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RESEARCH ARTICLE

Morphological study on ten grape cultivars grown under Assiut climatic conditions

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Abstract

Investigation was carried out during two consecutive seasons of 2017 and 2018 on ten grape cultivars namely Thomson Seedless ,Ruby Seedless (KingRuby), Red Roomy, Provano ,Black Moskate , Polomino , Rich Baba,Beauty Seedless, Bez El Naka and Bez El Anza grown in the orchard of Pomology Department at the Faculty of Agriculture, Assiut University .This study aimed to evaluate this cultivars regarding vegetative growth .The illustrated data revealed that, the average shoot length progressively increased with increasing the period of time. The last dates of estimation showed a slower increase of shoot length comparing with the earlier dates. Rich Baba and Ruby Seedless represented also higher values (80.41 and 80.1 cm^2, respectively) with no significant differences between them, however Bez-El-Anza exhibited the lowest value (49.54 cm^2).Provano grape cultivar gave the highest pruning weight followed by Red Roomy and then Bez-El-Naka. The present study revealed that there were great differences between the studied grape cultivars.

Keywords: Grape; Cultivars; Climatic conditions; Vegetative growth.

Introduction

All species of grapes belong to the family vitaceae and divided into three groups ; the European, the American and Mascadinian grape .From these , the European grape ‘’Vitis vinifera’’ is the most important one, named as old world grapes and accounts for the major production of win, dried and table grapes. Grapevine one of the worlds major fruit crop and has the earliest recorded history. It has also been praised in "The Holy Quran".

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Grape is one of the most important horticultural crops in the wold as well as in Egypt, so there are numerous grape cultivars and clones in the country.

Grape germplasm in Egypt is well-known for its diversity in seeded and unseeded fruit, in berry size, shape and color of the skin, as well as in berry flesh color, and is rich in various physiological and pomological characteristics. The number of the world cultivars exceeds 13,000 representing relatively large grape diversity OIV (2013). Cultivars identification and description is an essential stage in the certification program, guaranteeing the trueness-to-type of the

propagation materials. Morphological and pomological traits continue to be the first step for the description and classification of any germplasm as well as useful tools for screening the accessions of any collection Cantini *et al*. (1999). During the last years , many grape cultivars have been introduced to Egypt and the cultivated area of these cultivars are rapidly increased. The total area in Egypt reached (186231) Feddans with a production of (1734424) Tons according to FAO statistics (2017). To improve grapevine production we need a wide knowledge of morphological characteristics of vegetative growth and fruit quality .In this respect many investigations were done for description and evaluation of grape cultivars.

The main objective of this investigation was to study the performance of ten cultivars namely Thomson Seedless ,Ruby Seedless (KingRuby), Red Roomy, Provano, Black Muskate, Palomino, Rich Baba, Beauty Seedless, Bez El Naka and Bez El Anza, regarding vegetative growth under Assiut conditions.

Materials and Methods

The evaluation included ten grape cultivars which are grown in the orchard of Pomology Department at the Faculty of Agriculture ,Assiut University during two successive seasons of 2017-2018.These cultivars were Thomson Seedless ,Ruby Seedless (KingRuby), Red Roomy, Provano, Black Muskate , Palomino , Rich Baba ,Beauty Seedless, Bez El Naka and Bez El Anza. The study was conducted on 5 replicates of each cultivar. Five grapevines from each cultivar were selected, therefore the whole experiment consisted of 50 grapevines. This experiment was arranged in a complete randomized Blok design in an attempt to study the performance of ten cultivars regarding vegetative growth. Five new shoots from each vine were selected to estimate the following measurements:-

1. Define the time of bud break and then calculate the number of days required to reach ripening.
2. The progressive length of the selected shoots were estimated every week (from the onset of bud break till their growth became slower) and lasted for 8 weeks.
3. Leaf area for each cultivar was estimated according to the method described by Ahmed et al (1999).
4. Pruning wood weight was estimated at the end of growing season at the time of winter pruning.

Results and Discussion

Vegetative growth of studied grape cultivars consisted of shoot length (cm), leaf area (cm^2) and pruning wood weight (kg).

Shoot length (cm):

Shoot length (cm) estimated every week from the onset of bud break till exist of all the clusters has been illustrated in Tables 1, 2 and Figure 1.

The illustrated data revealed that, the average shoot length progressively increased with increasing the period of time. The last dates of estimation showed a slower increase of shoot length comparing with the earlier dates.

On the last date of measurement, Rich Baba, followed by Red Roomy and then Black Muscate represented the longest shoots (70.4, 69.6 and 67.3 cm, respectively) during the 1st season of study. While during

the 2nd season, Bez-El-Naka, Red Roomy and Beauty Seedless recorded the highest values. On the other side, Bez-El-Anza in the 1st season and Provano in the 2nd season gave the lowest values.

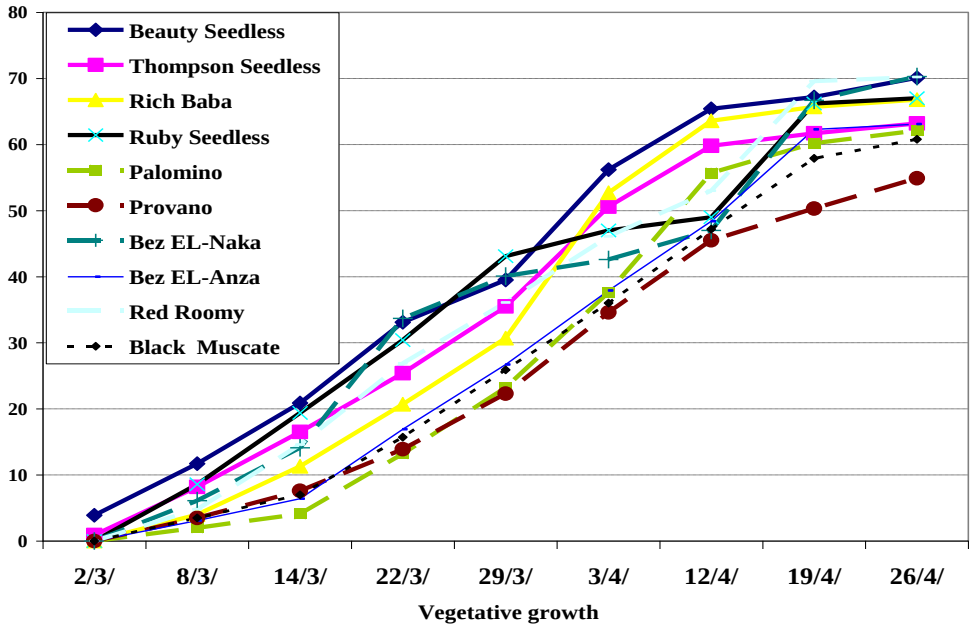

Figure 1. Progressive shoot length (cm) of the studied grape cultivars during 2018 season

Table 1. Progressive shoot length (cm) of the studied grape cultivars during 2017 season.

Cultivar	15/3/ 2017	22/3/ 2017	29/3/ 2017	4/4/ 2017	11/4/ 2017	18/4/ 2017	24/4/ 2017	3/5/ 2017	9/5/ 2017	16/5/ 2017
Beauty Seedless	5.6	11.5	21.4	38.7	46	52.6	53.8	54.9	56.4	60.4
Thompson Seedless	2.1	8.1	16.3	28.8	41.4	48.8	54.8	58.3	60.7	62.8
Rich Baba	00.0	4.3	9.2	17.7	26.9	40.1	48	59.2	69.6	70.4
Ruby Seedless	00.0	4.1	8.3	19.5	30.2	40.6	43	47	49	66.2
Palomino	00.0	00.0	2.8	10	23	38.3	46.4	55.9	61.7	62.8
Provano	00.0	3	7	17.2	33.6	45.8	51.1	57.3	62.5	65.4
Bez EL-Naka	00.0	2.2	6	14.1	23.3	33.7	39.7	42.6	47	66.7
Bez EL-Anza	00.0	00.0	3	8.4	17.9	26.8	30.2	33.9	36.4	57.5
Red Roomy	00.0	00.0	00.0	4.6	14.6	26.9	36.1	44.8	53	69.6
Black Muscate	00.0	00.0	00.0	6.8	14.9	23.6	29.4	38.4	46.7	67.3

Table 2. Progressive shoot length (cm) of the studied grape cultivars during 2018 season.

Cultivar	2/3/ 2018	8/3/ 2018	14/3/ 2018	22/3/ 2018	29/3/ 2018	3/4/ 2018	12/4/ 2018	19/4/ 2018	26/4/ 2018
Beauty Seedless	3.9	11.7	20.9	33.1	39.5	56.2	65.4	67.2	70.1
Thompson Seedless	0.9	8.2	16.5	25.4	35.5	50.6	59.8	61.7	63.2
Rich Baba	00.0	4	11.3	20.7	30.7	52.7	63.6	65.7	66.8
Ruby Seedless	00.0	8.6	19.4	30.4	43.1	47	49	66.2	67
Palomino	00.0	2	4.1	13.2	23.2	37.6	55.7	60.2	62.1
Provano	00.0	3.5	7.6	13.9	22.3	34.6	45.5	50.3	54.9
Bez EL-Naka	00.0	6.1	14.1	33.7	40.1	42.6	47	66.7	70.3
Bez EL-Anza	00.0	3.1	6.4	16.9	26.7	37.9	48.4	62.3	63.1
Red Roomy	00.0	4.8	14.6	26.9	36.1	46.1	53	69.6	70.2
Black Muscate	00.0	3.5	7	15.7	25.9	36	47.2	57.9	60.8

Leaf area (cm^2):

Generally, leaf area (cm^2) of all cultivars was higher in the 1st season comparing with the second one. Two season's average data (Table 3) revealed that, Thompson Seedless and Provano provides the highest values (91.88 and 90.82 cm^2, respectively). Rich Baba and Ruby Seedless represented also higher values (80.41 and 80.1 cm^2, respectively) with no significant differences between them, however Bez-El-Anza exhibited the lowest value (49.54 cm^2).These results are in the same line with (Grantz and Williams 1993) who found that the leaf surface area is mainly influenced by variety, nutrition and age of plant.

Pruning wood weight (kg):

Pruning wood weight (kg) was higher at the 1st season than the 2nd one in most of studied grape cultivars. Two season's average data (Table 3) suggested that, Provano grape cultivar gave the highest pruning weight followed by Red Roomy and then Bez-El-Naka. The corresponding values correlated with these cultivars were 2.44, 2.39 and 2.25 (kg), respectively, with no significant differences between them. On the other side, the lowest values of pruning wood weight were taken from Black Moscate and Beauty Seedless cultivars. They recorded 1.23 and 1.24 (kg), respectively. Spiegel-Roy *et al*. (1971) who found that pruning weight for such years were 55.8 and 18.6 kg/vine, respectively.

Shellie (2007) suggested that the yield of pruning weight ratio for most cultivars was within the recommended range of 5 to 10.

Ten grape cultivars and hybrids grown in South region of turkey were evaluated (Ates

et al., 2011). Great differences were observed among the studied cultivars.

These results are in agreement with those found by (Shellie *et al*, 2014) who reported that pruning wood weight (Kg) differed from 0.6 to 1.3 Kg . Hamman and Dani (2015) Pruning weight (pound/vine) ranged from 0.60 to 3.80 lbs.

Table 3. Leaf area (cm^2) and Pruning wood weight (kg / vine) of the studied grape cultivars during 2017 and 2018 seasons.

Cultivar	Leaf area (cm^2)			Pruning wood weight (Kg)		
	2017	2018	Mean	2017	2018	Mean
Beauty Seedless	68.46	56.44	62.45 D	1.06	1.41	1.24 E
Thompson Seedless	102.58	81.19	91.88 A	2.46	1.58	2.02 C
Rich Baba	93.32	67.00	80.41 B	1.62	1.55	1.58 D
Ruby Seedless	95.59	64.59	80.10B	1.74	1.56	1.65 D
Palomino	76.51	55.36	65.93 CD	1.60	1.41	1.50DE
Provano	105.51	76.14	90.82 A	3.24	1.64	2.44 AB
Bez EL-Naka	80.81	60.28	70.54 C	3.02	1.49	2.25 BC
Bez EL-Anza	51.20	47.87	49.54 E	3.70	1.51	2.10 A
Red Roomy	72.42	59.87	66.15 CD	2.97	1.82	2.39 AB
Black Muscate	70.81	66.11	68.46 CD	1.06	1.40	1.23 E

Number of days from the onset of bud break till crop harvest time:

Table 4 showed that Red Roomy represented the longest period of time from bud opening till harvest. It recorded 167 and 162 days in the 1st and 2nd seasons, respectively. The second cultivar in this respect was Ruby Seedless which took 152 and 141 days till harvest time in the 1st and 2nd seasons, respectively. These results are in harmony with those obtained by (Anderson 2006) who demonstrated that elapsed days from bud break to harvest differed from 142.6 to 179.2 days. Uddin *et al*. (2011) the days required to reach fruit set for most cultivars was 30 days.

Table 4. Number of days from the onset of bud break till crop harvest time.

Cultivar	Number of days	
	2017	2018
Beauty Seedless	136	127
Thompson Seedless	121	117
Rich Baba	135	135
Ruby Seedless	152	141
Palomino	141	135
Provano	116	138
Bez EL-Naka	134	137
Bez EL-Anza	133	132
Red Roomy	167	162
Black Muscate	118	123

Conclusions

These differences were in the shoot length (cm) the longest of which was Rich Baba, and the lowest of which was the Bez El Anza.- the leaf area (cm^2) the highest was Provano during the two seasons of study and the lowest was Bez El Anza - and for the weight of pruning wood (kg) the highest was the Red Roomy and the lowest was black muscat The number of days from onset of bud break till crop harvest were the longest, the Red Rumi, and the shortest provano cultivar.

References

Ahmed, F.F. and Morsy, M.H. (1999) 'A new method for measuring leaf area in different fruit crops', *Minia j .of Agric .Res& develop*. 19, pp. 97-105.

Anderson, P.C. (2006) 'Performance of 20 Muscadine Grape Cultivars in North Florida', *Journal of the American pomological society*, 60 (3), pp.129-135.

Ates, F., Coban, H., Kara, Z. and Sabir, A., (2011) 'Ampelographic characterization of some grape cultivars (*Vitis vinifera* L.) grown in south-western region of Turkey', *Bulg. J. Agric. Sci*, 17(3), pp.314-324.

FAO -Food and Agriculture Organization of the United Nations (2017) *FAOSTAT statistical database* [Statistical report]. Available at: http://www.fao.org/faostat

Cantini, C., Cimato, A. and Sani, G., (1999) 'Morphological evaluation of olive germplasm present in Tuscany region', *Euphytica*, 109(3), pp.173-181. doi:10.1023/A:1003728800464

Grantz, D.A. and Williams, L.E., (1993) 'An empirical protocol for indirect measurement of leaf area index in grape (*Vitis vinifera* L.)', *HortScience*, 28(8), pp.777-779.

Hamman, R.A. and Dami, I.E. (1999) *Evaluation of 35 wine grape cultivars and 'Chardonnay' on 4 rootstocks grown in western Colorado* [Technical report], Colorado Agricultural Experiment Station, (TR99-6). Available at: http://hdl.handle.net/10217/39290

Uddin, M., Shah, M., Rahman, K.U., Alam, R. and Rauf, M.A., (2011) 'Evaluation of local and exotic grapes germplasm at Mingora', *Swat. Sarhad J. Agric*. 27(4), pp. 553-556.

International Organisation of Vine and Wine (OIV) (2013) *World Vitivinicultural Statistics* [Statistical report]. Available at: http://www.oiv.int/

Shellie, K.C. (2007) 'Viticultural performance of red and white wine grape cultivars in southwestern Idaho', *HortTechnology*, 17(4), pp.595-603. doi:10.21273/HORTTECH.17.4.595

Shellie, K., Cragin, J. and Serpe, M. (2014) 'Performance of alternative European wine grape cultivars in southwestern Idaho: Cold hardiness, berry maturity, and yield', *HortTechnology*, 24(1), pp.138-147. doi:10.21273/HORTTECH.24.1.138

Spiegel-Roy, P., Kochba, J. and Lavee, S., (1971) 'Performance of table grape cultivars on different rootstocks in an arid climate', *Vitis*, 10(3), pp.191-200