

FRUIT CHARACTERISTICS, SEED VIABILITY AND POLYEMBRYONIC NATURE OF JAMUN (*EUGENIA JAMBULANUM*) FRUITS OF BANGLADESH

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Abstract

Of the five lines of Jamun studied Guda Jam produced the heaviest fruit (6.48 g) with maximum size (2.60 × 1.66 cm) followed by Comilla Jam (4.40 g and 2.33 × 1.66 cm). The highest brix reading was observed in Khudi Jam (17.5 %) and the lowest in Tit Jam (4.9%). The brix reading of other lines ranged from 7.5 to 10.6 per cent. The Guda Jam had highest edible portion (75.0%) closely followed by Kalo Jam (73.5%) and Tit Jam (72.0%). On overall consideration Guda Jam and Comilla Jam were found superior to others. Jamun seeds retained 84 to 96% germination upto 14 days of storage at room temperature after which germination decreased sharply. Monoembryonic and polyembryonic seeds ranged between 4-30 and 64-80% respectively.

Key words : Fruit characteristics, *Eugenia jambulanium*.

Introduction

Jamun (*Eugenia jambulanium*) is a popular fruit grown all over Bangladesh. The edible pulp which is rich in iron is generally eaten as a fresh fruit. However, it is also used in making delicious beverages, jellies, jam, squash, wine, vinegar, pickles and other articles of food (Ochse *et al.*, 1961). It is commonly propagated sexually. Being a cross pollinated crop it leads to variabilities in subsequent generations. Jamun seeds are reported to be polyembryonic in nature (Tiwari, 1926). There are Jamuns of different qualities in Bangladesh which have not been evaluated. Hence, the work was undertaken to study fruit characteristics, polyembryonic nature of seeds, and seed

viability of different lines of Jamuns in Bangladesh.

Materials and Methods

The study was carried out at the central research station of the Bangladesh Agricultural Research Institute (BARI), Joydebpur. Different kinds of Jamun fruits commonly known as Kalo Jam (JA-003), Tit Jam (JA-004), and Khudi Jam (JA-005) were collected from Gazipur and Guda Jam (JA-001) and Comilla Jam (JA-002) were collected from Dhaka and Comilla, respectively during June, 1989. Five hundred fruits were collected from a tree out of which 50 were randomly selected for analysis in the laboratory. Data in respect of

different quantitative and qualitative characters of these fruits and fruit components were recorded. Brix reading was taken by hand refractometer. Taste and astringency were measured by organoleptic test by a panel of judges.

One thousand seeds extracted from Comilla Jam were air-dried and treated with 0.2% Captan. One hundred seeds were sown in 100 poly bags of 10 × 12 cm size on the same day of extraction. Rest of the seeds were stored in an open glass jar at room temperature. One hundred of these seeds were sown each time at 7 days interval i.e. 7, 14, 21, 28 and 35 days after extraction in poly bags kept in open field. Data on germination (%), mono and polyembryony, and number of seedlings obtained per seed were noted. The height of seedlings and number of leaves were also recorded 75 days after sowing the seeds.

Results and Discussion

The lines were grouped into early, medium and late on the basis of harvesting time. Kalo Jam was found early while Guda Jam and Comilla Jam were medium, and Tit Jam and Khudi Jam were late in their availability in the

season. This Jam and Khudi Jam were rather wild type. Their fruits were generally eaten by birds and occasionally by children. The data on quantitative and qualitative characteristics of the fruits were presented in Tables 1 and 2, respectively. The large size fruits were obtained from Guda Jam (6.48 g) followed by Comilla Jam (4.40 g). The small size fruits were obtained from Tit Jam (0.55 g) and Khudi Jam (0.67 g). Similar trend was observed in fruit shape and size, and weight of seeds. The length and breadth of fruits varied from 0.78 to 2.60 and 0.75 to 1.96 cm, respectively. The results are in agreement with those reported by Bajpai and Chaturvedi (1985). The shape of fruits are shown in Figure 1. The fruits of Guda Jam were reddish black and those of Tit Jam pinkish. Fruits of other lines were black in colour. The flesh colour of Comilla Jam, Tit Jam and Khudi Jam was found to be pinkish and that of Guda Jam and Kalo Jam reddish. Fruits of Khudi Jam was very sweet and those of Guda Jam and Comilla Jam were slightly sweet but Kalo Jam and Tit Jam were sour in taste. The fruits of all the lines were highly astringent excepting Comilla Jam. Khudi Jam had highest brix reading (17.5%) and Tit Jam the lowest (4.9%). The brix reading of other

Table 1. Quantitative characteristics of Jamun fruits.

Land race	Local name	Fruit weight (g)	Fruit size		Seed weight (g)	Seed size		Brix reading (%)	Edible portion (%)
			Height (cm)	Width (cm)		Height (cm)	Width (cm)		
JA-001	Guda Jam	6.48	2.60	1.96	1.60	1.89	1.09	10.6	75.0
JA-002	Comilla Jam	4.40	2.33	1.66	1.42	1.87	0.97	10.4	68.2
JA-003	Kalo Jam	2.00	1.88	1.19	0.53	1.36	0.70	7.5	73.5
JA-004	Tit Jam	0.55	0.86	1.01	0.14	0.51	0.65	4.9	72.0
JA-005	Khudi Jam	0.67	0.78	0.75	0.33	0.64	0.70	17.5	50.8
	Mean	2.82	1.69	1.31	0.80	1.25	0.82	10.18	67.90
	S.D.	2.30	0.75	0.44	0.59	0.59	0.17	4.22	8.84

Table 2. Qualitative characteristics of Jamun fruits.

Land race	Fruit colour	Flesh colour	Taste	Astrin-gency	Seed colour
JA-001	Reddish black	Reddish	Slightly sweet	High	Reddish green
JA-002	Black	Pinkish	Slightly sweet	Low	Pinkish green
JA-003	Black	Reddish	Sour	High	Reddish green
JA-004	Pinkish	Pinkish	Sour	High green	Pinkish green
JA-005	Black	Pinkish	Very sweet	High	Pinkish green

ranged from 7.5 to 10.6%. The result indicated that there is scope of improving the fruit through hybridization. The highest edible portion was recorded in Guda Jam (75.0%) followed by Kalo Jam (73.5%), Tit Jam (72.0%), Comilla Jam (68.2%) and Khudi Jam (50.8%). Khudi Jam although was having highest brix reading was found unacceptable for table purpose for its high astringency and minimum pulp. Seed colour varied from reddish green to pinkish green. Guda Jam and Comilla jam were superior in overall fruit characteristics compared to other lines.

The data in respect of per cent germination of seeds and the number of seedlings were presented in Table 3. Freshly extracted seeds showed 96% germination of which 30% was monoembryonic and 66% was polyembryonic. However, when seeds were sown 7 days after extraction, per cent germination was not much different but polyembryonic increased to 80%. Maximum number of seeds were germinated (84 to 96%) within 14 days of extraction. This is more or less in agreement with that of Mowry *et al.* (1941) who reported high percentage of germination within 2 to 3

Table 3. Per cent germination and polyembryony in Jamun seeds in field condition.

Sowing time (days after extraction)	Per cent germination			Number of seedlings per seed
	Monoembryony	Polyembryony	Total	
Freshly extracted seed	30 a	66 a	96 a	2.26 a
7	14 a	80 a	94 a	2.49 a
14	20 a	64 a	84 a	2.24 a
21	15 a	0 b	15 b	1.00 b
28	4 a	0 b	4 b	1.00 b
35	0 b	0 b	0 b	0.00 b

Uncommon letters in the same column indicate significant difference at 1% level of probability.

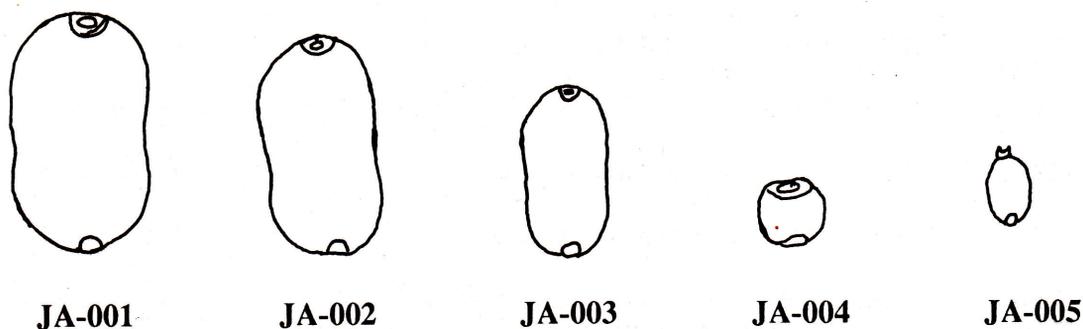


Fig. 1. Showing shape of Jamun fruits.

weeks. Viability of seeds decreased abruptly 21 days after extraction and the seeds lost their viability altogether in 35 days of extraction. This is quite in line with the findings of Shanmugavelu (1967). In this study 4 to 30 per

cent germinated seed were found monoembryonic and 64 to 80 per cent polyembryonic. Singh and Thakur (1977) obtained 20 to 50 per cent polyembryonic seeds in India. The number of seedlings per seed

Table 4. Plant height and number of leaves/seedlings after 75 days of germination.

Sowing time (days after extraction)	Height of seedlings (cm)		Number of leaves	
	Monoembryony	Polyembryony	Monoembryony	Polyembryony
Freshly extracted seed	23.33 a	20.80 a	16.00 a	15.88 a
7	22.00 a	19.10 ab	15.25 a	15.03 a
14	15.65 a	14.95 b	13.00 a	11.23 b
21	11.30 a	0.00 c	9.70 a	0.00 c
28	13.00 a	0.00 c	12.00 a	0.00 c
35	0.00 b	0.00 c	0.00 b	0.00 c

Uncommon letters in the same column indicate significant difference at 1% level of probability.

(polyembryonic) ranged from 2.40 to 2.49 when seeds were sown within 14 days of extraction. The seeds thereafter, lost their ability to produce more than one seedling in the field.

The height and number of leaves of Jamun seedlings were presented in Table 4. Seedling height of monoembryonic seeds (15.65 to 23.33 cm) was found higher than polyembryonic seedling (14.95 to 20.80 cm) irrespective of different storage period. The probable reason might be that the food material in a seed is used by many seedlings during germination in case of polyembryony. Similar trend was observed in case of number of leaves of monoembryonic (13.00 to 16.00) and polyembryonic (11.23 to 15.88) seedlings. The height of seedlings and number of their leaves decreased with the increased of storage period of seeds which might resulted from decreasing seed vigour (Table 4).

It is indicated from the study that there exists distinct land races of Jamun in Bangladesh which widely vary in respect of harvesting season, per cent edible portion and edible quality. Polyembryonic nature of Jamun

as revealed from the study is an advantage and could be exploited for large scale multiplication of any superior germplasm.

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