

Evaluation of some new mango cultivars under Aswan conditions

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Abstract

This investigation was carried out in a private orchard located at the entrance to Wadi Nugra Blana-region, Aswan Governorate, during two consecutive seasons of 2019 and 2020. The study aimed to evaluate the morphology, yield, and fruit quality of five foreign mango cultivars (Nam Doc Mai, Naomi, Osteen, R2E2, and Shelly) under Aswan conditions. All mango cultivars were 8 years old at the start of the experiment. They were planted 2 by 3 meters apart. Each cultivar was represented by five trees (i.e., five replicates). The trees of each mango cultivar were uniform in vigour. The obtained results showed that vegetative growth, yield, and physical and chemical characteristics of the fruit varied between the studied mango cultivars. On the basis of yield and fruit quality attributes, it could be suggested to cultivate R2E2, Naomi, and Shelly cultivars successfully under Aswan conditions.

Key words: mango cultivars, evaluation, vegetative growth, yield, fruit quality.

INTRODUCTION

Mango (*Mangifera indica L.*) is one of the most popular and common fruit crops in the world. It is considered the most important fruit in Egypt and acknowledged as the "king of fruits". It belongs to the family Anacardiaceae and the genus *Mangifera*. In Egypt, mango is considered one of the principle and strategic fruit crops, and it ranks second after citrus. Generally, although Egypt has an excellent opportunity for mango production, the productivity of different mango cultivars varies with soil and climatic conditions [1]. Aswan Governorate ranks fifth among all governorates in Egypt in mango production. Most cultivated fruit species possess numerous recognized cultivars, and their productivity largely depends on the successful performance of the more

popularly established planted cultivars. Different cultivars of mango vary in their performance, and these differences are governed by various genetic, cultural, and environmental factors. Due to the variation in performance of different mango cultivars, the suitability of these cultivars from the consumers point of view is often evaluated from different angles. A study of genetic diversity, growth, yield, and morphologically important external and internal characteristics of the fruit in mango cultivars is warranted to provide important criteria for the evaluation of such cultivars.

Previous studies showed vast differences among various mango cultivars grown for growth and fruiting behaviour under different climatic conditions [2]. Different cultivars' inherent variances in photosynthesis, plant hormones, fruit set, fruit retention, tree size, and leaf area could all play a vital role in the diversity of fruit yield, and a study reported significant variations among the mango genotypes for fruit yield [3]. Producers seek mango cultivars that are more productive, have a stable yield and good quality, are simple to cultivate, and are adapted to challenging climatic conditions. Meantime, customers seek the highest fruit quality with an emphasis on color and flavor, while traders and distributors require mango types with greater resistance to handling and transit [4]. In mango cultivars, the pulp content and other fruit quality traits depend on environmental influences and vary with the climatic conditions [5]; [6] and [7]. Prior research underlined the advantages of evaluation studies for choosing the finest mango cultivars for the different localities to achieve the highest fruit yield [8].

Therefore, this study aimed to evaluate the growth, flowering, fruit setting, yield, and fruit quality of five foreign mango cultivars (Nam Doc Mai, Naomi, Osteen, R2E2, and Shelly) under Aswan conditions.

Materials and Methods

This investigation was carried out in a private orchard located at the entrance to Wadi Nugra Blana-region, Aswan Governorate, during two consecutive seasons of 2019 and 2020 to evaluate the behaviour of some mango cultivars grown in such regions as well as to overcome the incomplete understanding of mango cultivars grown in the region of Upper Egypt. Five mango cultivars, i.e., Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly, were selected.

All mango cultivars were 8 years old at the start of the experiment. They were planted 2 by 3 metres apart. Each cultivar was represented by five trees (i.e., five replicates). The trees of each mango cultivar were uniform in vigour.

1- Experimental work:

Five treatments consisted of the five mango cultivars tested.

2-Experimental design:

This experiment was arranged in a completely randomized block design with five replicates, one tree per each.

3-Various measurements:

Generally, the following measurements were recorded in all the studied mango cvs. during the two seasons of the study:

3-1 Measurement of grown aspects in the tree growth cycles:

Twenty new shoots in the spring growth cycle growth flushes were chosen from the ten labelled secondary branches per tree in all the investigated mango cvs. to measure their length (cm), thickness (cm), and the number of leaves on them. Twenty leaves per shoot (below panels) in the spring growth cycle were taken to calculate their length and width (cm). Leaf area (cm²) was measured using the following equation, as reported by (Ahmed and Morsy) [9]: - $L.A = 0.70 (L \times W) - 1.06$

where L.A. = leaf area (cm)² maximum leaf length (cm) and W = maximum leaf width (cm.).

3-2 Measurements of flowering aspects:

At the blooming stage, dates were recorded at first, as well as the number of panicles per tree and panicle length (cm).

3-3 Measurements of yield as well as physical and chemical properties of the fruits::

Harvesting is achieved when the flesh becomes yellowish and the fruit shoulder swells to become rounded or flattened. The harvesting date (in days) of each mango cv. was recorded for the two study seasons. Yield expressed in kg and the number of fruits per tree in the undertaken mango cvs. were registered. Twenty fruits were taken randomly from the yield of each tree when each mango cv. reached the maturity stage, then transferred to the pomology laboratory, Horticulture Department, Faculty of Agriculture and Natural Resources, Aswan University. Fruits were put in closed wooden boxes for three days to ripen. The following physical and chemical properties of the fruits were determined:

3-3-1. Average fruit weight (g.)

3-3-2. Average fruit dimensions. (In cm.) [length and width] by vernier caliper

3-3-3. Fruit shape (length /width).

3-3-4. Percentage of pulp.

3-3-5. Percentage of Seed.

3-3-6. Percentage of peel.

3-3-7. Percentage of the total soluble solids by using a handy refractometer

3-3-8. Percentage of total acidity (expressed as g of citric acid per 100 g of pulp) by titration with 0.1N NaOH using phenolphthalein as an indicator according to **A.O.A.C. [10]**

3-3-9. Total soluble solids/total acidity.

3-3-10. Percentages of the total and reducing sugars according to the Lane and Eynon volumetric method outlined in **A.O.A.C. [10]**.

3-3-11. Percentage of sucrose (total sugars% minus reducing sugars%)

RESULTS AND DISCUSSION

1- Vegetative growth aspects in different mango cvs

Shoot length and number of leaves per shoot, as well as leaf area, in the spring growth cycle of the five mango cvs Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly under Aswan conditions during the 2019 and 2020 seasons are listed in Table (1)

1-1 Shoot length and number of leaves/ shoot:

It is evident from the obtained data that average shoot length varied from 13.23 cm in Shelly mango cv in the second season to 23.63 cm in Osteen mango trees in the first season. It was significantly varied among the five mango cvs. The maximum values were recorded on Osteen Mango cv., Shelly mango cv. recorded the minimum values. These results were true during both seasons. Data showed that Osteen cultivar had the lowest average number of leaves per shoot (17.35 leaves per shoot), while R2E2 cultivar had the highest average number of leaves per shoot (22.67 and 22.00) during the two seasons, respectively.

1-2 Leaf area

Leaf area was significantly varied among the five mango cultivars. It was maximized in mango cv. Naomi and Osteen and minimized in mango cv. R2E2 and Shelly. These results were true during both seasons. The great variation in vegetative growth characteristics was mainly attributed to the various responses of these mango cvs to horticultural practices, genetic and environmental factors, and the suitability of the climatic conditions of the Aswan region for some mango cvs and their unfitness for others.

These results are in agreement with those obtained by [11] ; [12] and [13], who declared that leaf blade area and petiole length ordinarily strongly depend on cultivars, climate, growth stages, and cultural practices. Growth behaviours are often influenced by cultivar genetics, plantation density, cultural practices, and methods of propagation.

2- Some flowering aspects:

Some flowering aspects of mango cvs Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly under Aswan conditions during 2019 and 2020 seasons are shown in Table (2).

2-1- Flowering date :

It is clear from the obtained data that all mango cvs under study opened their flower buds in February. It could be noticed that flowering in the Nam dok mai cultivar was the earliest (1st week of February) during the 2019 and 2020 seasons. followed by Naomi and Shelly cultivars (3rd week of February), while Osteen and R2E2 cultivars were the latest (4th week of February) during the two seasons.

The great and varied response of these mango cvs to climatic conditions as well as genetic factors could explain the present results.

Table (1) Vegetative growth aspects in the Spring growth cycle of New Mango cvs (Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly) under Aswan conditions during 2019 and 2020 seasons.

Mango cvs	Shoot length (cm)			Number of leaves/ shoot			leaf area (cm) ²		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Naomi	14.43 A	14.13 C	14.28	20.33 B	20.20 BC	20.27	78.68 A	76.9 A	77.8
Nam Dok Mai	19.17 B	18.93 B	19.05	20.00 B	19.00 C	19.50	61.37 B	56.10 AB	58.75
Osteen	23.63 A	22.97 A	23.30	17.70 C	17.00 D	17.35	66.41 B	65.20 AB	65.80
R2E2	14.17 C	13.77 CD	13.97	22.70 A	22.00 A	22.35	38.50 D	37.00 B	37.75
Shelly	13.50 C	13.23 D	13.40	22.00 A	21.00 AB	21.50	46.61 C	43.72 AB	45.15
L.S.D 5 %	1.25	0.59		1.63	1.66		5.82	7.82	

2-2- Length of panicle and number of panicles/tree:

Panicle length and number of panicles per tree in the five mango cvs during 2019 and 2020 seasons are shown in Table (2).

Significant differences were observed on the length of the panicle and the number of panicles per tree among most of the mango cvs investigated. Mango cv. Naomi recorded the highest panicle length (23.54 & 24.17 cm) during both seasons, respectively. The lowest panicle length (12.0 & 12.57 cm) appeared in mango cv. Nam Dok Mai during 2019 and 2020 seasons, respectively. The

maximum number of panicles per tree was registered in mango cv. R2E2 (43.33 & 55.33 panicles per tree), while the lowest values were obtained from Name Dok Mai cultivar (16.33 & 19.00) during the two studied seasons.

The material variation among the five mango cvs to adaptability under various environmental conditions could result in varying the ability of the trees to bear panicles.

These results are in agreement with those obtained by [14]. Who mentioned that it's possible that a shift in location or inherent genetic variation is the cause of the variation in fruiting in various cultivars.

Table (2): Some flowering aspects of New Mango cvs (Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly) under Aswan conditions during 2019 and 2020 seasons.

Mango cvs	Flowering date		pancil length (cm)			pancil No./tree		
	2019	2020	2019	2020	Mean	2019	2020	Mean
Naomi	3 rd week of Feb	3 rd week of Feb	23.54 A	24.17 A	23.86	22.33 C	23.00 C	22.67
Nam Dok Mai	1 st week of Feb	1 st week of Feb	12.00 C	12.57 D	12.29	16.33 D	19.00 D	17.67
Osteen	4 th week of Feb	4 th week of Feb	22.00 A	22.20 B	22.10	31.67 B	38.00 B	34.84
R2E2	4 th week of Feb	4 th week of Feb	14.47 B	14.67 C	14.57	43.33 A	55.33 A	49.33
Shelly	3 rd week of Feb	3 rd week of Feb	12.70 BC	14.40 CD	13.55	30.00 B	37.67 B	33.84
L.S.D 5 %			2.03	1.94		3.19	2.25	

3- Yield and it's components

Data in Table (3) show harvesting date, yield expressed in number of fruits / tree and yield (kg.) in the five mango cvs during 2019 and 2020 seasons.

3-1- Harvesting date in the different mango cvs

Harvesting dates for the different mango cvs are presented in Table (3). The date showed that there were variations in harvesting dates. Osteen, R2E2, and shelly cultivars were the earliest cultivars (3rd July and 1st July) during 2019 and 2020 seasons, respectively. While the Naomi cultivar was the latest harvested cultivar (17 July and 18 July) during the two studied seasons. The

different responses of the five mango cvs. to various biotic and abiotic stresses could explain the present results.

These results are in line with those obtained by [15] reported that Mango fruits could be generally harvested 12-16 weeks after fruit set depending on the variety.

3-2- Number of fruits/tree:

The data showed significant variation in fruit number/tree between the five evaluated cultivars. Fruit number ranged from 52.5 to 76 fruit/tree as an average of the two seasons Shelly cultivar had the highest fruit number/tree (77.33&74.67) followed by Nam Dok Mai (74.00 & 69.00) during 2019 and 2020 seasons, respectively. The lowest fruit number / tree were obtained from R2E2 cultivar (55.33& 49.67) during the two studied seasons.

3-3- Yield per tree (Kg):

The obtained results from the five cultivars indicate that there were significant differences between cultivars concerning their yield/tree. The yield/tree ranged from 19.27 to 31.38 Kg. as an average of the two seasons. The highest yield values were obtained from R2E2 (33.28 & 29.48 Kg) followed by Naomi cultivar (32.36 & 26.44 Kg) respectively during 2019 and 2020 seasons. While Nam Dok Mai cultivar gave the lowest yield values (20.47 & 18.06 Kg) during 2019 and 2020 seasons.

The significant differences in initial fruit setting, and fruit retention, alongside fruit dropping across various mango cultivars, may be the cause of these outcomes.

These results are in agreement with those obtained by [16] who discovered seasonal variations in the weight and volume of some selected mango clones' fruits. These variations could be caused by factors other than genetics, like the number of fruits per tree, the climate, and the environment.

4- Some physical characteristics in the different mango cvs fruits:

Data in Tables (4 to 7) show the average fruit height, diameter, shape index of fruit, average fruit weight (g), percentages of pulp, seeds, and peels, T.S.S.%, total acidity%, T.S.S./acidity, and total, reducing, and non-reducing sugars in the fruits of the different mango cvs during 2019 and 2020 seasons.

4-1- Average fruit height, diameter, and shape index of fruit

Data in Table (4) indicated that most studied cultivars were significantly varied. Fruit height, fruit diameter, and fruit shape ranged from (6.72 to 13.90) , (4.77 to 9.07 cm) and (1.30 to 2.24 cm, respectively, as an average of the two studied seasons. Naomi cultivar was the longest (13.63 and 14.17 cm), followed by Nam Dok Mai (13.37 and 13.77cm),while Shelly cultivar had the lowest fruit height values (6.90 and 6.53 cm) during 2019 and 2020 seasons, respectively. Concerning fruit diameter, Naomi had the highest values (9.10 and 9.03 cm), followed by R2E2 (8.77 and 8.70 cm), while the lowest values were obtained from the Shelly cultivar (4.60 and 4.93 cm) during both studied seasons. The Osteen cultivar had the highest fruit shape index among the evaluated cultivars (2.22 and 2.26), followed by Name Dok Mai (2.02 and 2.07). On the other hand, the R2E2 cultivar had the lowest fruit shape index values (1.30 and 1.30 & 1.30) during 2019 and 2020 seasons, respectively.

Table (3): Harvesting date, No. of fruits / tree, and yield / tree of New Mango cvs (Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly) under Aswan conditions during 2019 and 2020 seasons.

Mango cvs	Harvesting date		Number of fruits / tree			yield (kg)		
	2019	2020	2019	2020	Mean	2019	2020	Mean
Naomi	17-July	18-July	59.00 C	52.33 BC	55.67	32.36 A	26.44 A	29.4
Nam Dok Mai	15-July	09- July	74.00 AB	69.00 A	71.50	20.47 B	18.06 B	19.27
Osteen	03-July	01- July	63.00 BC	59.67 B	61.34	20.71 B	19.71 B	20.21
R2E2	03-July	01- July	55.33 C	49.67 C	52.50	33.28 A	29.48 A	31.38
Shelly	03-July	01-July	77.33 A	74.67 A	76.00	20.24 B	19.12 B	19.68
L.S.D 5 %			12.33	9.18		6.04	6.40	

4-2- Average fruit weight (g), and percentages of seeds, pulp, and peels

Data in Table (5) clearly show that great differences in fruit weight (g), pulp (%), peel (%), and seed percentage were observed among the five mango cultivars. Concerning fruit weight (g), the highest values were recorded in R2E2 (605.77 & 596.00 g), followed by Naomi (556.72 & 503.49 g), while the lowest fruit weight values were recorded in Shelly (260.22 & 254.72 g) during both seasons, respectively. Data also showed that pulp percentage ranged from 75.79 to 86.25 %.

R2E2 had the highest Pulp% values (83.57 & 86.25%) followed by Osteen (82.10 & 83.39%) and Shelly (81.20 & 82.66%) while the lowest values were obtained from Nam Dok Mai (75.79 & 76.81%) during 2019 and 2020 seasons.

Results also showed that the Naomi cultivar had the highest peel percentage values (16.54%) followed by Nam Dok Mai (16.23%) while the lowest peel percentage was obtained from the R2E2 cultivar (10.49%) as an average of the two studied seasons. Concerning seed % data, Nam Dok Mai gave the highest seed % (6.93 and 6.91%), followed by Shelly cv. (6.49 & 6.31%), while R2E2 cultivar had the lowest values (5.29 & 3.92%) during both seasons, respectively. These findings are in line with those of [17] and [18], who reported variation in fruit physical characteristics (i.e., weight of fruit, stone, and pulp) among different mango cultivars, which could be due to genetic or physiological factors, and [19], who cleared that physical characteristics of fruits varied significantly between different mango cultivars.

5- Fruit Some chemical characteristics of the different mango cvs:

Data in Tables (6 & 7) show the total soluble solids % (T.S.S. %), total acidity % (T.S.S. / Acidity), total reducing and non-reducing sugars in the fruits of the different mango cvs during 2019 and 2020 seasons.

5-1- Total soluble solids%:

During both seasons, total soluble solids ranged from 13.29 to 15.3%. The maximum values (15.13 & 15.47%) were recorded in Shelly mango, followed by Nam Dok Mai (14.87 & 15.00%). The lowest values (13.30 & 13.27%) were recorded on mango cv. Naomi.

5-2- Acidity % and TSS / acidity ratio :

The obtained results showed that Naomi cultivar had the highest acidity percentage (0.294), followed by Nam Dok Mai cultivar (0.293%) while Osteen cultivar had the lowest acidity percentage (0.264%) as an average of the two studied seasons. Data concerning TSS/Acidity ratio showed that Osteen cultivar gave the highest values (61.51 and 51.06), followed by Shelly (60.24 and 51.06), while the lowest values were recorded in Naomi cultivar (50.74 and 41.06) during the 2019 and 2020 seasons, respectively.

5- 3- Total sugars, reducing and non-reducing sugars %:

It could be noticed that total sugars, reducing sugars, and non-reducing sugars ranged from 11.03 to 13.75%, 3.49 to 4.56%, and 7.54 to 9.19%, respectively, during the two studied seasons. Data also indicated that the highest total sugar percentages were recorded in the Shelly cultivar (14.19 and 13.32%), followed by Name Dok Mai (13.64 and 12.77%), and on the other hand, the Naomi cultivar had the lowest values (11.37 and 10.70%) during the 2019 and 2020 seasons, respectively.

Concerning reducing sugars, data showed that there were no significant differences in reducing sugars among the studied cultivars during 2020 season. Data also showed that the Shelly cultivar had the highest reducing sugar percentage (4.56%) followed by Osteen cv. (4.36%), while the lowest reducing sugar percentage was recorded in the Naomi cultivar (3.49%) as an average of the two studied seasons. With regard to non-reducing sugars, the results obtained showed the highest cv. values for Shelly (9.51 and 8.87%), followed by Name Dok Mai (9.32 and 8.51%), while the lowest non-reducing values were for the Naomi variety (7.73 and 7.35%), recorded in the 2019 and 2020 seasons.

These results are consistent with those of [20], who found differences in the physical and chemical properties of the fruit between mango varieties, and with the results of [21], who reported that mango varieties differ significantly in various chemical properties.

Table (4): Some physical characteristics of the fruits of New Mango cvs (Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly) under Aswan conditions during 2019 and 2020 seasons

Mango cvs	Average fruit height (cm.)			Average fruit diameter (cm)			shape index		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Naomi	13.63 A	14.17 A	13.9	9.10 A	9.03 A	9.07	1.50	1.57	1.54
Nam Dok Mai	13.37 A	13.77 AB	13.57	6.63 B	6.70 B	6.67	2.02	2.07	2.05
Osteen	13.17 A	13.23 B	13.2	6.00 B	5.93 BC	5.97	2.22	2.26	2.24
R2E2	11.40 B	11.27 C	11.34	8.77 A	8.70 A	8.74	1.30	1.30	1.30
Shelly	6.90 C	6.53 D	6.72	4.60 C	4.93 C	4.77	1.51	1.33	1.42
L.S.D 5 %	0.93	0.62		0.96	1.16				

Table (5) Some physical characteristics of the fruits of New Mango cvs (Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly) under Aswan conditions during 2019 and 2020 seasons

Mango cvs	Average fruit weight (g.)			Fruit Pulp %			Fruit seeds %			Fruit peel %		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Naomi	556.72 A	503.4 9 B	530.11	78.98 AB	80.96 AB	79.97	6.35 A	5.2 AB	5.79	14.67 AB	18.41 A	16.54
Nam Dok Mai	276.35 B	262.0 0 C	269.18	75.8 B	76.8 B	76.30	6.93 A	6.91 A	6.92	17.03 A	15.42 AB	16.23
Osteen	332.67 B	333.3 9 C	333.03	82.1 AB	83.39 AB	82.75	5.77 A	5.9 AB	5.81	12.14 AB	10.26 C	11.2
R2E2	605.77 A	596 A	600.89	83.57 A	86.3 A	84.91	5.29 A	3.92 B	4.61	11.15 B	9.83 C	10.49
Shelly	260.22 B	254.7 2 C	257.5	81.2 AB	82.7 AB	81.93	6.49 A	6.31 AB	6.4	12.31 AB	11.73 AC	12.02
L.S.D 5 %	111.78	86.63		7.56	9.33		3.00	2.45		5.702	4.72	

Table (6) Some chemical characteristics of the fruits of New Mango cvs (Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly) under Aswan conditions during 2019 and 2020 seasons.

Mango cvs	Total soluble solids %			Total acidity %			TSS/Acidity ratio		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Naomi	13.27 B	13.30 B	13.29	0.263 A	0.325 A	0.294	50.74 A	41.06 B	45.90
Nam Dok Mai	14.87 A	15.00 AB	14.94	0.266 A	0.319 A	0.293	56.16 A	47.08 AB	51.62
Osteen	14.53 AB	14.67 AB	14.6	0.239 A	0.290 B	0.264	61.51 A	51.06 A	56.29
R2E2	13.70 AB	14.00 AB	13.85	0.254 A	0.307 AB	0.281	54.05 A	45.56 AB	49.80
Shelly	15.13 A	15.47 A	15.3	0.252 A	0.303 AB	0.277	60.24 A	51.06 A	55.65
L.S.D 5 %	1.53	1.84		0.036	0.024		12.62	9.06	

Table (7) Some chemical characteristics of the fruits of New Mango cvs (Naomi, Nam Dok Mai, Osteen, R2E2, and Shelly) under Aswan conditions during 2019 and 2020 seasons

Mango cvs	Total sugars %			Reducing sugars %			Non-reducing sugars %		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Naomi	11.37 D	10.70 C	11.03	3.63 C	3.35 B	3.49	7.73 C	7.35 B	7.54
Nam Dok Mai	13.64 B	12.77 B	13.20	4.32 B	4.26 A	4.29	9.32 A	8.51 A	8.92
Osteen	12.91 C	13.17 AB	13.04	4.34 B	4.38 A	4.36	8.58 B	8.79 A	8.69
R2E2	11.27 D	11.12 C	11.19	3.62 C	3.52 B	3.57	7.65 C	7.60 B	7.63
Shelly	14.19 A	13.32 A	13.75	4.68 A	4.45 A	4.56	9.51 A	8.87 A	9.19
L.S.D 5 %	0.444	0.434		0.205	0.238		0.459	0.631	

CONCLUSION

The phenotypic data from this study were used to evaluate five imported mango cultivars grown under Aswan climatic conditions. On the basis of yield and fruit quality attributes, it could be suggested to cultivate R2E2, Naomi, and Shelly cultivars successfully under Aswan conditions.

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