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INFLUENCE OF PRUNING SEVERITY ON BUD BEHAVIOUR, YIELD, BERRY QUALITY AND CONTENT OF TOTAL CARBOHYDRATES IN THE CANES OF THOMPSON SEEDLESS GRAPES UNDER PERGOLA TRELLIS SYSTEM

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ABSTRACT

This study was under taken during the seasons of 2001 and 2002 on twelve years old of Thompson Seedless grapevines. Vines were pruned to 6, 8 or 10 canes with 12 or 14 nodes per each cane under pergola trellis system. The results showed that the percentage of bud burst was affected by the cane length and number of nodes. So, leaving 6 canes with 12 or 14 nodes per cane increased bud burst percentage, since these treatments recorded 81.8% and 79.3% as the mean of two seasons respectively. Vines pruned to 6, 8 or 10 canes with 12 nodes per cane produced a higher bud fertility and leaf area than the other treatments used. While vines pruned to 8 canes with 12 nodes gave a higher internode thickness than the other pruning severity.

Number of clusters, yield per vine and per feddan were increased by increasing the number of nodes. Since, vines pruned to 10 canes with 12 or 14 nodes produced a higher number of clusters, yield per vine and yield per feddan than the other pruning severity.

Concerning berry quality, slight effect was observed on berry weight and diameter due to different pruning severity. Leaving 10 canes with 12 nodes gave somewhat increment in berry weight and diameter. Chlorophyll A and B in berry skin were increased by increasing the levels of bud load. While living 6 canes with 14 nodes gave a higher value of carotene. TSS was increased by pruning the vines to 8 canes with 14 nodes while acidity was decreased.

In relation to pruning severity, increasing bud load on the vine significantly increased total carbohydrates in the canes during dormant season. Vines pruned to 10 canes with 14 nodes showed a higher content of total carbohydrates in the canes than the other levels of pruning.

INTRODUCTION

Grape (*Vitis Vinifera*, L.) is considered the first deciduous fruit crop in both area and production allover the world and the second major fruit crop grown in Egypt Vineyards, have increased in the last few years especially in the newly reclaimed lands. Since, the total area reached about 142241 feddans producing about 1075105 metric tons according to the last statistics of the Ministry of Agriculture, 2001.

Thomson Seedless grape is one of the most important table grape cultivars grown in Egypt. Its area reached about 93031 feddan, producing about 697732 metric tons according to the last statistics of the Ministry of Agriculture, 2001.

In general, pruning is an obvious management technique developed to regulate the balance between fruit production and vegetative growth of

grapevines, also influenced bud behaviour and bud fertility (Christensen, 1986, Salem *et al.*, 1997, Shahein *et al.*,1998 and Ali *et al.*,2000) .

Pruning severity influenced the physiology of the grapevine cultivar. In this respect, it is well known that Flame Seedless, Ruby Seedless and Red Globe are pruned to spur system. Since, the fruitful buds are located at the base part of the canes. Yet, Superior and Thompson Seedless grapevines bearing unfruitful buds at the basal part of canes, therefore, it is pruned to cane system.

Little information on pruning severity of Thompson Seedless grapevines under pergolla trellis system. Yet, May et al (1982) showed that Thompson Seedless grapevine is recognized with having low fruitfulness at the basal nodes of the fruiting cane. Thus, this cultivars is essentially pruned to 12 or 15 nodes per cane or long spur with 5 nodes to produce an adequate fruiting. (Morris and Cawthon 1980, Fawzi *et al.*, 1984a; Omar and Abdel-Kawi 2000; Ali *et al.*, 2000; Samra 2001) .

Young vines bear few or even no fruitful buds, older ones have healthy vegetative growth and produced normal crop needs of more carbohydrates than assimilated by leaves at the first stage of development . A large accumulated carbohydrates in several parts of vine especially permanent wood of the trunk, arms and canes may influence bud formation, bud burst and bud fruitfulness (Bowen, and Kliwer, 1990, and Ali *et al.*, 2000) .

This investigation was carried out to fined out the suitable number of canes and number of nodes per each cane on bud behaviour, yield, berry quality and the content of total carbohydrates in the canes of Thompson Seedless grapes under pergola trellis system.

MATERIALS AND METHODS

This study was conducted during the two seasons of 2001-2002 in a private vineyard of Thompson Seedless grape at Boktares village near Aga, Dakahlia Governorate. The vineyard was established with vine spacing of 2.5m within rows and 3m between rows. The vines are grown in clay loam soil,and trained to cane pruning under pergola trellis system.

Vines were pruned at the beginning of February to six, eight or ten canes per vine with 12 or 14 nodes per each cane. Four or five renewal spurs (2 nodes) were retained per vine.The selected vines were arranged in a randomized block design, with four replicates and three vines per each replicate . The studied treatments are shown in Table(1).

Table(1): Pruning severity used for Thompson Seedless grape.

Treatment	Number of canes and nodes	Total number of nodes/vine
1	6 canes x 12 nodes	72 nodes
2	6 canes x 14 nodes	84 nodes
3	8 canes x 12 nodes	96 nodes
4	8 canes x 14 nodes	112 nodes
5	10 canes x 12 nodes	120 nodes
6	10 canes x 14 nodes	140 nodes

The following parameters were determined to evaluate the effect of different pruning severity levels on :

I. Bud Behaviour:

Number of bud burst and clusters per each vine were counted, then the percentage of bud burst and fertility buds were calculated as follows according to Bessis (1960) and Samra (2001)

Bud burst% = No. of bursted bud / Total No. of buds x 100

Bud fertility% = No. of cluster vine / Total No. of buds x 100

II. Vegetative Growth:

1. Leaf area (cm^2) : At full bloom stage, samples of matured leaves were collected to determine leaf area (cm^2.) using a planimeter.

2. Internode Thickness, it was determined from the third base internode at the full bloom stage and expressed in (cm.) by using a caliper.

III. Yield and berry quality:

At harvest time (first of August); when the TSS/ ranged about 17:18% according to, Samra (1982); the number of clusters per each vine and their weights were recorded to determine the following parameters:

1. Average number of clusters and cluster weight (gm).
2. Yield / vine (kg).
3. Yield / Feddan (ton).

Samples of 100 berries from each replicate were collected at random to determine average berry weight and diameter . The juice was pressed from the berries and filtrated through two layers of cheesecloth to determine :

1. Soluble solids percentage was determined using Carlsize hand refractometer.
2. Titratable acidity was determined by titrating 10 ml juice sample against (0.1 N) NaOH. Acidity was expressed as gm tartaric acid/100 ml juice according to AOAC (1980).
3. Soluble solids / acid ratio in berry juice.
4. Total chlorophyll A,B and Carotene: Samples of 0.4 gram fresh skin berries were extracted by 10 ml of acetone (85%) for (24 h) in cool chamber to determine both total chlorophyll and carotenes and measured by spectrophotometer at the wave length of 663, 644, 442 mu. The concentrations were calculated by mean of (Wettestein, 1957) equations:

   Chl.A = (9.784 x O.D.663) – (0.99 x O.D.644) = mg / L

   Chl.B = (21.426 x O.D.644) – (4.65 x O.D.663) = mg /L

   Carotene = (4.695 x O.D.442) – (0.268 x (Chl.A + Chl.B) = mg/L

   O.D. = Optical Density at a given wave length.

Chlorophyll A, B and Carotene were calculated as mg/g fresh weight of berries.

Total carbohydrates

At dormant season samples of one year old canes from the renewal spur (two canes per each vine) were collected at January. The middle portion of the cane was cut to small pieces, then dried and grounded. Samples of 0.2 gm of vine powder from dried canes were extracted with 15 ml HCL (10 N) for 6 hours. Total carbohydrates was determined according to modified method

of Schaffer and Hartman (1921) Total carbohydrates were calculated as gm glucose/100 gm dry weight.

Statistical analysis:

Statistical analysis of the present data was carried out according to, Snedecor and Cachran (1972).

RESULTS AND DISCUSSION

I. Bud behaviour:

1 - Bud burst percentage:

Data presented in Table (2) showed that percentage of bud burst was markedly affected by the cane length and number of buds per vine at the two seasons of this study .In this respect, it was found that the percentage of bud burst decreased by increasing the number of buds per cane. Since, vines pruned by leaving 6 canes with 12 or 14 nodes per cane significantly increased bud burst percentage than the other applied treatments. Yet, vines pruned to 10 canes with 14 nodes per cane gave a lowest bud burst value than the other levels of pruning during both seasons under the study.

The obtained data are in line with those found by, Philips (1969) who mentioned that the translocation of reserved carbohydrates from basal to distal buds promoted the distal to burst out. Moreover, Blasubrahmanyam and Khanduja (1977) observed that when Thompson Seedless grapevines were pruned to 10-20 canes/vines with 6-14 buds/cane, the percentage of bud burst decreased by increasing number of buds on the cane. Also, Fawzi *et al.,* (1984a) observed that vines with lower bud load gave a higher bud burst.

The hormonal control of the bud burst is an interesting point to discuss. Philips (1969) proved that the apical buds are acting source for IAA and GA3 which increased bud burst in the distal part. Moreover, Badawi *et al.*, (1984) reported that the increase in dormant buds in the basal part led to the accumulation of ABA translocated from the distal part. Since, increasing the number of nodes per cane lead to an increased in dormant buds. Similar results were obtained by, Omar and Abdel-Kawi (2000) and Samra (2001). Where, they found that increasing the number of buds reducing bud burst percentage of Thompson Seedless and Crimson Seedless grapes.

2 - Bud fertility:

Data in Table (2) revealed that, leaving 6, 8 and 10 canes with 12 nodes increased bud fertility percentage than leaving 14 nodes on the cane under the same number of the canes on the vine. In this respect, the highest percentage of bud fertility was found from vines pruned to 6 canes with12 buds per cane. Since, it recorded about 45.15 % as the mean of two season. Whereas, leaving 14 nodes per cane with 8 or 10 canes produced a lower bud fertility than the other levels of pruning severity. So, these treatments record 37.65 ,38.15 % of bud fertility as mean of two season under the study.

The obtained data are in agreement with Morris and Cawthon (1980) they found that vines pruned to 30 and 60 nodes gave a higher fruitfulness than leaving 90 nodes. Yet, Fawzi *et al.*, (1984a) mentioned that no clear effect on

fruitful buds percentage with increasing cane length from 12 to 18 buds/cane of Thompson Seedless grapes. Thus, Sansavini and Fanigliulo (1998) mentioned that the most fertile bud portion was recorded between 6-18 nodes on the cane of Sugraone grape since this cultivar was generally low in bud fertility especially at basal portion of the canes. Also, Samra (2001) found that bud fertility were affected by the retained buds on the canes. Since, leaving 8 or 10 canes with 12 buds gave a higher bud fertility than leaving 14 or 16 buds on the cane of Crimson Seedless grapevines.

Table (2): Effect of pruning severity on the percent of bud burst, bud fertility, Leaf area and Internode thickness (cm) of Thompson Seedless grapes under pergola trellis system.

Treatment	Bud Burst %			Bud fertility %			Leaf area (cm)2			Internode thickness(cm)		
	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean
6 canes x 12 nodes	80.0	83.6	81.8	46.0	44.3	45.15	170.3	173.4	171.9	0.90	1.00	0.95
6 canes x 14 nodes	79.0	79.6	79.3	39.0	41.7	40.15	160.3	160.6	160.5	1.09	1.04	1.07
8 canes x 12 nodes	76.0	77.0	76.6	40.0	39.0	39.5	162.3	170.0	166.2	1.13	1.20	1.17
8 canes x 14 nodes	72.0	76.3	74.1	39.0	37.3	38.15	150.3	164.6	157.5	1.00	0.90	0.95
0 canes x 12 nodes	71.0	75.0	73.0	44.3	43.0	43.65	157.3	159.6	158.5	1.10	1.20	1.15
0 canes x 14 nodes	68.0	71.6	70.1	37.3	38.0	37.65	144.0	146.3	145.2	1.04	0.84	0.94
L.S.D. at 5%	1.60	1.72	-	2.29	1.82	-	6.37	9.29	-	0.21	0.12	-

II. Vegetative growth:.

1. Leaf area:

It is clear from Table (2) that leaf area was significantly increased by decreasing the number of nodes. Since, vines pruned to 6 canes with 12 nodes resulted in a higher significant increment than the other levels of pruning in this respect .Whereas, vines pruned to 10 canes with 14 nodes gave the lowest average of leaf area. Similar response of pruning severity levels was referred by Sommer (1995) who found that the minimal pruning of Sultana grape had a stunting effect on growth, resulting in smaller leaves on the vine. Also, Abdel-Wahab (1997) found that the leaf area was affected by cane length. Since, leaf area was increased by decreasing the number of nodes per cane of King Ruby grapes.

2. Internode thickness:

It is obvious from Table (2) that vines pruned to 8 canes with 12 nodes gave a higher internode thickness (1.17 cm) than the other pruning severities. While, vines pruned to 10 canes with 14 nodes produced the lowest one as a mean of two seasons. In this respect, Hegazi (1985) found that cane thickness was decreased with increasing the number of buds per vine since, leaving 44 buds per vine gave the highest cane thickness (1.14 cm) against (0.84 cm) for the treatments of 48 buds per vine.

The obtained data are in accordance with those found by Abdel-Wahab (1997) who reported that shoot diameter was increased by decreasing the number of nodes per cane. While, vines pruned to 6 nodes per cane gave the highest average diameter (1.10 cm). Also, Pszczolkowski *et al.*, (1983) found that short pruning increased shoot diameter of "Cabernet Sauvignon" grape.

al., (1996) who found that the berry diameter was increased with increasing the number of nodes of Deiss Anz. grapes which pruned to 6, 8, 10 and 12 buds/cane. On the other hand, Abdel-Wahab (1997) found that vines pruned to 10 canes with 6 buds gave a high percentage of berry diameter of king Ruby grapes.

3 - Soluble Solids content:

It is clear fro table (5) that soluble solids percentage in berry juice was affected by different pruning severities. In this respect, 6 or 8 canes per vine produced a higher soluble solids content than leaving 10 canes per vine. Moreover, leaving 8 canes with 14 nodes gave a higher SSC values than the other treatments used under the study. Whereas, leaving 10 canes with 14 nodes gave a lowest percent of soluble solids than the other levels of pruning. Also, Sehrawat *et al.*, (1999) found that TSS was increased by increasing the bud load on the vine.

Furthermore, Keith Streigler and Morris (2000) mentioned that soluble solids content was increased when pruned leaving 6 canes with 12 buds than leaving 4 canes with 18 buds. Likewise, Samra (2001) found that soluble solids was reduced by increasing the number of nodes per cane. Since, leaving 10 canes with 12 nodes resulted in a higher SS value than leaving the same canes with 14 or 16 nodes on the canes of Crimson Seedless grapes.

4 - Total Titratable acidity:

Table (5) indicated that total acidity nearly gave an opposite trend to that noticed with soluble solids. Since, leaving 8 canes with 14 nodes showed a lower acidity in berry juice in comparison with the other levels of pruning. While, leaving 10 canes with 12 nodes per vine presented a higher total acidity in berry juice than the other levels of pruning. In this aspect, Morris *et al.*, (1985) found that pruning severity (70+10) nodes gave a higher total acidity in berry juice of Concord grapes than (30+10) nodes. Whereas, Hegazi (1985) mentioned that when the number of buds per vines increased total acidity in berry juice was increased.

Table (5): ***Effect of pruning severity on SSC, acidity and SSC/acid ratio of Thompson Seedless grapes under pergola trellis system.***

Treatment	SSC (%)			Acidity (%)			SSC/Acid ratio		
	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean
6 canes x 12 nodes	17.9	18.1	18.0	0.830	0.820	0.825	21.5	21.8	21.7
6 canes x 14 nodes	17.9	17.5	17.6	0.780	0.797	0.788	22.6	22.0	22.3
8 canes x 12 nodes	18.1	17.9	18.0	0.820	0.800	0.810	23.2	22.2	22.7
8 canes x 14 nodes	18.4	18.1	18.3	0.783	0.765	0.770	23.3	23.8	23.5
10 canes x 12 nodes	17.4	17.5	17.5	0.850	0.845	0.848	20.1	20.7	20.4
10 canes x 14 nodes	16.6	16.6	16.6	0.805	0.787	0.790	20.4	22.0	21.2
L.S.D. at 5%	0.34	0.50	-	0.012	0.025	-	0.81	1.06	-

5- Soluble Solids/acid ratio:

It is clear from Table (5) that the percent of soluble solids/acid ratio gave a similar trend to that noticed with the soluble solids. Moreover, leaving 8 canes with 12 or 14 nodes gave a higher SSC/acid ratio than leaving 6 or 10 canes on the vine. Whereas, vines pruning to 10 canes with 12 nodes produced a lower level of SSC/acid ratio than the other pruning severity as a mean of two seasons under the study. Since, the reduction attributed due to their effect for reducing the percent of soluble solids with increasing the valu es up total acidity in berry juice. Our results go in line with that reported by Samra (2001) who found that leaving 8 canes with 12 nodes gave a higher values of SSC/acid ratio than the other treatments. While, leaving 10 canes with 16 nodes showed a lower values of SSC/acid ratio than other pruning severities. Also, Hegazi (1985) found that leaving 44 buds gave a higher value SS/acid ratio than leaving 52, 60 and 68 buds of Thompson Seedless grapes.

6 - Chlorophyll A and B:

It is clear from Table (6) that both chlorophyll A and B of Thompson Seedless grape wereaffected by bud load. Since, leaving 10 canes with 14 nodes gave a higher levels of chlorophyll A and B than other pruning severity. Yet, leaving 8 canes with 12 nodes gave a lower total chlorophyll A and B than the other levels of pruning.

7 - Total Carotenes:

It is obvious from Table (6) that leaving 14 nodes on the canes gave a higher value of total carotenes than leaving 12 nodes per cane under different levels of canes. Moreover, leaving 6 canes with 14 nodes gave a higher total carotenes than the other pruning severities. While, leaving 8 or 10 canes with 12 nodes gave a lower value of total carotenes than other levels of pruning severity. In this respect, Samra (2001) found that vines pruned to 8 or 10 canes with 12 nodes gave a higher values of anthocyanin content than those pruned to leaving 14 or 16 nodes on the canes of Crimson seedless grapes. Moreover, Al-Ashkar (2000) reported that the anthocyanin content in berry skin was decreased with increasing the number of cluster per vine at higher number of nodes.

V. Total Carbohydrates in the canes:

Data from Table (6) indicated that total carbohydrates contents in the canes at dormant season was significantly increased by increasing the bud load. In this respect, vines which pruned to 10 canes produced a higher carbohydrates contents than leaving 6 or 8 canes per vine. Since, leaving 10 canes with 14 nodes showed a higher content of total carbohydrates in the canes whereas, vines pruned to 6 canes with 12 nodes resulted a lower carbohydrates content during the two season under this study.

That is not strange since, these treatments produced a lower number of bursted buds than leaving a higher bud load which presented a higher number of shoots. So, increasing leaves which lead to heavy canopy with

increasing photosynthesis and stored more carbohydrates on the canes (Kliewer 1981). In this respect, Samra (2001) found that total carbohydrates in the canes of Crimson Seedless grape were significantly increased by increasing the bud load. So, leaving 10 canes with 16 nodes gave a higher carbohydrates content than the other pruning severities.

On the other hands, Ali *et al.*, (2000) reported that total carbohydrates in the canes significantly decreased as cane length increased from 14 to 18 buds per cane. Moreover, vines pruned to 12 buds gave a higher carbohydrates content in the cane of Thompson Seedless grape.

Table (6): Effect of pruning severity on Chlorophyll A,B ,Carotenes in berry skin and total Carbohydrates in the canes of Thompson Seedless grapes under pergola trellis system.

Treatment	Chlorophyll A (mg/gm) Fresh weight			Chlorophyll B (mg/gm) Fresh weight			Carotenes (mg/gm) Fresh weight			Carbohydrates (gm/100gm dry weight)		
	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean
6 canes x 12 nodes	0.032	0.033	0.032	0.023	0.018	0.021	0.017	0.014	0.015	20.0	16.8	18.4
6 canes x 14 nodes	0.033	0.031	0.032	0.017	0.021	0.019	0.023	0.022	0.022	21.1	18.5	19.8
8 canes x 12 nodes	0.026	0.026	0.026	0.021	0.023	0.022	0.014	0.014	0.014	22.3	20.1	21.2
8 canes x 14 nodes	0.034	0.036	0.035	0.024	0.028	0.026	0.018	0.015	0.016	24.0	21.7	22.9
10 canes x 12 nodes	0.031	0.039	0.035	0.030	0.029	0.029	0.015	0.013	0.014	25.5	23.1	24.3
10 canes x 14 nodes	0.041	0.043	0.042	0.034	0.031	0.033	0.017	0.016	0.017	25.9	25.4	25.7
L.S.D. at 5%	0.001	0.009	-	0.002	0.002	-	0.006	0.001	-	0.56	0.53	-

REFERENCES

Abdel-El Wahab, M.A. (1997). Effect of cane length on bud behaviour growth and productivity of King Ruby grapevines. M. Sc. Thesis, Fac. Agric., Cairo University.

Al-Ashkar, R.A. (2000). Effect of some pruning and cluster thinning treatments on yield and fruit and fruit quality of Ruby Seedless grapevine. Egypt. J. Appl. Sci., 15(7):511-531.

Ali, M.A.; M.M. El-Mogy and I. Rizk (2000). Effect of cane length on bud behaviour, brunch characteristics wood ripening and chemical contents *of Thompson Seedless grapevine J. Agric. Sci., Mansoura* Univ., 26(3):1707-1717.

A.O.A.C. (1980). Association of Official of Analytical Chemist. 14th Ed. Published by the A.O.A.C., Washington, D.C. USA.

Badawi, A.M.; F. Fawzi; A.M. Shahin; R.S. Farrag and S.E. Abdel-Fattah (1984). Studies on changes occurring in hormone content of buds along the cane during dormancy, Swelling and burst stages of buds in Roumi Red grapes. Agric. Res. Rev., 62:79-84.

Bessis, R. (1960). Sur diierents Moders D'expression Quantitative Dela Fertilte 'Chez la vigne Aca pp.828-882.

Blasubrahmanyam, V.R. and S.D. Khanduja (1977). Effect of varying cane length on the fruiting potential of Thompson Seedless vines. Indian J. Hort., 34:113-116.

Bowen, P.A. and W.M. Kliewer (1990). Influence of clonal variation pruning severity and cane structure on yield component development in Cabernet Sauvignon grapevines. J. Amer. Soc. Hort. Sci., 115:530-534.

Christensen, L.P. (1986). Fruitfulness and yield characteristics of primary and lateral canes of Thompson Seedless grapevines. Amer. J. Enol. Vitic., 37:39-43.

Fawzi, F.; A.Z. Bondok and G.F. Ghobrial (1984a). 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.; A.Z. Bondok and G.F. Ghobrial (1984b). Effect of cane length on cropping, and some mechanical and chemical properties of bunches in Thompson Seedless grape variety. Annals Agric. Sci. Ain Shams, Univ. Cairo, 29(1):475-483.

Hegazi, A.M (1985). Effect of pruning on yield and fruit quality of Thompson Seedless grape. Zagazig J. Agric. Res., 12(1): 17-33.

Ibrahim, H.A.; A.S. Ihsan; A.H. Waadallah and S.S. Jaifer (1996). Effect of length and diameter of canes on the yield, physical, mechanical and chemical properties of grape cultivar Deiss, Anz. Mysore J. Agric. Sci., 30(1):69-75.

Keith Streigler, R. and Morris J.R. (2000). Effect of pruning method on yield and quality of "Sun belt" grapes grown in the San Joaquin Valley of California. HortSci., 35(3):277.

Kliewer, W.M. (1981). Grapevines physiology: How does grapevine make sugar.leaflet No.21231. Cooperative Extension US Department of Agric., California Univ.

May, P.P.; R. Clingeleffer and C.J. Brien (1982). Pruning of Sultana vines to long spurs. Amer. J. Enol. and Vitic., 3(4):214-221.

Miller, D.P. and G.S. Howell (1997). Influence of vine capacity and crop on the yield, fruit composition and sugar production per unit load area of Concord grapevines. In proceedings of the 4th International Symposium on Cool Climate Viticulture and Enology, Rochester, New York, USA, 16-20 July, Communications services, 11-94-98. (C.F. Hort. Abst., 68:8433).

Morris, J.R. and D.L. Cawthon (1980). Mechanical training and node adjustment of cordon-trained "Concord" grapevines. J. Amer. Soc. Hort. Sci., 105(3):310-313.

Morris, J.R.; D.L. Cawthon and C.A. Sims (1985). Effects of training system, pruning severity, nodes per bearing unit and shoot positioning on yield and quality of "Concord" grapes. Ark. Farm. Res., 34:7.

Nikov, M. (1986). Effect of bud load on the growth and fruiting of the grapevine cultivar Merlot, Rasteniev dni Nauki, 23(11):106-112. (C.F. Hort. Abst., 57:3280).

Omar, A.H. and A. Abdel-Kawi (2000). Optimal bud load for Thompson Seedless grapevines. J. Agric. Sci. Mansoura Univ., 25(9):5769-5777.

Philips, I.D.J. (1969). The Physiology of Plant growth and development. McGram. Hill, London, UK.

Pszczolkowski, T.P.; N.C. Garcia and F.V. Varas (1983). Effect of cane length, a second pruning and thiourea application on bud break of grapevines. Ciencia-e- Investigacion Agraria, 10(2):123-133 (Hort. Abst., 54:1680).

Rizk, N.A., I.A. Rizk and V.H. Girgis (1994). Effect of cane length on bud behaviour, wood pruning and bunch characteristics of Thompson Seedless grape. Egypt. J. Appl. Sci., 9(5):74-89.

Salem, A.T.; A.S. Kilani and G.S. Shaker (1997). Growth and quality of two grapevine cultivars as affected by pruning severity. Acta. Hort., 441:309-316.

Samra, N.R. (1982). Effect of some growth regulators on yield fruit quality and storage life of Thompson Seedless grapes Ph. D. Thesis, Fac. Agric. Mansoura Univ.

Samra; B.N. (2001). Studies on pruning severity of Crimson Seedless grapes. M.Sc. Thesis, Fac. Agric., Mansoura Univ.

Sansavini, S. and G. Fanigliulo (1998). Bud fertility and effect of pruning on fruiting in the seedless grape cultivars Centennial Seedless and Sugraone. Rivista di Frutticolturae di Ortofloricoltura., 6(2):55-60.

Schaffer, P.A. and A.F. Hartman (1921). The iodemetric determination of Copper and its use in sugar analysis. J. Bio. Chem., 45:349-364.

Scienza, A.; Valenti and G. Mezzadri (1983). Studies on pruning for production in grape vines vignevini, 10(3):45-51. (C.F. Hort. Abst., 53:4954).

Shahein, A.h; M.H. Osman and S.A. Asiha (1998). Effect of pruning levels on yield and fruit quality of Flame Seedless and Ruby Seedless grapevine cultivars. Alex. Agric. Res., 43(2):229-235.

Snedecore, G.W. and Cochran, W.G. (1972). Statistical Methods. 6th the Iowa State Univ., Iowa, U.S.A. 533p.

Sommer, K.J. (1995). Mechanized pruning in Australia KTBL [Kuratorimufur Technik and Bauwesen in der land wirtschaft] KTBL- Schrift wo, 364:23-50. (Hort. Abst., 66:1237).

Wettestein, D.V. (1957). Chlorophyll-letale and der Sunbmikro skopische form Wechsel der plastids Experimental cell Research, 12:427.

Wolpert, J.A.: G.S., Howell and T.K. Nasfield (1983). Sampling vidal Blance grapes. I-Effect of training system pruning severity, shoot exposure, shot origin, and cluster thinning on cluster weight and fruit quality. Amer. J. of Enology and vitic., 34(2) 72-76.

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تأثير شدة التقليم على سلوك البراعم والمحصول وجودة الثمار ومحتوى القصبات من المواد الكربوهيدراتية تحت نظام التدعيم بالتكاعيب فى العنب البناتي .

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أجريت هذه الدراسة خلال موسمي ٢٠٠١ – ٢٠٠٢ على كرمات عنب طومسون سيدلس مرباه بطريقة التكاعيب ونامية فى أرض طينية بمحافظة الدقهلية وفيها تم تقليم الكرمات إلى ٦ أو ٨ أو ١٠ قصبات وتحتوى كل قصبة على ١٢ أو ١٤ عين . وقد أوضحت النتائج أن نسبة التفتح تأثرت بزيادة طول القصبة وعدد العيون حيث أعطت الكرمات المقلمة إلى ٦ قصبات وبكل قصبة ١٢ أو ١٤ عينا زيادة فى نسبة البراعم المتفتحة حيث بلغ متوسط نسبة تفتح البراعم خلال موسمي الدراسة ٨١,٨ % و ٧٩,٣ % على التوالى فى حين انخفضت نسبة البراعم المتفتحة فى الكرمات المقلمة إلى ١٠ قصبات وبكل قصبة ١٤ عينا . كما تأثرت نسبة الخصوبة بعدد العيون المتروكة على الكرمة حيث وضحت الدراسة أن ترك ٦ أو ٨ أو ١٠ قصبات وعلى كل قصبة ١٢ عينا أدت إلى زيادة واضحة فى نسبة الخصوبة والمساحة الورقية عن باقى المعاملات فى حين أدى تقليم الكرمات إلى ٨ قصبات وعلى كل قصبة ١٢ عينا إلى زيادة فى سمك السلامية عن باقى المعاملات .

وقد أثرت مستويات التقليم المختلفة بصورة كبيرة على المحصول وخواص كل من لعنقود وحباته حيث زاد عدد العناقيد ومحصول الكرمة وبالتالي محصول الفدان بزيادة عدد العيون المتروكة حيث أعطت الكرمات المقلمة إلى ١٠ قصبات بكل منها ١٢ أو ١٤ عينا زيادة واضحة فى عدد العناقيد ومحصول الكرمة وبالتالىمحصول الفدان عن باقى المعاملات فى حين قل متوسط وزن العنقود .

كما أوضحت الدراسة أن الكرمات المقلمة إلى ١٠ قصبات بكل قصبة ١٢ عينا أدت إلى زيادة طفيفة فى متوسط وزن الحبة وقطرها كما أظهرت النتائج بعض التأثير على المكونات الكيميائية مثل الحموضة الكلية ونسبة المواد الصلبة الزائدة ونسبة الكلوروفيلات والكاروتينات فى الحبات بصورة لم تؤثر على جودتها وأظهرت الدراسة ارتفاع محتوى القصبات الناضجة عند السكون من الكربوهيدرات المخزنة بزيادة عدد البراعم المتروكة على الكرمات .

ومن خلال الدراسة يتضح أن ترك ١٠ قصبات فى كل قصبة ١٢ عينا على كرمات العنب الطومسون سيدلس تحت نظام التدعيم بالتكاعيب وتحت ظروف محافظة الدقهلية أدى إلى زيادة واضحة فى محصول الكرمة وبالتالي محصول الفدان نتيجة لزيادة عدد العناقيد ومتوسط وزن الحبة وقطرها .