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Chhattisgarh Dangkanda-1: A new high yielding variety of aerial yam (*D. bulbifera*) for Chhattisgarh

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Abstract

Chhattisgarh Dangkanda-1 is a medium maturing, *Kharif* season, high yielding variety of aerial yam suitable for cultivation in Chhattisgarh developed by S.G. College of Agriculture and research station, IGKVV, Jagdalpur. This variety has been notified by the Central Sub-Committee on Crop Standards Notification and Release of Varieties for Horticultural Crops, Ministry of Agriculture, Department of Agriculture and Co-operation, Government of India, New Delhi in 2020. It is a clonal selection from local genotype of aerial yam. It is a climbing, vine crop with anti-clock wise twinning; mature leaves are green colour with cordate long shape. The plants are field resistance to leaf spot and bulbils are tolerant to yam beetle also it shows lesser incidence of anthracnose disease. It produces brown colour aerial tubers with light yellow flesh. Bulbil possesses very good keeping quality (4-5 months storage in normal condition) and having excellent cooking quality. Aerial tuber contains 38-40% dry matter and 5.69% crude protein. This variety recorded yield improvement of 34.04% over local check during MLT. Average bulbils yield of this variety is 12.71 t/ha with 15.03 t/ha potential yield under optimum agronomical practices.

Keywords: Chhattisgarh Dangkanda-1, Aerial Yam, *Dioscorea bulbifera*, yield

Introduction

Root tuber of different species of *Dioscorea*, commonly called as yam provide staple food crop for over 100 million people in the humid and sub humid tropics. Aerial yam (*Dioscorea bulbifera*) is a member of the yam family (*Dioscoreaceae*) cultivated for their edible aerial tubers. Yams form a cheap source of carbohydrate food and are extensively used by hill tribes in the uncultivated tracts of Assam, Bihar, Bengal, Madhya Pradesh, Orissa, Deccan, Chhattisgarh etc. Aerial yam commonly known as *Dioscorea bulbifera* in India; air potato in abroad and locally known as *Dang Kanda*, *Lathi Kanda* and *Laat Kanda* in Chhattisgarh. It is a rich source of carbohydrate, protein, minerals and other vitamins and has high calorific value. It is a *Kharif* season crop and is most suitable under rain fed condition. Aerial yam comes under the group of minor tuber crop but it has major importance due to ethnic and high market value as compare to other *Dioscorea* species and it is a staple food of tribal farmers of Chhattisgarh. There are no varieties of aerial yam available in C.G. for cultivation. An effort has been made in this direction and C.G. Dangkanda-1 developed and released in 2020 for Chhattisgarh state. Adoption of this variety by farmers will increase their farm productivity and income, thus improving livelihood of the farmers and meet the food and nutritional requirements of burgeoning population of the country.

Materials and Methods

Genotype IGDb-1 is a clonal selection from local genotype of Aerial Yam. It is collected from Village-Kodebeda, Block & Tahsil-Lohandiguda, and District-Baster (C.G.) in 2004. It is evaluated from 2005 to 2012 for 08 years at research cum instructional farm of S. G. College of Agriculture and Research Station of IGKV, Jagdalpur. Based on consistent superior performance than other genotypes in replicated yield trials, the accession was introduced into All India Coordinated Research Project on Tuber Crops (AICRP on Tuber Crops) in 2013 for evaluation trial across the state. Testing of aerial yam entries initiated with evaluation of 11 entries in three centres of AICRP on Tuber crops i.e.

Ranchi (Jharkhand), Dapoli (MH) and Jagdalpur (C.G.). This accession was tested as TDb 13-6 (coded name) from IET (initial evaluation trial) to MLT (multi location trial) for 6 years (2013-2018). The data were analyzed following standard statistical procedures as described by Gomez and Gomez (1984). Based on its performance, the entry TDb 13-6 was recommended for release in Chhattisgarh state during 19th Annual Group Meeting of AICRP on Tuber Crops, which has been held at CTCRI, Trivandrum, and Kerala from 13-15 June 2019. The entry TDb 13-6 released as C.G. Dangkanda-1, aerial yam variety by SVRC and has been notified by the central sub-committee on crop standards notification and release of varieties for horticultural crops, ministry of agriculture, Department of Agriculture and Co-operation, Government of India, New Delhi in 2020.

Varietal Description

For identification purpose, the salient morphological attributes of variety C.G. Dangkanda-1 are described below- Stem Colour: Green, Wings: Absent, Plant Type: Climbing, Vigour: High, Twining Direction: Anti Clock Wise, Internode Length: 9-10 cm, Leaf colour: Pale Green, Mature leaf colour: Green, Leaf margin Colour: pale green, Vein Colour: Green, Leaf length: 9-10 cm, Leaf width: 7-8 cm, Petiole Colour: Green, Petiole length: 6-8 cm, Leaf length: 15-20 cm, Leaf density: Intermediate, Leaf type: Simple, Leaf lobation: lobed, Leaf Shape: Cordate long, Aerial tuber: present, Maturity after emergence: 6-7 months, Aerial tuber skin colour: Dark brown, Aerial tuber flesh colour: Light yellow, Ease to peeling: Easy, Preferred cooking method: Steam boiling (25-30 min), Flavour of cooked tuber: Very good acceptable, Overall assessment of cooked aerial tuber: High, Abiotic stress susceptibility: very low, Biotic stress susceptibility: Low,

Results and Discussion

Entry TDb 13-6 was evaluated under All-India Co-ordinated Research Project on Tuber crops from 2013-14 to 2018-19 under IET, URT and MLT at Jagdalpur centre. During IET evaluation total 11 entries were evaluated while in URT total 7 entries were evaluated. Only 4 entries including one local check were evaluated during MLT period. Entry TDb-13-6 consistently out yielded over local check during evaluation period (Table 1 & 2). The average no of aerial tuber per plant recorded in TDb 13-6 is 20.08 (Table 1). It recorded 11.07 t/ha bulbil yield during IET trial which is 68.02% higher than local entry and it produced 50.36% higher bulbil yield during URT (Table 2). In multi-location trial it was tested in 4 different locations of Chhattisgarh and recorded 34.04% higher bulbil yield over local check (Table 3).

Quality Parameters

In MLT trial entries were also evaluated for quality

parameters (Table 4, 5 and 6) and also with respect to insect pest and diseases (Table 7). Entry TDb 13-6 recorded mean dry matter content of 40.94%, 14.77% starch and 5.69% crude protein (Table 4). It recorded mean phosphorus of 1.25 ppm and 1.88% potassium during MLT (Table 5). It scores 8.42 mean organoleptic score in hedonic scale and having very good cooking quality (Table 6).

Disease resistance

Regarding leaf spot incidence TDb 13-1 exhibit no symptoms in field with mean score of 1.17. Also this entry recorded very less incidence of yam beetle during field and storage condition (Table 7).

Agronomic management

- **Field Preparation:** Two to Three ploughing followed by planking than digging of Pits (30 cm deep, 30 cm length and 30 cm width) for planting of aerial tubers/bulbils.
- **Time of planting:** 15 May to 15 June (Onset of Monsoon) during *kharif* for rainfed crop and 15 February to 15 April during summer for irrigated crop.
- **Seed Rate:** 8 to 10 q/ha having 50-60 g bulbils weight.
- **Spacing:** Planting spacing: 90 x 90 cm and 75 x 75 cm (Row & plant respectively).
- **Seed Treatment:** With Dithane M-45 OR Redomile OR Carbendazim @ 2.0 g per lit.
- **Fertilizer Dose:** Fertilizer dose: 80: 60: 80 kg, N:P:K) ha⁻¹ for high tuber yield and FYM/Compost 5.0 t /ha. (Full dose of FYM/Compost, P, K & 1/2 dose of N to be applied in pits before planting and remaining dose of N to be applied during intercultural operation and earthing up on 45 days after planting.
- **Weed Management:** Pre-emergence herbicide Metribuzine @ 0.25 kg ha⁻¹ should be applied on 1-2 days after planting and 2 Intercultural operations on 30 & 45 days after planting and one hand weeding required for weed management.
- **Harvesting of tubers:** At physiological maturity stage on pale yellow and after drying of leaves, petioles and vines (135-150 days after planting).
- **Tuber yield:** Average yield of bulbils: 12.71 t/ha, Potential yield of bulbils: 15.03 t/ha.

Usage

The new aerial yam variety Chhattisgarh Dangkanda-1 is suitable for *Kharif* season cultivation and preparation of many dishes. It is easy to cook (20-25 minutes) and cooked/boiled or roasted bulbils preferred for consumption. It possesses pleasant flavour and very good taste. The attractive tubers, good culinary and keeping quality of Chhattisgarh Dangkanda-1 will favour its acceptance in coming time.

Table 1: No of aerial tubers/plant under IET, URT and MLT of aerial yam (year wise from 2013-14 to 2018-19) at Jagdalpur Centre

S. No.	Name of Entries	No. of aerial tubers/ plant during IET			No. of aerial tubers/ plant during URT			No. of aerial tubers/ plant during MLT			Overall mean
		2013-14	2014-15	Mean	2015-16	2016-17	Mean	2017-18	2018-19	Mean	
1.	TDb-13-6	15.32	17.86	16.59	20.00	21.33	20.67	21.67	24.33	23.00	20.08
2.	Local	10.32	5.69	8.01	8.00	9.33	8.67	9.72	12.00	10.86	9.18
	CD (0.05)	1.71	1.41		3.08	2.78		4.35	2.80		

Source: Annual Progress Report of AICRP on Tuber Crops (2013-14, 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19)

Table 2: Bulbil yield (t/ha) under IET and URT of aerial yam (year wise from 2013-14 to 2016-17) at Jagdalpur Centre

S. No.	Name of Entries	Bulbil yield (t/ha) during IET				Bulbil yield (t/ha) during URT			
		2013-14	2014-15	Mean	Advantage over Local Check (%)	2015-16	2016-17	Mean	Advantage over Local Check (%)
1.	TDb-13-6	8.57	13.57	11.07	68.02	14.65	15.40	15.03	50.36
2.	Local	2.76	4.32	3.54		5.53	9.38	7.46	
	CD (0.05)	1.08	1.13			0.91	1.06	0.93	

Source: Annual Progress Report of AICRP on Tuber Crops (2013-14, 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19)

Table 3: Bulbil yield (t/ha) under MLT of aerial yam at different location in Chhattisgarh state (2017-18 and 2018-19) Locations: L-1: Jagdalpur, L-2: Dantewada, L-3: Kanker, L-4: Narayanpur

Entries	2017-18					2018-19					Pooled	Advantage over Local Check during MLT (%)
	Yield of bulbils (t/ha)					Yield of bulbils (t/ha)						
	L1	L2	L3	L-4	Mean	L1	L2	L3	L-4	Mean		
TDb 13-1	10.80	12.17	12.7	13.15	12.20	13.80	12.17	12.70	12.15	12.71	12.46	
TDb 13-5	9.70	10.88	11.28	10.5	10.59	9.52	9.98	10.28	9.10	9.72	10.16	
TDb 13-6	11.47	12.37	15.78	14.2	13.46	13.96	14.75	15.78	14.2	14.67	14.06	34.04
Local	9.46	10.7	8.68	9.62	9.62	6.75	10.7	8.68	9.62	8.94	9.28	
	CD at (5 %)				1.743	CD at (5 %)				2.01	1.88	

Source: Annual Progress Report of AICRP on Tuber Crops (2017-18)

Table 4: Dry matter, starch and crude protein content in TDb 13-6 (IGDb-1) under MLT Year wise (2017-18 & 2018-19)

S. No.	Name of Entries	Dry Matter content (%)		Mean	Starch Content (%)		Mean	Crude Protein (%)		Mean
		17-18	18-19		17-18	18-19		17-18	18-19	
1.	TDb 13-1	38.02	36.67	37.35	12.03	12.54	12.29	4.97	5.02	5.00
2.	TDb 13-5	40.28	39.08	39.68	14.13	14.29	14.21	6.75	6.28	6.52
3.	TDb 13-6	40.59	41.29	40.94	14.42	15.12	14.77	5.71	5.67	5.69
4.	Local	39.01	38.35	38.68	13.06	13.98	13.52	3.57	3.51	3.54
	SEM±	0.289	0.71	0.50	0.209	0.36	0.28	0.110	0.19	0.15
	CD at (5 %)	0.937	2.18	1.56	0.677	1.12	0.90	0.356	0.58	0.47

Source: Annual Progress Report of AICRP on Tuber Crops (2017-18 & 2018-19)

Table 5: Quality attributes of *Dioscorea bulbifera* entry TDb 13-6 (IGDb-1) under MLT Year wise (2017-18 & 2018-19)

S. No.	Name of Entries	Phosphorus (ppm)		Mean	Potassium (%)		Mean
		2017-18	2018-19		2017-18	2018-19	
1.	TDb 13-1	0.8	1	0.9	1.36	1.38	1.37
2.	TDb 13-5	1	0.9	0.95	1.49	1.46	1.48
3.	TDb 13-6	1.2	1.3	1.25	1.86	1.89	1.88
4.	Local	0.5	0.7	0.6	1.14	1.17	1.16
		SEM±		0.224	SEM±		0.31
		CD at (5 %)		0.778	CD at (5 %)		1.06

Source: Annual Progress Report of AICRP on Tuber Crops (2017-18 & 2018-19)

Table 6: Bulbils / Aerial Tuber Flesh colour, Cooking quality and Organoleptic score of *Dioscorea bulbifera* entry TDb 13-6 (IGDb-1) under MLT during the year 2017-18 & 2018-19

S. No.	Entries	Tuber skin Colour	Tuber flesh Colour	Cooking quality	Organoleptic score		Mean Organoleptic score
					2017-18	2018-19	
1.	TDb 13-1	Dark Brown	Light yellow	Very Good	7.20	7.10	7.15
2.	TDb 13-5	Dark Brown	Light yellow	Very Good	7.58	7.40	7.49
3.	TDb 13-6	Dark Brown	Light yellow	Very Good	8.45	8.39	8.42
4.	Local	Dark Brown	Light yellow	Very Good	6.47	6.69	6.58
	SEM ±	-	-	-	0.181	0.25	0.22
	CD at (5 %)	-	-	-	0.588	0.76	0.67

Source Annual Progress Report of AICRP on Tuber Crops (2017-18 & 2018-19)

Hedonic Score Scale

Liked extremely= 9; Liked very much= 8; Liked moderately = 7; Liked slightly = 6, Liked Neither liked nor disliked = 5, Disliked slightly = 4, Disliked moderately = 3, Disliked very much = 2, Disliked extremely = 1

Table 8: Leaf spot incidence (0-5 scale) in *Dioscorea bulbifera* entry TDb 13-6 (IGDb-1) under MLT year wise (2017-18 & 2018-19)

S. No.	Name of Entries	Anthracnose incidence (0-5 scale) at Jagdalpur		Mean
		2017-18	2018-19	
1.	TDb 13-1	1.35	1.23	1.3
2.	TDb 13-5	0.68	0.35	0.52
3.	TDb 13-6	1.21	1.12	1.17
4.	Local	0.95	1.21	1.08
		SEM ±		0.28
		CD at (5 %)		0.95

Source: Annual Progress Report of AICRP on Tuber Crops (2017-18 & 2018-19)

Conclusions

Chhattisgarh Dangkanda-1 has performed well in multi-location trials conducted under AICRP on Tuber crops in Chhattisgarh state. And therefore can be grown successfully for increasing the aerial yam productivity in these areas. Chhattisgarh Dangkanda-1 can meet the long felt demand of farmers for a variety with good keeping and culinary quality, and field resistance to anthracnose with high aerial tuber yield.

References

1. Anonymous. Annual report of the National Bureau of Plant Genetic Resources, NBPGR, Pusa Campus, New Delhi, India, 2005, p. 148.
2. Annual report, AICRP on Tuber Crops, Central Tuber Crop Research Institute, ICAR, Trivandrum, Kerala, India, 2014, p. 33-69.
3. Annual report, AICRP on Tuber Crops, Central Tuber Crop Research Institute, ICAR, Trivandrum, Kerala, India, 2015, p. 37-70.
4. Annual report, AICRP on Tuber Crops, Central Tuber Crop Research Institute, ICAR, Trivandrum, Kerala, India, 2016, p. 34-71.
5. Annual report, AICRP on Tuber Crops, Central Tuber Crop Research Institute, ICAR, Trivandrum, Kerala, India, 2017, p. 35-117.
6. Annual report, AICRP on Tuber Crops, Central Tuber Crop Research Institute, ICAR, Trivandrum, Kerala, India, 2018, p. 35-117.
7. Annual report, AICRP on Tuber Crops, Central Tuber Crop Research Institute, ICAR, Trivandrum, Kerala, India, 2019, p. 35-117.