Journal of Emerging Trends in Engineering and Applied Sciences (JETEAS) 5(2): 135-144

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Physical Screening in Fruits of Guava (*Psidium guajava* L.) Genotypes

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Abstract
Screening was carried out on hundred guava genotype in respect of fruits physical attributes during 2010-2011.Physical fruit characters of guava fruits varies significantly among different guava genotypes. Out of hundred guava genotypes, thirteen elite guava genotypes (genotype no 100,99,30,50,4,94,57,88,5,33,3,8 and 67) toped the rest of genotypes in term of physical characters. Tree no. 99 was found superior one over all genotypes , in term of fruit weight (300.5g) fruit diameter (7.36cm) , less number of seed per fruit(0), lowest seed weight(0.00g), lowest seed weight to fruit weight ratio(0%), higher pulp thickness (3.2cm), higher pulp weight(271.7g), pulp to fruit weight ratio(88.7%), maximum peel weight (28.83g).

Keywords: guava, genotypes, screening, fruit, physical, characters.

INTRODUCTION

Guava (*Psidium guajava L*), is one of the important fruit cultivated in several tropical and subtropical countries of the world. (Pathak, *et al*. 2007). The centre of origin of guava tree was southern Mexico and Central America, and was long ago spread throughout the American tropics, Asia, Africa and Pacific Islands. Genus Psidium belong to family Myrtaceae and 15 contains about 150 species, of which most widely cultivated is common guava, *P. guajava*. (Purseglove, 1974).

Guava is very common tropical fruit in the Sudan, the tree is grown commercially in every regions, and its production continues all the year round (Salih and Elbashir 2000). The most important guava producing states are Khartoum, blue Nile (Sennar, Singa) and (shandi, Kassala), northern kordofan (Al-Rahad Um-Ruwaba El-obeid) and Darfur. (Babiker, 2010).

The major problems facing the guava industry are severity of wilt disease, high seed content of diploid commercial varieties and poor yield with small and miss shaped fruit of triploid seedless varieties. (Ray, 2002).

Improvement in guava fruit can be achieved through development of cultivars with least number and soft seeds, resistant to guava wilt disease and to fruit fly, whitefly and mealy bug, spreading growth habit, suitable for processing, better fruit quality in terms of shape, size, colour, firmness, thick pulp pleasing aroma and better keeping quality, having pink\ red flesh and skin for export market. (Shukla *et al*., 2004).

However, seed propagation should be avoided as owing to heterozygous nature of tree and cross-pollination, the seedling raised plants are never true – to type. Apart from a longer juvenile phase the seedlings differ widely in yield and physical characteristics of fruits. Seedlings, however, are used as rootstocks. Several methods of vegetative propagation techniques have been standardized in guava. (Mukhopadhay and Sen, 1986). Guava strains in Sudan varies in term of fruit size, color and white to red pulp also softy to rough, waxy and hardness of seeds and flavor, all this variation due to sexual propagation of guava. The framers named some strains that shown distinct character such like Shandi and Pakistani (white varieties). Sudany, shambat, Singa and ganip (red varieties). (Babiker, 2010). The natural self-pollination in guava with 35% outcrossing results in a heterozygous. Open-pollinated seedling population, with adequate genetic variation very useful for selection of desirable commercial types (Nakasone and Paul, 1998). Selection can also be made from wild population. Seeds were collected from various guava – growing belts and seedling were evaluated to identify superior types for better yield characters. (Cheema and Deshmuk, 1972).

The main objective of this study was to develop promise Guava genotypes with better fruits physical characters through screening among genotypes (guava trees) in term of physical characters of the fruits.

LITERATURE REVIEW

Gen*us Psidium* contains about 150 species (Hayes, 1974). All cultivated varieties of guava are either diploid 2n=2x =22 or triploid 2n=3x =33 (Atchinson, 1947). In guava, most of the commercial varieties are reported to be diploids, the chromosome number being 2n = 22, except the seedless types which are

triploids. A natural triploid with somatic chromosome number of 2n = 33 was reported by Kumar and Ranade (1952).

Guava bears flower solitary or in cyme of two to three flowers, on the current season growth in the axil of the leaves (Prakash, 1976). Peak time of anthesis is between 5.00-6. 30 AM in most of the varieties of guava. The dehiscence of anthers occur 15-30 minutes after anthesis and continues for two hours .The pollen fertility is high in almost all the cultivars (Balasubramanyam, 1959). Although, the guava is self pollinated crop but some extent cross pollination takes place by insect. (Arvindakshan, 1960). Guava is mainly a self pollinated crop but occurrence of cross pollination results in great variation in the seedling population. (lyer and Subramanian,1987).

Inheritance Pattern in guava reported by Shukla *et al*. (2004). Guava cultivars are heterozygous in nature. There is a linkage between red flesh colour and bold seed size. Triploidy and some other genetic factors are responsible for female sterility. (Subramanyam and lyer, 1982).

The propagation of guava through seeds should not be encouraged because the seedlings have long juvenile phase, give lower yields and bear poor fruits quality. But the seedlings can be served as rootstock material for grafting or budding. For planting seedlings, seed should be collected from the plants producing high quality fruits and high yield (http://www.fruitipedia.com/guava.htm.). Thirty-two guava germplasm were evaluated on the basis of fruit morphology, physical properties and yield (Jana *et al.,* 2010).

The varietals characteristics in guava are not as distinct as found in majority of other fruit crops. Its propagation through seeds reduces the distinctive characteristics of a variety in commercial cultivation. L-49 variety, one of the important guava varieties developed through selection from cultivar Allahabad Safeda, and distinct with semi-dwarf tree, high yielder and white flesh. Banarasi Surkha variety, its local selection from red fleshed type and distinct with heavy bearing, large fruits, soft and pink flesh, CISHG-1 variety, distinct with fruits skin colour are deep red, good TSS percent and soft seeds, Ark Mridula (Selection-8) variety, developed through selection from Allahabad Safeda seedling and distinct with soft seeds and white flesh, Lalit (CISHG- 3) variety, developed through seedling selection from cultivar Apple Colour., RHR-G-14 variety, developed through seedling selection from Thailand genotypes and distinct with pink colour of fruits skin and flesh and good sugar (Ray, 2002).

Efforts have been made over the past few decades to widen guava genetic base by creating Attempts are still going on to improve the existing commercial cultivars through selection of germplasm and combining the desirable traits of various genotypes through hybridization.

A variety with in-built resistance to the biotic and a biotic resistance besides high yielding capacity of good quality fruit is lacking in guava. The DNA marker assisted selection has the potential to introduce and deploy favorable gene combinations for disease control along with the other agronomical important traits. (George and Sonu, 2010).

Guava is an open pollinated crop, and seedlings are extensively used to raise new plantations. Selection from these seedlings can be used to obtain superior strains with respect to fruit yield and quality. (Singh, 1995).

Guava fruit contained 5.4% seed, 8.3% Pomace/peel, Pulp 82% and Juice 65%. prominent 86 sugars are Fructose 59%, Glucose 36% and Sucrose 5% . Fructose is the principal sugar in green fruits while fully ripe fruits contain high content of sucrose. (Akash *et al*., 2009).

Physical fruit characters of guava fruits varies among different guava accessions, Fruit diameter ranged between (6.80 - 5.50- 9.50 cm), Fruit length(5.94- 4.50- 7.80 cm), Fruit weight (169.44- 85.00- 350.00 g), number of seed per fruit(66 - 536 seeds) and seed weigh(9.2-20.0 g). (Anonymous, 2009).In cultivar Allahabad Safeda average fruit weight ranged between 90-160 (g).

MATERIALS AND METHODS

The experiment was conducted in 2010 – 2011 at Alkhelala area- north of Khartoum north in orchard of Mohammed Alhadi Alshakh to screen Guava genotypes (100 trees) in respect of fruit physical characters. Three mature guava fruits (three replications) were collected from each tree, out of hundred Guava trees (genotypes).

OBSERVATIONS

Three ripe fruits were collected randomly from each guava tree for recording fruits physical characters as followed:

1. Fruit weight (g)
2. Fruit diameter (cm)
3. pulp thickness(cm)
4. Number of seeds per fruit (seed)
5. seed weight(g)
6. pulp weight (g)
7. peel weight (g)
8. Seeds weight to fruit weight ratio (%)
9. Peel weight to fruit weight ratio (%)
10. Pulp weight to fruit weight ratio (%)

DATA ANALYSIS

The data were analyzed statistically by using randomized completed block design as per the method suggested by (Pansey and Sukhatme, 1985).

RESULT AND DISCUSSION

The results obtained in the present study on screening of hundred Guava genotypes in respect of fruits physical characters, are discussed hereunder in the light of established facts and figures available in the literature.

Out of four hundred open pollinated guava seedling progenies, hundred seedlings were selected based on their growth and yield. The results revealed that there was a significant difference in physical fruit characters. Of these hundred genotypes, thirteen genotypes (Genotype. No 100 , 99 , 30 , 50 , 4 , 94 , 57 , 88 , 5 , 33 , 3 , 8 and 67) showed better fruit physical performance. (table 1, Fig 1 , 2 , 3 , and 4). The highest fruit weight was registered in genotype no 99 (300.5 g) followed by 30 (205.5 g), 5 (193.9 g), 67 (193.7 g), 50 (188.8 g), 100 (186.0 g), 57 (153.4 g), 4 (148.8 g), 165 94(136.1g), 8 (132.7 g), 33 (126.7 g), 88 (114.9 g) and 3 (83.37 g), in relation to other genotypes (table, 1 fig,1). This result was superior to the finding of (Jana *et al.,* 2010) whose recorded that the highest guava fruit weight obtained by cv. Eskwala was (139.8 g). The existing finding indicated that, the genotypes no 99 (300.5g), 30 (205.5g), 5 (193.9g), 67 (193.7g), 50 (188.8g), 100 (186.0g) and 57 (153.4g), showed better performance in term of fruits weight (table,1 fig,1) compared with the highest fruit weight of White cultivar L-49 (152.50 g) reported by (Patel *et al.*, 2007) and maximum Fruit weight in Hybrid-7 (151.50g) and in Hybrid-11 (128.25g) (Babu *et al.*, 2007). Tandon *et al*, (1983) found that the fruit weight of the winter crop was (135g) in var.Apple Colour, (126g) in var. Chittidar and (162g) in var. Sardar guava .According to Mitra and Bose, (1985) the 174fruit weight ranged from (86-161g) in var. Allahabad Safeda, (80-120g) in var. Apple Colour, (92-132g) in var. Benaras, (96-148g) in var. Chittidar, (79-131g) in var. Pear shaped, (91-136g) in var. Red Fleshed, (96-145g) and (71-87g) in var. Sardar . Jessica,(2001) revealed that the fruit weight in var. Apple colour ranged from (59.27-167.76g).Maximum fruit diameter was observed in genotype no 99 (7.36cm) followed by 30 (7.10cm), 67 (7.00cm), 50 (6.90cm), 5 (6.76cm), 88 (6.76cm), 4 (6.26cm), 100 (6.23cm), 57 (6.13cm), 8 (5.96cm), 33 (5.93cm), 3 (5.46cm) and 94 (5.26cm) (table,1 fig, 2) as compared with rest of genotypes. Most of values obtained above were better than the results reported by (Patel *et al.*, 2007) and it fall with in the range of fruit diameter (6.80 - 5.50- 9.50 cm) reported by (Anonymous, 2009).

Significantly less number of seed per fruit was recorded in genotype no 99 (0) and 192 100 (0), 94 (58), 3 (69), 57 (103), 33 (137), 4 (141), 30 (142), 67(148), 88 (162), 5 (171), 8 (201) and 50 (217) respectively when compared with the remaining genotypes (table, 1 fig 3). (Bashir *et al.*, 2009) reported that more number of seeds in guava fruits (200.80 seeds /fruit) in relation to the value registered in this experimental results. Maximum number of seeds reported in above selected genotypes was less than half number of seeds of maximum number of seeds reported by (Anonymous, 2009). Jessica, (2001) revealed that, the number of seeds per guava fruit var. Apple colour was (142-450).

Raman *et al.* (1971) reported that triploidy is the cause of seedlessness in guava.Variation in number of seed among different genotypes in this studies might be due to guava varieties are either diploid 2n=2x =22 or triploid 2n=3x =33. These finding are in conformity with observation of (Atchinson, 1947). A natural triploid with somatic chromosome number of 2n = 33 was reported by Kumar and Ranade (1952).

The lowest seed weight in fruit was noted in genotypes no 99 (0.00 g) and 100 (0.00 g), 57 (0.70 g), 94 (1.43 g) 33 (1.53 g), 3 (1.86g), 67 (2.83 g), 88 (2.86 g), 5 (3.46 g), 4 (3.60 g), 30 (4.60 g), 8 (5.33 g) and 50 (5.53 g) subsequently (table,1 fig,4). And this result showed very less seed weight per fruit in relation to the seed weight (9.2-20.0 g per fruit) reported by (Anonymous, 2009). According to Sehgal and Singh (1965) the weight of the seeds per guava fruit in the cultivar Safeda was (3.23g), in var. Chittiar (6.36g), in var. Sardar (6.31g), in var. Red Flcshed (2.50) and (0.24g) in var. Seedless. Pandey (1968) reported that, the seed weight per fruit of the cultivar Apple Colour 204was (0.96g).

Observations among genotypes, indicated that the lowest seed weight to fruit weight ratio was obtained in genotype no 99 (0 %), 100 (0%), 57 (0.66%), 94 (1.03%), 33 (1.20%), 67 (1.53%), 88 (1.90%), 5 (2.00%), 30 (2.23%), 3 (2.30%), 4 (2.50%), 50 (3.60%) and 8 (4.10%) respectively, (table,1 fig,4) compared with the other genotypes. This result indicated that, less seed weight had been obtained compared to the finding of (Akash, *et* al., 2009).

Significantly higher pulp thickness observed in genotypes no 99 (3.2cm), 100 (3.0cm), 67(1.83 cm), 30 (1.73 cm), 94 (1.56 cm), 57 (1.56 cm), 33 (1.33 cm), 5 (1.33 cm), 88 (1.26 cm), 50 (1.23 cm), 4 (1.20 cm), 3 (1.13 cm) and 8 (1.00 cm), respectively (table,1 fig 2) in relation to the other genotypes.

However, significantly higher pulp weight showed in genotype no 99(271.7g), 30 (179.1g) -followed by 5(171.5g), 100(166.8g), 88(159.2g), 50 (155.7g) 57

(141.9g), 67 (133.5g), 4 (121.2g), -94 (115.5g), 8 (107.8g), 33 (96.03g) and 3 (70.43g) subsequently (table, 1 fig ,1) when compared with the rest genotypes. However the genotype no 99 toped the remaining genotypes in term of bulb weight (271.7g) and also showed better performance when compared with maximum Pulp weight (190.04 g) reported by (Bashir *et al.*, 2009). Prabhu, (2010) revealed that, the highest pulp weight of guava fruits was registered in Selection-7 (58.27 g).

Significantly appreciable increase in pulp to fruit weight ratio was associated with genotype no 99 (88.7%), 100 (88.4%), 30 (87.60%), 57 (87.20%), 88 (85.20%), 94 (83.40%), 5 (82.40%), 67 (82.23%), 3 (82.13%), 4 (80.07%), 8 (79.87%), 50 (78.87%) and 33 (77.30%) subsequently (table,1 fig,2). and this result superior to the finding of (Akash, *et* al., 2009). Maximum peel weight was found in genotype no 99 (28.83g) followed by genotype no 50 (27.30g), 33 (27.10g), 67 (25.10g), 4 (23.93g), 88 (23.23g), 30 (21.77g), 100 (19.23g), 94 (19.17g), 5 (18.97g), 8 (18.87g), 57 (16.87g) and 3 (10.90g) respectively (table ,1 fig ,2). The ascorbic acid is 8mainly found in the skin and slightly lower concentration is found in the flesh (Nakasone and Paul, 1998).

Genotype no 33 (21.50%) showed significantly higher peel to fruit weight ratio followed by 4 (16.37%), 94 (15.90), 50 (15.43%), 8 (14.03%), 3 (13.43%), 67 (12.90%), 88 (12.90%), 57 (12.13%), 5 (11.27%), 100 (11.23%), 99 (11.23%) and 30 (10.63%), respectively (table,1fig, 2) compared to all other genotypes.

The experimental results obtained were clearly confirm the superiority of selected trees in term of fruits physical characters in relation to the results reported by (Anonymous, 2010).Hence, based on fruit morphology, the genotypes no 99 followed by 30, 5, 100, 88, 50, 57, 67, 4, 94, 8, 33 and 3 (table 1, & fig from 1 to 4, plate 1) were found promising for cultivation.

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APPENDIX

Table (1): Physical characteristics of guava Genotypes

Genotypes No.	Fruits weight (g)	No. of seeds (seed)	Pulp thickness (cm)	Fruit diameter (cm)	Peel to fruit ratio (%)
G .No 1	115.0j-z	102.0f-u	1.167i-r	5.833e-u	16.50a-i
G .No 2	150.2b-q	135.7c-u	1.000m-r	6.400a-n	15.10b-m
G .No 3	83.37t-z	69.00k-u	1.133j-r	5.467j-u	13.43c-m
G .No 4	148.8b-r	141.7c-u	1.200i-r	6.267a-q	16.37a-j
G .No 5	193.9bcd	171.0c-s	1.333f-p	6.767a-i	11.27g-m
G .No 6	75.77v-z	60.67o-u	1.100k-r	5.233m-u	14.83b-m
G .No 7	100.3m-z	177.3c-s	1.000m-r	5.567i-u	14.60b-m
G .No 8	132.7d-z	201.3b-p	1.000m-r	5.967c-u	14.03b-m
G .No 9	102.6l-z	176.7c-s	1.333f-p	5.700g-u	14.80b-m
G .No 10	129.8e-z	207.3b-l	1.067l-r	5.967c-u	13.37c-m
G .No 11	121.6i-z	89.33h-u	1.367f-p	5.933c-u	13.87b-m
G .No 12	136.6c-x	171.0c-s	1.100k-r	6.600a-l	14.83b-m
G .No 13	88.97q-z	90.67h-u	1.333f-p	5.167n-u	12.60c-m
G .No 14	138.4c-v	250.7bcde	1.033m-r	6.333a-p	16.57a-i
G .No 15	104.5l-z	77.00j-u	1.067l-r	5.133o-u	10.60klm
G .No 16	163.3b-m	210.7b-k	1.333f-p	7.467a	14.80b-m
G .No 17	120.1i-z	131.0c-u	1.033m-r	6.000c-u	15.30b-l
G .No 18	75.57v-z	83.67i-u	0.9333o-r	5.200n-u	13.40c-m
G .No 19	124.5g-z	225.0b-i	1.067l-r	5.733g-u	18.27abc
G .No 20	114.5j-z	185.3c-r	0.9667n-r	5.867d-u	14.43b-m
G .No 21	136.8c-x	160.0c-s	1.133j-r	6.233b-r	14.17b-m
G .No 22	189.3b-e	257.3bcd	1.367f-p	7.167abc	12.50d-m
G .No 23	256.9a	149.3c-t	1.633f-j	7.067a-e	12.03e-m
G .No 24	73.93xyz	110.7e-u	0.9333o-r	4.900tu	13.87b-m
G .No 25	157.6b-n	95.33g-u	1.100k-r	6.167b-s	16.77a-h
G .No 26	77.33u-z	104.0f-u	1.033m-r	5.000rstu	14.27b-m
G .No 27	92.80o-z	229.7b-h	1.033m-r	5.567i-u	14.47b-m
G .No 28	103.1l-z	130.7c-u	1.200i-r	5.733g-u	17.10a-f
G .No 29	98.47n-z	77.00j-u	1.267h-p	5.467j-u	10.67jklm
G .No 30	205.5b	142.7c-t	1.733fgh	7.100abcd	10.63jklm
G .No 31	69.40z	58.67p-u	1.000m-r	4.867u	14.57b-m
G .No 32	135.8c-y	204.0b-n	1.167i-r	6.233b-r	13.30c-m
G .No 33	126.7f-z	85.67i-u	1.333f-p	5.933c-u	21.50a
G .No 34	144.2c-t	155.7 c-s	1.000m-r	6.167b-s	9.933lm
G .No 35	154.8b-o	137.7 c-u	1.400f-o	6.367a-o	10.73jklm
G .No 36	85.43r-z	131.0c-u	0.8667pqr	5.367l-u	12.47d-m
G .No 37	95.00n-z	65.33l-u	1.100k-r	5.767f-u	15.93b-k
G .No 38	147.2b-s	93.00g-u	1.000m-r	6.467a-m	14.50b-m
G .No 39	127.1e-z	176.3c-s	1.133j-r	6.133c-t	16.57a-i
G .No 40	107.7k-z	203.3b-o	0.9333o-r	6.033c-u	14.97b-m
G .No 41	100.3m-z	167.3c-s	1.500f-m	5.000rstu	11.30g-m
G .No 42	128.5e-z	329.7ab	1.233h-q	6.100c-u	10.93i-m
G .No 43	82.60t-z	92.00h-u	1.000m-r	5.200n-u	15.47b-l
G .No 44	101.0m-z	173.7c-s	0.8667pqr	5.567i-u	15.20b-m
G .No 45	107.7k-z	238.0b-f	1.000m-r	5.733g-u	15.83b-k
G .No 46	89.50q-z	146.7c-t	1.133j-r	5.200n-u	16.70a-h
G .No 47	107.1k-z	63.33m-u	1.467f-n	5.933c-u	12.53c-m
G .No 48	75.10v-z	108.3g-u	1.667f-i	5.567i-u	13.70b-m
G .No 49	128.8e-z	198.3b-q	1.333f-p	6.300a-q	17.13a-f
G .No 50	188.8b-f	217.3b-j	1.233h-q	6.900a-g	15.43b-l
G .No 51	90.67p-z	69.33k-u	1.000m-r	5.233m-u	16.17a-k
G .No 52	122.5h-z	141.0c-u	0.9333o-r	5.900d-u	13.53b-m
G .No 53	72.90yz	206.0b-m	1.033m-r	4.900tu	17.17abcdef
G .No 54	101.9l-z	212.7b-j	1.000m-r	5.600h-u	17.53abcde
G .No 55	153.4b-p	263.7bc	1.233h-q	6.333a-p	11.20h-m
G .No 56	96.27n-z	139.7c-u	0.7333qr	5.200n-u	14.73b-m
G .No 57	153.4b-p	103.0f-u	1.567f-l	6.133c-t	12.13e-m
G .No 58	108.7k-z	108.3f-u	1.000m-r	5.767f-u	13.77b-m
G .No 59	104.7l-z	98.33f-u	1.067l-r	5.467j-u	17.00a-g
G .No 60	102.5l-z	160.3c-s	1.067l-r	5.400k-u	13.37c-m
G .No 61	106.7k-z	98.67f-u	1.333f-p	5.667g-u	17.40abcde
G .No 62	101.0m-z	147.3c-t	1.133j-r	5.700g-u	15.23b-l
G .No 63	108.4k-z	189.7c-r	1.067l-r	5.400k-u	15.60b-l
G .No 64	138.5c-v	167.0c-s	1.467f-n	5.867d-u	17.10abcdef
G .No 65	167.7b-k	204.0b-n	1.267h-p	5.500j-u	14.13b-m

Genotypes No.	Fruits weight (g)	No. of seeds (seed)	Pulp thickness (cm)	Fruit diameter (cm)	Peel to fruit ratio (%)
G .No 66	89.03q-z	115.7d-u	1.067l-r	5.967c-u	14.50b-m
G .No 67	193.7bcd	148.7c-t	1.833ef	7.000a-f	12.90c-m
G .No 68	180.9b-i	145.7c-t	1.800fg	6.700a-j	13.83b-m
G .No 69	129.3e-z	434.3a	0.700r	5.700g-u	19.20ab
G .No 70	173.7b-j	152.7c-s	1.467f-n	6.833a-h	12.37d-m
G .No 71	133.4d-y	133.7c-u	1.167i-r	6.033c-u	17.50abcde
G .No 72	118.9i-z	112.3e-u	1.300g-p	5.500j-u	15.57b-l
G .No 73	101.8l-z	80.33j-u	1.033m-r	5.067qrstu	12.97c-m
G .No 74	123.7g-z	96.67f-u	1.267h-p	5.700g-u	19.17ab
G .No 75	101.3m-z	82.67i-u	1.567f-l	5.633h-u	17.97abcd
G .No 76	120.8i-z	111.7e-u	0.9667n-r	4.967stu	12.07e-m
G .No 77	83.03t-z	128.3c-u	0.9667n-r	4.967stu	12.27d-m
G .No 78	118.1j-z	129.7c-u	1.133j-r	5.567i-u	12.37d-m
G .No 79	74.77w-z	82.33i-u	1.133j-r	5.133o-u	17.63abcde
G .No 80	114.7j-z	258.7bc	1.433f-o	5.800f-u	15.90b-k
G .No 81	84.57s-z	34.67stu	1.033m-r	5.133o-u	13.23c-m
G .No 82	90.33p-z	234.7b-g	1.067l-r	6.333a-p	9.500m
G .No 83	100.4m-z	82.33i-u	1.433f-o	5.433k-u	15.60b-l
G .No 84	135.8c-y	0.000u	2.233de	5.400k-u	10.03lm
G .No 85	164.6b-l	111.7e-u	1.467f-n	6.033c-u	15.10b-m
G .No 86	87.40q-z	110.0e-u	1.300g-p	5.100p-u	15.63b-l
G .No 87	82.90t-z	133.3c-u	0.9667n-r	5.100p-u	12.70c-m
G .No 88	185.3b-g	162.3c-s	1.267h-p	6.767a-i	12.90c-m
G .No 89	114.9j-z	75.67j-u	1.500f-m	5.567i-u	11.53f-m
G .No 90	128.7e-z	87.33h-u	1.667fghi	5.400k-u	16.70a-h
G .No 91	184.4b-h	126.7c-u	1.600f-k	6.400a-n	11.90e-m
G .No 92	126.1g-z	62.67n-u	1.667fghi	5.800f-u	16.37a-j
G .No 93	140.6c-u	48.67r-u	1.400f-o	5.200n-u	13.97b-m
G .No 94	136.1c-y	58.33q-u	1.567f-l	5.267m-u	15.90b-k
G .No 95	137.7c-w	112.7e-u	1.133j-r	5.867d-u	17.17a-f
G .No 96	181.2b-i	8.000tu	2.733bc	6.533a-l	11.63f-m
G .No 97	193.1bcd	0.000u	2.533cd	5.800f-u	12.70c-m
G .No 98	197.1bc	0.000u	2.367cd	6.633a-k	12.87c-m
G .No 99	300.5a	0.000u	3.233a	7.367ab	11.23h-m
G .No 100	186.0b-g	0.000u	3.033ab	6.233b-r	12.23d-m
C.V%	3.87%	5.58%	1.92%	1.28%	1.90%
$Lsd_{0.05}$	48.66**	109.4**	0.4009*	0.9661*	4.392*
SE±	17.45	39.22	0.1438	0.3464	1.575

Mean values having different superscript letters within columns (for each parameter) are significantly different ($P \leq 0.05$

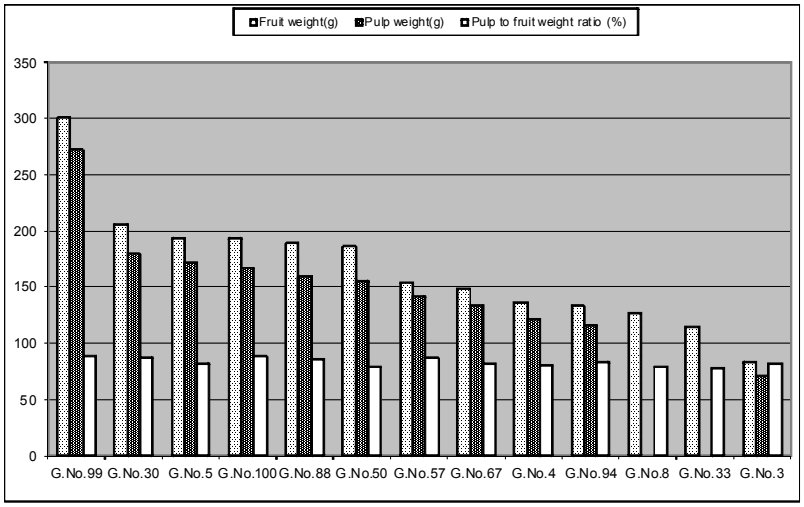

Fig. 1: Fruit weight, Pulp weight and Pulp to fruit weight ratio in thirteen selected guava genotypes

Table (1): Physical characteristics of guava Genotype

Genotypes No.	Pulp to fruit weight (%)	Seed to fruit weight (%)	Seed weight (g)	Peels weight (g)	Pulp weight (%)
G .No 1	78.13u-z	3.733c-j	3.767c-r	18.97a-s	83.70o-y
G .No 2	79.30p-z	3.600d-l	5.400a-e	22.30a-k	122.5c-u
G .No 3	82.13d-z	2.300j-y	1.867r-z	10.90n-s	70.43s-y
G .No 4	80.07l-z	2.500j-x	3.600d-u	23.93a-i	121.2c-v
G .No 5	82.40c-z	2.000m-z	3.467e-x	18.97a-s	171.5bcd
G .No 6	75.07xyz	5.100abc	3.700c-s	11.20m-s	60.53wxy
G .No 7	80.33j-z	3.400d-o	3.433e-y	14.83f-s	82.00o-y
G .No 8	79.87n-z	4.100b-h	5.333a-f	18.87a-s	107.8f-y
G .No 9	83.83b-u	1.367v-z	1.400yz	16.33d-s	84.60n-y
G .No 10	82.23d-z	2.400j-y	5.167a-g	17.53b-s	106.6f-y
G .No 11	86.47a-j	2.300j-y	2.533l-z	16.50d-s	102.6g-y
G .No 12	79.10q-z	3.700c-k	4.733a-i	20.27a-q	111.6e-x
G .No 13	86.27a-l	1.467u-z	1.300za	11.47l-s	76.20p-y
G .No 14	78.33u-z	3.500d-n	4.700a-j	22.27a-k	111.8e-x
G .No 15	85.37a-p	2.033m-z	2.033p-z	9.300rs	93.17k-y
G .No 16	79.43o-z	4.067b-i	6.433a	23.43a-i	131.8b-q
G .No 17	79.47o-z	3.233e-r	3.800c-r	18.73a-s	64.30v-y
G .No 18	82.63c-y	1.967n-z	1.467wxyz	10.13qrs	63.97v-y
G .No 19	76.43yz	3.300e-q	4.000c-p	22.53a-k	97.93i-y
G .No 20	79.83n-z	3.733c-j	4.733a-i	16.13e-s	94.00j-y
G .No 21	81.43e-z	2.433j-y	3.267g-z	19.03a-s	114.5e-x
G .No 22	81.17f-z	3.067f-t	5.700abc	24.17a-g	159.3b-g
G .No 23	84.20a-u	2.100l-z	5.433abcde	24.03a-h	228.1a
G .No 24	80.60j-z	3.533d-m	2.500l-z	10.13q-s	50.30y
G .No 25	80.80i-z	2.533j-x	3.800c-r	26.70a-d	127.1b-s
G .No 26	75.93xyz	1.800p-z	1.433xyz	10.97n-s	64.93u-y
G .No 27	78.70s-z	4.833abcd	4.267b-l	13.53h-s	75.00q-y
G .No 28	78.37u-z	2.867g-v	4.267b-l	18.00b-s	81.13o-y
G .No 29	84.97a-r	2.367j-y	2.267l-z	10.20pqrs	83.93o-y
G .No 30	87.60a-e	2.233j-y	4.600a-k	21.77a-m	179.1b
G .No 31	81.97e-z	1.467u-z	1.000zd	10.07qrs	58.33wxy
G .No 32	81.33f-z	2.467j-y	3.333f-z	18.17b-s	115.9d-w
G .No 33	77.30w-z	1.200w-z	1.533vwxyz	27.10abc	96.03j-y
G .No 34	85.17a-q	2.900g-v	1.467wxyz	16.97b-s	125.7b-t
G .No 35	85.93a-n	2.000m-z	3.133h-z	13.77g-s	143.9b-l
G .No 36	83.53b-w	2.667h-w	2.200m-z	10.97n-s	71.60r-y
G .No 37	80.10k-z	1.633s-z	1.500vwxyz	13.57h-s	78.27p-y
G .No 38	80.47j-z	2.367j-y	2.867h-z	16.87b-s	127.5b-s
G .No 39	78.30u-z	3.133f-s	3.667d-t	22.00a-l	101.1h-y
G .No 40	79.97m-z	3.067f-t	3.267g-z	18.73a-s	85.67n-y
G .No 41	86.50a-j	2.133l-z	2.033p-z	11.27m-s	87.03l-y
G .No 42	83.60b-v	3.467d-n	3.267g-z	13.90g-s	112.0e-x
G .No 43	80.37j-z	2.167k-z	1.600u-z	12.53k-s	68.53t-y
G .No 44	78.33u-z	4.433a-f	4.200c-n	15.47e-s	81.33o-y
G .No 45	79.93n-z	2.567i-x	2.667j-z	17.43b-s	87.67l-y
G .No 46	77.47v-z	2.967f-u	2.600k-z	15.10e-s	71.67r-y
G .No 47	85.57a-o	1.900o-z	2.000p-z	13.40i-s	91.73k-y
G .No 48	81.03g-z	2.933f-u	2.167n-z	10.33p-s	62.60wxy
G .No 49	78.47u-z	3.400d-o	4.233b-m	22.50a-k	102.1h-y
G .No 50	78.87r-z	3.600d-kl	5.533abcd	27.30ab	155.7b-h
G .No 51	79.87n-z	1.633s-z	1.433xyz	14.63f-s	74.57q-y
G .No 52	79.17p-z	5.300ab	6.167ab	16.87b-s	99.47h-y
G .No 53	76.40z	4.433a-f	3.233g-z	12.53k-s	57.13xy
G .No 54	76.40z	4.067b-i	4.000c-p	17.87b-s	80.37o-y
G .No 55	84.33a-u	2.500j-x	3.800c-r	16.63c-s	136.9b-o
G .No 56	78.87r-z	3.733c-j	3.533d-v	12.23k-s	80.50o-y
G .No 57	87.20a-g	0.6667yz	0.7000zf	16.87b-s	141.9b-n
G .No 58	84.70a-t	1.567t-z	1.600u-z	15.13e-s	91.93k-y
G .No 59	75.17xyz	5.767a	4.633a-k	17.90b-s	82.53o-y
G .No 60	80.37j-z	4.267b-g	3.967c-q	14.03g-s	84.47n-y
G .No 61	81.33f-z	1.867o-z	1.600u-z	18.00b-s	87.13l-y
G .No 62	79.30p-z	3.400d-o	1.933q-z	15.43e-s	108.6f-x
G .No 63	78.83r-z	2.867g-v	3.000h-z	17.07b-s	88.30l-y
G .No 64	78.57t-z	2.667h-w	3.500e-w	23.53a-i	103.3f-y
G .No 65	83.23b-w	1.633s-z	2.867h-z	19.70a-s	146.4b-k
G .No 66	80.03m-z	3.400d-o	2.933h-z	12.70j-s	73.27r-y
G .No 67	82.23d-z	1.533t-z	2.833h-z	25.10a-f	133.5b-p

Genotypes No.	Pulp to fruit weight (%)	Seed to fruit weight (%)	Seed weight (g)	Peels weight (g)	Pulp weight (%)
G .No 68	84.87a-s	1.300w-z	2.333l-z	25.43a-e	153.8b-i
G .No 69	75.53xyz	3.267e-q	4.167c-o	24.83a-f	100.3h-y
G .No 70	86.17a-m	1.800p-z	1.600u-z	21.47a-n	150.7b-j
G .No 71	78.50t-z	2.667h-w	3.367f-z	22.23a-k	107.8f-y
G .No 72	81.20f-z	1.300w-z	1.533v-z	20.77a-p	96.63j-y
G .No 73	84.70a-t	1.667s-z	1.667s-z	10.87o-s	89.27k-y
G .No 74	79.13q-z	1.700r-z	2.133o-z	23.67a-i	99.87h-y
G .No 75	80.50j-z	1.533t-z	1.467w-z	18.70a-s	81.17o-y
G .No 76	83.30b-w	2.967f-u	1.900r-z	9.567rs	109.4f-x
G .No 77	82.53c-z	3.333e-p	2.833h-z	10.13qrs	70.40s-y
G .No 78	81.00h-z	2.467j-y	2.700i-z	14.03g-s	104.4f-y
G .No 79	78.10u-z	2.267j-y	1.533v-z	13.93g-s	59.30wxy
G .No 80	76.97xyz	4.733a-e	4.867a-h	17.47b-s	86.33m-y
G .No 81	85.87a-n	1.233w-z	1.067zc	10.93n-s	82.57o-y
G .No 82	83.13b-x	5.267ab	3.967c-q	9.233s	77.13p-y
G .No 83	82.97b-x	1.567t-z	1.367z	15.63e-s	83.43o-y
G .No 84	89.97a	0.0000z	0.0000zg	13.97g-s	121.8c-v
G .No 85	83.13b-x	1.767q-z	1.833r-z	19.37a-s	143.4b-m
G .No 86	79.40o-z	2.900g-v	2.367l-z	13.73g-s	71.30r-y
G .No 87	82.00e-z	3.300e-q	2.667j-z	10.43p-s	69.80s-y
G .No 88	85.20a-q	1.900o-z	2.867h-z	23.23a-j	159.2b-g
G .No 89	84.97a-r	1.500u-z	1.633t-z	13.43i-s	99.80h-y
G .No 90	82.03e-z	1.367v-z	1.833r-z	19.63a-s	107.3f-y
G .No 91	86.30a-k	1.800p-z	2.900h-z	22.00a-l	159.8bcdef
G .No 92	82.70b-x	0.9333yz	1.167zb	20.73a-p	104.2f-y
G .No 93	86.97a-i	0.6333yz	0.9000ze	11.20m-s	128.5b-r
G .No 94	83.40b-w	1.033xyz	1.433xyz	19.17a-s	115.5e-w
G .No 95	79.63o-z	1.867o-z	2.067p-z	19.90a-r	112.1e-x
G .No 96	88.27abcd	0.1000z	0.06667zc	21.27a-o	159.8bcdef
G .No 97	87.30a-f	0.0000z	0.0000zg	16.37d-s	176.8bc
G .No 98	87.13a-h	0.0000z	0.0000zg	21.77a-m	175.3bc
G .No 99	88.77ab	0.0000z	0.0000zg	28.83a	271.7a
G .No 100	88.43abc	0.0000z	0.0000zg	19.23a-s	166.8bcde
C.V%	**3.64%**	**2.87%**	**3.71%**	**2.32%**	**2.02%**
$Lsd_{0.05}$	**4.786****	**1.200***	**1.591***	**8.120***	**44.45****
SE±	**1.716**	**0.4301**	**0.5704**	**2.912**	**15.94**

Mean values having different superscript letters within columns (for each parameter) are significantly different ($P \leq 0.05$

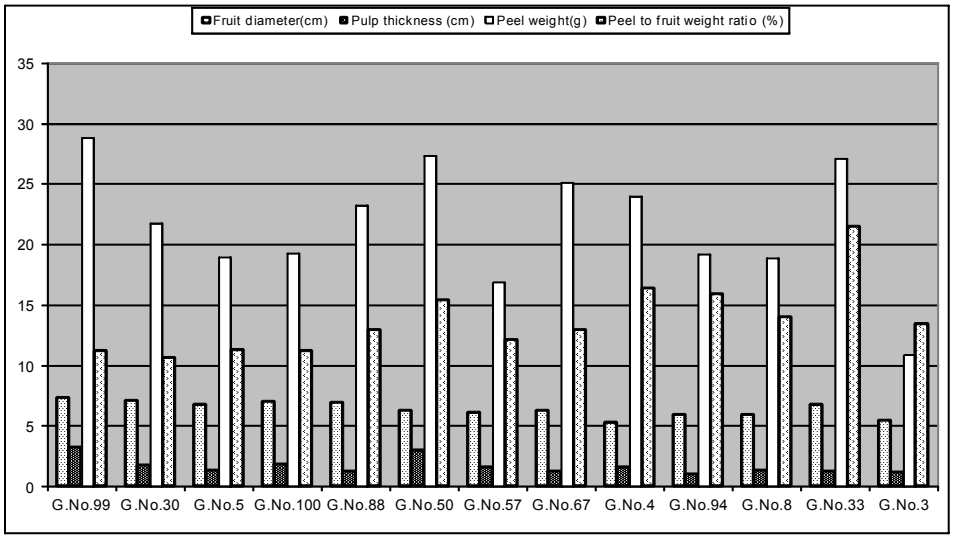

Fig. 2: Fruit diameter, Pulp thickness, peel weight and Pulp weight to Fruit weight ratio in thirteen selected guava genotypes

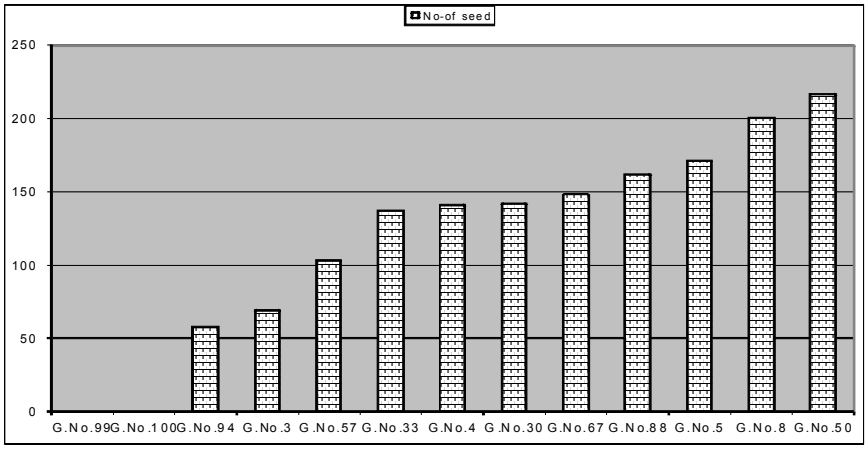

Fig. 3: Number of seeds per fruit in thirteen selected guava genotypes.

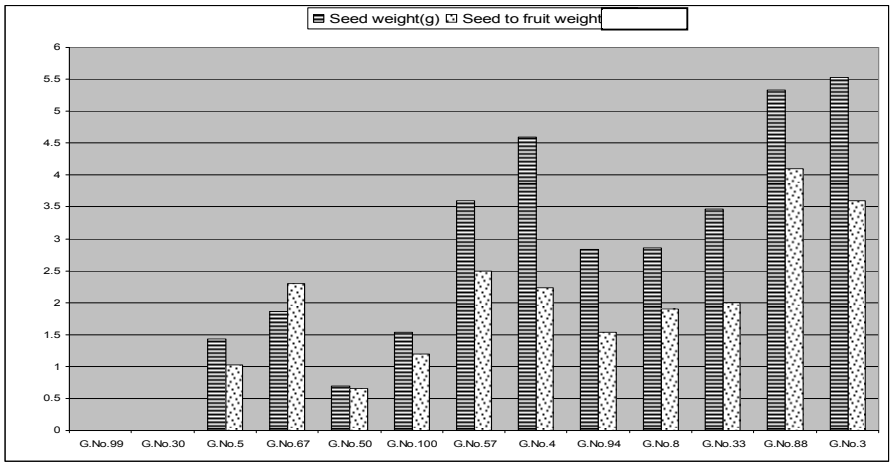

Fig. 4: Seed weight and seeds to fruit weight ratio in thirteen

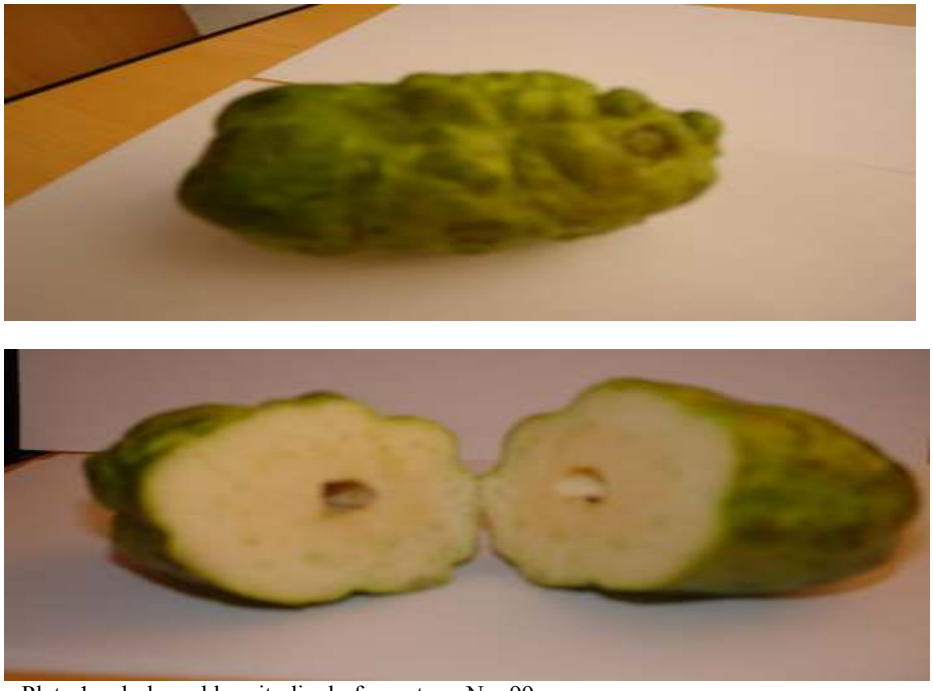

Plate 1: whole and longitudinal of genotype No. 99.