Annals of Agric. Sci., Moshtohor
Vol. 56(1) (2018), 61 – 70

ISSN 1110-0419
http://aasj.bu.edu.eg/index.php

Effect of different levels of buds load on bud behavior and fruit quality of Early Sweet grapevine

Thoraua S. A. Abo-ELwafa
Viticulture. Dept. Hort. Res. Institute. Agric. Res. Center, Giza, Egypt
Corresponding author: thorayaaboelwafa@yahoo.com

Abstract

This investigation was carried outduring both 2016& 2017 seasons in a private vineyard at El-Khatatba region, Minufyia Governorate to studytheEffect of different levels of buds load on bud behavior and the quality of Early Sweet grapes.The chosen vines were 7-yearold, grown in a sandy soil, spaced at 2 X 3 meters ,irrigated by the drip irrigation system, trellised by the Spanish Parron shape system. Vines were trained to quadrilateral cordon and spur- pruned. Vines pruned to three different levels of bud load (48,72 and 96 buds/vine) and number of buds per fruiting spurs adopted to 2,4and 6 buds/spur .The results showed that (48bud/vine)24spurs ×2 budsincreased bud behavior,physical characteristics , vegetative growth, wood ripening and weight of pruning.In addition,total carbohydrates in canes, however, the levelload of (96 bud/vine) 24spurs ×4 budsgave the highest yield per vinein both seasons. Finlay, the best results was (48 bud/vine) namely 24,12 and 8 fruiting spurs adopted to 2,4and 6 buds/spur,respectively.

Keywords: Grapevines, Early Sweet, spur pruned, vegetative growth, yield and quality

Introduction

Grape is considering one of the most important fruit crops all over the world and popular and favorite fruit crops. Moreover, it is considered to be the second most important fruit crop after citrus in Egypt as its acreage, production and exportation in Egypt.

The production of grapes in Egypt increased as a new varieties became known and culture practices post-harvest handling as well as a new marketing methods utilized in the new reclaimed areas in the Egyptian deserts particularly the early ripening cultivars such as "Flame seedless", "Superior" and "Early Sweet

Early sweet grapevine cv. is considered a prime and outstanding grapevine cv. grown under Egypt conditions. It ripens early especially when treated with breakages and easily marketing to most foreign countries. Early Sweet Grapes is a large seedless berry with a creamy white color. The high sugar level gives this grape a sweet flavor with a hint of Muscat and an extremely high juice level.

Pruning is the most important cultural practice in the management of grapevine to sustain production and productivity. Pruning methods have been developed to balance fruit productivity, vegetative growth and attain maximum yield without reducing vine vigour. An increase in the severity of pruning will increase the vigor of individual shoot at the expense oftotal growth and crop **(Weaver, 1976 and Celik*et al.*, 1998).** Pruning practice through which grape production can be increased and cluster quality improved.

Bud load is the most important factor affecting yield and cluster quality as well as vine vigor of Thompson seedless grapevines **Morris and Cawthon (1980); Fawzi *et at.*, 1984 ; Marwad et. *al.*, (1993); Omar and Abdel-kawi, 2000; Rubio *et al.*,(2002) on** Tempranillo variety **Khamis *et al.*, (2017)**on superior grapevines. Adjusting the length of fruiting spur is necessary to balance growth and fruiting status/vine nutritional status and bud fertility (**Tamura *et al.*, 2002 and Ranspise *et al.*, 2003).**Previous studies showed that adjusting the length of fruiting spurs in most grapevine cvs. is considered the main reasons for promoting productivity **(Abdel –Fattah *et al.*, 1993; Kamel, 2002; Ansam, 2002; Awad, 2003; Nejatian, 2003; Jarad, 2004 ; Abdel-Mohsen, 2013; Ali and MoumenKh. Mohamed, 2016) and Khamis *et al* (2017)**

Therefore the objective of this study is to determine the optimum bud load for Early sweet grapevine and their effect on bud behavior, fruit quality, yield and vegetative growth.

Materials and Methods

This study was carried out during two consecutive 2016&2017 experimental seasons in a private vineyard at El-Khatatba, Menoufiya governorate, Egypt on Early sweet grapevines cultivar. The vines were 7-year-old, grown in a sandy soil, spaced at 2 X 3 meters apart, irrigated by the drip irrigation system, trellised by the Spanish Parron shape system.

Vines were trained to quadrilateral cordon and spur- pruned. The experiment consisted of nine treatments arranged in a randomized complete block design, a hundred and eight uniform vines were chosen. Each twelve vines acted as a replicate and each three replicates acted as treatment. The vines were pruned during at the last weekof December during two seasons of study.All vines received the same cultural managements recommended by ministry agriculture.

The study included the following treatments

T1-pruning at 24 fruiting spurs ×2 buds= 48 buds
T2-pruning at 12 fruiting spurs ×4 buds= 48 buds
T3-pruning at 8 fruiting spurs ×6 buds= 48 buds
T4-pruning at 36 fruiting spurs ×2 buds=72 buds
T5-pruning at 18 fruiting spurs ×4 buds=72 buds
T6-pruning at 12 fruiting spurs ×6 buds=72 buds
T7-pruning at 48 fruiting spurs ×2 buds=96 buds
T8-pruning at 24 fruiting spurs ×4 buds=96 buds
T9-pruning at 16 fruiting spurs ×6 buds=96 buds

1-Bud behavior

During the two seasons, the following measurements were recorded:

a-Bud burst:

b- Percentage of bud burst:

Number of buds were counted one month after bud burst and the percentage of bud burst were calculated as follows according to **Bessis(1960).**

$$Bud\ burst\% = \frac{\text{No of bursted buds per vine}}{\text{Total buds per vine}} x100$$

c-Bud fertility:

Number of clusters per vine were counted and divided by the total number of buds and the fertility was calculated as follows according to **Bessis(1960).**

$$\text{Bud fertility\%} = \frac{\text{No of clusters per vine}}{\text{no of Total buds left at winter pruning}} \times 100$$

2-Morphological and vegetative growth

Vegetative growth parameters were determined after two weeks of fruit set as follows:

1- Average shoots length (cm).

Twenty vegetative shoot were measured as average (cm), also number leaves fail date were calculated for each treatment when the leaves began take the red color and begins fail **(El-Ashram 1993).**

2- Average leaf area (cm^2)

Twenty leaves / vine were picked at Veraison of the apical 6th and 7th leaves using a CI-203- Laser Area-meter made by CID, Inc., Vancouver, USA..

3-N, P,K and Mg**content in the leaves**:

At full bloom, samples of 20 leaf petioles per each replicate were taken from
leaves opposite to cluster were used for the determination of N, P and K according to **(Cottenie*et al.*1982).**

4- Chlorophyll content in theleaves:Sixth and seventh leaves from the tip of the growing shoots were used for the determination of total chlorophyll content in the leaves after two weeks from last treatment according to **(Mackinny, 1941)**

3-Yield and physical characteristics of clusters

Harvesting indices (TSS% and acidity %) were weekly monitored from version till maturity when TSS reached about 16-17% according to **Tourk *et al.*,(1995).**

a- Average cluster length (cm).
b- Average cluster width (cm).
c- Average cluster weight (g).
d- Yield /vine =number of clusters/vine × average cluster weight.

4-physical characteristics of berries

a- Average berry weight (g).
b- Total number of berries per cluster
c- Average size of berries$(cm)^3$
d- Average berry width(cm)
e- Average berry length(cm)
f- Shot berries per cluster%=Number of shot berries per cluster ×100
Total number of berries per cluster

3- Chemical characteristics of berries

a- Total soluble solids (TSS % in berry juice using a hand refract meter.
b- Total treatable acidity (as tartaric acid %) according to the Official Analysis Methods **(A.O.A.C., 2000).**
c- TSS / acid ratio.

At dormant seasons:

a- Wood ripening :
b-Weight of pruning: was carried out at the time of winter pruning(g)
c-Total carbohydrates in cane content (%):from fruitingcanes for next seasonwere determined calorimetrically by using reagent according to the method described by **Herbert *et al.*,(1971)**

Statistical analysis :

All the obtained data during ecal season of this study were subjected to statistical of various according to the method described by **(Snedecor and Cochran,1990)**.However, the differences means were differentiated by using Duncan's multiple rage test **(Duncan,1955).**

Result and Discussion

1-Bud behavior

a-Time of bud burst:

Data presented in table (1) showed that pruning Early sweet grapevines atlevel 24spurs ×2 buds (48 buds/vine) advanced the beginning of bud burst date compared with other treatments followed by the vines were pruned at36 spurs ×2 buds (72buds/vine)and finally the vineswere pruning at level16 spurs ×6 buds (96 buds/vine) in both seasons of study.

b-Percentage of bud burst and bud fertility:

From table (1) it is clear that the bud burst and bud fertility percentage was increased significantly by decreasing the number of bud load/ vine in the two seasons. Since, the highest bud burst and bud fertility

percentage was associated with the lowest bud load (48 buds/vine) buds compared with (72 buds/vine) and (96 buds/vine) respectively in both seasons of study. Treatments under each levels (48, 72 or 96 buds) were nonsignificantly between them in both seasons . Moreover, vines werepruned at 8 spurs with 6 buds gave the highest bud burst and bud fertility percentage followed by the vines were pruned at 12 spurs ×4 buds compared with the other treatments while vines were pruned at 24 spurs with 4 buds gave the lowest bud burst and bud fertility percentage compared with the other treatments during both seasons under the study.

The results obtained also by **Ali and Moumen Mohamed, 2016, Omar and Abd EL-Kawi (2000)** found that increasing bud load reduces bud fertility%. Furthermore, leaving 18 canes with 4 nodes andleaving 21canes with3 nodes give a highest significant value of bud fertility percentage in the first and second seasons respectively while the lowest value was obtained when leaving 8 cane with 6 nodes in both season of the study.

Table 1. Effect of different buds load levels on bud behavior of Early Sweet grapevines in 2016 and 2017 seasons

Treatments		Bud burst date		Bud burst%		Bud fertility%	
		2016	2017	2016	2017	2016	2017
	24spurs ×2 buds	13/2	12/2	96.2a	97.5a	78.3a	81.2 b
48	12 spurs ×4 buds	15/2	14/2	96.9a	98.45a	82.8a	89.6a
	8 spurs ×6 buds	15/2	14/2	96.9a	98.5a	82.3a	91.2a
	36spurs ×2 buds	14/2	15/2	91.3ab	93.2ab	57.4b	57.9c
72	18 spurs ×4 buds	16/2	17/2	90.1ab	91.8ab	56.9b	57.3c
	12 spurs ×6 buds	17/2	15/2	89.9ab	91.7ab	54.2b	58.0c
	48 spurs ×2 buds	17/2	16/2	87.5ab	90.0b	40.9c	41.9 d
96	24 spurs ×4 buds	18/2	18/2	84.0b	87.45b	38.0c	47.2d
	16 spurs ×6 buds	20/2	19/2	87.5ab	89.6b	47.9b	41.9d

Values within each column followed by the same letter/s are not significantly different at 5% level

2- Vegetative growth

a- Shoot length and Leaf area

With respect to the effect of buds load on shoot length and leaf area data obtained in Table (2) show that 2 buds/spur treatments was the superior treatment in this respect as it enhanced shoot length and leaf area inEarly sweet grapevines as compared with 4 and 6 buds/spur treatments in this concern during 2016 and 2017 seasons.

The vine were pruning at 24 spurs/2 buds (48 buds/vine) and 48 spurs/2 buds (96 buds/vine) gave the highest value compared with the other treatments during both seasons under the study, However The vine were pruning at 12 spurs/8 buds (96 buds/vine) recorded the lowest shoot length and leaf area in both seasons.

This increased with sever pruning may be due to the strong reduction in pruned wood as compared to light pruning, thus affects that balance between nitrogen and carbohydrates in favorite of nitrogen which promotes vegetative growth. The findings of **Abd El-Baki (2003)** showed that there was a gradual increase in shoot length of both "King Ruby" and "Thompson seedless" all along the growing seasons. However, "King Ruby" vines produced the longest shoots under the level of 12 buds/vine followed by 18 and 24 buds/vine, while the shortest ones were noticed in case of 30 buds/vine. In addition, **Ali and MoumenKh. Mohamed, (2016)** found that thehighest shoot length and leaf area were recorded on the vines that pruned to leave 15 fruiting spurs x 4eyes. Also, **Sabbatini*et al.* (2015)** mentioned that as number of nodes retained increased, vine size and leaf area.

b- chlorophyll A and B

Regarding chlorophyll A and B data in Table (2) revealed that pruning Early sweet grapevinesat level 24spurs ×2 buds (48 buds/vine) increased chlorophyll A and B followed by the vines were pruned at12 spurs ×4 buds(48 buds/vine) as compared with the other treatments in 2016 and 2017seasons, respectively. While, vines pruned at 48 spurs with 2 buds (96 buds/vine) gave the lowest chlorophyll A and B compared with the other treatments in both seasons of study.

These results are in contrast with those reported by **Velu (2001)**and **Senthilkumar *et al* (2015)** observed that the maximum chlorophyll content (2.699 mg/g) was registered at a pruning level of 67 % of canes to 5 bud level and 33 % of the canes to 2 bud level. In addition, **Ali, *et al.*,(2016)** found that the highest chlorophyll A and B were recorded on the vines that pruned to leave 8 canes x 10 eyes

Table 2. Effect of different of buds load levels on Shoot length, Leaf area chlorophyll A and B of Early Sweet grapevines in 2016 and 2017 seasons

Treatments		Shoot length (cm).		Leaf area (cm^2)		chlorophyll A (mg / g f.w.)		Chlorophyll B (mg / g f.w.)	
		2016	2017	2016	2017	2016	2017	2016	2017
48	24 spurs ×2 buds	136.0a	139.0a	192.2a	200.9a	1.62a	1.69a	1.52a	1.51a
	12 spurs ×4 buds	131.3b	134.3bc	178.5ab	182.8ab	1.61a	1.75a	1.51a	1.16a
	8 spurs ×6 buds	129.5b	132.8c	92.8c	101.1c	0.94bc	1.93a	0.86 bc	1.16a
72	36spurs ×2 buds	132.6b	136.8abc	191.9a	195.9a	0.95bc	0.96bc	0.85bc	0.45b
	18 spurs ×4 buds	130.3b	133.5c	175.5ab	183.8ab	0.82bc	0.96bc	0.95bc	0.44b
	12 spurs ×6 buds	129.8b	133.3c	88.1c	97.3c	0.94bc	0.95bc	0.93bc	0.46b
96	48 spurs ×2 buds	135.8a	137.8ab	192.1 a	199.8a	0.55c	0.57c	0.50 c	0.38b
	24 spurs ×4 buds	131.0b	134.8bc	177.1ab	180.9ab	1.56a	0.75bc	0.72bc	0.41b
	16 spurs ×6 buds	129.5b	133.8bc	97.0c	103.8c	0.80bc	0.80bc	0.76 bc	0.33b

Values within each column followed by the same letter/s are not significantly different at 5% level

N, P, K and Mg content in the leaves

The data presented in Table 3 revealed that vineswereprunedat24 spurs/2 buds(48 buds/vine) gave the highest percentage of phosphorous,potassium andmagnesium comparedwith (72 buds/vine)and (96 buds/vine) respectively in both seasons of studyfollowedby the vines were pruned12 spurs ×4 buds as compared with the other treatments in 2016 and 2017seasons, respectively. On the other hand ,the lowest value percentage of phosphorous ,potassium andmagnesium was obtained when the vine were pruning at48 spurs ×2 buds(96 buds/vine)in both seasons of the study whiledifferent levels of buds load gave a non significantly differences in percentage of nitrogen compared of them under this study.

These results as a general trend are in agreement with**(Weaver, 1976)** The increase on the leaf chemical constituents at the higher levels of vine load might be attributed to the promotion on the leaf area which resulted in enhancing photosynthesis process as well as the reduction on main shoot length and number of leaves which aids in reducing the depletions of these nutrients. **Ali, (2016)**showed that the maximum values of chlorophylls (a & b), total chlorophylls, N,P, K and Mg in the leaves were recorded on the vines pruned to leave 102 eyes/vine and sprayed three times with citric acid at 0.4%. These findings were true during both seasons.

Table 3. Effect of different levels of buds load on N, P, K and Mg of Early Sweet grapevines in 2016 and 2017 seasons

Treatments		N %		P %		K %		Mg %	
		2016	2017	2016	2017	2016	2017	2016	2017
48	24 spurs ×2 buds	1.88a	1.58a	0.36a	0.39a	0.86a	0.89a	0.49a	0.50a
	12 spurs ×4 buds	1.61a	1.53a	0.36a	0.38a	0.95a	0.95a	0.49a	0.49 a
	8 spurs ×6 buds	1.43a	1.73a	0.36a	0.37a	0.84a	0.85a	0.48a	0.48a
72	36spurs ×2 buds	1.46a	1.54a	0.31a	0.34a	0.64bc	0.66bc	0.36b	0.36b
	18 spurs ×4 buds	1.56a	1.26a	0.29a	0.35a	0.69b	0.70b	0.34b	0.35 b
	12 spurs ×6 buds	1.39a	1.75a	0.30a	0.32a	0.57cd	0.58cd	0.33b	0.33b
96	48 spurs ×2 buds	1.69a	1.36a	0.18b	0.20b	0.51d	0.53d	0.31b	0.31b
	24 spurs ×4 buds	1.64a	1.61a	0.19b	0.21b	0.51d	0.53d	0.31b	0.32 b
	18 spurs ×6 buds	1.45a	1.57a	0.19b	0.21b	0.50d	0.31 b	0.31b	0.32b

Values within each column followed by the same letter/s are not significantly different at 5% level

3-Yield and physical characteristics of clusters

a- Cluster length and width

Data in Table (4) declared that the buds load of (48 buds/vine) 24 spurs/2 buds produced the highest significant cluster length and width compared with pruning (72 buds/vine) and (96 buds/vine) in both seasons. However the treatment of (96 buds/vine) 24 spurs/4 buds recorded the lowest cluster length and widthin both 2016 and 2017 seasons

b- Cluster weight and Yield /vine

data in Table (5) revealed that pruningEarly sweet grapevinesat(48 buds/vine) 24 spurs/2 buds produced the highest cluster weight compared with pruning at(72 buds/vine)and (96 buds/vine) in both seasons. While, pruning at(72 buds/vine)12 spurs/6 buds recorded the lowestcluster weight in both 2016 and 2017 seasons. Regardingyield per vine pruned (96 buds/vine) 24 spurs/4 buds produced the highest yield per vine compared with leaving (72 buds/vine) and (48 buds/vine) in both seasons. On the other hand,pruning

at (48buds)24 spurs/2 buds recorded the lowestyield per vine in both 2016 and 2017 seasons.

These results agreed with those findings of **Ansam(2002)and EL-Baz*et al.*, (2002)** On Kings Ruby grapevine vines pruned to 40 or 60 buds/vine produced the highest width and length of clusters compared with the other bud load (20, 50 and 80bud/vine) **Aly (2001).Fawzi*et al.* (2015)** showed that interaction between the two studied factors was insignificant in most cases. The highest value of cluster width and cluster length was noticed with the pruned vine at 2eyes per cane plus 24buds.

Table 4. Effect of different of buds loadlevels on Cluster length (cm), width (cm), Cluster weight (g) and Yield /vine (kg) of Early Sweet grapevines in 2016 and 2017 seasons

Treatments		Cluster length (cm)		Cluster width (cm)		Cluster weight (g)		Yield /vine (kg)	
		2016	2017	2016	2017	2016	2017	2016	2017
48	24 spurs ×2 buds	28.3a	29 a	24.2a	25.8a	512.5 a	525 a	15.75 d	17.55 c
	12 spurs ×4 buds	27.5a	29 a	24.8a	23.8 ab	412.5bcd	445 bc	17.01bcd	18.91abc
	8 spurs ×6 buds	27.4a	28.a	16.5 de	15.3 e	385 d	410 cd	17.35bcd	19.03abc
72	36spurs ×2 buds	24 b	26ab	22ab	22.3abc	400 cd	437.5 bc	18 bc	20.23ab
	18 spurs ×4 buds	23.5b	24.5b	19.5bcd	20.3bd	387.5 d	387.5cd	19.01 ab	19.5 abc
	12 spurs ×6 buds	27.8a	27.3b	19.8bcd	18.8cde	375 d	367.5 d	16.35 cd	18.45 bc
96	48 spurs ×2 buds	23.8b	24.5b	20.5bc	19.8bce	460 abc	497.5ab	18.37abc	20.56 a
	24 spurs ×4 buds	22 b	23 b	15.75 e	16.8de	462.5ab	512.5 a	20.21 a	20.67 a
	16 spurs ×6 buds	22.8b	24.3b	18cde	19 cde	487.5 a	522.5 a	18.23 abc	19.93 ab

Values within each column followed by the same letter/s are not significantly different at 5% level

Physical characteristics of berries

Data presented in table (5) revealed that the highest values of berry weight, size, width and length were obtained when the vines were pruned at(48 buds/vine) 24 spurs/2 buds as compared with the other treatments in 2016 and 2017seasons followed by the vines were pruned at (48 buds/vine) 8 spur ×6 buds as compared with the other treatments in 2016 and 2017seasons, respectively. While,vines were pruned at(96 buds/vine) 24 spurs with 4 buds gave the lowest berry weight, size,widthand lengthcompared with the other treatments in both seasons of study.

Regarding shoot berries percentage per cluster of in the same table revealed that pruning Early sweet grapevines (48 buds/vine) 12 spurs/4 buds decreased shoot berriespercentage per clusteras compared with(72 buds/vine)and (96 buds/vine) in 2016 and 2017seasons, respectively. While, vines pruned to (96 buds/vine) 48 spurs with 2 buds gave the highest shoot berriespercentage per cluster of compared with the other treatments in both seasons of study.

Table 5. Effect of different of buds load levels on 25 berries weight (g), Size of berries $(cm)^3$, Berry width, length(cm)and shoot berries per cluster%, of Early Sweet grapevines in 2016 and 2017 seasons

Treatments		25 berries weight(g)		Size of berries$(cm)^3$		Berry width(mm)		Berry length(mm)		shoot berries per cluster%	
		2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
48	24 spurs ×2 buds	117.2a	120.a	115.4a	118.a	19.8a	21a	23.2a	23.7a	2.8e	3.1d
	12 spurs ×4 buds	96bc	99.3 bc	102.5 bcd	108.3 b	19 ab	19.6 ab	22.6 a	23.1 a	2.1 e	2.6 D
	8 spurs ×6 buds	101.3 b	105 b	105 bc	108 b	19.5 ab	20.3 ab	22.4 a	22.9 a	3.7 cde	4.1 Cd
72	36spurs ×2 buds	86.7 Bcd	93.3 bcd	97.7 bcd	100.7 b	19.7 ab	18.9 abc	23 a	23.7 a	6.2 bcde	7.4 Bc
	18 spurs ×4 buds	96.8 Bc	103 b	99.5 bcd	102.3 b	17.7 bc	18.4 bc	19 bc	20 bc	9.4 b	10.1 B
	12 spurs ×6 buds	82.8 Cde	87.5 cde	96.3 cd	100 b	18.7 ab	19.2 abc	21.6 a	22.1 ab	6.9 bc	7.5 Bc
96	48 spurs ×2 buds	73.5d ef	81 de	95 d	100.3 b	18.4 ab	18.9 abc	21.4 a	22 ab	19.1 a	19.7 A
	24 spurs ×4 buds	66.75 f	77.5 e	61.3 f	77.5 c	16.5 cd	17.4 cd	17.6 c	18.4 c	17.2 a	18.0 A
	16spurs ×6 buds	70 ef	75 e	75 e	80 c	15.9 d	16.2 d	18.1 c	18.7 c	16.4 a	17.4 A

Values within each column followed by the same letter/s are not significantly different at 5% level

Ali and MoumenKh. Mohamed, 2016 showed that the highest berry weight, size, width and length were recorded on the vines that pruned to leave 15 fruiting spurs x 4eyes and decreasing shoot berries per cluster percentage of Early Sweet grapevines. Also, **Hussain and El-Dujaili, (1990),Abd El-Baki (2003) and Sabbatini*et al.* (2015)** mentioned that as number of nodes retained increased, berry weight of 'Niagara' grapevines increased

Chemical characteristics

Total soluble solids content (%), Acidity and TSS/acid ratio

Data presented in Table (6) indicated that non significantly difference between all treatments in both seasons on total soluble solids content (%), Acidity and TSS/acid ratio of Early sweet grapevinescultivar.Since,vines were pruned at (48 buds/vine) 12 spur ×4 buds and (48 buds/vine) 24spur ×2 buds gave the highest total soluble solids content and decreased Acidity compared with treatments (72 buds/vine)and (96 buds/vine) respectively in both seasons of study while treatment (96 buds/vine) 48 spurs ×2 buds gave the lowest value oftotal soluble solids contentand increased Acidity compared with the other treatments in 2016 and 2017seasons this study

This is agreement with those mentioned by **Dhillon (2004), Almanza-Merchan *et al.* (2014) and Sabbatini *et al.* (2015)** stated that long pruning type presented the highest values of TSS%. Beside, **Rizk*et al.* (1994)** and **Abd El-Wahab (1997)** recorded that total soluble solids of grape berries was not affected by treatments of bearing unit length. In this trend, **Ansam (2002) and Cangi and Klc (2011)** found that bud loading had no effect on total soluble solids in addition.

Table 6. Effect of different of buds loadlevels on TSS, Acidity% and TSS/acid ratio of Early Sweet grapevines in 2016 and 2017 seasons

Treatments		TSS%		Acidity%		TSS/acid ratio	
		2016	2017	2016	2017	2016	2017
48	24 spurs ×2 buds	17.2 a	17.7a	0.374 a	0.374ab	45.9a	45.7 a
	12 spurs ×4 buds	17.3 a	17.7a	0.363b	0.375 a	47.6a	47.2 a
	8 spurs ×6 buds	16.8 ab	17.3ab	0.367ab	0.375 a	45.4ab	46.1 a
72	36spurs ×2 buds	16ab	16.5ab	0.373ab	0.387a	42.8ab	42.6ab
	18 spurs ×4 buds	16.4 ab	16.8ab	0.365ab	0.375a	44.9ab	44.8ab
	12 spurs ×6 buds	16.3 ab	16.8ab	0.367 ab	0.378a	44.4ab	44.4ab
96	48 spurs ×2 buds	16.5a b	16.0ab	0.387a	0.390 a	42.6.1ab	41.0b
	24 spurs ×4 buds	16.8 ab	16.1ab	0.373ab	0.383a	45.0ab	42.0ab
	16 spurs ×6 buds	16.8 ab	16.0ab	0.375a	0.365ab	44.0ab	43.8ab

Values within each column followed by the same letter/s are not significantly different at 5% level

At dormant seasons

Carbohydrates, Wood ripening and Weight of pruning/vine

The data presented in Table (7) revealed vines were prunedat(48 buds/vine)24 spurs/2 buds gave the highest Wood ripening and Weight of pruning per vinecompared with (72 buds/vine)and (96 buds/vine) respectively in both seasons of study.On the other hand ,the lowest value ofwood ripening and weight of pruning per vine was obtained whenvines were pruning at (72 buds/vine)12spurs ×6 buds in both seasons of the study while different levels of buds load gave a non significantly differences in carbohydrates in canes except pruning (72 buds/vine)12 spur ×6 buds gave the lowest valuecompared with other treatments of study. Our results in this connection agree with those obtained by **Omar & Abdel-kawi (2000)** who reported that increasing leaves lead to heavy canopy with increase in active photosynthesis and stored carbohydrates in the new canes. Similar results were obtained by **El-Baz*et al.*, (2002)** on Crimson seedless grapevines **Genaidy (2015)** increasing the buds on the vineyard led to a weight loss of wood pruning and mature wood.

Conclusion

From the previous results, it can be recommended that pruning Early Sweet grapevine at (48 bud/vine) namely 24,12 and 8 fruiting spurs adopted to 2,4and 6 buds/spur gave highest values of bud behavior, physical characteristics and vegetative growth .Also increased wood ripening ,weight of pruning and total carbohydrate in canes However, the bud load of (96 bud/vine) 24spurs ×4 buds gave the highest with yield per vine in both season in both seasons

Table 7. Effect of different of buds load levels on carbohydrates, Wood ripening and Weight of pruning/vine(g) of Early sweet grapevines in 2016 and 2017 seasons

Treatments		carbohydrates(%)		Wood ripening		Weight of pruning/vine(g)	
		2016	2017	2016	2017	2016	2017
48	24 spurs ×2 buds	35.56 a	35.60 a	0.962a	0.969a	3.77a	4.13a
	12 spurs ×4 buds	31.10 ab	35.07 a	0.903b	0.912b	2.83b	3.07b
	8 spurs ×6 buds	31.94 ab	34.71 a	0.813c	0.826c	2.70b	2.91b
72	36spurs ×2 buds	34.91 a	31.16 ab	0.957a	0.966a	3.96a	4.04a
	18 spurs ×4 buds	32.70 a	27.86 b	0.902b	0.910b	2.90b	3.125b
	12 spurs ×6 buds	31.94 ab	32.02 ab	0.755d	0.770d	2.60b	2.85b
96	48 spurs ×2 buds	34.96 a	34.98 a	0.947ab	0.936ab	3.75a	3.94a
	24 spurs ×4 buds	34.65 a	32.745 a	0.903c	0.911b	3.06b	3.28b
	16 spurs ×6 buds	27.7 b	33.88 a	0.770d	0.779d	2.73b	3.025b

Values within each column followed by the same letter/s are not significantly different at 5% level

References

A.O.A.C.(2000). Association of Official Agricultural Chemists. Official Methods of Analysis. 4th ed.pp. 495-510. Benjamin Franklin Station, Washington. D.C., U.S.A.

Abd El-Baki, M.S.A. (2003). Effect of summer pruning and thinning on growth and fruiting of King Ruby grapes. M.Sc. Thesis., Fac. of Agric., Cairo Univ., Cairo, Egypt

Abd El-Wahab, M. A. (1997).Effect of cane length on bud behaviour, growth and production of "king Ruby" grapevines.M. Sc. Thesis, Cairo University, Egypt.

Abdel-Fattah S.E; Marwad, I. A; and Isis AbdelshahiedRizk (1993). Effect of bud load and spur length on Roumi Red grapevine I-Weight of pruning and chemical compostion of 1 year - old wood. Zagazig.J. Agric.. Res Vol 2.0 No. (6) pp1889 -1899

Abdel-Mohsen, M.A. (2013): Application of various pruning treatments for improving productivity and fruit quality of crimson seedless grapevine. World Journal of Agricultural Sciences 9 (5): 377-382

Almanza-Merchan, P.J., G.R. Fischer and G.E. Cely(2014).The importance of pruning to the quality of wine grape fruits (Vitisvinifera L.) cultivated under high-altitude tropical conditions. AgronomiaColombiana, 32(3): 341-348.

Aly, M.S.M.(2001) Effect of bud load and some growth regulators on growth, yield and fruit quality of King's Ruby grapevine cultivar. Ph. D. Agric. Sci., Ain Shams University, Cairo, Egypt

Ali, A.H.; M.Kh. Uwakiem and H.M.M. Sayed(2016)Effect of Vine Load and Spraying Citric Acid on Fruiting of Superior Grapevines Grown Under Minia Region Conditions- Egypt *Assiut J. Agric. Sci., (47) No. (6-2) 2016 (484-503)*

Ali H. Ali and Moumen A. Kh. Mohamed(2016) Effect of Fruiting Spur Length and Spraying Seaweed Extract on Yield and Berries Quality of Early Sweet Grapevines Assiut J. Agric. Sci., (47) No. (6-2) 2016 (504-517) ISSN: 1110-0486

Ansam, S.A. El.,(2002). Effect of cane length on bud behaviour, growth and productivity of "Superior" grapevines. M.Sc. Thesis, Fac. of Agric., Cairo Univ., Egypt.

Awad, N.A.E. (2003): Studies on pruning severity of Thompson seedless grapes. M. Sc. Thesis Fac. of Agric. Mansoura Univ. Egypt

Bessis, R. (1960). Sur Differents Models Expression Quantitative Delafertilité chez la vigneAca p.p. 828 -882.

Cangi, R. and D. Klc, (2011) Effects of bud loading levels and nitrogen doses on yield, physical and chemical properties of brined grape-leaves. African Journal of Biotechnology, 10(57): 12195-12201.

Celik, H., Y.S. Agaoglu, Y. Fidan, B. Marasali and C. Soylemezoglu, (1998). General Viticulture. Professional Books Series, Ankara, 1: 1-253.

Cottenie, A.; M. Verloo; L. Kiekens; G. Relgho and W. Camerlynuck (1982). Chemical analysis of plant and soil. Lab. of analytical and Agrochemistry State Univ. Gent, Belgium

Dhillon, W.S. (2004).Standardization of pruning intensity in grape cv. Perlette. Haryana Journal of Horticultural Sciences, 33(3/4): 172-174.Cangi, R. and D. Klc, 2011. Effects of bud loading levels and nitrogen doses on yield, physical and chemical properties of brined grape-leaves. African Journal of Biotechnology, 10(57): 12195 -12201.

Duncan, B. D. (1955). Multiple test range and multiple F tests. Biometries. 11-142.

El- Ashram, M.A. (1993): Modern Approaches of Cultivation and Production of Grapevines. Dar El-Fekr, El- Arabie, pp. 275-276.

EL-Baz, EI. EI. T.; A.M. Mansour; EI.F.EI-Dengawy and B.N. Samra (2002) Influence of pruning severity on bud behavior, yield, ,berry quality and some biochemical contents of the canes of "Crimson seedless" Grapes. Egypt.j.Hort.29(1) pp.39-60.

Fawzi, F., Bondok, A.Z. and Ghobrial, G. F. (1984). Effect of cane length on bud behaviour and wood ripening of Thompson seedless grape variety,

Annals Agric., Sci., Ain Shams Univ., Cairo 29 (1) 465-474.

Fawzi, F., F.H. Laila, M.F.M. Shahin, M.A. Merwad and E.A.E. Genaidy(2015). Effect of vine bud load on bud behavior, yield, fruit quality and wood ripening of superior grape cultivar. International Journal of Agricultural Technology, 11(5): 1275-1284.

Genaidy,E.(2015).Effect of vine bud load on bud behavior,yield ,fruit quality And wood ripening of superior grape cultivar.J of Agr.Tech,1275-1284

Herbert, D.;P.J.Phipps and R.F.Strange(1971). Determination of total carbohydrates Methods in Microbian;5(B):209-244.

Hussain, M.M. and J.A.H. El-Dujaili(1990). Effect of bud level and training system on yield and quality of Dies El-Anz grape cultivar (*Vitisvinifera*. L.). Hort. Abst., 62: 6472.

Jarad, A. (2004): Effect of fruit canes and eyes vine load on the productivity of a local grape variety under the conditions of Deir El- Zor city. Bull Fac. Agric. Cairo Univ, 55: 603-608

Kamel, M.K. (2002): Physiological studies on pruning and fertilization of Flame seedless grapevines. (*V. vinifera* L.). Ph. D. Thesis. Fac. Of Agric. Minia Univ. Egypt

Khamis , M. A.; A.A.R.Atawia; H.E.M.El-Badawy and A.A.M.Abd EL-Samea (2017) Effect of buds load on growth, yield and fruit quality of Superior Grapevines. Middle East. J.ofAgric .Res ISSN2077-4605.Vol:061 Issue:01 . J- Mar pag: 152-160

Mackinny, G. (1941). Absorption of light by chlorophyll soluation. J. Bio. Chem., 140: 315-322.

Marwad, I. A.; Rizk, N. A and Ibrahim, A. H(1993). Effect of cane length on bud behaviour, Yield, bunch characteristics and wood maturity of Thompson seedless grapevines Egypt. J. Appl. Sci., 8 (12) pp 47-60.

Morris, J. R. and D. L. Cawthan (1980). Yield and quality response of "Concord grapes to training systems and pruning severity in Arkansas, J. Amer. Soc. Hort. Sci., 105 (3): 307-10. (Hort. Abst. 51: 233).

Nejatian, M.A. (2003): Effects of bud number and cane length on bud fertility and some characteristics of grapevine cv. Bidanehsefid, 19(4): 457-467.

Omar, A.H and Abdel- kawi, A. (2000). Optimal bud load for Thompson seedless grapevines. J. Agric Sci. Mansoura Univ. 25 (9), pp5769-5777.

Ranspise, S. A.; Patil, B. T.; More, T. A.; Birade, R. M.; Ghure, T. K., (2003): Effect of sub-cane pruning on fruitfulness and yield of grape cv Thompson seedless. Journal of Maharashtra Agricultural Universities.27 3: 258-259

Rizk, I. A. (1996). Effect of cane length on bud behaviour and bunch characteristics in "Thompson seedless" cultivar. Egypt. J. Appl. Sci., 11 (7): 220-34.

Rizk, N. A.; I. A. Rizk and V. H. Girgis (1994). Effect of cane length on bud behaviour, wood ripening and bunch characteristics in "Thompson seedless" grapevines. Egypt. J. Appl. Sci., 9 (5): 74-89.

Rubio, J.A., Albuquerque M. V., peixy, J.L and yuste . J. (2002). la mejora varietal de la vid, susconsescuencias y beneficios. Vida Rural, pp 149: pp 62-66

Sabbatini, P., K. Wierba, L. Clearwater and G.S. Howell(2015). Impact of training system and pruningseverity on yield, fruit composition, and vegetative growth of 'Niagara' grapevines in Michigan International Journal of Fruit Science, 15(3): 237-250.

Senthilkumar.S,Vijayakumar.R.M.,Soorianathasundaram.K.andDurgadevi.D.(2015)Effect of pruning severity on vegetative, phgsiological, yield And quality attributes in grape (*vitis vinifera. L.)* :AReview.Curr.Agi Res.J.Vol.3(1),42-54.

Snedecor, G.A. and W.G.Cochran(1990).Statistical Methods.6thed the lowa state. Univ.press.Iowa U.S.A.

Tamura, F.; Muraya, K. and Fujji, Y. (2002): Effects of short cane pruning in summer and long cane pruning in winter on growth and yield of the grapevine "Muscat" of Alexandria' in forcing culture condition. Hort. Res. (Japan), 1(4): 269-274. (Hort. Abst., 73(5): 4269).

Tourky, M.N., El-Shahat, S.S. and Rizk, M. H. (1995).Effect of Dormex on fruit set, quality and storage life of Thompson seedless grapes (Banati grapes) J. Agric. Sci., Mansoura Univ., 20(12): 5139-5151.

Velu, V. (2001)Studies on bud load and certain crop thinning practices on vigour, yield and quality of grapes (Vitisvinifera L.) cv. Muscat. M.Sc.,

Weaver, R.J.(1976). Grape Growing. Wiley-Interscience Publication, John Wiley & Davis, New York, London, Sydney, Tronto pp. 160-175.

تأثير حمولة البراعم على سلوك البراعم وجودة الثمار فى العنب الايرلى سويت

ثريا صابر على ابو الوفا

قسم بحوث العنب -معهد بحوث البساتين -مركز البحوث الزراعيه

أجريت هذة الدراسة خلال موسمى ٢٠١٦ و ٢٠١٧ فى مزرعةخاصة بالخطاطبه- محافظة المنوفيهكرمات عنبايرلى سويت عمرها ٧سنوات ومنزرعة فى تربة رمليه تروى بالتنقيط وعلى مسافة زراعة ٣X٢ م ومرباه بطريقة الكردون الرباعى باستخدام نظام تدعيم البارون سيستم .

وقد استهدف هذا البحث دراسة تأثير حمولة البراعم على سلوك العيون وجودة الثمار فى العنب الايرلى سويت.

حيث تم استخدام ثلاث مستويات مختلفة من حمولة البراعم وهى (٤٨-٧٢-٩٦برعم/للكرمه)عدد البراعم لكل دابره ثمرية (٢-٤-٦) وقد أظهرت النتائج أن تحميل ٤٨ برعم لكل كرمة اى ٢٤ دابره ثمرية على كل دابرة ٢عين كان له تأثير كبيرسلوك البراعم و الصفات الطبيعية و الكيميائية للعنقود والحبات وتحسن صفاتالنمو الخضرى والهرمونات فى الأوراق وتحسين نسبه الكربوهيدرات فى القصبات . ومع ذلك كانت أفضل المعاملات إنتاجا للمحصول ٩٦ برعم لكل كرمة وفى النهاية كانت المعاملة ٤٨ برعم لكل كرمة اى ٢٤و١٢و٨ دوابر ثمرية مع ٢و٤و٦ براعم على الدابرة الثمرية على التوالى تحت الدراسة افضل المعاملات