The Pharma Innovation Journal 2022; SP-11(8): 513-518

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(8): 513-518

www.thepharmajournal.com
Received: 15-06-2022
Accepted: 19-07-2022

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Morphological characterization of surveyed jackfruit genotypes in Godavari zone of Andhra Pradesh

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Abstract
The present investigation entitled "Morphological characterization of surveyed jackfruit genotypes in Godavari Zone of Andhra Pradesh" was conducted at Horticultural Research Station, Venkataramannagudem. Survey was conducted in Devarapalli, Mettaupparagudem, Venkataramannagudem, Jaggannapeta, Kommugudem, Krishnampalem and Ramannapalem villages of West Godavari district. During the survey thirtyone genotypes were identified and all they were compared with the check variety Palur-1. Maximum fruit weight (19.96 kg), fruit length (55.00 cm), weight of flakes per fruit (8.62 kg), number of flakes per fruit (315.00) and highest flake length (11.10 cm) was recorded in VJC-7 genotype. Higher weight of fresh flake with seed (49.80 g) and weight of fresh flake without seed (41. 80 g) was recorded in VJC-23. VJC-16 (3.32 cm) recorded higher flake width.

Keywords: Jackfruit, germplasm, evaluation

Introduction
Jackfruit is botanically referred to *Artocarpus heterophyllus* Lam. belongs to the family Moraceae, which includes mulberry (*Morus* spp.) and figs (Ficus spp.). It is native to the rain forests of Western Ghats, India and is cultivated throughout tropical lowlands in south and South- East Asia, parts of Central and Eastern Africa and Brazil. Major jackfruit producers are Bangladesh, India, Myanmar, Thailand, Vietnam, China, Philippines, Indonesia, Malaysia and Sri Lanka. Jackfruit is the National fruit of Bangladesh and Sri Lanka and the State fruit of the Indian States of Kerala and Tamil Nadu.

The family Moraceae encompasses of 55 genera and 900-1,000 species, mostly tropical shrubs, trees, but also few vines and herbs. The genus *Artocarpus* contains about 50 species of which 15 bears edible fruits and two of them have horticultural importance *viz.,* Jackfruit (*Artocarpus heterophyllus* Lam.) and bread fruit (*Artocarpus altilis*). Monkey jack (*Artocarpus lakoocha*) and Ainipala (*Artocarpus hirsutus*) are two wild species of jackfruit. The poor people of jackfruit growing area used to eat this fruit instead of rice for one of their daily meals, hence it is commonly referred to as "the poor man's food" (Rahman *et al*., 1994) [8].

Jackfruit has a peculiar fruit bearing habit called cauliflorous bear's fruits on the trunk and branches (Hossain *et al*., 2012) [4]. The fruits are large, round cylindrical to pear shaped, greenish fruit technically termed as syncarp, which is a type of multiple fruit consisting several fruitlets or true fruit. The edible part in jackfruit are fully developed perianths which are referred as flakes. The trees have a significant role in the preservation of the environment, very effective in the amelioration of soils and prevention of soil erosion (Reddy *et al*., 2004) [10]. The primary economic product of jackfruit is the fruit, used both at immature and mature stages. Immature fruits are used as vegetable purpose and mature fruits are used for preparation of value-added products such as dried dehydrated flakes or flake Powder, beverages, candies etc.

Lot of variability is existing in the Godavari zone of Andhra Pradesh and *in-situ* evaluation of these germplasm for fruit characters and yield characters will be useful for identification of new genotypes for the commercial cultivation in the state. Evaluation of germplasm is the basic tool for identification of superior genotypes. The knowledge on qualitative and quantitative characters of different types of jackfruit would help the growers to identify actual characters of good quality jackfruit for using different purposes.

Jackfruit shows a considerable range of variation in morpho-agronomic characters. The great extent of natural variation available for various characters among the genotypes suggests good scope for improvement in economic traits. Large variability ensures better chance of producing new genotypes.

Material and Methods

Survey was conducted in Godavari Zone of Andhra Pradesh. Information regarding superior genotypes were collected from the farmers and fruit traders of Godavari zone. The selected jackfruit trees were identified in the farmer's fields. However, jackfruit being an underutilized crop were grown in backyard without any management practices, mixed with other fruit trees. The observations on various characters of each genotype were recorded timely and periodically in the farmers fields during the year 2022. The harvested fruits brought to the laboratory for further analysis. Data on morphological parameters of fruits and flakes of the selected jackfruit trees were recorded based on Jackfruit descriptors (IPGRI, 2000). The data collected from different observations was analyzed using the method of descriptive statistics.

Results and Discussion

Fruit bearing position

The observations on fruit bearing position of different genotypes are given in Table 1 showed that the check variety Palur -1 and two genotypes namely VJC-30 and VJC-31 produced fruits on main trunk, primary and secondary branches. Fifteen genotypes under study *viz*., VJC-4, VJC-7, VJC-8, VJC-12, VJC-14, VJC-15, VJC-16, VJC-17, VJC-18, VJC-23, VJC-24, VJC-25, VJC-26, VJC-28, VJC-29 produced fruits on main trunk and primary branches whereas, nine genotypes *viz*., VJC-1, VJC-2, VJC-3, VJC-5, VJC-6, VJC-10, VJC-11, VJC-21 and VJC-27 produced fruits on primary as well as secondary branches. Further, five genotypes *viz*., VJC-9, VJC-13, VJC-19, VJC-20 and VJC-22 produced fruits on primary branches.

Fruit clustering habit

Fruit clustering habit was recorded visually as solitary and clustering bearing habit are given in Table 1 showed that the check variety Palur -1 and twenty six genotypes viz., VJC-1, VJC-2, VJC-3, VJC-4, VJC-5, VJC-6, VJC-8, VJC-10, VJC-11, VJC-12, VJC13, VJC-14, VJC-15, VJC-16, VJC-17, VJC-18, VJC-19, VJC-20, VJC-21, VJC-23, VJC-26, VJC-27, VJC-28, VJC-29, VJC-30 and VJC-31 were showed cluster bearing habit and remaining five genotypes *viz*., VJC-7, VJC-9, VJC-22, VJC-24 and VJC-25 were showed solitary bearing habit.

Fruit shape

Much variation was observed in fruit shapes such as ellipsoid, clavate, spheroid, oblong and irregular were observed among the 31 jack genotypes. Data presented in Table 1 showed that the check variety Palur -1 and three genotypes *viz*., VJC-15, VJC-22 and VJC-25 showed spheroid fruit shape whereas, eleven genotypes under study *viz*., VJC-4, VJC-9, VJC-10, VJC-12, VJC-14, VJC-19, VJC-20, VJC-21, VJC-24, VJC-27 and VJC-29 showed irregular fruit shape and ten genotypes *viz*., VJC-1, VJC-2, VJC-6, VJC-8, VJC-13, VJC-17, VJC-18, VJC-26, VJC-28 and VJC-30 showed ellipsoid shape. Further, five genotypes *viz*., VJC-3, VJC-7, VJC-16, VJC-23 and VJC-31 showed clavate fruit shape and remaining two genotypes VJC-5 and VJC-11 showed oblong fruit shape. Phaomei *et al*. (2018) [7] reported wide variation in fruit shape of jackfruit varied from ellipsoid, oblong, spheroid, clavate, obolid and irregular. It might be due to the combined effect of nature of pollination and the genetic characters. Inadequate pollination gives irregular and misshapen shape of fruits whereas, uniform pollination results in definite shape.

Stalk attachment to fruit

The stalk attachment to fruit was recorded visually as flattened and depressed. Data presented in Table 2 showed that the check variety Palur -1 and twelve genotypes under study *viz*., VJC-7, VJC-9, VJC-10, VJC-13, VJC-14, VJC-15, VJC-17, VJC-20, VJC-24, VJC-25, VJC-26 and VJC-27 showed depressed stalk attachment to fruit and remaining nineteen genotypes VJC-1, VJC-2, VJC-3, VJC-4, VJC-5, VJC-6, VJC-8, VJC-11, VJC-12, VJC-16, VJC-18, VJC-19, VJC-21, VJC-22, VJC-23, VJC-28, VJC-29, VJC-30, VJC-31 showed flattened stalk attachment to fruit.

Fruit rind colour

Data presented in Table 1 showed that genotypes differed in rind colour and it was observed that the check variety Palur -1 and thirteen genotypes under study *viz*., VJC-2, VJC-6, VJC-8, VJC-10, VJC-11, VJC-12, VJC-19, VJC-20, VJC-22, VJC-26, VJC-28, VJC-29 and VJC-30 categorized under green rind colour and fourteen genotypes *viz*., VJC-1, VJC-3, VJC-4, VJC-5, VJC-9, VJC-13, VJC-14, VJC-15, VJC-16, VJC-17, VJC-21, VJC-23, VJC-27, VJC-31 categorized under greenish yellow rind colour. Further, two genotypes *viz*., VJC-24, VJC-25 categorized under yellow rind colour and rest two genotypes namely VJC-18 and VJC-7 categorized under yellowish brown, reddish yellow rind colour respectively. Rahman *et al*. (2016) [11] reported variations in rind colour like greenish yellow, brownish yellow and light yellow.

Spine density

Spine density was recorded visually as dense and sparse. Table 2 showed that the check variety Palur -1 and fifteen genotypes under study *viz*., VJC-6, VJC-8, VJC-9, VJC-11, VJC-12, VJC-13, VJC-14, VJC-15, VJC-18, VJC-19, VJC-21, VJC-22, VJC-24, VJC-28 and VJC-29 showed sparse spine density and remaining sixteen genotypes under study *viz*., VJC-1, VJC-2, VJC-3, VJC-4, VJC-5, VJC-7, VJC-10, VJC-16, VJC-17, VJC-20, VJC-23, VJC-25, VJC-26, VJC-27, VJC-30 and VJC-31 showed dense spine density. Phaomei *et al.* (2018) [7] reported sparse and dense spine density of jackfruit genotypes.

Latex exudation

Latex exudation of different genotypes was observed visually and categorized as low, medium and high. Data presented in Table 1 showed that five genotypes *viz*., VJC-2, VJC-17, VJC-23, VJC-24 and VJC-25 categorized under low latex exudation genotypes, check variety Palur -1 along with seventeen genotypes *viz*., VJC-3, VJC-4, VJC-6, VJC-10, VJC-11, VJC-12, VJC-13, VJC-14, VJC-15, VJC-16, VJC-18, VJC-22, VJC-26, VJC-27, VJC-29, VJC-30 and VJC-31 were categorized under medium latex exudation genotypes whereas, rest nine genotypes *viz*., VJC-1, VJC-7, VJC-8, VJC-9, VJC-14, VJC-19, VJC-20, VJC-21 and VJC-28 were categorized under high latex exudation genotypes. Variation in latex exudation was reported by Phaomei *et al.* (2018) [7] as low, medium and high.

Flake shape

Flake shape of jack genotypes under study were observed as twisted, obovate, rectangular, oblong with curved tips and irregular. Table 2 showed that the check variety Palur -1 and the genotype VJC-6 categorized under rectangular flake shape whereas, twelve genotypes under study *viz*., VJC-2, VJC-3, VJC-10, VJC-11, VJC-23, VJC-24, VJC-25, VJC-26, VJC-28, VJC-29, VJC-30 and VJC-31 categorized under twisted shape and eight genotypes *viz*., VJC-4, VJC-5, VJC-7, VJC-8, VJC-12, VJC-15, VJC-18 and VJC-19 categorized under oblong with curved tips. Further, eight genotypes VJC-1, VJC-13, VJC-14, VJC-16, VJC-17, VJC-20, VJC-21 and VJC-27 categorized under irregular flake shape and the remaining two genotypes *viz*., VJC-9 and VJC-22 categorized under obovate flake shape.

Flake texture

Data presented in Table 2 recorded that flake texture among 31 genotypes ranged from soft to melting. The check variety Palur -1 and eleven genotypes under study *viz*., VJC-1, VJC-2, VJC-12, VJC-13, VJC-16, VJC-17, VJC-18, VJC-19, VJC-23, VJC-24 and VJC-25 categorized under firm flake texture whereas, twelve genotypes *viz*., VJC-3, VJC-4, VJC-5, VJC-6, VJC-7, VJC-8, VJC-9, VJC-10, VJC-14, VJC-21, VJC-26, VJC-30 categorized under soft flake texture and seven genotypes *viz*., VJC-11, VJC-15, VJC-22, VJC-27, VJC-28, VJC-29 and VJC-31 categorized under coarse flake texture and melting texture was observed in VJC-20. Similar findings reported by Gomez *et al*. (2015) [3].

Flake color

Flake colour varied from yellow, light yellow and creamy white among 31 jack genotypes presented in Table 2 It was observed that the check variety Palur -1 and eight genotypes *viz*., VJC-4, VJC-6, VJC-14, VJC-16, VJC-17, VJC-18, VJC-19, VJC-23 categorized under yellow flake colour. Majority thirteen genotypes under study *viz*., VJC-1, VJC-3, VJC-9, VJC-10, VJC-11, VJC-15, VJC-20, VJC-21, VJC-25, VJC-26, VJC-27, VJC-30 and VJC-31 categorized under light yellow flake colour and rest ten genotypes *viz*., VJC-2, VJC-5, VJC-7, VJC-8, VJC-12, VJC-13, VJC-22, VJC-24, VJC-28 and VJC-29 categorized under creamy white flake colour. Similar results are reported by Akter and Rahman (2017) [1].

Quantitative characterization of fruit

Data presented in Table 3 showed that fruit weight ranged from 2.77 kg (VJC-27) to 19.96 kg (VJC-7). The mean fruit weight under study was recorded 9.70 kg. It was observed that two genotypes VJC-7 (19.96 kg) and VJC-11(15.97) were recorded higher fruit weight than the check variety Palur-1 (15.18 kg). Fruit length ranged from 22.50 cm (VJC-27) to 55.00 cm (VJC-7) and it was recorded that seven genotypes namely VJC-4 (42.80 cm), VJC-5 (52.00 cm), VJC-7 (55.00 cm) VJC-11 (47.60 cm), VJC-14 (42.60 cm), VJC-20 (46.30 cm), VJC-28 (40.40 cm) were recorded higher fruit length than the check variety Palur-1 (39.50 cm). Fruit diameter ranged from 15.70 cm (VJC-27) to 28.40 cm (VJC-14). One genotype (VJC-14) recorded maximum fruit diameter (28.40 cm) than the check variety Palur-1 (27.30 cm). It might be due to the soil and nutrient status of the place, environmental conditions and genetic factors among the genotypes. The findings are accordance with Jagadeesh *et al*. (2010) [5] and Uikey *et al*. (2020) [12]. Number of flakes per fruit ranged from 25.00 (VJC-27) to 315.00 (VJC-7). It was recorded that three genotype VJC-5 (250.00 cm) VJC-7 (315.00 cm) and VJC-9 (295.00) were recorded maximum number of flakes per fruits than the check variety Palur-1 (246). Weight of flakes per fruit ranged from 0.45 kg (VJC-27) to 8.62 kg (VJC-7). One genotype (VJC-7) recorded maximum weight of flakes per fruit (8.62 kg) than the check variety Palur-1 (7.02 kg). The size of the fruit influence the number of flakes per fruit. Rachis core length and rachis core diameter also have impact on number of flakes per fruit. Longest rachis length and widest rachis diameter reduces the number of flakes per fruit. Number of flakes per fruit and average weight without seed influence the edible portion of the jackfruit and it may be due to environmental conditions, nutrient status of the soil and genetic differences between the genotypes. Similar results reported by Chandrasekhar *et al*. (2018) [2].

Data given in Table 4 showed that weight of fresh flake with seed ranged from 8.0 g (VJC-20) to 49.8 g (VJC-23) among the 31 genotypes. It was recorded that eight genotypes *viz*., VJC-3 (35.0 g), VJC-16 (36.6 g), VJC-17 (42.4 g), VJC-18 (35.8 g), VJC-19 (42.0 g), VJC-23 (49.8 g), VJC-24 (36.0 g) and VJC-25 (42.0 g) were recorded maximum weight of fresh flake with seed than the check variety Palur-1 (34.0 g). Among 31 genotypes weight of fresh flake without seed which ranged from 4.0 g (VJC-20) to 41.8 g (VJC-23). It was recorded that seven genotypes VJC-16 (27.6 g), VJC-17 (34.9 g), VJC-18 (30.8 g), VJC-19 (36.0 cm), VJC-23 (41.8 g), VJC-24 (28.0 g) and VJC-25 (37.0 g) were recorded maximum weight of fresh flake without seed than the check variety Palur-1 (27.0 g). Similar results are reported by Phaomei *et al*. (2018) [7].

Quantitative characterization of flakes

Data given in Table 4 showed that flake length ranged from 3.18 cm (VJC-20) to 11.10 cm (VJC-7). It was recorded that fourteen genotypes VJC-3 (6.91 cm), VJC-7 (11.10 cm), VJC-8 (6.96 cm), VJC-11 (8.50 cm), VJC-13 (6.78 cm), VJC-14 (7.13 cm), VJC-15 (6.80 cm), VJC-18 (7.62 cm), VJC-22 (7.21 cm), VJC-23 (7.22 cm), VJC-24 (7.30 cm), VJC-25 (7.18 cm), VJC-28 (7.15 cm) and VJC-29 (7.33 cm) were recorded higher flake length than the check variety Palur-1 (6.48 cm). Flake width ranged from 1.90 cm (VJC-9) to 3.32 cm (VJC- 16). It was recorded that three genotypes *viz*., VJC-16 (3.32 cm), VJC-18 (3.29 cm) and VJC-24 (3.26 cm) were recorded higher flake width than the check variety Palur-1 (3.23 cm). Flake thickness ranged from 0.12 cm (VJC-20) to 0.67 cm (VJC- 18). It was recorded that two genotypes VJC-17 (0.65 cm) and VJC- 18 (0.67 cm) were recorded higher flake thickness than the check variety Palur-1 (0.63 cm). The findings are accordance with Rai *et al*. (2003), Jagadeesh *et al*. (2010) [9, 5] and Krishnan *et al*. (2015) [6]. In the present study, heaviest fruits recorded longest flake length and might be due to genetic makeup and microclimatic conditions of the genotype.

Table 1: Qualitative characterization of fruits of jackfruit genotypes

S. No	Genotype	Fruit bearing position	Fruit clustering habit	Fruit shape	Latex exudation	Fruit rind colour
1	VJC-1	Primary branches	Cluster	Ellipsoid	High	Greenish yellow
2	VJC-2	Primary and Secondary branches	Cluster	Ellipsoid	Low	Green
3	VJC-3	Primary and Secondary branches	Cluster	Clavate	Medium	Greenish yellow
4	VJC-4	Main trunk and Primary branches	Cluster	Irregular	Medium	Greenish yellow
5	VJC-5	Primary and secondary branches	Cluster	Oblong	High	Greenish yellow
6	VJC-6	Primary and Secondary branches	Cluster	Ellipsoid	Medium	Green
7	VJC-7	Main trunk and Primary branches	Solitary	Clavate	High	Reddish yellowish
8	VJC-8	Main trunk and Primary branches	Cluster	Ellipsoid	High	Green
9	VJC-9	Primary branches	Solitary	Irregular	High	Greenish yellow
10	VJC-10	Primary and Secondary branches	Cluster	Irregular	Medium	Green
11	VJC-11	Primary and Secondary branches	Cluster	Oblong	Medium	Green
12	VJC-12	Main trunk and Primary branches	Cluster	Irregular	Medium	Green
13	VJC-13	Primary branches	Cluster	Ellipsoid	Medium	Greenish yellow
14	VJC-14	Main trunk and Primary branches	Cluster	Irregular	High	Greenish yellow
15	VJC-15	Main trunk and primary branches	Cluster	Spheroid	Medium	Greenish yellow
16	VJC-16	Main trunk and Primary branches	Cluster	Clavate	Medium	Greenish yellow
17	VJC-17	Main trunk and Primary branches	Cluster	Ellipsoid	Low	Greenish yellow
18	VJC-18	Main trunk, Primary branches	Cluster	Ellipsoid	Medium	Yellowish brown
19	VJC-19	Primary branches	Cluster	Irregular	High	Green
20	VJC-20	Primary branches	Cluster	Irregular	High	Green
21	VJC-21	Primary branches	Cluster	Irregular	High	Greenish yellow
22	VJC-22	Primary branches	Solitary	Spheroid	Medium	Green
23	VJC-23	Main trunk and Primary branches	Cluster	Clavate	Low	Greenish yellow
24	VJC-24	Main trunk and primary branches	Solitary	Irregular	Low	Yellow
25	VJC-25	Main trunk and Primary branches	Solitary	Spheroid	Low	Yellow
26	VJC-26	Main trunk, Primary branches	Cluster	Ellipsoid	Medium	Green
27	VJC-27	Primary and Secondary branches	Cluster	Irregular	Medium	Greenish yellow
28	VJC-28	Main trunk and Primary branches	Cluster	Ellipsoid	High	Green
29	VJC-29	Main trunk and Primary branches	Cluster	Irregular	Medium	Green
30	VJC-30	Main trunk, Primary and secondary branches	Cluster	Ellipsoid	Medium	Green
31	VJC-31	Main trunk, Primary and secondary branches	Cluster	Clavate	Medium	Greenish yellow
32	Palur-1	Main trunk, Primary and secondary branches	Cluster	Ellipsoid	Medium	Green

Table 2: Qualitative characterization of fruits and flakes of jackfruit genotypes

S. No	Genotype	Stalk attachment to fruit	Spine density	Flake colour	Flake shape	Flake texture
1	VJC-1	Flattened	Dense	Light yellow	Irregular	Firm
2	VJC-2	Flattened	Dense	Creamy white	Twisted	Firm
3	VJC-3	Flattened	Dense	Light Yellow	Twisted	Soft
4	VJC-4	Flattened	Dense	Yellow	Oblong with curved tips	Soft
5	VJC-5	Flattened	Dense	Creamy white	Oblong with curved tips	Soft
6	VJC-6	Flattened	Sparse	Yellow	Rectangular	Soft
7	VJC-7	Depressed	Dense	Creamy white	Oblong with curved tips	Soft
8	VJC-8	Flattened	Sparse	Creamy white	Oblong with curved tips	Soft
9	VJC-9	Depressed	Sparse	Light yellow	Obovate	Soft
10	VJC-10	Depressed	Dense	Light Yellow	Twisted	Soft
11	VJC-11	Flattened	Sparse	Light yellow	Twisted	Coarse
12	VJC-12	Flattened	Sparse	Creamy white	Oblong with curved tips	Firm
13	VJC-13	Depressed	Sparse	Creamy white	Irregular	Firm
14	VJC-14	Depressed	Sparse	Yellow	Irregular	Soft
15	VJC-15	Depressed	Sparse	Light Yellow	Oblong with curved tips	Coarse
16	VJC-16	Flattened	Dense	Yellow	Irregular	Firm
17	VJC-17	Depressed	Dense	yellow	Irregular	Firm
18	VJC-18	Flattened	Sparse	yellow	Oblong with curved tips	Firm
19	VJC-19	Flattened	Sparse	Yellow	Oblong with curved tips	Firm
20	VJC-20	Depressed	Dense	Light yellow	Irregular	Melting
21	VJC-21	Flattened	Sparse	Light yellow	Irregular	Soft
22	VJC-22	Flattened	Sparse	Creamy white	Obovate	Coarse
23	VJC-23	Flattened	Dense	Yellow	Twisted	Firm
24	VJC-24	Depressed	Sparse	Creamy white	Twisted	Firm
25	VJC-25	Depressed	Dense	Light yellow	Twisted	Firm
26	VJC-26	Depressed	Dense	Light yellow	Twisted	Soft
27	VJC-27	Depressed	Dense	Light yellow	Irregular	Coarse
28	VJC-28	Flattened	Sparse	Creamy white	Twisted	Coarse
29	VJC-29	Flattened	Sparse	Creamy white	Twisted	Coarse
30	VJC-30	Flattened	Dense	Light Yellow	Twisted	Soft
31	VJC-31	Flattened	Dense	Light yellow	Twisted	Coarse

Table 3: Quantitative characterization of fruits of jackfruit genotypes

S. No	Genotype	Fruit weight (kg)	Fruit length (cm)	Fruit diameter (cm)	No. of flakes/ fruit	Weight of flakes/ fruit (kg)
1	VJC-1	8.14	32.10	19.80	132.00	3.48
2	VJC-2	11.65	34.50	26.40	178.00	4.43
3	VJC-3	8.23	35.50	22.60	108.00	3.58
4	VJC-4	11.00	42.80	23.70	240.00	3.98
5	VJC-5	11.42	52.00	23.00	250.00	4.50
6	VJC-6	11.22	34.10	24.60	205.00	3.68
7	VJC-7	19.96	55.00	27.00	315.00	8.62
8	VJC-8	7.95	33.00	23.30	105.00	2.32
9	VJC-9	11.69	38.00	24.20	295.00	2.98
10	VJC-10	7.00	28.80	22.20	153.00	2.34
11	VJC-11	15.97	47.60	27.50	238.00	6.96
12	VJC-12	6.56	32.30	19.00	104.00	1.16
13	VJC-13	8.20	34.80	22.40	142.00	2.68
14	VJC-14	14.49	42.60	28.40	182.00	6.07
15	VJC-15	9.92	30.00	22.20	156.00	3.55
16	VJC-16	7.85	34.10	20.40	103.00	3.65
17	VJC-17	9.53	32.90	24.20	138.00	3.58
18	VJC-18	7.64	29.10	20.60	106.00	3.56
19	VJC-19	8.60	32.50	22.00	105.00	4.27
20	VJC-20	9.19	46.30	19.80	208.00	1.79
21	VJC-21	8.00	36.50	21.10	131.00	2.86
22	VJC-22	10.54	33.40	25.60	168.00	4.49
23	VJC-23	9.86	37.20	22.90	105.00	4.41
24	VJC-24	11.12	35.40	24.60	121.00	4.16
25	VJC-25	10.84	33.10	25.10	132.00	4.95
26	VJC-26	5.32	28.20	15.80	105.00	1.58
27	VJC-27	2.77	22.50	15.70	25.00	0.45
28	VJC-28	10.18	40.40	22.40	157.00	4.45
29	VJC-29	11.50	37.00	24.50	152.00	4.78
30	VJC-30	7.00	32.60	19.50	121.00	2.86
31	VJC-31	7.35	35.20	23.60	102.00	2.45
	Mean	9.70	36.11	22.71	154.26	3.70
Range	Max	19.96	55.00	28.40	315.00	8.62
	Min	2.77	22.50	15.70	25.00	0.45
Check variety	Palur-1	15.18	39.50	27.30	246.00	7.02

Table 4: Quantitative characterization of fruits and flakes of jackfruit genotypes

S. No	Genotype	Weight of fresh flake with seed (g)	Weight of fresh flake without seed (g)	Flake length (cm)	Flake width (cm)	Flake thickness (cm)
1	VJC-1	32.00	25.00	5.93	2.72	0.55
2	VJC-2	25.00	20.00	7.10	2.54	0.41
3	VJC-3	35.00	26.00	6.91	2.62	0.27
4	VJC-4	20.00	16.00	5.62	1.98	0.24
5	VJC-5	20.00	15.00	5.96	2.80	0.28
6	VJC-6	18.00	12.00	6.40	2.20	0.32
7	VJC-7	31.00	23.00	11.10	3.12	0.45
8	VJC-8	34.00	26.00	6.96	3.05	0.48
9	VJC-9	10.00	6.00	5.83	1.90	0.18
10	VJC-10	16.00	10.50	5.15	2.10	0.34
11	VJC-11	34.00	26.00	8.50	2.80	0.30
12	VJC-12	13.00	7.00	6.18	2.12	0.23
13	VJC-13	23.00	15.50	6.78	2.96	0.32
14	VJC-14	34.00	26.40	7.13	2.85	0.25
15	VJC-15	23.00	17.00	6.80	2.20	0.20
16	VJC-16	36.60	27.60	6.22	3.32	0.62
17	VJC-17	42.40	34.90	6.25	3.23	0.65
18	VJC-18	35.80	30.80	7.62	3.29	0.67
19	VJC-19	42.00	36.00	6.28	2.60	0.59
20	VJC-20	8.00	4.00	3.18	2.28	0.12
21	VJC-21	25.00	17.00	5.92	2.95	0.40
22	VJC-22	27.00	16.00	7.21	2.20	0.31
23	VJC-23	49.80	41.80	7.22	3.20	0.57
24	VJC-24	36.00	28.00	7.30	3.26	0.54
25	VJC-25	42.00	37.00	7.18	2.61	0.55
26	VJC-26	19.00	15.00	5.20	2.63	0.27

27	VJC-27	21.00	16.00	5.25	2.52	0.30
28	VJC-28	30.00	23.00	7.15	2.58	0.42
29	VJC-29	32.00	24.00	7.33	3.18	0.48
30	VJC-30	26.00	18.00	6.05	2.31	0.45
31	VJC-31	25.00	21.00	5.35	2.62	0.38
	Mean	27.92	21.34	6.55	2.67	0.39
Range	Max	49.80	41.80	11.10	3.32	0.67
	Min	8.00	4.00	3.18	1.90	0.12
Check variety	Palur-1	34.00	27.00	6.48	3.23	0.63

Conclusion

From the present study, it may be concluded that jackfruit genotypes selected under Godavari zone of Andhra Pradesh showed variation in qualitative and quantitative characters of jackfruit. Wide variations were recorded in morphological characters of fruit and flakes of jackfruit. Maximum fruit weight (19.96 kg), fruit length (55.00 cm), weight of flakes per fruit (8.62 kg), number of flakes per fruit (315.00) and highest flake length (11.10 cm) was recorded in VJC-7 genotype. Maximum weight of fresh flake with seed (49.80 g) and weight of fresh flake without seed (41. 80 g) was recorded in VJC-23. VJC-16 (3.32 cm) recorded maximum flake width. Therefore, the jackfruit germplasm can be used in crop improvement programme.

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