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EFFECT OF SOME AGRICULTURAL TREATMENTS ON BUD FERTILITY, VEGETATIVE GROWTH AND YIELD OF SUPERIOR GRAPE CULTIVAR

El-Mogy, M.M.; M.A. Abd El-Wahab and Ghada Sh. Shaker
Viticulture Dept., Hort. Res. Instit., Agric. Res. Center, Giza, Egypt

ABSTRACT

This study was carried out to investigate the effect of some agricultural treatments on bud fertility, vegetative growth and yield of Superior grape cultivar. Eight agricultural treatments were applied just before the beginning of bloom (before flower induction): removal of laterals, pinching the main shoots, girdling, removal of laterals + pinching the main shoots, removal of laterals + girdling, pinching the main shoots + girdling as well as removal of laterals + pinching the main shoots + girdling in addition to the control.

The results showed that all conducted treatments, except removal of laterals were effective in increasing the percentage of fertile buds, number of bunches/vine, average bunch weight, yield, and improving physical and chemical characteristics of bunches and berries, dynamics of wood ripening, morphological and chemical characteristics of vegetative growth compared with control. pinching the main shoots + girdling followed by removal of laterals + pinching the main shoots + girdling resulted in a great stimulation on all the studied parameters. On the other hand, removal of laterals as well as control were found to record the minimum values of these characters.

INTRODUCTION

"Superior" cultivar is an early-ripening cultivar, which ripens in the first to mid June. In Egypt, Some grape growers suffer greatly from the remarkable depression in the level of bud fertility which is negatively reflected on the yield of this variety.

C/N ratio which directly related to fruiting may help to explain the failures in fruit-bud formation (Winkler 1965). Applying of some agricultural practices just before the beginning of bloom (before flower induction) such as pinching the main shoots and maintaining laterals or girdling were found to increase carbohydrate content and C/N ratio which was reflected on bud fertility , yield and its components and fruit quality of various grape cultivars. In this respect, many of researchers emphasized the importance of the aforementioned practices for raising bud fertility and hence yield of the vines. Ranieri and Fideghelli (1971), Sarowa and Bakhshi (1972), Sarooshi (1977), Chundawat *et al.*, (1979), Dabas *et al.*, (1980), Huang (1980), Khajuria, and Bakhshi (1984), Sharma, *et al.*, (1984), Mann and Kushal (1985), Cheplygin (1986), Lopez (1987), Orth, *et al.*, (1989), Wang (1989), Abd El-Wahab, *et al.*, (1997), Caspari, *et al.*, (1998), Ezzili and Bejaoui (1998), Kalil, *et al.*, (1999), Josan *et al.*, (2001), Ibrahim *et al.*, (2001) and Lorenzo *et al.*, (2001).

The target of the present study is to raise carbohydrates to nitrogen ratio (C/N ratio) through applying some practices which release moderate vegetative growth, with abundant fruit-bud formation and consequently high fruit production of Superior grapevines.

MATERIALS AND METHODS

This investigation was conducted in a private vineyard located at El-Khatatba, Menoufiya governorate on mature Superior grapevines. The study extended for three successive seasons (2003, 2004 and 2005). The vines were 6-year-old, grown in a sandy soil, spaced at 2 X 2.5 meters apart and irrigated by the drip irrigation system, cane-pruned and trellised by the "Y" shape system. The vines were pruned during the second week of January for the three seasons of the study so as to leave (5 canes X 15 buds/cane). 192 uniform vines were chosen. Each six vines acted as a replicate and each four replicates were treated by one of the following treatments.

Eight agricultural treatments were applied just before the beginning of bloom (before flower induction) as follows :

1. Control (Con.)
2. Removal of laterals (R)
3. Pinching the main shoots (by cutting off 2-3 cm. of the shoot tip) (P)
4. Girdling (by removing a narrow ring of the bark (2-3mm) entirely around the trunk (G)
5. Removal of laterals + Pinching the main shoots (R + P)
6. Removal of laterals + Girdling (R + G)
7. Pinching the main shoots + Girdling (P + G)
8. Removal of laterals + Pinching the main shoots + Girdling (R+ P+ G)

The following parameters were measured to evaluate the tested treatments:-

1. Percentage of fertile buds

Percentage of fertile buds was estimated in winter for dormant buds (predicted bud fertility) borne on 100 canes each of 15 buds for each bud position for the control and the treated vines. The method previously described by Ambika and pondey., (1969) was adopted. This parameter was also estimated in spring after bud burst (actual fruit shoots) for comparing between both estimates and finding out the possibility of relying on the percentage fertile buds at the dormant stage as a criterion for adjusting the required cane length at pruning time.

2. Yield and its components

Yield/vine (kg) was determined as number of bunches/vine. Average bunch weight (g) was calculated from the weight of a random sample of five bunches.

3. Physical and chemical characteristics of bunches and berries :

Representative random samples of 5 bunches/vine were harvested at maturity Tourky *et al.*, (1995). The following characteristics were determined: number of berries per bunch, coefficient of bunch compactness was calculated by dividing average number of berries/bunch by the average length of the bunch according to Weaver *et al.*, (1962), berry weight (g), berry size (cm^3) and berry dimensions (cm). Total soluble solids in berry juice (T.S.S.) (%) by hand refractometer and total titratable acidity as tartaric acid (%) (A.O.A.C. 1985). Hence TSS /acid ratio was calculated.

4. Dynamics of wood ripening:

Four shoots/vine of the current season growth were tagged to follow up the rate of wood ripening monthly starting from mid of June till mid of

October. Total length of the shoot as well as length of the part of the ripened shoot (changing from greenish to brownish color) were measured. Then, coefficient of wood ripening was calculated by dividing length of the ripened part by the total length of the shoot according to Bouard (1966).

5- Morphological and Chemical Characteristics of Vegetative growth

At growth cessation, the following morphological and chemical determinations were carried out on 4 shoots / the considered vine:

1- Average shoot diameter (cm).
2- Average leaf area (cm^2) of the apical 5^{th} and 6^{th} leaves using a planimeter.
3- Leaf content of pigments (chlorophyll A, B and carotene) (mg/g fresh weight) of the 5^{th} and the 6^{th} leaves (Westein, 1957).
4- Cane content of total carbohydrates (%) (Smith *et al.*, 1956). and total nitrogen(%) (Pregl, 1945). C/N ratio was also calculated..

6. Statistical analysis:

The complete randomized block design was adopted for the experiment. The statistical analysis of the present data was carried out according to Snedecor and Chocran (1972). Averages were compared using the new L.S.D. values at 5% level. Percentages were transformed by the equation prior to the statistical analysis and thereafter percentages were presented with statistical letters.

RESULTS AND DISCUSSION

1. Percentage of fertile buds

Results of bud inspection as shown in Fig.(1) indicated that the percentage of predicted bud fertility lengthwise the cane of the tested treatments increased gradually attaining its maximum values in the middle part of the cane (from the 6^{th} to the 10^{th} bud), then, a remarkable gradual decrease was observed at the distal buds of the cane (from the 11^{th} to the 15^{th} bud) in the second and third seasons. As for the effect of treatments, it can be noticed that all treatments surpassed control at all positions of the cane except (R) treatment which had the lowest percentage of fertile buds (35.7% and 34.3%) in the second and third seasons respectively. However, (P+G) treatment was found to have the highest percentage of fertile buds (53.4% and 56.3%) in the second and third seasons respectively.

As regards percentage of actual fruit shoots lengthwise the cane, the results illustrated in Fig.(2) revealed that, it exhibited a trend similar to that of the percentage of predicted bud fertility lengthwise the cane for all the tested treatments in the subsequent seasons. The similarity of the trend of both predicted and actual fruitfulness suggests that the advance forecasting through the examination of bud fertility during winter may be a reliable guide for winter-pruning and fruiting of "Superior" variety in the ensuing season.

These results agree with the findings of Wang (1989) and Abd El-Wahab *et al.*, (1997) who showed that the number of fruiting shoots of Thompson seedless grapevines was minimum at the base of the cane and increased greatly between the sixth and the fifteenth buds. In addition, pinching the main shoots + maintaining laterals increased the percentages of fruitful buds at different sectors of the cane compared with control vines.

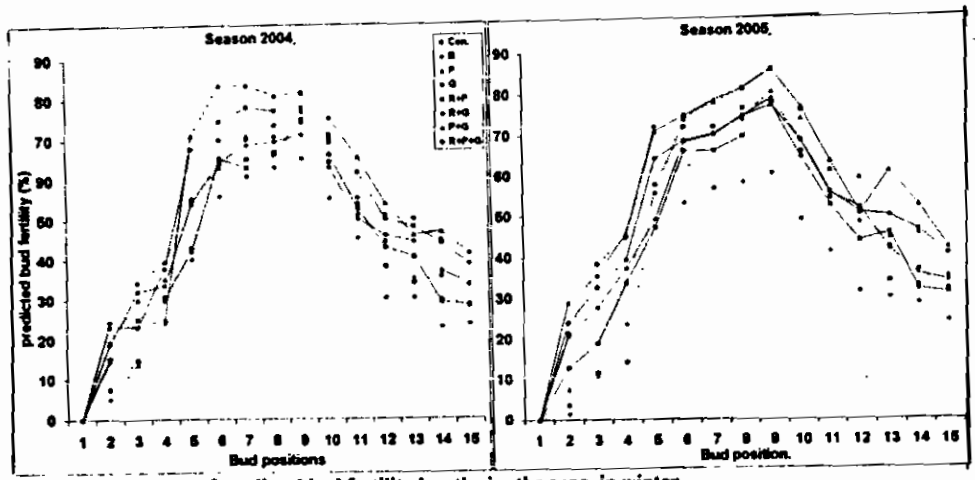

Fig (1): Percentages of predicted bud fertility lengthwise the cane in winter.

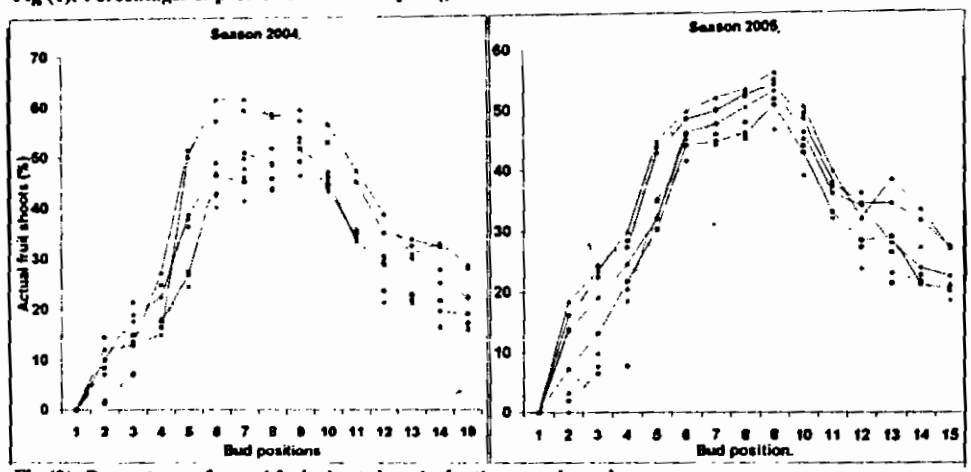

Fig (2): Percentages of actual fruit shoots lengthwise the cane in spring.

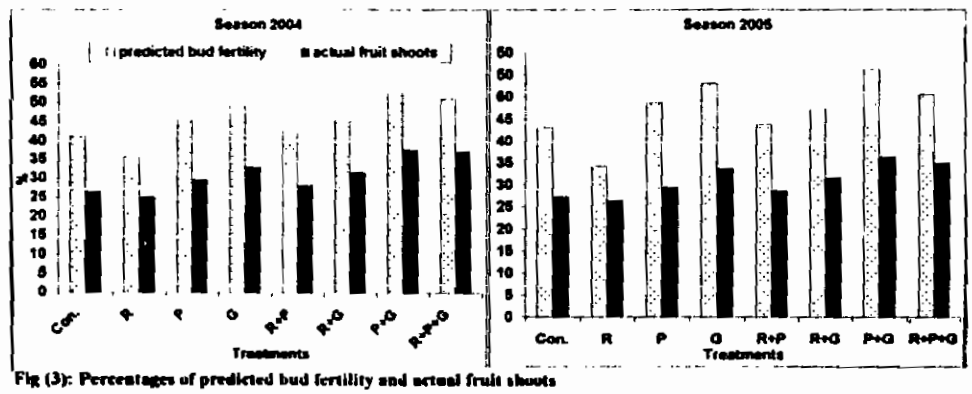

Fig (3): Percentages of predicted bud fertility and actual fruit shoots

Dabas, *et al.*, (1980) and Ezzili and Bejaoui (1998) found that girdling at the beginning of flowering increased the percentage of fruitful buds.

Fig.(3) indicated that the percentage of predicted bud fertility was higher as compared to that of actual fruit shoots for all the tested treatments in the second and third seasons. Percentage of fruitful dormant buds detected in January 2004 and 2005 was similar to that of the percentage of actual fruit shoots which appeared in the subsequent seasons. It is worth mentioning that the percentage of actual fruit shoots was found to be less to a great extent than the predicted percentage for all conducted treatments. This difference may be ascribed to the death of primordial bunches during bud burst. Similar results were obtained by Khalil and Ghobrial (1991), who found that the mean percentage of abscission of bunches from bud burst to flowering reached 9.3 % and 8.3% in 1987 and 1988 respectively of the total number for Thompson seedless grape and 10.8% and 6.6% in 1987 and 1988 respectively for Italia grape.

2. Yield and its components

(P+G) treatment increased significantly the number of bunches/vine (28.3 and 27.4) in the second and third seasons respectively, followed by (R+P+G) treatment. The other treatments had an effect that was statistically equal to control. As for average bunch weight, it is evident that (P+G) treatment resulted in the highest values of this estimate (573.2, 583.3.4 and 570.2 g) in the three seasons respectively, followed by (R+P+G) treatment which had also heavy bunches. With respect to the yield, both (P+G) and (R+P+G) treatments accounted for the highest yields (Table,1) The positive effect of pinching on increasing number of bunches/vine and yield can be explained by the temporary cessation of the growth of main shoots and the redistribution of assimilates in winter buds during their formation These results agree with the finding of Huang (1980), Mann (1985), Lopez (1987), Abd El-Wahab, *et al.*, (1997) and Ibrahim *et al.*, (2001) who recorded that pinching the main shoots and maintaining laterals resulted in the highest average number of bunches/vine, weight of bunches and yield.. Also, girdling at the beginning of flowering increased weight of bunches and yield according to Orth, *et al.*, (1989), Kalil., *et al* (1999) and Josan *et al.*, (2001) who found that trunk girdling during full bloom increased the yield from 11 kg/plant in the control to 14.1-21.2 kg.

3. Physical and chemical characteristics of bunches and berries :

(P+G) and (R+P+G) treatments increased significantly of the average number of berries per bunch which had was reflected on the coefficient of bunch compactness, hence these treatments had the highest values of this estimate in the three seasons (Table, 2). The increase in number of berries per bunch may be attributed to the increase in berry set as previously mentioned by Huang (1980), Abd El-Wahab *et al.*, (1997) and Ibrahim *et al.*, (2001) who found that Shoot pinching of Muscat Hamburg grapevines plus removing of laterals or girdling at full bloom significantly increased fruit set and coefficient of cluster compactness.

Table (1): Effect of treatments on No. of bunches, average bunch weight(g) and yield/vine (kg) in 2003, 2004 and 2005 season

Caracteristics / Treatments	No. of bunches			Average bunch weight (g)			Yield/vine (kg)		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
Con.	20.2	19.9	20.5	446.1	445.5	428.6	8.9	8.9	8.8
R	19.8	18.9	19.8	440.9	434.7	416.8	8.8	8.2	8.3
P	20.3	22.2	22.1	475.4	488.3	469.7	9.5	10.8	10.4
G	19.9	24.8	25.4	545.1	548.4	535.4	10.9	13.6	13.6
R+P	20.3	21.3	21.6	462.7	469.6	446.3	9.3	10.0	9.6
R+G	20.1	23.7	23.8	498.2	508.5	503.1	10.0	12.1	12.0
P+G	19.8	28.3	27.4	573.2	583.3	570.2	11.5	16.5	15.6
R+P+G	20.2	27.8	26.4	566.7	575.1	547.9	11.3	16.0	14.4
new L.S.D. at (0.05)	N.S	6.7	4.9	78.6	87.9	65.1	1.53	1.87	2.12

Table (2): Effect of treatments on No. of berries per bunch and coefficient of bunch compactness in 2003, 2004 and 2005 s

Caracteristics / Treatments	No. of berries/bunch			Coe. of bunch compactness		
	2003	2004	2005	2003	2004	2005
Con.	155.4	153.4	142.9	7.13	7.31	7.11
R	157.5	152.3	140.6	7.06	7.25	7.03
P	160.0	166.8	148.4	7.21	7.65	7.31
G	172.3	176.3	158.6	7.52	7.83	7.45
R+P	159.4	160.0	146.2	7.15	7.51	7.24
R+G	163.0	168.2	152.4	7.21	7.72	7.40
P+G	172.0	179.5	164.5	7.58	7.94	7.65
R+P+G	171.9	180.8	160.2	7.54	7.90	7.56
new L.S.D. at (0.05)	8.6	10.2	12.3	0.35	0.28	0.33

Average berry weight was affected by the conducted treatments. (R) treatment decreased it insignificantly (2.74,2.79 and 2.90 g) in the three seasons respectively, while the other treatments increased it with variable degrees. The (P+G) treatment (3.27,3.19 and 3.40 g) in the three seasons respectively, and (R+P+G) treatment in the first season (3.23 g) were significantly the highest. Similar effects were also evident concerning berry size but the effect of (R+P+G) treatment was obvious for the three considered seasons. (P+G) treatment was found to have the highest values of both berry length and diameter. Effects of the (R+P+G) treatment varied from season to another (Table, 3). These results are in accordance with those obtained by Abd El-Wahab *et al.*, (1997) and Ibrahim *et al.*, (2001) who showed that head suckering and pinching the main shoots and maintaining laterals resulted in the highest average berry weight, berry size and berry dimensions. In addition, Sharma *et al.*, (1984), Orth *et al.*, (1989) and Kalil *et al.*, (1999) reported that girdling at the beginning of flowering increased weight and size of berries.

The conducted treatments affected the berry chemical properties. In general, (R) treatment resulted in a decrease in both TSS (15.1,15.3 and 15.2 %) and TSS/acid ratio (17.4,16.5 and 16.9) in the three seasons respectively and an increase in the acidity percentage (0.87,0.93 and 0.90 %) in the three seasons respectively, but these effects were insignificantly different from the control. The effect of (P+G) and (R+P+G) treatments were the highest for the three seasons (Table, 4). These results agree with the findings of Wang (1989), Abd El-Wahab, *et al.*, (1997) and Ibrahim *et al.*, (2001) who ensured that head suckering and pinching the main shoots and maintaining laterals resulted in the highest total soluble solids and TSS/acid ratio and the lowest acidity of berry juice. Also, Orth, *et al.*, (1989), Kalil, *et al.*, (1999), Josan *et al.*, (2001) showed that trunk girdling along with brushing of bunches improved the quality of grapes by increasing total soluble solids and reducing sugars and by decreasing the percentage of juice acidity.

4. Dynamics of wood ripening:

Fig.(4) clearly indicates that wood ripening gradually increased through the considered sampling dates for the three seasons of the study.

Concerning the effect of treatments, it is apparent from the same figure that the highest increase in the rate of wood ripening from 15-June till 15-October was observed in (P+G) treatment (0.70, 0.76 and 0.85) for the three seasons respectively, whereas, the lowest rate of was obtained from (R) treatment (0.54, 0.58 and 0.65) during three seasons respectively, which were even lower than the control. These results are in accordance with those obtained by Abd El-Wahab *et al.*, (1997) and Ibrahim *et al.*, (2001) who pointed out that coefficient of wood ripening gradually advanced in the successive dates of measurements recording averages between 0.37 and 0.36 to 088 and 0.89 from July 19 till October 2 during 1992 & 1993 seasons, respectively. As for the effect of treatments, it is evident that coefficient of wood ripening was always higher in all summer pruning treatments in comparison with control.

Table (3): Effect of treatments on physical properties of berries in 2003, 2004 and 2005 seasons

Caracteristics / Treatments	Berry weight (g)			Berry size (cm^3)			Berry length (cm)			Berry diameter (cm)		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
Con.	2.81	2.84	2.93	2.44	2.39	2.53	2.03	2.00	2.03	1.77	1.76	1.76
R	2.74	2.79	2.90	2.37	2.34	2.48	2.01	1.97	2.02	1.75	1.76	1.74
P	2.91	2.87	3.10	2.60	2.45	2.71	2.10	2.06	2.09	1.82	1.83	1.82
G	3.10	3.05	3.31	2.80	2.66	2.95	2.19	2.17	2.20	1.95	1.90	1.89
R+P	2.84	2.87	2.98	2.51	2.43	2.59	2.07	2.05	2.07	1.80	1.80	1.79
R+G	2.99	2.96	3.23	2.71	2.57	2.86	2.17	2.08	2.14	1.92	1.87	1.85
P+G	3.27	3.19	3.40	2.92	2.00	3.07	2.31	2.26	2.24	1.98	1.97	1.96
R+P+G	3.23	3.12	3.35	2.86	2.73	3.01	2.25	2.24	2.22	1.98	1.95	1.93
new L.S.D. at (0.05) =	0.37	0.28	0.46	0.35	0.24	0.41	0.24	0.21	0.16	0.18	0.15	0.16

Table (4): Effect of treatments on chemical properties of berries in 2003, 2004 and 2005 seasons

Caracteristics / Treatments	TSS (%)			Acidity (%)			TSS/acid ratio		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
Con.	15.5	15.3	15.4	0.84	0.87	0.88	18.5	17.6	17.5
R	15.1	15.3	15.2	0.87	0.93	0.90	17.4	16.5	16.9
P	16.1	16.0	16.1	0.79	0.76	0.76	20.4	21.1	21.2
G	16.6	18.9	16.5	0.63	0.64	0.65	26.3	26.4	25.3
R+P	15.5	15.6	15.8	0.81	0.86	0.78	19.1	18.1	20.3
R+G	16.3	16.4	16.3	0.67	0.69	0.65	24.3	23.8	25.1
P+G	17.3	17.5	17.1	0.59	0.59	0.61	29.3	29.7	28.0
R+P+G	17.1	17.2	17.1	0.59	0.61	0.62	29.0	28.2	27.6
new L.S.D. at (0.05) =	1.3	1.7	1.2	0.16	0.25	0.23	8.3	9.2	7.1

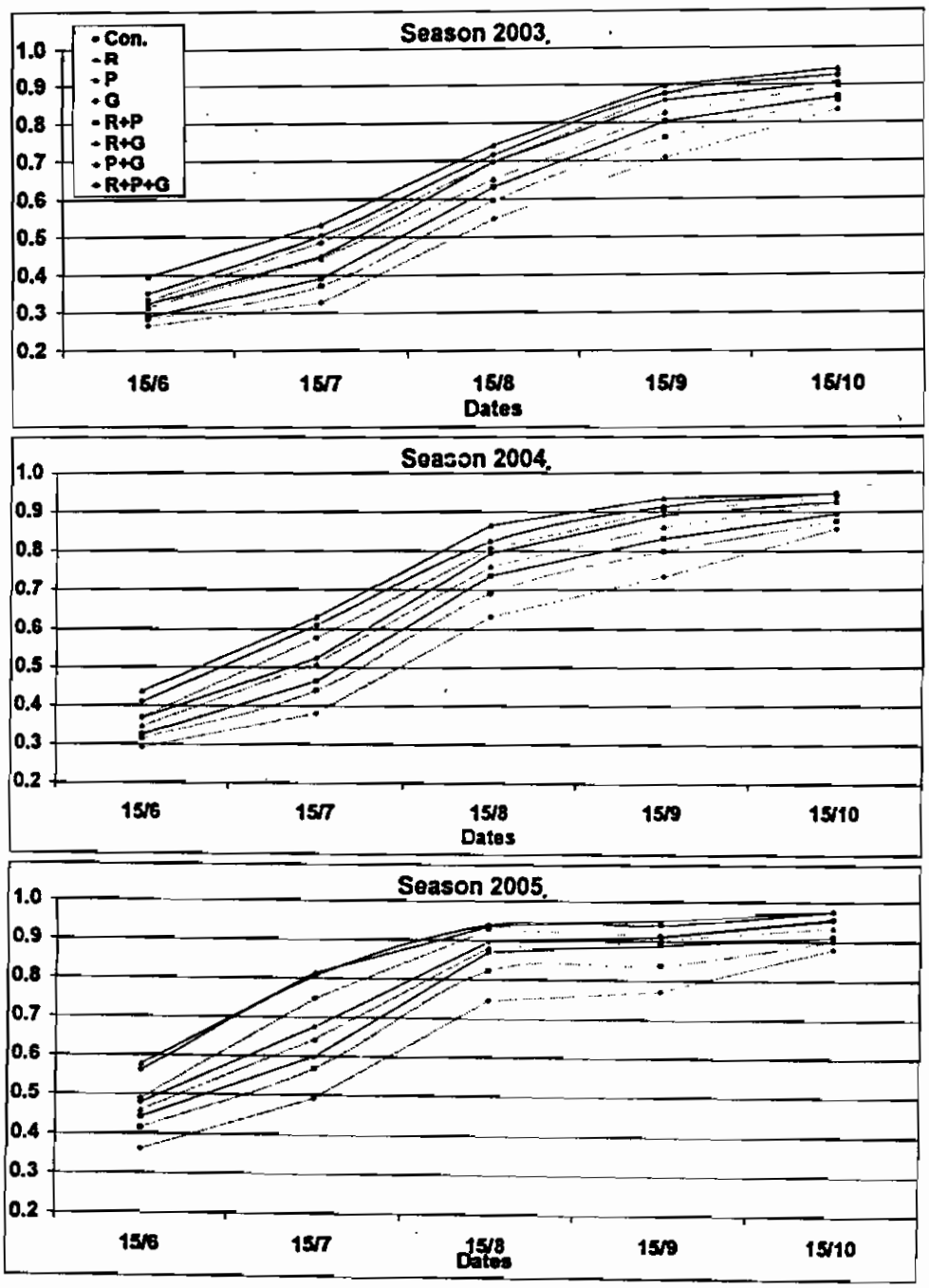

Fig (4): Dynamics of wood ripening through of measurements in 2003, 2004 and 2005 seasons

5- Morphological and Chemical Characteristics of Vegetative growth

(P+G) treatment had the highest shoot diameter (1.22, 1.29 and 1.23 cm) and leaf area (196.7, 198.1 and 195.6 cm^2) compared with the control and the other treatments Pronouncing effects of the (R+P+G) treatment were also observed. However, the effect was insignificantly different from the control as far as leaf area is concerned especially in the third season (Table,5). The positive influence of the conducted treatments was previously supported by Abd El-Wahab *et al.*, (1997), Ibrahim *et al.*, (2001) Lorenzo *et al.*, (2001) who recorded that head suckering and pinching the main shoots and maintaining laterals resulted in the highest values of vegetative growth (Average number of leaves per shoot and leaf area). Also, Caspari *et al.*, (1998) mentioned that the girdled vines were used as indicators of carbohydrate supply. They added that vegetative growth responded in an exponential and linear manner, respectively, to changes in carbohydrate supply.

The effect of the conducted treatments on leaf pigments was significantly evident only with chlorophyll A. This effect was attributed to (P+G) treatment in the three seasons and (R+P+G) treatment in the second and third seasons. (Table,6).

None of the conducted treatments had a significant influence the cane content of total nitrogen. As for the percentage of total carbohydrate of the cane, (P+G) treatment resulted in the highest significant increase(28.4, 29.1 and 28.4%) in the three seasons respectively. This treatment also had the highest C/N ratio compared with the control (63.1, 60.6 and 64.5) in the three seasons respectively. Comparable effects attributed to the (R+P+G) treatment were attained concerning both carbohydrates% and. C/N ratio. (Table, 7). These results are in accordance with those obtained by Abd El-Wahab *et al.*, (1997) who found that pinching the main shoots and maintaining laterals resulted in the highest percentages of total carbohydrates in the second season. Chundawat *et al.*, (1979) also showed that girdling at the beginning of flowering increased carbohydrate content and C/N ratio.

The relative increase in total carbohydrate content of canes observed in the conducted treatments may be attributed to the high rate of shoot growth and wood ripening, as previously outlined by Stoev (1971) who assured the presence of a highly positive correlation between carbohydrate accumulation in shoots and degree of wood ripening.

Data illustrated in Fig.(5) indicated the presence of a highly positive correlation between the C/N ratio and the percentage of predicted bud fertility with degree (0.95 & 0.88).

However, results illustrated in Fig.(6) indicated the presence of a highly positive correlation between the percentage of predicted bud fertility and the yield with degree (0.96 & 0.89).

Finally, it can be concluded that the fertility of Superior grapevines can be raised by the considered treatments. We recommend the combined Pinching the main shoots + Girdling (P + G) treatment for its better effect on bud fertility, yield and physical and chemical characteristics of the berries. Yet, further investigations should be carried out on this proposed protocol for decreasing bunch compactness.

Table (5): Effect of treatments on shoot diameter and leaf area in 2003, 2004 and 2005 seasons

Caracteristics / Treatments	Shoot diameter (cm)			Leaf area (cm^2)		
	2003	2004	2005	2003	2004	2005
Con.	1.01	1.10	1.01	164.4	169.5	166.8
R	0.95	1.04	0.98	151.5	162.6	155.3
P	1.07	1.19	1.09	176.3	183.6	178.4
G	1.17	1.22	1.15	182.1	189.6	187.1
R+P	1.03	1.12	1.04	171.5	177.9	173.9
R+G	1.11	1.22	1.15	182.7	184.2	185.7
P+G	1.22	1.29	1.23	196.7	198.1	195.6
R+P+G	1.17	1.24	1.19	195.3	194.2	187.8
new L.S.D. at (0.05) =	0.13	0.16	0.18	15.7	14.6	21.3

Table (6): Effect of treatments on chlorophyll (A and B) and caroten in 2003, 2004 and 2005 seasons

Caracteristics / Treatments	Chlorophyll (A) (mg/g fresh weight)			Chlorophyll (B) (mg/g fresh weight)			Caroten (mg/g fresh weight)		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
Con.	0.43	0.40	0.39	0.22	0.20	0.20	0.20	0.21	0.23
R	0.40	0.36	0.35	0.20	0.19	0.21	0.17	0.20	0.19
P	0.53	0.45	0.50	0.23	0.22	0.24	0.23	0.24	0.25
G	0.65	0.59	0.61	0.25	0.23	0.25	0.25	0.26	0.20
R+P	0.46	0.41	0.42	0.23	0.20	0.23	0.22	0.21	0.26
R+G	0.64	0.57	0.54	0.24	0.23	0.26	0.25	0.23	0.20
P+G	0.70	0.64	0.64	0.29	0.26	0.24	0.25	0.28	0.21
R+P+G	0.69	0.62	0.64	0.27	0.25	0.25	0.26	0.28	0.24
new L.S.D. at (0.05) =	0.17	0.21	0.22	N.S	N.S	N.S	N.S	N.S	N.S

Table (7): Effect of treatments on total nitrogen, total carbohydrates and C/N ratio in 2003, 2004 and 2005 seasons

Caracteristics / Treatments	total nitrogen (%)			total carbohydrates (%)			C/N ratio		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
Con.	0.48	0.53	0.52	24.2	24.8	25.4	50.4	46.8	48.8
R	0.47	0.54	0.54	23.6	24.4	25.1	50.2	45.2	46.5
P	0.45	0.50	0.53	25.3	25.4	26.4	56.2	50.8	49.8
G	0.43	0.49	0.47	26.2	26.4	27.7	60.9	53.9	58.9
R+P	0.45	0.50	0.53	24.9	25.2	26.2	55.3	50.4	49.4
R+G	0.44	0.48	0.49	26.1	25.8	27.2	59.3	53.8	55.5
P+G	0.45	0.48	0.44	28.4	29.1	28.4	63.1	60.6	64.5
R+P+G	0.44	0.47	0.47	27.3	27.7	27.8	62.0	58.9	59.1
new L.S.D. at (0.05) =	N.S	N.S	N.S	2.7	3.4	2.2	7.1	7.6	9.8

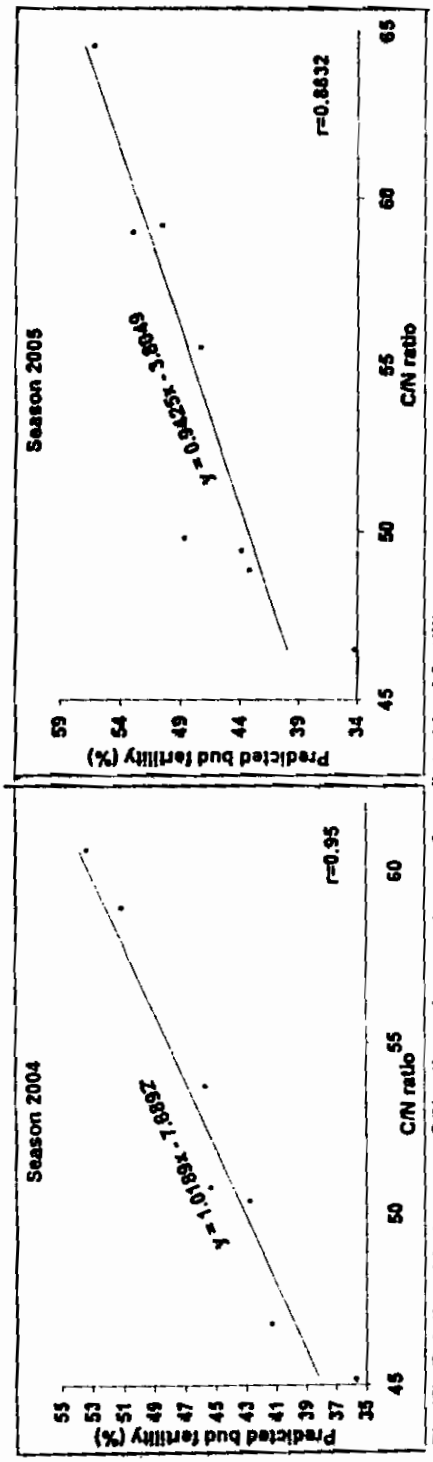

Fig (5): Relationship between C/N ratio and percentages of predicted bud fertility

Fig (6): Relationship between percentages of predicated bud fertility and yield

REFERENCES

Abd El-Wahab, W.A, Mohamed. S.M. and El-Gendy, R.S. (1997): Effect of summer pruning on bud behaviour and bunch characteristics of Thompson seedless grapevines. Bull. Fac. Agric. Univ. Cairo, 48 : 351-378.

Ambika Prasad and Pandey, S. D. (1969) : A simple and quick method to determine fruitfulness of dormant duds in grape. The Indian J. of Hort. Vol. (26) No. 3 and 4.

Association of Official Agricultural Chemists (1985): Official Methods of Analysis A. O. A. C., Benjumin Franklin Station, Washington, D. C. N. S. A. pp 440-510.

Bouard, J. (1966): Recherches physiologiques sur la vigne et en particulier pour l'aoutment des sarments. Thesis Sc. Nat Bordeaux-France. Pp.34.

Caspari, H. W., Lang, A., Alspach, P. (1998): Effects of girdling and leaf removal on fruit set and vegetative growth in grape. Amer. J. of Enol. and Viticul., 49 (4): 359-366.

Cheplygin, I. K. (1986): Effect of summer pruning on the development of young grapevines. Sadovodstvo i Vinogradarstvo Moldavii, 6: 23-25.

Chundawat, B. S., Jindal, P. C., and Khera, A. P. (1979): Effect of girdling on bud, flower and berry drop in grapes *V. vinifera* L. Haryana Agric. Univ., J. of Res., 9(4): 332-336.

Dabas, A. S., Jindal, P. C., and Chauhan, K. S. (1980): Effect of girdling different parts of vine on fruit bud formation and bud killing in Thompson Seedless grape (*Vitis vinifera* L.). Haryana Agric. Univ., J. of Res., 10 (4): 569-570.

Dabas, A. S., Jindal, P. C. and Yamdagni, R. (1980): Effect of girdling on berry set, berry drop, panicle drying and quality of Thompson Seedless grapes (*Vitis vinifera* L.). Progressive Horticulture, 12(3): 41-46.

Ezzili, B. and Bejaoui, M. (1998): Influence of girdling on growth and fertility of Grenache Noir (*Vitis vinifera* L.) at El Khenguet (Tunisia). Bulletin de l'OIV, 71(809/810): 557-570.

Huang, H. B. (1980). Studies on the effect of summer pruning on cropping and wine quality in Muscat Humburg grapevines. Acta Agriculturea universitatis Pekinensis, 1: 45-48.

Ibrahim, A. H. , Abd El-Karem M. A. and Abd El-Hady M. A. (2001): Response of Red Roomy grapevines to summer pruning. J. Agric. Sci. Mansoura Univ., 26 (9): 5641-5649.

Josan, J. S., Mehrotra, N. K., Thatai, S. K., Harish Kumar, Grewal, I. S., and Sharma, J. N. (2001): Effect of girdling, brushing and GA3 on maturity and fruit quality of grape cv. Perlette. Ind. J. of Hort., 58(3): 250-253.

Kalil, G. P. da C., Terra, M. M., Kalil Filho, A. N., Macedo, J. L. V. de and Pires, E. J. P. (1999): Effects of girdling and gibberellic acid on the fruiting of 'Maria' seedless grapevine. Scientia Agricola, 56 (2): 317-328.

Khalil, W. and Ghobrial, G. F. (1991): Abscission and transformation of clusters in Thompson seedless and Italia grape varieties. Egyp. J. of Hort., 2 (12): 187-196

Khajuria, H. N. and Bakhshi, J. C. (1984): Responsiveness of Perlette grapes (*Vitis vinifera* L.) to the application of CCC, NMC, TIBA, coconut milk and girdling treatments. Ind. Agric., 28 (4): 255-260.

Lopez F. E. (1987): Effects of summer pruning on the cultivar Tempranillo in the Rioja Alavesa region. Connaissance de la Vigne et du Vin, 21 (4):239-246.

Lorenzo, R. di, Ferrante, S. and Barbagallo, M. G. (2001): Modification of source/sink ratios in Nero d'Avola (*Vitis vinifera* L.) grapevines in a warm-dry environment. Advan. in Hort. Sci., , 15 (1/4):31-38.

Mann, S. S., Kushal Singh (1985): Effect of summer pruning on yield and quality of Perlette grapes. Acta Hort., 158:.133-138.

Orth, C. H. F., Merwe, G. G. van der, and Chambers, K. R. (1989): Effect of girdling before bloom or after fruit set on yield and bunch quality of Bien Donne and Dan-ben-Hannah. Deciduous Fruit Grower, 39 (10): 373-376.

Pregl, F. (1945): Quantitative Organic Micro-Analysis 4th Ed J. and A. Churchill, Ltd., London.

Ranieri, M. de and Fideghelli, C. (1971): The effect of girdling on bud differentiation in the vine cv. Maria Pirovano. Annali dell' Istituto Sperimentale per la Frutticoltura, , 2 (1): 45-60.

Sarooshi, R. A. (1977): Some effects of girdling, gibberellic acid sprays, bunch thinning and trimming on the sultana. Australian J. of Expe. Agric. and Animal Husb., 17 (8): 700-704.

Sarowa, P. S. and Bakhshi, J. C. (1972): Fruit crop and quality regulation in Perlette variety of vinifera grapes. IV. Effect of pruning, bunch thinning, girdling, Sevin and gibberellic acid treatments. Punjab Horti. J. 12 (2/3) 68-77.

Sharma, S., Jindal, P. C., and Chauhan, K. S. (1984): Response of 4-CPA and girdling on bud, flower and berry drop in Himrod cultivar of grapes (V. vinifera L.). Haryana Agric. Univ. J. of Res. , 14 (2): 132-135.

Smith, F. Gilles, M. A. Hamilton, J. K. and Gedess, P. A. (1956): Colorimetric methods for determination of sugar and related substan. Anal. Chem. 28: 350.

Snedecor, G. W. and Cochran. W.G. (1972): Statistical Methods . 6th ed, The Iowa State Univ. . Press . Ames. , Iowa , U.S.A. , pp. 50

Stoev, K. (1971): Physiological bases of Viticulture, Section 1. (In Russian la.) Publishing house. Bulgarian academic, Science, Sofia.

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.

Vargas, G.G. (1984). Effect of summer pruning on fruit set in Alphonse Lavallei and Cardinal grapevines . Agronomua Tropical 34 (4/6) 105-113 C.F.(Hort. Abst. 58:2766).

Wang. W.Y. (1989): Studies on forcing of Golden Muscat grapevine (Vitis vinifera x Vitis labrusca) II. Study of the improvement of fruiting potential and autumn-winter fruit quality . Jour. of Agric Res. of China 38 (1) : 42-52 C.F. (Hort Abst. 60:5055).

Weaver, R. J., Kasimatis, A. N. and Mecune, S. (1962): Studies with gibberellin on wine grapes to decrease bunch rot. Amer. J. Enol. And Vitic., 78-82.

Westein, D. V. (1957): Chlorophyll-letale und der submikro skopische formwechsel der plastids, Experimental Cell Research, 12:427.

Winkler, A. (1965): General Viticulture. Univ. Calif. Press, Barkely and Loss Angeles.

تأثير بعض المعاملات الزراعيـــة علـــى خـــصوبة البـــراعم والنمـــو الخـــضرى والمحصول فى العنب صنف السوبيريور

محفوظ محمد الموجى ، محمد عبد العزيز عبد الوهاب ، غادة شكر شاكر

قسم العنب – معهد بحوث البساتين – مركز البحوث الزراعية بالجيزة – مصر

أجرى هذا البحث لدراسة تأثير بعض المعاملات الزراعية على خصوبة البراعم والنمـــو الخضرى والمحصول لكرمات عنب السوبيريور. وقد تم إجراء ثمانى معاملات زراعية قبل بداية التزهير مباشرة وهى إزالة الأفرع الثانوية، تطويش الأفرع الرئيسية، التحليـــق، إزالـــة الأفـــرع الثانوية+تطويش الأفرع الرئيسية، إزالة الأفرع الثانوية+ التحليق، تطويش الأفـــرع الرئيـــسية + التحليق، إزالة الأفرع الثانوية+تطويش الأفرع الرئيسية+ التحليق بالاضافة إلى الكنترول (كرمات غير معاملة).

وقد أشارت نتائج الدراسة أن كل معاملات التجربة كانت فعالة ما عـــدا معاملـــة إزالـــة الأفرع الثانوية فى زيادة خصوبة البراعم وعدد العناقيد/كرمة ومتوسط وزن العنقود والمحـــصول كما أدت إلى تحسين الصفات الطبيعية والكيماوية للعناقيد والحبـــات وديناميكيـــة نـــضج الخـــشب بالاضافة إلى الصفات الخضرية والكيماوية للمجموع الخضرى مقارنة بالكنترول، وقـــد أعطـــت معاملة تطويش الأفرع الرئيسية مع التحليق يليها معاملة تطويش الأفرع الرئيسية مع التحليق مـــع إزالة الأفرع الثانوية أكبر درجة تحسين فى كل الصفات تحت الدراسة ومن ناحية أخرى ســـجلت معاملة إزالة الأفرع الثانوية بالاضافة إلى الكنترول أقل القيم لهذه الصفات.