Agro-morphological variation in Kankoda (*Momordica dioica* Roxb)

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ABSTRACT

Kankoda (*Momordica dioica* Roxb) is a potential and economically important vegetable crop with good nutritional and medicinal value. Characterization was carried out by studying 9 qualitative and 17 quantitative traits. Categorical differences among 15 genotypes including two checks viz Indira Kankoda-1 and CG Kankoda-2 were observed in traits such as days to first female flowering node, stem colour, leaf colour, leaf length, leaf width, leaf margin, leaf colour, fruit shape, fruit length, fruit diameter, fruit weight, number of fruits/plant, fruit yield/plant, days to first male flowering, density of spines, seed colour, days to first female flowering, vine length and 100-seed weight. Several of these traits are useful as genetic markers and for hybridization programmes.

Keywords: Characterization; genotypes; Kankoda; traits

INTRODUCTION

Known by various names as Kankoda, Kheksi, teasle gourd, Kakrol, Kantola, Meetha Karela and Kantroli etc, the spine gourd is a potential cucurbitaceous vegetable with high protein and medicinal value grown in Odisha, Maharashtra, Bihar and Chhattisgarh and is consumed by tribals. The exact information about statistics on area and production in Chhattisgarh state even in India is still unknown. It is estimated that it is having green fruit yield of 28-30 q/ha in Chhattisgarh (Yadav 2018). To study the diversity of spine gourd, it is essential to distinguish the genotypes and categorize the descriptors so that they can be utilized as genetic markers.

MATERIAL and METHODS

Fifteen genotypes viz IGSG 21-1 to IGSG 21-13 including two checks viz Indira Kankoda-1 and CG Kankoda -2 were collected from northern hill zone of Chhattisgarh and Indira Gandhi Krishi Vishwavidyalaya main campus, Raipur, Chhattisgarh. These were evaluated in randomized block design with three replications during kharif 2021. Two meter spacing was maintained between rows and between plants along with 1:4 (male:female) ratio in the field. Recommended package of practices was adapted and data were recorded on 5 randomly selected plants. Observations were made using character descriptors as outlined by Rasul et al (2004) and Yadav (2021).

RESULTS and DISCUSSION

Twenty six parameters of agro-morphological characteristics as listed in Table 1 were recorded from 5 randomly selected plants in Kankoda.

Flowering characteristics: Flowering was characterized by days to first male flowering, days to first female flowering and days to first female flowering node. Among fifteen genotypes, 80 per cent showed medium early first male flowering and 20 per cent late flowering. Three genotypes were recorded medium (41-45 days) of 20 per cent while 12 genotypes showed late (46-50 days) duration ie 80 per cent for days to first female flowering. Days to first female flowering node was classified into early, medium and late. Three genotypes exhibited medium (20%), whereas, 12 genotypes late (80%) female flowering node.

Stem characteristics: Stem was characterized by its colour, fineness, number and vine length. These were

Table 1. Parameters (descriptors) of agro-morphological traits in Kankoda

Trait	Parameter	Name of genotypes with two checks (C-1 and C-2)	Number of genotypes	Per cent genotypes
Days to first male flowering	1. Early (35-40)	-	-	-
	3. Medium early (41-45)	IGSG21-1, SG21-2, IGSG21-4, IGSG21-6, IGSG21-7, IGSG21-8, IGSG21-10, IGSG21-11, IGSG21-12, IGSG21-13, C-1, C-2	12	80
	5. Late (>50)	IGSG21-3, IGSG21-5, IGSG21-9	3	20
Days to first female flowering	1. Early (35-40)	-	-	
	3. Medium early (41-45)	IGSG21-7, IGSG 21-8, C-2	3	20
	5. Late (46-50)	IGSG21-1, IGSG21-2, IGSG21-3, IGSG21-4, IGSG21-5, IGSG21-6, IGSG21-9, IGSG21-10, IGSG21-11, IGSG21-12, IGSG21-13, C-1	12	80
Days to first female flowering node	1. Early (35-40)	-	-	-
	3. Medium early (41-45)	IGSG21-7, IGSG 21-8, C-2	3	20
	5. Late (46-50)	IGSG21-1, IGSG21-2, IGSG21-3, IGSG21-4, IGSG21-5, IGSG21-6, IGSG21-9, IGSG21-10, IGSG21-11, IGSG21-12, IGSG21-13, C-1	12	80
Stem colour	1. Light green	IGSG21-4, IGSG-13, C-1	3	20
	2. Green	IGSG21-1 , IGSG21-2 , IGSG21-3 , IGSG21- 5, IGSG21- 6, IGSG21- 7, IGSG21-8 , IGSG21- 9, IGSG21-10, IGSG21- 11, IGSG21-12	11	73
	5. Dark green	C-2	1	7
Stem fineness	1. Smooth	IGSG21-1, IGSG21-2, IGSG21-4, IGSG21-5, IGSG21-6, IGSG21-7, IGSG21-8, IGSG21-9, IGSG21-10, IGSG21-11, IGSG21-12	11	73
	3. Moderate	IGSG 21-3, C-2	2	13
	5. Rough	IGSG21-13, C-1	2	13
Number of stems/plant	1. Few (<10)	All genotypes including both checks (C-1, C-2)	15	100
	3. Moderate (11-20)	-	-	-
	5. Many (>21)	-	-	-
Vine length (cm)	1. Short (100-110)	-	-	-
	3. Medium (111-120)	All genotypes including both checks (C-1, C-2)	-	-
	5. Large (>120)	IGSG21-4, IGSG21-7, IGSG-10	15	100
Leaf colour	1. Light green	IGSG21- 5, IGSG21-6, IGSG21-8, IGSG21-9, IGSG21-10, IGSG21-11, IGSG21-12, IGSG21-13, C-1	3	20
	3. Green	IGSG21-1, IGSG21-2 , C-2	9	60
	5. Dark green	IGSG21- 2, IGSG21-3, IGSG21-9, IGSG21-12	3	20
Leaf margin	3. Slightly dented	IGSG21-1, IGSG21-6, IGSG21-7, IGSG21- 8, IGSG21-10, IGSG21-11, IGSG21-13, C-1	4	27
	5. Medium dented	IGSG21- 4, IGSG21-5, C-2	8	53
	7. Dented	-	3	20
Leaf length (cm)	1. Short (1-7)	All genotypes with both checks (C-1, C-2)	-	-
	3. Medium (7.1-15)	-	15	100

	5. Long (>15)	IGSG21-1, IGSG21-4, IGSG21-5, IGSG21-6	-	-
Leaf width (cm)	1. Narrow (1-7)	IGSG21-2 , IGSG21-3, IGSG21-7, IGSG21-8, IGSG21-9, IGSG21-10, IGSG21-11, IGSG21-12, IGSG21-13, C-1, C-2	4	27
	3. Medium(7.1-15)	-	11	73
	5. Wide (>15)	IGSG21-4, IGSG21-5, IGSG21-7	-	-
Fruit colour	1. Greenish yellow	IGSG21-3, IGSG21-9, IGSG21-10, IGSG21-12, C-1	3	20
	3. Yellow green	IGSG21-6, IGSG21-11, IGSG21-13	5	33
	5. Green	IGSG21-1, IGSG21-2, IGSG21-8, C-2	3	20
	7. Dark green	IGSG21-1, IGSG21-6, IGSG21-8, IGSG21-9, IGSG21-10, IGSG21-11	4	27
Fruit shape	1. Round	IGSG21-2, IGSG21-4, IGSG21-7, C-1	6	40
	3. Oval	IGSG21-3, IGSG21-5, IGSG21-12, IGSG21-13, C-2	4	27
	5. Cylindrical	IGSG21-1, IGSG21-2, IGSG21-3, IGSG21-5, IGSG21-7, IGSG21-9, IGSG21-13, C-1	5	33
Density of spines	1. Thin	IGSG21-4, IGSG21-6, IGSG21-8, IGSG21-10, IGSG21-11, IGSG21-12, C-2	8	53
	3. Thick	-	7	47
Fruit length (cm)	1. Short (<5)	All genotypes with both checks (C-1, C-2)	-	-
	3. Medium (4.1-9)	-	15	100
	5. Long (>9)	-	-	-
Fruit diameter (cm)	1. Small (1-4)	IGSG 21-1, IGSG21-7, IGSG21-8, IGSG21-9	-	-
	3. Medium (4.1-8)	IGSG 21-2, IGSG 21-3, IGSG 21-4, IGSG 21-5, IGSG 21-6, IGSG 21-10, IGSG 21-11, IGSG 21-12, IGSG 21-13, C-1, C-2	4	27
	5. Large (8.1-12)	-	11	73
Days to first fruit harvest	1. Early (45-50)	-	-	-
	3. Medium (50-60)	All genotypes with both checks (C-1, C-2)	-	-
	5. Late (>60)	-	15	100
Days to last fruit harvest	1. Early (<100)	IGSG21-11, IGSG21-12	-	-
	3. Medium (100-110 days)	IGSG21-1, IGSG21-2, IGSG21-3, IGSG21-4, IGSG21-5, IGSG21-6, IGSG21-7, IGSG21-8, IGSG21-9, IGSG21-10, IGSG21-13, C-1, C-2	2	13
	5. Late (>110)	-	13	87
Number of fruits/plant	1. Few (<20)	-	-	-
	3. Moderate (21-40)	-	-	-
	5. Profuse (41-60)	All genotypes with both checks (C-1, C-2)	-	-
	7. Many (>60)	-	15	100
Single fruit weight (g)	1. Light (1-5)	-	-	-
	3. Medium (5-10)	IGSG21-2, IGSG21-4, IGSG21-5, IGSG21-8, IGSG21-11, IGSG21-12	-	-
	5. Heavy (10-15)	IGSG21-1, IGSG21-3, IGSG21-6, IGSG21-7, IGSG21- 9, IGSG21-10, IGSG21-12, C-1, C-2	6	40
	7. Very heavy (>15)	-	9	60

Fruit yield/plant (kg)	1. Low (<1.0)	IGSG21-1, IGSG21-5, IGSG21-6, IGSG21-7, IGSG21-8, IGSG21-10, IGSG21-13, C-1	-	-
	3. Medium (1.1-3.0)	IGSG21-2, IGSG21-3, IGSG21-4, IGSG21-9, IGSG21-11, IGSG21-12,	8	53
	5. Good (2.1-3.0)	C-2	6	40
	7. Very good (3.1-4.0)	IGSG21-1, IGSG21-6, IGSG21-7, IGSG21-8, IGSG21-10, IGSG21-13, C-2	1	7
Seed colour	1. Light yellow	IGSG21-3, IGSG21-4, IGSG21-5, IGSG21-9, IGSG21-12, C-1	7	47
	3. Grey	IGSG21-2, IGSG21-11	6	40
	5. Black	-	2	13
100-seed weight (g)	1. Light (<10)	All genotypes with both checks (C-1, C-2)	-	-
	3. Medium (11-20)	-	15	100
	5. Bold (>20)	-	-	-
Number of seeds/fruit	1. Few (1-15)	All genotypes with both checks (C-1, C-2)	-	-
	3. Less (16-30)	-	15	100
	5. Medium (31-45)	-	-	-
	7. Large (41-60)	-	-	-

recorded in full growth stage of the crop. About 73, 20 and 7 per cent genotypes had green, light green and dark green stems respectively. Eleven genotypes were smooth (73%) while two were moderate and rough (13% each) for stem fineness. Number of stems/plant and vine length were noted for all genotypes with both checks ie 100 per cent frequency.

Leaf characteristics: The leaves were grouped by their colour, margin, length and width. Nine genotypes were green (60%), 3 were light green and dark green (20% each). Leaf margin was quite variable from medium dented (53%) to slightly dented (27%) and dented (20%). Four genotypes showed narrow (27%), whereas, 11 genotypes showed medium (73%) leaf width.

Fruit characteristics: Fruits were characterized into distinct classes by their colour, shape, density, length and diameter. The colour of fruits was yellow green (33%), green (20%) and dark green (27%). Fruit shape was round (40%), cylindrical (33%) and oval (27%). Generally, growers prefer cylindrical to oval shape fruits. Density of spines had 2 categories in which 8 genotypes were thin (53%) while 7 with spines (47%). Fruit length was found medium in all genotypes including both checks ie 100 per cent. Fruit diameter was medium (27%) for 4 genotypes, whereas, 73 per cent had long diameter.

Days to fruit harvest characteristics: There were no differences observed in days to first fruit harvest, days to last fruit harvest and number of fruits/plant ie 100 per cent for all genotypes including both checks.

Fruit yield characteristics: Six genotypes were having heavy (10-15 g) and 9 were having heavy (>15 g) single fruit weight. Eight genotypes had medium (53%), six had good (40%) and one check had very good (C-2) fruit yield/plant (7.0%).

Seed characteristics: Colour of seeds was variable from light yellow to black. Seven genotypes showed light yellow (47%), 6 showed grey (40%) and 2 showed black (13%) colour. 100-seed weight was medium (11-20 g) for all genotypes with both checks. All genotypes exhibited less number of seeds/fruit (16-30) ie 100 per cent.

In the present investigations the highest variation was observed for days to first female flowering node, stem colour, leaf colour, leaf length, leaf width, leaf margin, fruit colour, fruit shape, fruit length, fruit diameter, fruit weight , number of fruits/ plant and fruit yield/plant. Similar findings were also reported by Rasul et al (2004) and Yadav (2021). Similar observations on traits like days to first male flowering, density of spines, seed colour, days to first female flowering, vine length and 100-seed weight were also

observed by Yadav (2021). Qualitative traits were not as influenced as quantitative traits by the environment. Therefore, the above traits of Kankoda could be used as genetic markers in hybridization programmes.

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