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EVALUATION OF SOME GRAPEVINE CULTIVARS UNDER NOBARIA CONDITIONS

Girgis, V. H.; S. I. A. El-Shennawy and Alia H. Ibrahim
Hort. Res. Inst., Agric. Res. Cent., Egypt

ABSTRACT

In 1996 and 1997 a Balady variety; Matrouh Aswad and two of the newly introduced table grape varieties Gold and Black Rose, were studied under the environmental conditions of Nobaria region, north west of the Nile delta.

Morphological characteristics; bud behaviour, Yield, clusters and berries characteristics, heat summation and heat units for the growth periods were put under evaluation.

Gold was the earliest in bud burst, fruit set and harvesting date. It has the highest number of berries/cluster, compactness coefficient, heat summation and T.S.S content and the lowest acidity so it has the highest T.S.S/acid ratio and its berry is oval tends to be round.

Black Rose has a highest bud burst and the lowest fruitful buds, fertility coefficient, yield and compactness coefficient, it has oval berry.

Matrouh Aswad has the lowest percentage of bud burst but it has the highest, heat units for the growth periods, fruitfulness and fertility reflexing being the highest in yield, it has almost oval truncate berry.

Matrouh Aswad and black Rose have the highest bunch weight, length, width and berry weight, size, length, diameter.

It could be recommended that Matrouh Aswad is the main variety planted in Nobaria region and the new grape plantations in the new reclaimed lands a long the periphery of the western dessert.

INTRODUCTION

Viticulture is one of the most important fruit crops all over the world, which maintains always its advanced position and economical importance.

In Egypt it is the second fruit crop after citrus. Its total area reached 141233 Faddan in 2000.

Two Varieties Thompson Seedless (an early variety), and Roumy Red (a late variety) occupy more than half of this area. Kamel, A. *et al.* (Egypt California project 1983) carried out a survey all over Egypt to register and evaluate the Balady (local) Varieties. Matrouh Aswad which is planted in Matrouh Governorate, is one of the most promissing and eminent characteristics of these varieties.

Recently (1981) 23 table grape varieties were introduced from the university of California (Davis) which extended the maturity season all over six month from Juine to December. Gold an early mid season, Black Rose a mid season were among these cultivars.

Many table grape varieties were put under several evaluation studies in different regions in Egypt, Kamel 1964, Egypt California project 1983, Kamel *et al.* (1992) Abd El Kawi and El-Yan 1992 a,b,c), Abd El-Fattah and Kasstour (1993 a,b), Marwad *et al.* (1994), El-Sharkawy 1995, Fawzy 1998 and Ahmed *et al.*(2001).

The present study aimed to evaluate one of the promissing Balady varieties, Matrouh Aswad beside two of the newly introduced table grapes Gold and Black Rose under the environmental conditions of the new reclaimed land at Nobaria region along the periphery of the western desert, north west of the Nile delta.

MATERIAL AND METHODS

The present investigation was carried out during 1996 and 1997 seasons on a local grape variety named Matrouh Aswad and two recently introduced table grape cultivars namely Black Rose and Gold. These cultivars are grown in Nobaria region at the Horticulture research station. The vines were cultivated in 1991 in calcareous soil. Sixteen vines from each cultivar were chosen in four equal replicates. The vines were planted 3m apart between raws, 2m apart in the row, trained according to cordon-spur pruning system under trellis system. The vines were pruned to about (48) buds in each season. They all received the usual cultural practices. Mechanical and chemical analysis for the soil where the vines were grown were achieved.

Date of complete bud burst and fruit set were recreated at the end of both periods. Harvesting was carried out from each of the cultivars under study when reached the proper ripening stage.

The parameter used to evaluate these 3 cultivars were as follows:

I) Morphological characteristics:-

1-The growing tip.
2-The growing shoots.
3-The Internodes.
4-The flower.
5-The leaf; leaf shape, surface colour, thickness, lobes, sinus, petioler sinuses and leaf margin.
6-The Tendrils: considering sequence and colour.

These parameters were determined according to Brieder (1950), Berg (1959), Singh and Singh (1940), Rodrigues (1959), Kolenti (1946), Winkler *et al.*, (1965) and International Registered Schedule (Cosmo *et al.* 1958).

II)Bud Behaviour:

The number of bursted buds was recorded for each vine. The buds were considered opened at the wooly bud stage, (stage, B, Baggiolini, 1952). The percentage of bud burst per vine in relation to the total number of buds left at winter pruning and the percentage of fruiting buds/vine in relation to the number of bursted buds/vine were determined during the two successive seasons of the experimental study. Bud fertility coefficient was calculated by dividing the total number of clusters by the total number of buds per vine left at pruning time according to Bessis, R (1960).

III) Yield and clusters, Berris characteristics:

At harvest time the average of yield per vine for each cultivars was recorded and samples were taken from each cv. to determine the following estimates:

1- Bunch weight, length and width.

2- Berry weight, size, length, diameter, length/diameter berry ratio. (berry shape, according to Bioletti 1938), colour and compactness coefficient according to the following equation

$$\text{Corpactness Coefficient} = \frac{\text{number of berries/culuster}}{\text{cluster length}}$$

3- Percentage of total soluble solids (T.S.S.).
4- Acidity (Grams of Tarteric acid/100 ml juice).
5- T.S.S. /acid ratio.

IV) Heat Summations (according to Winkler *et al.*1965):

During the two seasons of the experiment the weather were recorded according to the meteorological data in Nobaria region to estimate heat summation, as degree days, for the period from bud burst to October 31 for each cultivar under Nobaria region by determining the sum of the mean daily temperature above 50°F (10°C,) for the period concerned.

V) Statistical analysis:

The obtained data were statistically analysed using the completely randomized design according to Sendecor and Cochran (1990). Mean separation was conducted by using new L.S.D values at 5% level.

RESULTS AND DISCUSSION

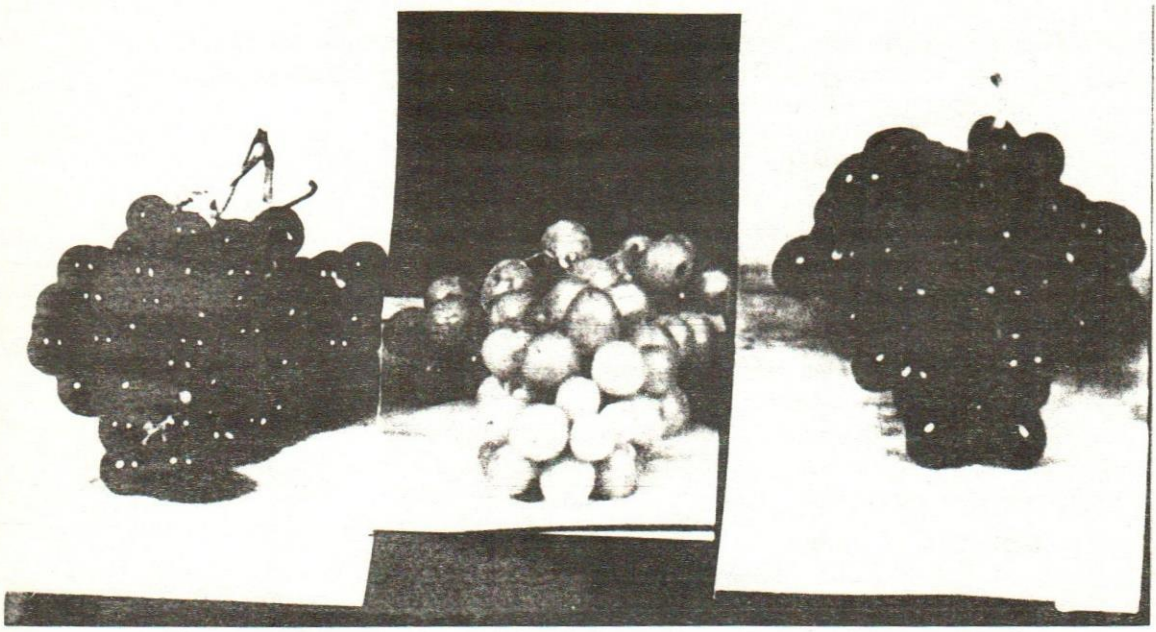
According to the mechanical soil analysis presented in Table (1) and chemical soil composition is shown in Table (2). Data from Table (3) presented that Gold cultivar was the earliest in bud burst, fruit set and harvesting date of about a week; in comparison with the two others which were almost similar.

Table (1): Mechanical analysis of the tested soil at tested area.

Depth Cm	Sand %	Silt %	Clay %	Texture %	Total $CaCO_3$ %
0-25	50.53	16.27	32.9	Sandy clay 100m	30.52
25-50	47.60	18.12	34.28	Sandy clay 100m	32.14
0-25	1.35	8.3	1.55	0.0	8.65

Table (2): Chemical analysis of the soil at tested area.

Depth (cm)	C.M %	PH	E.C (ds/m)	Soluble Anions				Soluble cations mg/L				Total N	Available	
				Ca_3^-	HCO_3^-	Cl^-	SO_4^-	Ca^{++}	Mg^{++}	Na^+	K^+	(ppm)	P	K
0-25	1.53	8.3	1.55	0.0	8.65	5.0	5.45	6.5	3.6	5.25	2.1	53.9	7.14	81.9
25-50	0.55	7.95	1.75	0.0	9.35	6.0	5.10	6.35	4.7	7.7	2.3	39.3	7.0	89.7



Matrouh aswad Gold Black Rose

Fig (1) : Matrouh aswad, Gold and Black Rose.

1-Morphological characteristics

Varitey Character	Matrouh Aswad	Black Rose	Gold
a. Growing Tip	Downy	Glabrous	Glabrous
b. Growing shoots	Glabrous	Glabrous	Glabrous
c. Internods length	Long (more than 7 cm)	Long	Long
Thickness	Thick (more than 5mm)	Thick	Thick
d. Flower	Hermaphrodite	Hermaphrodite	Hermaphrodite
e. Leaf shape	Orbicular	Orbicular	Orbicular
Surface	Rough	Rough	Smooth
Colour	Green	Green	Green
Thickness	Medium	Medium	Thin
No. of lobes	5	5	5
Sinuses depth	Deep	Deep	Deep
Petiole sinus	Narrow (width is less than depth) with U shaped	Narrow With U shaped	Narrow With U shaped
Leaf tooth	Broad and many, the apical tooth was pointed	Broad and many, the apical tooth was pointed	Broad and many, the apical tooth was pointed
Type of margin	Irregularly	Irregularly	Irregularly
f. Tendril sequence	Intermittent	Intermittent	Intermittent
Colour	Green	Green	Green

2) Bud behaviour and Yield:

Bud behaviour and yield in the two seasons 1996, 1997 are presented in Table (4) since the data. showed that the percentages of bud burst were significantly high for Black Rose and Gold cvs. (61.84 & 61.02) in the first season and (58.01 & 60.92) in the second one for the two cultivars, respectively. However, it was significantly low for Matrouh Aswad cultivar since; it recorded (51.49 & 53.02) during the two seasons, respectively.

On the other hand, the data of percentage of fruitful buds revealed a significant difference among the three cultivars. Matrouh Aswad cv. recorded the highest percentage; (34.4 & 35.93) in both seasons. Whereas, the least percentage was recorded by Black Rose; (21.3 & 19.72) for the two seasons respectively. Moreover, fertility coefficient and yield are in line with what recorded by percentage of fruitful buds. The obtained results are in harmony with those obtained by Abd-El-Fatah and Kasstor (1993a & b) on 19 newly introduced cultivars under middle Egypt conditions, Ahmed *et al.* (2001), Kamel *et al.* (1992), Egypt California project (1983) and Winkler *et al.* (1965).

3) Cluster and Berry characteristics:

One- Physical properties:

Data from Table (5) clearly showed that the highest average bunch weight was obtained in Black Rose and Matrouh Aswad cvs. in the two season while the lowest one was found in Gold cv. Significant differences were found between Gold and the other two cultivars during the two seasons of the study.

Bunch length of Matrouh Aswad and Black Rose cvs. was about (20.17 & 19.29 cms) and (20.69 & 18.63 cms in the first and second seasons, respectively, while it ranged about (16.31 and 16.28 cms) in Gold for the two seasons respectively. A significant difference was detected between Gold and the other two cultivars.

As regards to bunch width in both seasons, Gold cv. recorded the least one in this respect, while Matrouh Aswad and Black Rose cvs. were approximately equal. These results are in agreement with Winkler *et al.* (1965), Egypt California project (1983) and Kamel *et al.*, (1992) who reported that Black Rose cv. has a large size and a long bunch while Gold cv. has a medium size and a short bunch.

A significant difference was found between the studied cultivars as regards to the number of berries/cluster in the two experimental seasons (1996 & 1997). Gold cv. had the greatest values followed in descending order by Matrouh Aswad. Black Rose cv. had the lowest number of berries/cluster.

It is clear from the data in Table (5) that a significant differences were found between the cultivars under the study. As regard to the compactness coefficient in the two seasons. Gold cv. had the highest compact bunch while Blak Rose had the lowest compact bunch, Matrouh Aswad was in between.

Data in Table (5) revealed that there is a significant differences between the cultivars as regard to the berry weight and size in the two seasons. The highest berry weight and size recorded by Black Rose cv. followed by Matrough Aswad cv. Since, the lowest berry weight recorded by

Table (5) Physical properties of bunches and berries of Matrouh Aswad, Black Rose and Gold Under Nobaria conditions during 1996, 1997 seasons.

Variety	Bunch weight		Bunch length		Bunch width		Number of berries/cluster		Compactness coefficient		Berry weight		Berry size		Berry length		Berry diameter		L/D Berry ratio	
	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997
Matrouh Aswad	317.46	292.7	20.17	20.69	13.24	12.02	59.11	55.00	3.0	2.71	5.37	5.32	5.35	5.17	2.19	2.2	2.09	2.14	1.05	1.03
Black Rose	325.63	321.68	19.29	18.63	12.79	12.77	50.00	47.90	2.59	2.52	6.52	6.88	6.17	6.47	2.33	2.0	1.70	1.86	1.40	1.60
Gold	257.04	262.62	16.31	16.28	9.96	10.25	68.70	60.70	4.29	3.81	3.7	4.3	3.47	4.07	1.83	1.81	1.65	1.60	1.10	1.12
L.S.D at 5 %	14.72	29.12	1.55	1.32	1.18	1.66	7.83	4.78	0.40	0.46	0.31	0.29	0.48	0.53	0.12	0.08	0.16	0.15	0.13	0.11

Gold cv. (3.7 & 4.3 gms) and the lowest berry size recorded also by Gold cv. (3.47 & 4.07 cm^3) for the both seasons, respectively.

Data of Table (5) clearly show that Matrouh Aswad and Black Rose cvs. showed the significant highest values for both berry length and diameter in the two seasons in comparison with Gold cv. Concerning L/D berry ratio (berry shape) and colour of berry, data in table (5) and Figure (1) revealed that it was nearly oval truncate and jet black colour in Matrouh Aswad cv. However, it was oval and jet black colour in Black Rose and was nearly oval tends to be roundish and golden colour in Gold cv.

The previous results of berry shape are generally in harmony with those recorded by Winkler *et al.* (1965), Egypt California project (1983), Kamel *et al.* (1992), Abd El-Fatah and Kaster (1993 a,b), Tourkey *et al.* (1995), and Ahmed *et al.* (2001).

b- Chemical properties:

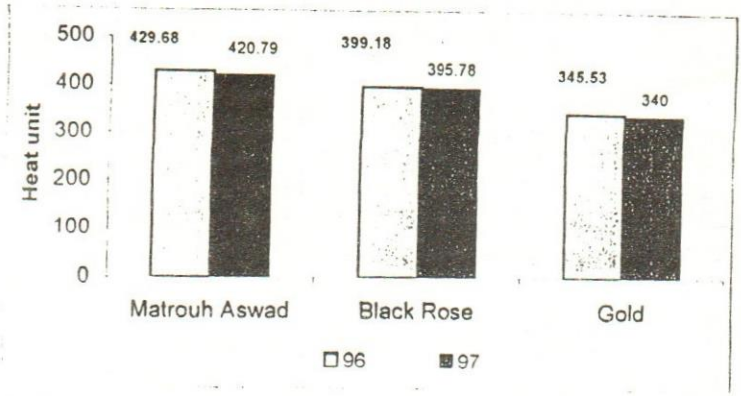
It is clear from Table (6) that there was a significant difference between Gold and the other two cultivars in both seasons regarding to T.S.S. & Acidity % and T.S.S./Acid ratio. As for T.S.S. content, it was lower in Matrouh Aswad and Black Rose cvs. than Gold cv.. Concerning acidity percentage, it was lower in Gold cv. as compared to the other two studied cultivars. T.S.S./Acid ratio was higher in Gold than in Black Rose and Matrouh Aswad cvs.

These results go in line with those early reported by many researches for different cultivar, Hassan and Rizk (1989), Abd El-Fatah and Kastor (1993a,b), Tourkey *et al.* (1995) Fawzy 1998 and Ahmed *et al.* (2001).

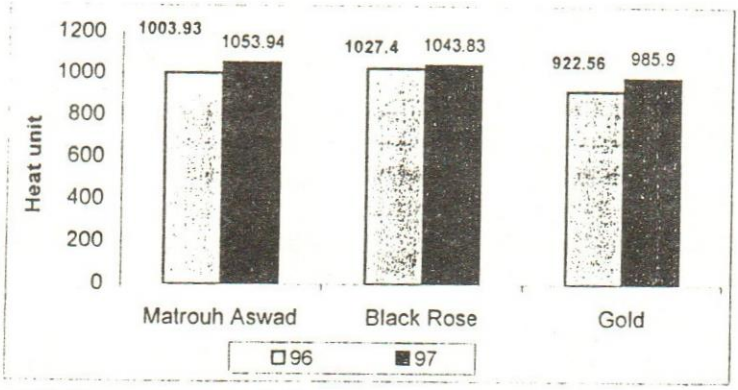
4- Heat summation:

Data in Table (7) showed the Heat summation as degree-days above 50°F for the period of bud burst to October 31 under Nobaria condition. Black Rose cv. had the lowest value followed by Matrouh Aswad. Gold cv. had the highest value according to its early bud burst date. These results are true for the two experimental seasons. It is clear from the data that heat summation for Nobaria region is similar to the climatic region II of California 2,50 1 to 3,000 degree days. This region can produce most of the premium-quality and good standard white and red table grape of California (Winkler *et al.*, 1965). Fig. (2) shows the heat units for the period from bud burst to fruit set, Fig. (3) shows the heat units for the period from the fruit set to harvest and Fig. (4) show the mean of heat units of the two experimental seasons 1996 & 1997 for the period from bud burst to harvest for the three experimental cultivars. It is clear from the figures that Matrouh Aswad cv. achieved the maximum heat units for all the growth periods regardless of the slightly increase in heat units for the mid season period in 1996 recorded by Black Roes.

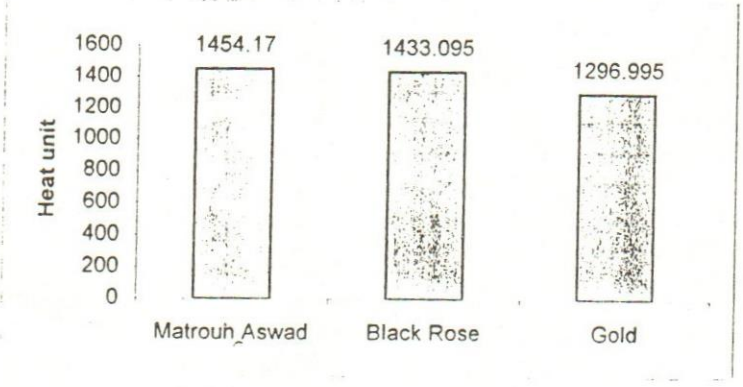
In from, the above mentioned results the data revealed that, Matrouh Aswad cultivar overcomes the two other varieties under study. Although, it acquired the lowest percentage of bud burst, it was the highest in fruitfulness and fertility reflexing, being the highest in yield which attained almost the double. In regard to the physical and chemical characteristics, if not, it was the best, it is in between.



Fig(2): Heat units for the period from bud burst to fruit set for the experimental cultivars in 1996 and 1997 seasons.



Fig(3): Heat units for the period from fruit set to harvest for the experimental cultivars in 1996 and 1997 seasons.



Fig(4): The mean of heat units for the experimental cultivars for the two experimental seasons 1996 and 1997 for the period from bud burst to harvest.

It is worth mentioning that, the late ripening of Matrouh Aswad gives it a periority of being the leading variety during this period. The early of maturity of Gold put it in the period of Thompson Seedless whose appearance drives out any other variety. Furthermore Matrouh Aswad is adapted to the severe desert environmental conditions, where it survives in Matrouh Governorate region.

Therefore, it could be recommended that Matrouh Aswad to be the main variety planted in Nobaria region and the new grape plantations in the new reclaimed lands along the periphery of the western desert.

It is worth mentioning that, the so called Balady (Local) variety, Matrouh Aswad needs more studies to reveal its real name and origin. Most probably, it is not alocal variety.

Table (3) Date of complete bud burst, complete fruit set and harvest in 1996 & 1997 seasons.

Variety	Date of complete Bud burst		Date of complete fruit set		Date of harvest	
	1996	197	1996	1997	1996	1997
Matrouh Aswad	29/3	31/3	18/5	19/5	29/7	31/7
Black Rose	31/3	2/4	16/5	18/5	29/7	30/7
Gold	23/3	25/3	9/5	10/5	17/7	20/7

Table (4) Bud burst %, Fruitful buds %, fertility coefficient and yield per tree in Kg of Matrouh Aswad, Black Rose and Gold under Nobaria conditions during 1996, 1997 seasons.

Variety	Bud burst %		Fruitful buds %		Fertility coeficient		Yield/vine kg	
	1996	1997	1996	1997	1996	1997	1996	1997
Matrouh Aswad	51.49	53.02	34.4	35.93	0.49	0.5	8.63	8.15
Black Rose	61.84	58.01	21.3	19.72	0.25	0.24	4.47	4.28
Gold	61.02	60.92	27.89	27.02	0.31	0.3	4.5	4.45
L.S.D. 5%	3.35	3.28	2.97	2.01	0.04	0.04	0.83	0.6

Table (6) Chemical properties of Juice of berries of Matrouh Aswad, Black Rose and Gold under Nobaria conditions during 1996, 1997 seasons.

Variety	T.S.S		Acidity		T.S.S/Acid ratio	
	1996	1997	1996	1997	1996	1997
Matrouh Aswad	15.83	14.38	0.57	0.68	27.00	21.10
Black Rose	16.17	16.76	0.64	0.61	25.21	27.42
Gold	18.93	17.88	0.45	0.43	42.00	41.50
L.S.D. 5%	1.18	0.71	0.08	0.07	5.86	5.08

Table (7) Heat summations as degree-days above 50 °F for the period of bud burst to October 31. Of Matrouh Aswad, Blak Rose, and Gold under Nobaria conditions during 1996, 1997 seasons.

Variety	1996	1997
\Matrouh Aswad	2710.12	2597.27
Black Rose	2703.08	2583.67
Gold	2731.23	2619.17

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المراجع العربية

كامل أ ، ع. سيد ، م. فرج ، أ. إبراهيم (١٩٩٢) : أساسيات تحسين زراعة وإنتاج العنب. مشروع تطوير النظم الزراعية – وزارة الزراعة واستصلاح الأراضي.

تقييم بعض أصناف العنب تحت ظروف النوبارية

فيكتور حبيب جرجس – صلاح إبراهيم أحمد الشناوي– عليه حافظ إبراهيم

معهد بحوث البساتين – مركز البحوث الزراعية – جمهورية مصر العربية

تمت دراسة الصنف البلدي مطروح أسود وصنفين من أصناف عنب المائدة الحديثة هي صنف جولد وبلاك روز تحت الظروف البيئية لمنطقة النوبارية خلال عامي ١٩٩٦ ، ١٩٩٧.

وقد تم تقييم الصفات المورفولوجية ، سلوك البراعم ، المحصول ، صفات العناقيد والحبات بالإضافة إلي مجموع الوحدات الحرارية والوحدات الحرارية لفترات النمو.

وجد أن الصنف جولد كان أكثر تبكيرا في مواعيد تفتح البراعم والعقد والحصاد وله القيمة الأعلى لعدد الحبات في العنقود وكذلك معامل التزاحم ، ومجموع الوحدات الحرارية ، والمواد الصلبة الذائبة وكذلك نسبة المواد الصلبة الذائبة للحموضة وكانت حباته بيضاوية تميل للاستدارة ، ووجد أن الصنف بلاك روز كان له أعلي قيمة لتفتح البراعم وأقل قيمة في نسبة الإثمار ومعامل الخصوبة والمحصول ومعامل التزاحم للعنقود وكانت حباته بيضاوية ، كما وجد أن صنف العنب مطروح أسود ولو انه كان الأقل في نسبة تفتح البراعم ولكن كان الأعلى في الوحدات الحرارية لفترات النمو ونسبة الإثمار ومعامل الخصوبة وبالتالي كان الأعلى في كمية المحصول ، وحباته بيضاوية ذات قاعدة مستدوية.

وقد أعطي الصنف مطروح أسود وبلاك روز أعلي قيمة لوزن ، طول ، عرض العنقود وكذلك وزن وحجم وطول وقطر الحبة.

ومن ثم يكون صنف مطروح أسود هو الأنسب للزراعة في المناطق الجديدة لزراعة العنب وكذلك الأراضي المستصلحة الممتدة علي حافة الصحراء الغربية شمال غرب الدلتا.