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Studies on Quantitative Characteristics of Fruits of Some Guava Germplasm in Both on and Off-Seasons

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Abstract: A Study on quantitative characteristics of fruits of guava germplasm in both on and off seasons was carried out at the germplasm center, Fruit-Tree Improvement Project (FTIP) of the Department of Horticulture, Bangladesh Agricultural University, Mymensingh, during June, 2000 to April, 2001. Different quantitative characters were found statistically significant. In respect of different characters such as fruit size, fruit weight, thickness, weight of mesocarp and endocarp, number of seeds per fruit, percent edible portion. The guava showed better performance in both on and off seasons but fruits of off- seasons were better than that of on seasons. In respect of fruit weight, size, flesh weight, seed per fruit and percent edible portion, the germplasm PG-028, PG-027 and PG-005 were superior among all the germplasm in both the seasons.

Key words: Quantitative characteristics, guava, germplasm

Introduction

Guava (*Psidium guajava* L), one of the most common and popular fruits of Bangladesh. It claims to be the most important fruit in area and production after Jackfruit, pineapple, mango and melon in Bangladesh (Anonymous, 1997). The average yield was 4.9 metric ton in the year 1992-93 while it was 4.77 metric ton per hectare in 1996-97 (Anonymous, 1997). Guava yield is extremely low in comparison to the leading guava producing countries of the world. It is a good source of vitamins and minerals (Phandis, 1970). Most of the people of Bangladesh suffer from malnutrition specially vitamins and minerals. In general, pink fleshed varieties are poor in vitamin C content than the white fleshed ones (Golberg and Levy, 1941). Besides, it contains more iron, 80 percent of which is in the seeds, and is not utilized (Miller and Bazore, 1945) Nathani and Srivastava (1965) in their detailed study with 14 varieties among the different varieties of guava were mainly in respect of fruit shape and size, colour and texture of ripe fruits and pulp. Variabilities exists in guava cultivars across the country because of seed propagation for continuous generation and introduction of cultivars as well. However, there are many non descript cultivars available in the country. Therefore, the study was undertaken to record the quantitative characters of thirteen air-layered guava germplasm.

Materials and Methods

The study was conducted at the germplasm centre, Fruit-Tree Improvement Project (FTIP) of the Department of Horticulture, Bangladesh Agricultural University, Mymensingh, during June, 2000 to April, 2001. Thirteen

guava cultivars viz, PG-001, PG-002, PG-003, PG-004, PG-005, PG-006, PG-007, PG-008, PG-009, PG-011, PG-013, PG-028 and PG-029 were included in this study. Randomized Complete Block Design with three replications was used for this experiment. There were three guava trees each cultivar and mature fruits were randomly collected from plants for both seasons. The fruits were brought at Department of Horticulture for investigating their quantitative characters. The data were analyzed statistically and the mean differences were compared by least significant differences (Gomez and Gomez, 1984).

Results and Discussion

Significant variations were observed among the cultivar in respect of fruit weight, fruit size, thickness, weight of mesocarp and endocarp, number of seed per fruit, weight of seeds per fruit, weight of 1000-seeds and percent edible portion in both the seasons (Table 1 and 2). In on season the maximum fruit weight was obtained from PG-028 (241.36 g) followed by PG-007 (224.21 g) and the rest germplasm ranged from 47.00 g (in PG-003) to 202.70 g (in PG-005). In off-season, the maximum fruit weight was also obtained from PG-028 (261.25 g) followed by PG-007 (254.10 g). The fruits of the rest cultivars ranged from 81.10 g (in PG-003) to 240.62 g (in PG-005). During on season PG-007 produced the longest fruit (8.03 cm) followed by PG-001 (8.01 cm), PG-003 (7.2 cm) and PG-028 (7.2 cm) while PG-003 produced the shortest fruit (4.16 cm). Fruit breadth of different cultivars ranged between 4.25 to 7.12 cm in PG-003 and PG-028, respectively. During off- season PG-007 also produced the longest fruit (8.95 cm) where as PG-003 produced the

Table 1: Quantitative characters of fruit of different guava germplasm during on-season

Germplasm	Fresh weight (g)	Fruit size		Thickness (cm)		Weight (g)		No. of seed/ fruit	Weight of seed/ fruit	Weight of seed/ 100g fruit	Weight 1000 seed (g)	Percent edible portion
		Length (cm)	Breath (cm)	-----		-----						
				Mesocarp	Endocarp	Mesocarp	Endocarp					
PG-001	174.62	8.01	7.05	1.35	4.30	124.12	50.50	445.50	3.91	2.15	8.50	97.80
PG-002	67.17	5.95	4.60	0.76	3.60	44.60	22.57	457.87	2.60	4.05	5.60	95.40
PG-003	47.00	4.16	4.25	0.65	2.90	28.50	18.50	381.10	2.10	4.70	5.50	95.20
PG-004	144.58	5.70	5.50	0.70	3.56	93.50	51.08	469.65	4.13	3.15	9.14	96.60
PG-005	202.70	6.74	6.75	1.40	4.15	150.50	52.20	241.68	2.39	1.30	11.90	98.68
PG-006	149.80	7.20	6.70	0.90	3.60	107.50	42.25	456.50	3.05	2.30	7.40	97.70
PG-007	224.21	8.03	6.95	1.05	3.75	167.65	56.56	400.15	4.00	1.86	11.45	98.11
PG-008	150.40	6.10	6.80	0.95	3.96	107.65	42.75	470.51	2.90	1.99	6.81	97.98
PG-009	77.65	5.50	5.57	0.86	3.54	55.80	21.85	276.86	3.20	4.30	12.15	96.10
PG-011	106.35	5.60	5.85	0.80	3.50	67.20	39.15	553.50	2.56	2.60	4.99	97.65
PG-013	157.77	6.65	7.00	1.30	3.80	117.82	39.95	600.85	2.62	1.10	4.96	98.40
PG-028	241.36	7.20	7.12	1.65	4.48	175.91	65.45	501.40	5.18	2.05	10.24	97.90
PG-029	168.22	5.65	5.75	1.50	4.62	121.60	46.62	270.50	3.55	2.10	7.61	97.85
LSD (1%)	0.44	0.73	0.73	0.44	0.88	6.13	5.39	177.50	0.68	0.41	1.00	1.45
CV %	2.46	5.02	5.15	7.97	4.06	2.56	5.59	8.29	3.17	6.87	5.35	2.55

Table 2: Quantitative characters of fruit of different guava germplasm during off-season.

Germplasm	Fresh weight (g)	Fruit size		Thickness (cm)		Weight (g)		No. of seed/ fruit	Weight of seed/ fruit	Weight of seed/ 100g fruit	Weight 1000 seed (g)	Percent edible portion
		Length (cm)	Breath (cm)	-----		-----						
				Mesocarp	Endocarp	Mesocarp	Endocarp					
PG-001	204.50	8.85	7.60	1.70	4.55	144.15	60.35	480.50	4.30	2.50	9.56	98.20
PG-002	96.05	6.50	5.60	1.05	4.40	65.50	30.55	600.25	3.30	4.65	6.25	95.80
PG-003	81.10	4.66	4.85	0.90	3.25	55.60	25.50	405.25	2.30	4.85	5.75	95.50
PG-004	190.40	6.45	6.35	0.95	3.90	125.25	65.15	490.50	4.60	3.40	9.60	97.20
PG-005	240.62	7.15	7.90	1.65	4.70	175.50	56.12	265.59	2.50	2.25	12.50	98.90
PG-006	186.75	8.15	7.70	1.25	3.95	130.50	56.25	487.53	3.55	2.65	7.86	97.85
PG-007	254.10	8.95	7.87	1.60	4.15	188.60	65.50	520.15	5.15	2.57	11.90	98.80
PG-008	191.33	6.60	7.20	1.90	4.20	135.58	55.75	515.45	3.00	2.85	6.98	98.80
PG-009	96.50	6.30	6.65	1.30	3.76	60.85	35.65	360.85	2.50	4.85	12.95	97.10
PG-011	134.50	6.20	6.30	1.10	3.85	89.25	45.15	590.45	3.70	3.00	6.85	97.87
PG-013	179.45	7.01	7.80	1.55	4.10	128.85	50.60	645.85	3.50	1.90	5.15	99.25
PG-028	261.25	8.25	8.15	3.03	5.18	190.90	70.55	570.30	5.90	2.45	12.85	98.30
PG-029	215.20	6.70	6.15	2.20	5.15	160.60	54.60	290.40	3.85	2.90	8.75	98.70
LSD (1%)	7.85	0.77	0.85	0.52	0.88	8.59	10.29	173.70	1.11	0.78	0.94	1.68
CV %	2.60	4.76	5.37	4.62	3.05	2.96	8.58	5.89	2.85	5.59	4.55	0.75

shortest fruit (4.66 cm). This variation in fruit length was might be due to variation in genetic make up of the cultivars. Mitra *et al.* (1983) Azad *et al.* (1987) Ullah *et al.* (1992) was also reported this type of variation. Fruit breadth of different guava cultivars ranged between 4.85 cm in PG-003 to 8.15 cm in PG-028. From an experiment, Nag (1988) obtained the breadth of different guava varieties like PG-028, PG-013 and PG-005 as 7.82, 6.57 and 5.87 cm, respectively. Azad *et al.* (1987) and Ullah *et al.* (1992) also reported varying fruit breadth of different guava varieties.

During on season, the highest mesocarp thickness was observed in PG-028 (1.65cm) followed by PG-029(1.5 cm), PG-005 (1.4 cm) and PG-001 (1.35 cm). This finding differed with that of Nag (1988), who reported greater mesocarp thickness in PG-005(2.86 cm) than PG-013 (1.83 cm) and PG-028(1.54). This might have occurred due to the variation of environmental factors. During off season, the highest mesocarp thickness was observed in PG-028 (3.03 cm) and the lowest in PG-003 (0.90 cm). Yousof

(1990) reported that the mesocarp thickness of different guava varieties ranged from 1.90 to 2.5 cm. During on season the endocarp thickness ranged from 2.90 to 4.62 cm in PG-003 and PG-029, respectively. On the contrary, in off season the endocarp thickness ranged from 3.25 (PG-003) to 5.18 cm (PG-028). Nag (1998) found the endocarp thickness of PG-028, PG-005 and PG-013 as 4.78 cm, 4.43 cm and 3.49 cm, respectively. In on season, the highest mesocarp weight was obtained from PG-028 (175.91 g) where as the lowest from PG-003 (28.50g). In off-season, mesocarp weight was also found the highest in PG-028 (190.9 g) and the lowest was noticed in PG-003 (55.6 g). In on-season, the average weight of endocarp were found to vary from 18.50 to 65.45 g in PG-003 and PG-028, respectively. During off-season, the highest was also found in PG-028 (70.55 g) followed by PG-007 (65.50 g) where as the lowest in PG-003 (25.50 g). Nag (1988) studied the endocarp weight of four guava varieties like PG-028 PG-013 and PG-005 and local that ranged from 377.00 to 71.00 of which is in agreement with the present

study. Number of seeds per fruit in on season which ranged from 241.68 (PG-005) to 600.85 (PG-013) and in off-season the highest and lowest number of seeds were also recorded from the PG-013(645.85) and PG-005 (65.59), respectively. Ullah *et al.* (1992) and Nag (1998) also reported the variation in number of seeds per fruit among different guava varieties. In on-season, the maximum weight of seeds per fruit was obtained from PG-028 (5.18 g) and the lowest from PG-003 (2.10 g). In off-season, the maximum was obtained from PG-028 (5.90 g) and the lowest from PG-003 (2.30 g). Ullah *et al.* (1992) also reported seed weight per fruit as 4.70, 7.50, 2.90, 1.90 and 2.20 g in the varieties of PG-004, PG-028, PG-013, PG-005 and PG-003, respectively. The thousand seeds weight varied from 4.96 (PG-013) to 12.15 g (PG-009) during on-season but in off season it varied also significantly from 5.15 (PG-013) to 12.95g (PG-009). During on-season percent edible portion ranged from 95.20 (PG-003) to 98.68% (PG-005) whereas in off-season it was 95.50% (PG-003) to 99.25% (PG-003). Azad *et al.* (1987) reported, 97.29 to 98.69% edible portion in five guava varieties. Ullah *et al.* (1992) found 36.65 to 98.68% edible portions in nine guava varieties.

From the above discussion, it can be concluded that among the thirteen germplasm PG-028, PG-007 and PG-005 were found better in respect of fruit weight, size, flesh weight, seeds per fruit and edible portion in both the seasons.

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