variance for Tuber yield and its component characters in greater yam entries -

S. No.	Character (df)	Mean sums of square		
		Replication	Treatment	Error
		(2)	(7)	(14)
01	Tuber length (cm)	25.79	49.43*	8.77
02	Tuber diameter (cm)	0.50	7.47**	0.11
03	Tuber yield per plant (kg)	0.23	1.48*	0.07
04	Tuber yield per ha (t/ha)	30.81	226.16*	9.92
05	Dry matter (%)	16.59	33.49*	5.86
06	Starch (%)	38.54	35.69*	12.84

*: Significant at 5%, **: significant at 1%

Table 2: Mean performance of greater yam genotypes for tuber yield and attributing characters

Entries	Tuber length (cm)	Tuber Diameter (cm)	Tuber yield per plant (kg)	Tuber yield (t/ha)
TGy 17-3	30.67	8.32	1.79	21.38
TGy 17-4	32.33	8.62	2.17	26.76
TGy 17-5	33.67	7.14	1.02	12.63
TGy 17-6	33.50	8.28	1.35	16.63
TGy 17-8	26.00	9.89	1.69	20.82
TGy 17-10	38.33	9.47	3.19	39.42
Sree Karthika	36.50	12.32	2.39	29.55
Local	28.33	8.10	1.30	16.05
Mean	32.42	9.02	1.86	22.89
SEm ±	1.71	0.19	0.15	1.82
SEd	2.41	0.27	0.22	2.56
CD at (5%)	5.17	0.57	0.46	5.50
CV (%)	9.13	3.63	14.23	13.75

Table 3: Quality parameter and disease score of greater yam genotypes

Entries	Dry matter (%)	Starch (%)	Organoleptic score	Anthracnose
TGy 17-3	33.88	14.42	5.48	1
TGy 17-4	34.08	15.67	5.02	1.2
TGy 17-5	29.75	14.36	6.95	1
TGy 17-6	30.40	19.29	7.78	1
TGy 17-8	27.33	15.35	7.01	1
TGy 17-10	34.03	15.93	5.88	1
Sree Karthika	37.06	24.67	7.97	1.2
Local	36.07	17.24	5.03	1.2
Mean	32.83	17.12	-	
SEm ±	32.83	2.07	-	
SEd	1.40	2.92	-	
CD at (5%)	1.97	6.26	-	
CV (5%)	4.23	20.94		

Table 4: Morphological characters of Tuber in greater yam genotypes

Entries	Tuber Shape	Tuber cortex colour	Tuber flesh colour	Hairiness of tuber
TGy 17-3	Cylindrical	Yellowish	White	Sparse
TGy 17-4	Digitate	Yellowish	Yellowish White	Sparse
TGy 17-5	Liner	Dark Purple	White	Sparse
TGy 17-6	Irregular	Dark Purple	White	Sparse
TGy 17-8	Irregular	Dark Purple	white	Sparse
TGy 17-10	Irregular	Dark Purple	White	Sparse
Sree Karthika	oval	Dark purple	Mixed	Sparse
Local	Cylindrical	Yellowish	White	Sparse

Fig 1: Tuber flesh colour of eight genotypes of greater yam

Fig 2: Best performing genotypes of greater yam

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