

Evaluation of some mango seedling strains grown under Aswan region

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Abstract

This study was established during two consecutive seasons of 2019 and 2020 in a private mango orchard situated at KomOmbo, Aswan Governorate (24° 28' 45.1596" and 32° 56' 28.626") where the texture of soil is clay and water table depth not less than two meters. Fifteen mango seedling strains age of trees ranging from 25 to 30- years old. They were planted at 6x6 meters; regular horticultural practices were carried out as usual. The growth, nutritional status, yield and quality of fruits of fifteen mango seedling strains were evaluated under conditions of Aswan region based on relatively better yield and fruit quality. The following strains of mango seedlings have been cultivated successfully, thirteenth, twelfth, eleventh and tenth strain in descending order under Aswan conditions. Also, through the numerical evaluation of the productivity characteristics and the fruit quality of the strains under study, it became clear that the tenth, eleventh, twelfth and thirteenth strains showed superiority, so they must be cultivated and spread them through vegetative propagation and expand their cultivation.

Keywords: Mango seed strains; Growth; Yield; Quality; Numerical evaluation

Introduction

The botanical name for mango tree is *Mangifera indica* mango belongs to the Anacardiaceae family. The genus mangifera is native to South- East Asia and includes 62 species. Mango has great adaptability and thrives in a wide range soil and climatic conditions. Also, it has relatively hardly nature, low cost of culture and maintenance. Mango is the most popular fruit of the orient and has been called king of the fruits. Fruits from the better cultivars have melting yellow flesh, fine aroma and good flavour. Ripe mangoes are eaten in dessert canned or used for making juice, Jam and other preserves. The fresh kernel of the mango seed (stone) constitutes 13-19% of

weight of the fruit, 55-70% of the weight of the stone. In times of food scarcity in India, the kernels are roasted or boiled and eaten after soaking to dispel the astringency (tannins), the kernels are dried and ground to flour which is mixed with wheat or rice flour to make bread and it is also used in puddings. Indian analyses of the mango kernel reveal the amino acids namely alanine, cystine, arginine, glycine, aspartic acid, glutamic acid, histidineleucine, lysine, Isoleucine, methionine, praline, serine, phenyl alanine, tyrosine, threanine, tyrosine valine at levels lower than in wheat and gluten. Tannin content may be 0.12 to 0.18% or much higher in certain mango cultivars. (Singh, 1960 and Galan- Sauco, 1993; Larrauriet *al.*, 1996 and Kuruom, 1967). Mangoes are cultivated in more than 100 countries especially India, Pakistan, Mexico, Philippines, Brazil, China, Bangladesh and Other countries of south East

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Asia, India has the largest mango cultivation area (Singh, 1960; Whiley, 1992; Whiley and Scaffer, 1997 and Devillers, 1998). It is also grown successfully in Egypt in the most regions. In Egypt, mango is considered among the principle and strategic fruit crops and it considered among the principle and strategic fruit crops and it ranks the second position after citrus. The fruiting area of mango orchards reached 265509 feddans produced 1091535 tons fruits. In Aswan Governorate where the present study took place fruiting area reached 13573 feddans produced 67076 tons fruits. (Annual Reports of Statistical Institute and Agricultural Economic Research in Egypt, 2019). Therefore, the aim of this study was an attempt to know more about growth, nutritional status of trees, fruit setting, yield, fruit quality and the susceptibility of fifteen mango seedy strains growing in Aswan region. This assessment could provide valuable information to prescribe the prime mango seedling strain having higher yield and fruit quality which can be cultivated successfully under Upper Egypt environmental conditions.

Materials and Method

This study was established during two consecutive seasons of 2019 and 2020 in a private orchard situated at KomOmbo. Aswan governorate where the texture of the soil is clay with a water table depth not less than two meters. Some mango seedling strains namely first, second, a third, fourth, fifth, sixth, seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteenth and fifteenth strain were selected for achieving this evaluation study. All mango seedling strains have the age of trees ranging from 25 to 30 years old at the start of this study. They were planted at 6x6 meters apart (116 trees/ feddan). Each strain was represented by six trees which were healthy and uniform in growth vigor. The fifteen treatments

consisted of the six tested mango seedling strains which examined. This experiment was arranged in randomized complete block design (RCBD) with three replicates, two trees per each. All mango seedling strains received a basal recommended fertilizer in addition to the regular agricultural and horticultural practices which were already followed in the orchard including pruning, hoeing, irrigation with Nile water as well as pathogens, pests and weed control. Fifteen leaves from spring growth cycle were chosen on four labeled branches (four shoot, for each direction) for measuring the main shoot length, number of leaves per shoot and leaf area according to (Ahmed and Morsy, 1999). Samples of five mature and fresh leaves / tree were taken (first week of July) for determination of total chlorophylls (chlorophyll A + B) and total carotenoids (mg/ 1.0 g. F.W.) according to (Fadl and Seri El-Deen, 1978). Fifteen mature leaves from non-fruiting shoots in the spring growth cycle (Summer, 1985) were taken (first week of July) for determination of N, P, K (as %) and Zn and Fe (as ppm) according to the procedures that outlined by (Chapman and Pratt, 1965). Ten panicles per tree were chosen and labeled four counting number of perfect flowers. Just before harvesting, number of retained fruits on the ten selected panicles/tree was counted percentages of initial fruit setting and fruit retentions % was estimated by dividing the number of retained fruits / ten panicles by total number of flowers on these panicles and multiplying the product by 100. The fifteen strains were harvested during July and August during both seasons. Yield per tree (expressed as number of fruits / tree and weight (kg.) / tree) was recorded. Ten fruits from each tree were taken for determination the following physical and chemical character.

1- Fruit weight (g.)

- 2- Fruit height (cm.)
- 3- Fruit diameter (cm.)
- 4- Percentage of peel weight.
- 5- Percentage of seed weight.
- 6- Percentage of pulp weight
- 7- T.S.S. % by using handy refractometer.
- 8- Percentages of total and reducing sugars (A.O.A.C., 2000) according to (Lane and Eynon, 1965).
- 9- Total acidity % (as g citric acid/ 100 g pulp) (A.O.A.C., 2000).
- 10-Crude fibre content (A.O.A.C., 2000).

All the obtained data were tabulated and statistically analyzed according to the procedure of (Steel and Torrie, 1980). The individual comparisons on the studied parameters in the fifteen-mango seedling strain were compared by using new L.S.D. test at 5%.

Numerical evaluation of the mango seed strains

Evaluation of the tested mango strains at the average 2019 and 2020 seasons was calculated on the basis of 100 units which were divided among the various fruit parameters according to (Hamed, 2012). 30 units for the yield/tree, 10 units for each of the fruit weight, percentage of fruit set, percentage of pulp and total sugars, and 10 units for each of the characteristics of fruit length and width, seed weight, TSS%, acidity% and crude fiber %. Each strain that gave the best results in any character was given the full mark specified for this character, while each of the other tested strains took lower units to their qualities.

Results and Discussion

1-Some vegetative growth aspects in different mango seedling strains

Shoot length, number of leaves/ shoot and leaf area in the fifteen mango seedling strains namely (first, second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteen and fifteen strain during 2019 and 2020 seasons were listed in Table (2). Shoot length varied from 11.2 cm in fifth strain in the first season to 20.9 cm in the thirteenth strain in the second season. It was significantly varied among the fifteen-seedling mango strains the maximum values were recorded to the thirteenth strains. Fifth strain mango recorded the minimum values. These results were true during both seasons. Number of leaves per shoot and leaf area behaved the same trend of shoot length, since the maximum values were recorded in thirteenth strain, while the lowest values were obtained from fifth strain. The great variation on vegetative growth characteristics was mainly attributed to the various responses of these mango strains to horticultural practices, genetic and environmental factors and the suitability of the climatic conditions of Aswan region to some mango seed strain unfitness to the other. These results are in agreement with these obtained by Said (2001); Khat tab *et al.* (2007); Shivanandam *et al.* (2007); Shaban (2009); Masoud-Amal (2010); Baita *et al.* (2010); Singh and Bhargava (2011); Reddy *et al.* (2011); Abourayya *et al.* (2012); Parshant *et al.* (2012); Silva *et al.* (2014) and Fahmy (2016).

2-The leaf chemical components in different mango seedling strains

There were no significant differences between the fifteen seedling mango strains in some traits of the leaf chemical components namely total chlorophylls, total carotenoids N, P, K, Zn, and Fe in the leaves.

3-Percentages of initial fruit set and fruit retention in different mango seedling strains

Both of initial fruit setting and fruit retention percentages were significantly varied among the fifteen mango seedling strains. Initial fruit set ranged from 3.9 % in fifth strain to 8.1 % in thirteenth strain in season 2019 and from 4.0% in fifth strain to 8.3% in thirteenth strain in season 2020. Fruit retention % of ranged from 0.7% in fifth strain to 3.0% in thirteenth strain in the first season of study and from 0.8% in fifth strain to 3.1% in thirteenth strain in 2020 seasons. These results are in agreement with those obtained by (Hodaet *al.*, 2003; Nunez and Davenport, 2003; Hassan *et al.*, 2004 and Abd El- Hadi, 2006).

4-Number of fruits / tree and yield per tree in different mango seedling strains

Data in Table (4) showed that yield expressed in number of fruits / tree and yield (kg.) in the fifteen mango seeding strains during 2019 and 2020. Number of fruits per tree ranged from 196 in fifth strain to 505 fruits in thirteenth strain in the first season of study and from 200 fruits in fifth strain to 512 fruits in thirteenth strain in the second season. The maximum yield (144.4, 148.5 kg) per tree was observed in the thirteen mango seed strain. Fifth strain recorded the lowest yield per tree (37.2, 40.0 kg.) during the two seasons, respectively. These results agree with those obtained by Sukhvibul *et al.* (2005); Abd El- Hadi (2006); Sharma and Singh (2006); Sweidan *et al.* (2007); Shaban (2009) and Silva *et al.* (2014).

5-Fruit weight, height and diameter of fruit in the different mango seedling strains

Data in Tables (4, 5) showed that weight, height and diameter of fruits of the different mango seedling strains during 2019 and 2020 seasons. The weight, height and diameter of fruit

significantly varied among the fifteen mango seed strain. The maximum values of fruits weight (286.0, 290.0 g), height (11.3, 11.6 cm) and diameter (8.5, 8.6 cm) were recorded in thirteenth strain. Fifth strain recorded the minimum values. The rest mango seedling strain occupied in between position.

6-Pecentage of peel, seed and pulp of fruit in the different mango seedling strains

Data in Table (5) showed that peel %, seed % and pulp % in the fruits of the different mango seedling strains during 2019 and 2020 seasons.

6- 1 Fruit peel weight %

It was varied from 19.1 % to 16.5 % during both seasons. Fifth strain, fourteenth strain and fifteenth strain gave the highest values. The lowest values (16.5, 16.5 %) were recorded in thirteenth strain during both seasons, respectively.

6- 2 Fruit seed weight %

It was varied from 20.9% to 15.8 during both season. Fifth strain, fourteenth strain and fifteenth strain gave the highest values.

The lowest values (16.0, 15.8 %) were recorded in thirteenth strain during both seasons, respectively.

6- 3 Pulp %

It was varied from 60.0 to 67.7% during both seasons. The maximum percentage of pulp was presented in thirteenth strain (67.5, 67.7) followed by twelfth strain (66.3, 66.6), while the lowest values were recorded ion fifth strain (60.0, 60.0 %) during both seasons, respectively.

7-Fruit quality characteristics in the different mango seedling strains

Data in Table (6) showed that T.S.S. %, total acidity %, fibre %, total and reducing sugars % in the fruits of the different mango seedling strain during 2019 and 2020 seasons.

7- 1 Total soluble solids %

It was varied from 12.8 to 17.1 % during both seasons. The maximum values (16.9, 17.1 %) were recorded in thirteenth strain. The lowest values (12.8, 12.9%) were recorded on fifth strain.

7- 2 Total acidity %. It was varied from (0.411 , 0.245%) during both seasons. The maximum values (0.411, 0.408%) were recorded on fifth strain. The lowest total acidity % (0.245, 0.250 %) were observed in the fruits of thirteenth strain.

7- 3 Total and reducing sugars percentages:

They were varied significantly according to mango seedling strains was varied from 8.9 to 12.9 % for total sugars and 1.9, 5.6 % reducing sugars during both seasons.

The maximum values of total sugars (12.9, 12.9 %) and reducing sugars (5.6, 5.6 %) were recorded in the thirteenth strain. Fifth strain had the lowest values of these sugars %. Similar results were announced during both seasons.

7- 4 Total fiber %

Total fibre % ranged from 0.74 % to 1.01% in all mango seedling strains during both seasons. The maximum values (1.01, 0.99%) were recorded in fifth strain. The lowest values (0.74, 0.74 %) were recorded in thirteenth strain.

The great variation on fruit quality characteristics of the fifteen mango seedling strain might be attributed to the great difference in growth, fruit setting, yield and fruit quality. These results agree with those obtained by Sarkaret *et al.*, (2001); Mane *et al.*, (2001), Tandon and Kalra (2001); Sobeih and El-Helaly (2020); Seery (2003); Tawfik (2003), Hassan *et al.*, (2004); and Fahmy (2016).

Numerical evaluation of the mango seedling strains

Data illustrated in Table (7) showed that the numerical evaluation of the mango seedling strains under study and growing in Aswan governorate, in the average of 2019 and 2020. The data in table 7 showed that, there were great differences in the numerical evaluation, productivity and fruit quality of mango seedlings strains under study. From the ninth to thirteenth strains gave high values compared to the rest of the strains, and their values were 88.2, 95.4, 98.0, 99.0 and 99.5, respectively. Meanwhile, the fourth, fifth, fifteenth, second and first strains gave the lowest values.

Table (2). Some vegetative growth aspects in the spring growth cycle and pigments (mg/ 1.0 g F.W.) of the studied mango seed strains in 2019 and 2020 seasons.

Some mango seed strains	Shoot length (cm) spring		Number of leaves /		Leaf area (cm) ²		Total chlorophylls (mg/		Total carotenoids	
	growth cycle		shoot				1.0 g F.W.)		(mg/1.0 g F.W.)	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
First strain	13.5	13.8	10.5	11.0	65.17	66.00	4.44	4.46	1.86	1.88
Second strain	14.7	14.5	11.7	11.5	69.10	70.00	4.36	4.50	1.91	1.78
Third strain	15.2	15.3	11.9	12.0	71.50	72.17	4.71	4.88	1.89	1.81
Fourth strain	15.3	15.3	12.0	12.5	71.60	72.55	5.10	5.18	1.88	2.00
Fifth strain	11.2	11.4	9.0	9.0	58.22	59.31	5.22	4.95	2.11	1.99
Sixth strain	16.2	16.5	12.3	12.5	73.20	74.00	5.33	5.42	2.01	2.04
Seventh strain	16.8	16.9	13.0	13.5	73.50	74.10	4.61	4.81	2.10	2.08
Eight strain	17.0	17.1	13.5	13.5	75.10	75.18	4.71	4.84	2.22	2.18
Ninth strain	17.6	17.8	13.6	13.7	76.00	75.80	5.13	5.22	2.23	2.25
Tenth strain	16.8	17.0	13.2	13.4	74.20	75.00	5.04	5.13	2.11	2.19
eleventh strain	17.5	17.5	14.0	14.5	76.00	76.11	5.19	5.22	2.11	2.09
Twelfth strain	18.3	19.5	15.0	15.6	78.20	78.15	5.13	5.21	1.84	1.61
Thirteenth strain	21.0	20.9	17.0	18.0	80.10	81.66	4.50	4.61	1.81	1.86
Fourteenth strain	11.6	11.9	9.3	9.5	61.32	61.51	5.00	4.96	1.98	1.99
fifteenth strain	12.2	12.6	9.9	10.0	63.13	64.20	5.18	5.22	1.99	1.99
New L.S.D. at 5%	1.9	2.0	1.6	1.7	2.01	2.08	Ns	Ns	Ns	Ns

Table (3). Leaf content of N,P,K (as %) , Zn and Fe (as ppm) of the fifteen mango seed strains grown under Aswan region conditions in 2019 and 2020 seasons.

Some mango seed strains	Leaf N %		Leaf P %		Leaf K %		Leaf Zn (ppm)		Leaf Fe (ppm)	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
First strain	1.81	1.82	0.22	0.21	1.21	1.23	42.01	42.11	48.11	48.00
Second strain	1.81	1.81	0.20	0.21	1.20	1.19	42.18	42.22	48.11	48.23
Third strain	1.83	1.83	0.21	0.22	1.15	1.18	42.51	42.66	48.22	48.35
Fourth strain	1.82	1.83	0.22	0.23	1.18	1.19	42.77	42.89	48.51	48.61
Fifth strain	1.81	1.83	0.23	0.24	1.16	1.17	42.61	42.63	47.71	47.88
Sixth strain	1.80	1.82	0.24	0.25	1.20	1.21	43.11	42.21	48.62	48.71
Seventh strain	1.84	1.85	0.25	0.26	1.21	1.23	43.40	42.61	48.88	49.00
Eight strain	1.86	1.85	0.24	0.24	1.20	1.21	43.11	42.55	49.01	49.22
Ninth strain	1.86	1.85	0.26	0.24	1.22	1.21	42.71	42.80	48.31	48.38
Tenth strain	1.86	1.87	0.23	0.25	1.19	1.20	42.91	42.99	48.44	48.56
eleventh strain	1.81	1.82	0.26	0.25	1.18	1.18	43.09	43.18	49.00	49.09
Twelfth strain	1.82	1.83	0.25	0.26	1.17	1.18	42.71	42.88	48.71	48.88
Thirteenth strain	1.84	1.85	0.27	0.24	1.22	1.23	43.11	43.36	49.01	49.23
Fourteenth strain	1.86	1.85	0.26	0.26	1.21	1.21	42.71	42.77	48.85	48.89
fifteenth strain	1.85	1.86	0.24	0.25	1.19	1.21	42.78	42.91	48.88	48.91
New L.S.D. at 5%	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns

Table (4). Yield and yield attributes of the studied mango seed strains grown under Aswan region conditions in 2019 and 2020 seasons.

Some mango seed strain	Initial fruit setting %		Fruit retention %		Number of fruits/tree		Yield/tree (kg.)		Fruit weight (g.)	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
First strain	4.3	4.4	1.2	1.3	260.0	272.0	53.3	57.1	205.0	210.0
Second strain	4.6	4.7	1.4	1.4	284.0	290.0	62.5	62.4	220.0	215.0
Third strain	4.7	4.8	1.5	1.6	300.0	312.0	67.5	71.1	225.0	228.0
Fourth strain	4.9	4.9	1.8	1.9	315.0	320.0	73.4	76.5	233.0	239.0
Fifth strain	3.9	4.0	0.7	0.8	196.0	200.0	37.2	40.0	190.0	200.0
Sixth strain	5.0	5.1	1.9	2.1	330.0	335.0	79.2	81.1	240.0	242.0
Seventh strain	5.6	5.8	2.1	2.3	350.0	355.0	88.2	90.2	252.0	254.0
Eight strain	5.9	6.1	2.4	2.5	378.0	380.0	98.3	98.0	260.0	258.0
Ninth strain	6.3	6.4	2.6	2.6	390.0	390.0	102.2	101.4	262.0	260.0
Tenth strain	6.7	7.0	2.8	2.9	412.0	418.0	109.6	112.9	266.0	270.0
eleventh strain	7.3	7.4	2.9	2.9	422.0	430.0	114.8	116.1	272.0	270.0
Twelfth strain	7.8	7.9	2.9	3.0	440.0	455.0	123.2	127.4	280.0	280.0
Thirteenth strain	8.1	8.3	3.0	3.1	505.0	512.0	144.4	148.5	286.0	290.0
Fourteenth strain	4.1	4.3	0.9	0.9	220.0	222.0	42.9	45.5	195.0	205.0
fifteenth strain	4.2	4.5	0.9	1.0	230.0	230.0	48.3	48.3	210.0	210.0
New L.S.D. at 5%	0.5	0.6	0.2	0.2	11.1	11.6	9.2	9.4	4.8	5.1

Table (5). Some physical characteristics of fruits of the fifteen mango seed strains grown under Aswan region conditions in 2019 and 2020 seasons.

Some mango seed strains	Fruit length (cm.)		Fruit width (cm.)		Peel weight%		Seed weight%		Pulp %	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
First strain	8.3	8.5	6.9	7.0	18.6	18.5	19.6	19.5	61.8	62.0
Second strain	8.6	8.8	7.1	7.3	18.4	18.3	19.5	19.2	62.1	62.5
Third strain	8.9	8.9	7.5	7.4	18.3	18.2	19.3	19.1	62.4	62.7
Fourth strain	9.0	9.1	7.7	7.7	18.2	18.1	19.1	19.0	62.7	62.9
Fifth strain	7.5	7.6	6.5	6.6	19.2	19.1	20.8	20.9	60.0	60.0
Sixth strain	9.2	9.2	7.9	7.9	19.0	19.0	18.6	18.5	62.4	62.5
Seventh strain	9.4	9.3	7.9	8.0	18.8	18.7	18.3	18.2	62.9	63.1
Eight strain	9.6	9.5	8.0	8.1	18.6	18.5	18.1	18.0	63.3	63.5
Ninth strain	9.6	9.7	8.2	8.2	18.4	18.3	17.7	17.6	63.9	64.1
Tenth strain	9.8	9.9	8.3	8.3	17.8	17.2	17.4	17.3	64.8	65.5
eleventh strain	9.9	10.6	8.4	8.3	17.6	17.5	17.2	17.0	65.2	65.5
Twelfth strain	10.6	10.7	8.4	8.5	17.1	16.9	16.6	16.5	66.3	66.6
Thirteenth strain	11.3	11.6	8.5	8.6	18.5	16.5	16.0	15.8	67.5	67.7
Fourteenth strain	7.7	7.8	6.6	6.8	19.0	19.0	20.5	20.5	60.5	60.5
fifteenth strain	7.8	7.9	6.7	6.9	18.8	18.7	20.1	20.0	61.1	61.3
New L.S.D. at 5%	0.2	0.3	0.1	0.2	0.8	0.7	0.7	0.6	0.9	1.0

Table (6). Some chemical characteristics of fruits of the fifteen mango seed strains grown under Aswan region conditions in 2019 and 2020 seasons.

Some mango seed strain	T.S.S.%		Total sugars%		Reducing sugars%		Total acidity%		Crude Fibre%	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
First strain	13.6	13.8	9.5	9.6	2.4	2.5	0.370	0.366	0.96	0.95
Second strain	14.0	14.1	9.9	10.0	2.9	2.9	0.355	0.350	0.93	0.92
Third strain	14.3	14.5	10.3	10.4	3.3	3.4	0.340	0.330	0.91	0.90
Fourth strain	14.8	15.0	10.8	10.9	3.8	3.9	0.320	0.310	0.89	0.88
Fifth strain	12.8	12.9	8.9	9.0	1.9	2.0	0.411	0.408	1.01	0.99
Sixth strain	15.0	15.1	11.0	11.0	3.9	3.9	0.310	0.300	0.87	0.85
Seventh strain	15.2	15.6	11.1	11.2	4.0	4.0	0.295	0.290	0.85	0.84
Eight strain	15.4	15.7	11.4	11.6	4.3	4.5	0.280	0.275	0.82	0.80
Ninth strain	15.7	15.8	11.6	11.8	4.6	4.7	0.270	0.260	0.80	0.78
Tenth strain	15.9	15.9	11.9	11.9	4.8	4.8	0.260	0.260	0.78	0.77
eleventh strain	16.2	16.3	12.1	12.4	5.0	5.3	0.255	0.255	0.76	0.75
Twelfth strain	16.6	16.7	12.5	12.6	5.2	5.4	0.255	0.250	0.76	0.75
Thirteenth strain	16.9	17.1	12.9	12.9	5.6	5.6	0.245	0.250	0.74	0.74
Fourteenth strain	13.1	13.2	9.2	9.3	2.2	2.3	0.398	0.379	0.98	0.98
fifteenth strain	13.2	13.4	9.3	9.5	2.4	2.6	0.388	0.375	0.97	0.96
New L.S.D. at 5%	0.2	0.2	0.2	0.2	0.1	0.1	0.020	0.022	0.01	0.02

Table (7). General score evaluation of fruit of the fifteen mango seed strains grown under Aswan region conditions in the average of 2017 and 2018 seasons.

Index	Units specified	Average of 2017 and 2018 seasons														
		1 st strain	2 nd strain	3 rd strain	4 th strain	5 th strain	6 th strain	7 th strain	8 th strain	9 th strain	10 th strain	11 th strain	12 th strain	13 th strain	14 th strain	15 th strain
Yield/tree (Kg)	30	18.00	19.00	20.00	21.00	15.00	22.00	23.00	25.00	26.00	27.00	28.00	29.00	29.50	16.00	17.00
Fruit set (%)	10	6.50	7.50	7.80	8.00	6.30	8.30	8.50	8.80	9.00	9.50	10.00	10.00	10.00	6.50	6.70
Fruit weight (gm)	10	7.00	7.70	7.90	8.00	7.80	8.30	8.50	8.80	9.00	10.00	10.00	10.00	10.00	6.80	6.50
Pulp (%)	10	6.50	6.70	6.80	6.00	6.60	6.90	7.00	7.30	7.70	10.00	10.00	10.00	10.00	6.00	6.30
Fruit length (cm)	5	3.70	3.80	3.90	4.00	3.50	4.00	4.10	4.20	4.30	4.50	5.00	5.00	5.00	3.50	3.60
Fruit width(cm)	5	4.00	4.10	4.20	4.30	3.50	4.30	4.40	4.50	4.60	4.70	5.00	5.00	5.00	3.60	3.70
Seed weight (gm)	5	3.70	3.70	3.80	3.70	3.60	4.30	4.40	4.50	4.60	4.70	5.00	5.00	5.00	3.50	3.60
Total sugars (%)	10	7.40	7.80	8.00	8.30	8.10	7.50	8.70	8.80	8.90	10.00	10.00	10.00	10.00	7.00	7.30
TSS (%)	5	4.20	4.30	4.40	4.40	4.30	4.40	4.50	4.60	4.70	5.00	5.00	5.00	5.00	4.10	4.00
Acidity (%)	5	3.40	3.60	3.70	3.80	3.50	3.60	3.70	3.80	5.00	5.00	5.00	5.00	5.00	3.40	3.50
Crude fiber (%)	5	3.50	3.40	3.50	3.50	3.30	4.10	4.20	4.30	4.40	5.00	5.00	5.00	5.00	3.40	3.40
Total scour fruit quality	70	49.9	48.6	54.0	54.0	50.5	55.7	58.0	59.6	62.2	68.4	70.0	70.0	70.0	47.8	48.6
Total unit yield/palm	100	67.9	67.6	74.0	75.0	65.5	77.7	81.0	84.6	88.2	95.4	98.0	99.0	99.5	63.8	65.6

Conclusion

From the obtained data of such study, there were a promising seedy mango strains in their growth, productivity and fruit quality which grown under Aswan governorate conditions. These seedy strains must be taken a lot of care and must be spread their cultivation via vegetative propagation specially grafting.

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