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EFFECT OF SOME POLYETHYLENE COVERING TYPES AND HYDROGEN CYANAMIDE TREATMENTS ON VEGETATIVE GROWTH, FRUITING AND EARLY RIPENING IN FLAME SEEDLESS GRAPE VINES

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ABSTRACT : In 1999 and 2000 seasons Flame Seedless grapevines grown in sandy soil and drip irrigation system at Ismaelia, Egypt were subjected to the following covering treatments after being pruned and sprayed with Dormex 5% in December: (1) Vines were covered by height clear copolymer polyethylene tunnel (PE); (T_1), (2) As T_1 but soil surface was covered by clear polyethylene sheets (T_2), (3) Vines were covered by threadding the PE over the trellis at the two sides, the PE reached the ground and anchored in a trench with soil (T_3). (4) As T_3 but without grounding PE in the soil (T_4). (5) As T_4 but the PE was until 75 cm up to the soil (T_5). (6) Vines were sprayed with Dormex 5% without covering (T_6). (7) Vines were sprayed with water and without covering (T_7). All covering treatments started on December 15 in the two tested seasons.

Vines treated with T_1 and T_2 gave the highest values of earliness for budburst and budburst percentage. Treatments (1), (2) and (3) recorded the highest values of earliness of harvest date (53, 62, 56 days) and (50, 56, 43 days) in the two seasons, respectively. They gave also the highest volume and weight of juice extracted from 100 berries as well as the highest TSS% and pH values.

Application of Dormex resulted in increasing the number of leaves / shoot and budburst percentage . Untreated vines (T_7) gave the highest yield / vine, cluster weight , shoot length, pruning weight and leaf area.

From the economic view, the highest additional costs, total return and gross margin / fed. were obtained from T_2.

INTRODUCTION

Grapes are among the most popular fruits in Egypt. The area under vineyards reached to about 142, 241 feddans* produce about 1075, 105 tons. Flame Seedless is one of the new cultivars introduced in the last twenty years in Egypt, harvested early in late June . especially in the newly reclaimed sandy soils, producing high yields and suitable for exportation. Earlier harvesting of this cultivar permit for a high price, especially for exportation to Europe markets .

Covering Flame Seedless grapevines with plastic films will led to get early yield with better fruit quality .

In Frence Chamayou (1975) reported that the advantages of a plastic cover may include earliness, slight yield increase and standard - sized grape growth, but the advantage may include greenish grape colour . use of soil and vine plastic cover significantly increased the number of bunches and weight of berries. In addition, plastic cover significantly reduced the incidence and intensity of *Botrytis* Leeuwen *et al.* (1998).

In South Africa, Avenant and Loubser (1993) found that budburst and flowering of Erlihane and Sultanine cvs were earlier under covered vines with plastic films and the harvest date was advanced by 10 days.

* Static of Ministry of Agriculture , 2000

Plastic covering significantly increased air and soil temperature, giving advanced budding and earlier harvesting. Plastic covering increased growing degree days accumulation and advanced budburst by 12-20 days. Commercial ripening was advanced by 8-22 days, increased berry mass and increased pruning cane mass (Novello *et al.* , 2000).

In Turkey, Uzun (1993) noted that plastic covering of vines advanced flowering by 20-27 days in Perlette and 19 -26 days in Black Bagdad and ripening was advanced by 15-17 and 16-19 days, respectively.

Grapes harvest was earlier by 2 weeks in vines covered with plastic films and there was no effect on cluster weight and yield (Fanizza and Ricciardi, 1991) . Using low density stabilized anti -UV polyethylene in covering grapevines gave the best results in term of quali- quantitative characteristics and advanced harvest (Colapietra *et al.*,1997 and Vox, 1999) in Italy.

The present work was conducted to evaluate the effects of covering vine and soil on budburst, vegetative growth, cluster quality , yield and earliness of ripening of Flame Seedless grapevines grown in newly reclaimed soil and previously treated with hydrogen cyanamide as dormancy breaking agent .

MATERIALS AND METHODS

This investigation has been carried out during the two consecutive seasons of 1999 and 2000 in the vineyards at El-Kassasien Horticulture Research Station, Ismailia Governorate, Egypt.

Five - years - old Flame Seedless grapevines grown in fine sandy soil at 2x3 m apart and drip irrigated with about 5000 m^3/fed. / year fertilizers irrigation water/ feddan / year were used in the first season, while 6 - years - old vines were used in the second one. The physical and chemical characteristics of experimental soil and irrigation water are shown in Table 1.

The experimental grapevines were selected to be as uniform as possible in the two seasons and received the same agrotechnical practices, except for the tested hydrogen cyanamide and different types of covering treatments.

The vines were fertigated using eighty units N (as ammonium nitrate) + fifty units P_2O_5 (as phosphoric acid) + one hundred and twenty units K_2O (as potassium sulphate) and foliar sprayed with chelated micro elements (Fe, Mg, Mn, Zn, Cu, Mo and B) three times a year.

In 1999 and 2000 seasons, 42 vines were pruned in December, leaving uniform bud- load (40 buds) per vine. Thereby six vines were sprayed with Dormex (hydrogen cyanamide) at 5% after winter pruning, while the remained six vines were sprayed with water as a control. Polyethylene protection took place on 15th December .

The selected vines were subjected to the following covering treatments (Fig. 1):

1. Vines covered by high tunnel clear copolymer polyethylene 200 µ , 2 m high and 2 m width (T_1).
2. Vines were covered by high tunnel clear copolymer polyethylene 200 µ (2 m high and 2 m width) and the soil surface was covered by clear polyethylene sheets 80 µ (T_2).
3. Vines were covered by threadding the copolymer polyethylene film 200 µ over the trellis at the two sides. The polyethylene reached the ground and anchored in a trench with soil . At the end of the row sides, vertical polyethylene strips were arranged for easy opening and closing (T_3).
4. Vines were covered by threadding the copolymer polyethylene film 200µ over the trellis at the two sides until touch the soil and without grownding it (T_4).

5. Vines were covered by threading the copolymer polyethylene film 200µ over the trellis at the two sides until 75 cm. up to the soil (T_5).

6. Vines were sprayed with dormex and without any covering treatment (T_6).

7. Vines were sprayed with water and without any covering treatments (T_7 as a control) .

Each treatment was represented by 6 vines shared between 3 replicate.

The following parameters were concerned :

1.Budburst

Included budburst number and percentage , date of budburst and budburst gained earliness. In each season, the beginning of budburst was recorded when 5 buds per vine were opened, when leaf tips were emerged from the buds. The budburst was then recorded weekly. The budburst percentage was calculated for the whole vine bud - load according to the following equation :

$$\text{Budburst (\%)} = \frac{\text{Number of opened buds}}{\text{Bud load per vine}} \times 100$$

Budburst percentage was estimated for buds opened every week during January, February and March. Furthermore, the number of days from winter pruning to budburst for each treatment and the earliness in buddburst for each season was calculated .

2.Vegetative Growth

1. Shoot length (cm) was determined as an average of ten randomly sampled shoots / vine

2. Leaf area (cm^2) was determined using leaf area meter (model CI-203) as an average of 20 mature leaves per vine in August of each season. The leaves were sampled from the middle portion of the growing shoots.

3. Total number of leaves growing on the shoots per vine was counted .

4. Weight of prunings (kg) per vine was recorded after winter pruning of each season.

3. Yield and Fruit Quality

3.1 Picking season

The date of first picking were recorded for each treatment. Harvesting took place when the TSS value reached 17±1%. The number of days from winter pruning till first clusters picking and the gained earliness in picking season were calculated.

3.2 Number of clusters / vine

The numbers of clusters per vine were counted every fifteen days during each of Feb., Mar. and April. The total number of clusters per vine at harvest was calculated.

3.3 Yield per vine

The total yield per vine (kg) was recorded for each season.

3.4 Cluster characteristics

The average cluster weight (g), length (cm), width (cm) and size (cm^3) as well as rachis weight (g) were recorded at harvest for each replicate.

3.5 Number of berries / culuster

Number of brries/ cluster was recorded as an average of total berries of 5 harvested clusters per replicate.

3.6 Berry characteristics

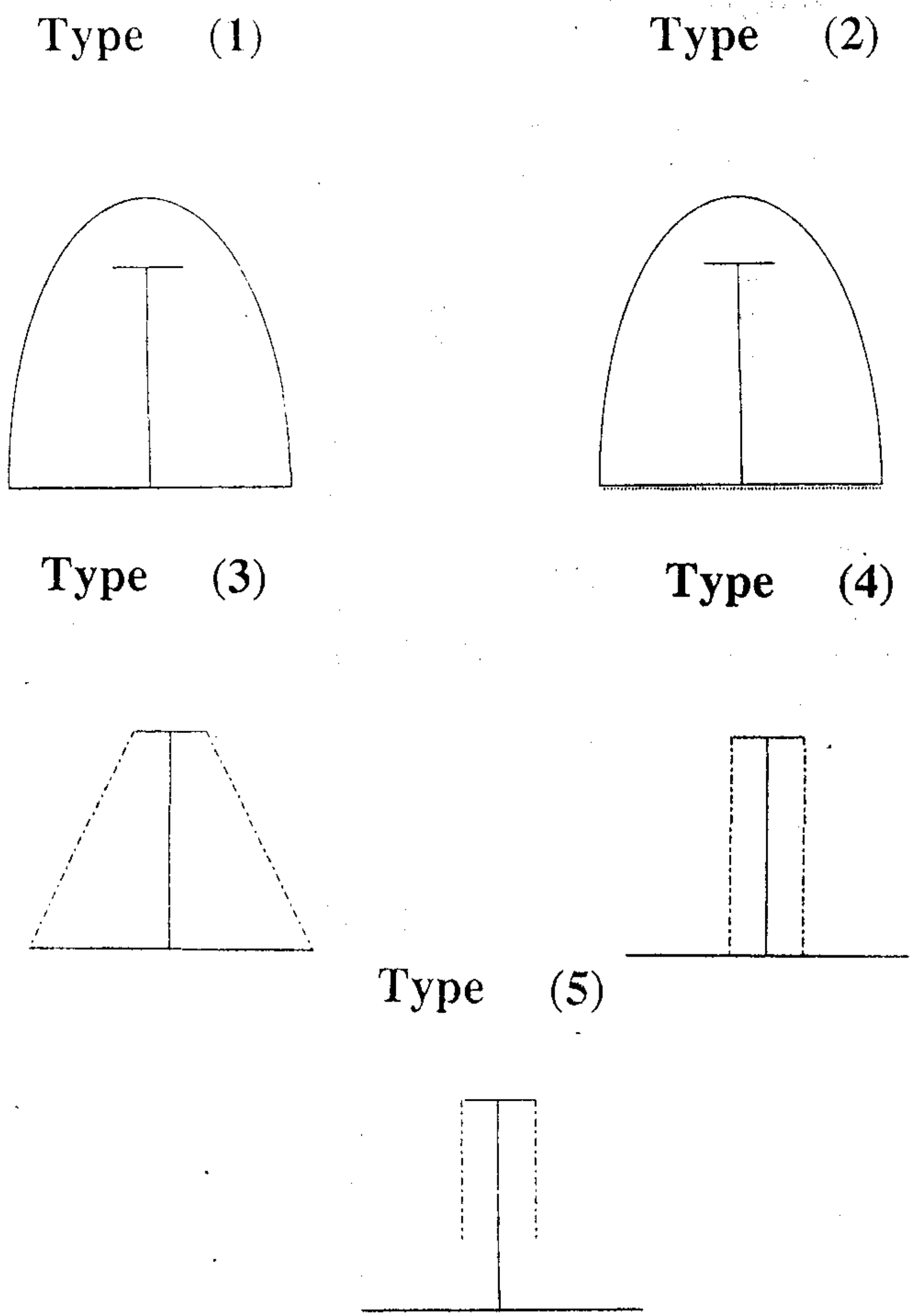
Berry firmness was determined in ten berries using Pushpull dynamometer (Model FD 101) without removing berry peel. The average firmness of the sample was expressed as gram.

In addition, berry diameter (mm), 100-berry weight (g) and size (cm^3) as well as juice weight and volume of 100- berries were recorded .

Moreover, juice total soluble solids percentage (TSS%) was determined using a hand refractometer and juice activated acidity (pH) was determined using a pH meter style (Hanna 8514).

4 Economical Indicators

The materials used in the structure of additional costs per feddan were calculated.



ig. 1, Drawing sections in different polyethylene covering types

Table 1. Physical and chemical characteristics of the experimental soil and used irrigation water.

A. Soil mechanical analysis, $CaCO_3$ %, organic matter, EC (mmos/cm) and pH.

Soil depth (cm)	Soil mechnical analysis			Soil	$CaCO_3$	Organic matter	E.C. mmos/	PH
	Sand %	Clay %	Silt %	texture	%	%	(1:2)cm	1:2.5
0-30 cm	93	6	1	sand	2	0.06	0.48	7.9
30-60 cm	94	5	1	sand	17	0.03	0.39	8.6

B. Soil soluble ions (meq/l)

Soil depth (cm)	Cations (meq/l)				Anions (meq/l)			
	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	$SO_4^{=}$	Cl	HCO_3	$CO_3^{=}$
0-30 cm	0.6	0.4	0.42	0.12	0.24	0.5	0.8	-
30-60 cm	0.3	0.3	1.40	0.12	0.62	0.5	1.0	-

C. Soil macro and micronutrients contents

Soil depth (cm)	Macronutrient (ppm)			DTPA-extractable micro-nutrients (ppm)		
	N	P	K	Fe	Zn	Mn
0-30 cm	54	3	60	0.4	0.1	0.3
30-60 cm	16	4	48	0.4	0.1	0.1

D. Chemical analysis of the irrigation water.

pH.	EC mmos /cm	Salinity ppm	Cations (meq/l)				Anions (meq/l)				SAR
			Ca^{++}	Mg^{++}	Na^{+}	K^{+}	$So_4^{=}$	Cl^{-}	HCO_3^{-}	$Co_3^{=}$	
7.5	2.34	1497.6	6.2	2.8	13.2	0.22	10.97	2.25	9.2	-	6.22

Annual depresiation was also calculated according to the fact that steel bars could be used for 6 years and polyethylene films for 3 years. The following equations were used in this concern:

Total return = yield x price, gross margin (GM) = Total return - Additional cost, change in gross margin percentage (%) =

$$\frac{\text{GM for treatment-GM for control}}{\text{GM for control}} \times 100$$

Gross margin: Additional cost ratio =

$$\frac{\text{Gross margin}}{\text{Additional cost}}$$

(means the income of each L.E. of additional cost ratio). All these equations were calculated according to (Gittinger , 1948)

The obtained data were statistically analyzed according to the complete randomized block design with three replicates. The means representing the effect of the tested treatments were compared by the New L.S.D. method at 0.05 acconrding to (Snedecor and Cochran, 1980). .

RESULTS AND DISCUSSION

1. Earliness

1.1 Budburst

Data in Table 2 indicated obvious differences in budburst commencement between the vines sprayed with water and those sprayed with Dormex. The earliness in budburst gained by spraying Dormex was about 43 and 41 days as compared with control (T_7) in the first and second seasons, respectively. The data also revealed that all covering treatments significantly advanced budburst as compared with uncovered vines. The covering types one and two (high tunnel) gave the highest values of gained earliness compared with all other covering types. No significant differences were detected between types four and five in the first season only. The lowest values in this concern (43 & 41days) were recorded for uncovered vines (T6) in the two seasons, respectively.

The obtained herein results are in line with those reported by Avenant and Laoubser (1993), Uzum and Ulta (1993), Novello *et al.* (1998, 2000) and Yang and Yang (2001).

1.2 Harvesting date

Data in Table 2 revealed that the gained earliness in harvesting date by Dormex spraying was five days in both seasons. Vines sprayed with Dormex without covering took 138 and 140 days from budburst to harvesting compared with 100 and 110 days for vines sprayed with water in the first and second seasons, respectively.

The data also indicated that all treatments significantly advanced the harvesting date compared with uncovered treatments. In addition, vines covered with types one, two and three recorded the highest values of gained earliness of harvesting compared with types four and five. This may be due to the complete tighty covering in the types one , two and three which were more effective in saving the accumulated heat units during the day.

Analogical results were reported by Avenant (1997), Schiedeck *et al.* (1999), Vox (1999), Ergenoglu *et al.* (1999) and Novello *et al.* (2000).

2. Vegetative growth

Tables 2, 3 and 4 represented the effect of the tested treatments on budburst percentage, shoot length, number of leaves per shoot, prunings weight, number of cluster per vine and leaf area during the growth season and after harvesting.

2.1 Budburst percentage

The obtained data in Table 2 clearly show that Dormex treatments exerted obvious effect on budburst percentage of Flame Seadless grapvines. However, budburst percentages in Dormex sprayed vines were 38.8 and 40.1% compared with 10.2 and 10.3% for control treatment in the first and second seasons, respectively.

The data reveal also that budburst percentage gradually increased as growth season advanced, reaching its maximum value at 68 days after winter pruning under all tested treatments, whereas, control vines attained the maximum budburst percentage at 108 days after pruning. This means that all tested treatments as an average, gained 40 days earliness in budburst percentage compared with control treatment. As for the effect of covering types, the data clear that the highest budburst percentages (66.2 and 67.8%) came from vines covered with type one compared with all other types. Vines covered with type two had higher percentages of budburst (48.5 and 54.6%) than those covered with type three (45.5 and 40.9%), four (30.7 and 26.3%) and five (27.1 and 23.7%) in both seasons, respectively. The lowest budburst percentage (27.1 and 23.7%) was recorded for vines covered with type five in the two seasons, respectively. It is interesting to notice that Dormex sprayed vines without covering gained budburst percentages (38.8 and 40.1%) higher than those of vines covered with types four and five in both seasons.

These results are in line with those reported by Sourial *et al.* (1993) and Yang and Yang (2001). The interaction between treatments and period from pruning was significant in the two tested seasons. However, at 40 days after pruning 13-14% and 7-11% of buds for vines covered with type one and two in the first and second seasons, respectively. Were opened, whereas those of other covering types were still dormant. Also, buds of control vines were still dormant until about 90 days after pruning. From the period 54 to 108 days, budburst percentage steadily increased in all tested treatments in a similar trend to that of the main factor (period).

2.2 Shoot length

It is quite evident from Table 3 that shoot length gradually and significantly increased with the advance in season reaching its maximum length by the end of growth seasons (Nov. 1 st) and realizing about 8.5 folds of its initial length on Feb. 5 Regardless of covering types treatments sprayed with Dormex showed a significant increase in average shoot length compared with vines sprayed with water (control). No significant differences could be detected between different types of covering in the two seasons.

The interaction (period x treatment) was significant in both tested seasons. A significant increment was recorded in shoot length with all treatments sprayed with Dormex compared with the treatment sprayed with water from the beginning of the growth season to the 5th of April. It is worthy to mention that the tallest shoot by the end of growth season (166.4 and 190.6cm) was recorded for untreated (control) vines in the two seasons, respectively. This may be due mainly to the lower budburst percentage in untreated vines compared to treated ones. In addition, the ultimate shoot length of uncovered vines (T_6) was markedly higher than those of covered ones in both seasons.

2.3 Number of leaves /shoot

A significant gradual increase in number of leaves per shoot was noticed with growth season in advance. The ultimate average number of leaves/shoot at the end of growth season recorded 4.38 and 3.96 folds of its initial number at 5th of Feb.

Regardless covering types a significant increment in leaf number/shoot was gained by Dormex spraying compared with water sprayed vines (control). This means that Dormex spraying at 5% increased number of leaves/ shoot than unsprayed vines which recorded the lowest leaf number / shoot (7.0 and 6.0 leaves/ shoot) in the two seasons, respectively. Within spread treatments, the highest leaf number / shoot was recorded in covering type two and three without significant differences between them in both seasons. Whearas, covering type five treatment recorded the least number of leaves/shoot (13.4 and 14.8 leaves/shoot) with Dormex sprayed treatments in both seasons, respectively.

The interaction (period x treatment) was significant in the two seasons. Within all tested treatments, leaf number /shoot was gradually increased from the 5 th of Feb. to reach its maximum number by the end of growth season, except control vines on which no leaves were emerged untill the 5th of April.

2.4 Pruning weight

Data in Table 4 reveal that the highest weight of pruning was obtained by covering type two and three treatments without significant differences between them, especially in the second season. However, Dormex sprayed, uncovered vines gained the lowest weight of winter pruning in both seasons. Treatment sprayed with water (control) gave significantly higher pruning weight than treatments covered with type one and five particularly in the first season.

However, parallel results were obtained by Novello *et al.* (2000) who reported that covering increased pruning cane mass.

2.5 Leaf area

As shown in Table 4, leaves of uncovered vines, even sprayed with Dormex or not, attained maximum leaf area (150.4 and 126.0 cm^2 in the first season and 134.5 and 141.6cm^2) in the second one, respectively) compared with all types of covering. The least leaf area (97.0 and 99.5 cm^2) was recorded for covering type two treatment in the two seasons, respectively. This means that all covering treatments reduced leaf area compared with the uncovered ones, mainly because higher leaf number/shoot in covered treatments.

2.6 Number of clusters/vine

Data in Table 4 indicated gradual and significant increment in number of clusters per vine with advancing in growth season, reaching its maximum number on 5th of April. However, during two months (5th of Feb. to 5th of

April) average number of clusters/vine was increased by 414.3 and 307.4% in the two seasons, respectively.

Regarding the effect of PE covering on number of clusters per vine, covering types one , two and three significantly increased average number of clusters as compared with control without significant differences between them in both seasons. All Dormex sprayed treatments showed an increase in number of clusters per vine compared with those sprayed with water (control).

The interaction (period x treatment) was significant in the two seasons of study and followed the same trend of each season individual factor, except control vines on which no clusters were appeared until March 20 in both seasons, so its average was markedly low.

3. Yield and fruit quality

3.1 Yield per vine

Data in Table 5 indicated that the highest yield vine (7.59 and 6.95 kg/vine) was obtained by untreated (control) vine, descendingly followed by those covered by types one (6.37kg), two (6.05kg) , five(6.32kg) and uncovered treatment (6.49kg/vine) in the first season and type one(6.54kg), two (6.44kg) and three (6.38kg) in the second season, without significant differences between them.

Reports in the literature concerned with the effect of PE covers on yield are variable. Fanizza and Ricciardi (1991) reported insignificant differences between covered and uncovered treatments for yield. On the other hand, Chamayou (1975) found a slight yield increase as a result of plastic cover. However, Novello *et al.* (2000) and Shrestha *et al.* (2000) mentioned that vine growing under plastic produced higher yields.

3.2 Clusters and berries characteristics

3.2.1 Cluster characteristics

As shown in Table 5, the highest weight of cluster (816.0 and 695.9g) was recorded for untreated vines descendingly followed by covering type two (676.8g) and covering type three (638.9g) in the first and second seasons, respectively. This may attributed mainly to the lower number of clusters / vine recorded for these treatments.

Cluster size, cluster length and width as well as rachis weight were significantly affected by the tested treatments and approximately followed similar trend to that of cluster weight in both seasons. As for number of berries/cluster, control vines exhibited the highest berries number/ cluster (458.4 and 421.7), followed by those sprayed with Dormex without covering (394.4) and covering type three (313.2) in the first and second seasons, respectively. However, the data cleared that covering treatments reduced berry set percentage compared to uncovered ones.

3.2.2 Berries characteristics

It is quite evident from Table 6 that, the highest weight (192.56 and 213.22g) and volume (184.26 and 195.16ml.) of 100 berries were recorded for covering type one, followed by those of covering type two (189.7 and 204.32 and 183.26 and 188.6 ml.) in the first and second seasons, respectively. The lowest corresponding values were gained by Dormex sprayed uncovered and control treatment in the two seasons. The other treatments came in between.

Regarding berry firmness and diameter, the data show that, all covering treatments significantly increased berry firmness and berry diameter compared to uncovered ones, either Dormex sprayed or not in both seasons. So, the lowest values of the considered berry characteristics were recorded for uncovered treatments (treat. six and seven) whereas, the highest berry firmness (222.2 and 216.9g) and diameter (15.18 and 14.08mm) were recorded for covering type three and five in the first season, respectively. In the second season the corresponding values were detected for the same treatments, beside covering type one.

In this respect, Fanizza and Ricciardi (1991) reported that no significant differences were detected between covered and uncovered treatments for cluster weight. Leeuwen *et al.* (1998) found that using plastic cover significantly increased the weight of berries. Colapietra *et al.* (1999) mentioned that average bunch weight and berry weight were greater when vines were covered with plastic film and when treated with 5% hydrogen cyanamide. On the other hand, Ergenoglu *et al.* (1999) reported that average cluster and berry weights and sizes were decreased under PE compared with non-covered controls.

3.2.3 Juice charcteristics

Results in Table 6 indicated that volume and weight of juice extracted from 100 berries as well as TSS percentage were increased in response to all covering treatments as compared to uncovered ones. Therefore, the highest values of the considered juice characteristics were recorded for covering gave the highest types one, two and three, whereas, uncovered vines, either Dormex sprayed or not gained the lowest weight and volume of 100-berry juice and TSS percentage. Other covering treatments (types four and five) recorded intermediate values in both seasons.

Regarding the activated acidity (pH), Dormex sprayed uncovered vines gained the lowest pH value (2.96 and 2.98), whereas the highest values were recorded for covering types one, two and three, with the superiority for covering type two (3.71) and type three (3.30) in the first and second seasons, respectively.

These results are in agreement with those obtained by Fanizza and Ricciardi(1991); Colapietra *et al.* (1999) and Novello *et al.* (2000).

4. Economical indicators

Tables 7 and 8 show the structure of additional cost and the economical indicators.

4.1Total return per feddan (TR)

Earliness of harvesting resulted in increasing total return/fed. Vines covered with type two gave the highest TR /fed. (26.232.0), descendingly followed by type one (22.605.0 LE.), type three (21.155.0 LE.), type four (10.857.0 LE.) and type five (12.948.0 LE.). Vines sprayed with water and /or Dormex without covering gave higher yields but lower prices, therefore they gained the lowest TR (8.664.0 and 7.641.0 LE. for Dormex and water sprayed vines, respectively. However all covered treatments gave higher TR than uncovered ones.

4.2 Additional cost per feddan (AC)

Treatments covered with types one and two have the highest additional cost/fed. (AC) compared with all other covering treatments. The higher AC for type two may be attributed to the expense of soil covering. Type five have the lowest AC compared with all covering treatments.

4.3 Gross margin per feddan (GM)

As shown in Table 8, vines covered with type two gained the highest gross margin / fed. (22.610.8LE.), followed by type one (19.325.0 LE.) and type three (18.555.0LE.) mainly because its early yield with high prices. However, the lowest gross margin/fed. was recorded for uncovered treatments and covering type four treatment.

4.4 Changes in gross margin (CGM)

Data in Table 8 show that the highest changes in gross margin (CGM) was recorded for covering type two treatment (196%) followed by type one (152%) and type three (143%). Vines sprayed with Dormex and uncovered indicate the lowest changes in gross margin (13%).

4.5 Gross margin/additional cost ratio (GM/AC)

This ratio means the income (L.E.) of each pound spend in the additional cost.

The highest GM/AC ratio (8.9) was gained by covering type five treatment, descendingly followed by type three (7.1), type two (6.2) and type one (5.9). The lowest ratio (4.3) was recorded for type four treatment.

The prementioned results confirmed the findings reported by several workers. Ergenogluo *et al.* (1999) in Tukey found that protected grapevine cultivation was more economical than open field growing. Shiedeck *et al.* (1999) in Brazil reported that vines grown under plastic and pruned on 21 July achieved a price 5 times higher than berries from vines grown autdoors and pruned on 11 August (the normal pruning date). On the other hand, Cardinal *et al.* (1997) mentioned that the annual costs of complete and partial covers were 35.500 F and 23.900 F/ha, respectively, so that until installation and maintenance costs are reduced considerably, covers will not be considered economic.

5. Accumulated heat units

Table 4 represent heat units accumulated from covering to harvesting and the tested treatments. The total heat units accumulated during covering period was 630.2°C in the first season and 674.9°C in the second one. The lowest accumulated heat units from covering to harvesting recorded for type two treatment in the two seasons, while, uncovered treatments indicated the highest accumulated heat units. However, covering treatments decreased accumulation of the heat units from covering to harvest compared with uncovered treatments. The highest heat units gained / day was recorded for covering trend can be shown with heat unit gained per types one, two and three, while covering type five recorded the lowest heat units gained/day in both seasons.

From the above mentioned results, it can be concluded that covering treatments led to increase

Table 2. Effect of some covering types and Dromex treatments on budburst percentage, number of days from winter pruning to budburst and from budburst to harvest of Flame Seedless grapvines (1999 and 2000 seasons).

Treatments	budburst		Harvesiting		budburst percentage (days from pruning)								
	Days after pruning	Gained earliness (days)	Days after budburst	Gained earliness (days)	40	47	54	61	68	94	101	108	Treat av.
First season (1999)													
Vine sprayed with dormex													
Covering type 1	34	63	110	53	13.1	18.2	53.4	78.3	91.7	91.7	91.7	91.7	66.2
Covering type 2	34	63	101	62	14.2	20.1	35.2	50.3	67.1	67.1	67.1	67.1	48.5
Covering type 3	41	56	100	56	-	16.4	25.1	61.3	65.4	65.4	65.4	65.4	45.5
Covering type 4	49	48	133	15	-	3.1	15.7	34.2	48.1	48.1	48.1	48.1	30.7
Covering type 5	51	46	133	13	-	6.2	26.3	35.2	37.2	37.2	37.2	37.2	27.1
Without covering 6	54	43	138	5	-	-	13.3	50.1	61.8	61.8	61.8	61.8	38.8
Vine Spryed with water 7	97	-	100	-	-	-	-	-	-	10.4	30.9	39.9	10.2
Period av.	-	-	-	-	3.9	9.1	24.1	44.2	53.0	54.5	57.4	58.7	-
N.LSD 0.05	2.51	2.42	1.51	1.51	P= 2.323 T= 2.913 T.P = 4.762								
Second season (2000)													
Vine sprayed with dormex													
Covering type 1	44	55	155	50	11.1	17.3	64.1	80.9	92.2	92.2	92.2	92.2	67.8
Covering type 2	43	56	110	56	7.2	15.3	40.1	61.9	78.1	78.1	78.1	78.1	54.6
Covering type 3	50	49	116	43	-	-	19.6	45.7	65.5	65.5	65.5	65.5	40.9
Covering type 4	50	49	133	27	-	-	14.1	17.2	37.4	47.2	47.2	47.2	26.3
Covering type 5	56	43	137	16	-	-	7.4	26.1	35.2	40.3	40.3	40.3	23.7
Without covering 6	58	41	140	5	-	-	1.2	48.1	65.3	65.3	65.3	65.3	40.1
Vine Spryed with water 7	99	-	110	-	-	-	-	-	-	8.9	31.4	42.1	10.3
Period av.	-	-	-	-	2.6	4.6	22.4	40.0	53.4	56.8	60.0	61.5	-
N.LSD 0.05	1.51	1.51	1.51	6.21	P=6.812 T=7.205 T.P =8.109								

Table 3. Effect of some covering types and Dromex treatments on shoot length and number of leaves/shoot of Flame Seedless grapevines (1999and 2000 seasons).

Treatments		Shoot lenght (cm)							Number of Leaves /shoot						
		Feb.		March		Abril	Nov.	Treat	Feb.		March		Abril	Nov.	Treat
		5th	20th	5th	20th	5th	1st	av.	5th	20th	5th	20th	5th	1st	av.
First season(1999)															
Vine sprayed with dormex	Covering type 1	18.3	34.9	48.7	65.5	86.2	127.2	62.9	7.3	11.0	14.7	19.0	21.7	25.3	16.5
	Covering type 2	19.7	31.9	51.6	71.8	94.2	143.8	69.2	7.0	11.0	18.0	20.3	22.0	26.3	17.4
	Covering type 3	19.1	33.6	51.8	69.1	89.2	129.7	65.4	8.7	12.7	17.0	19.3	20.3	29.3	17.8
	Covering type 4	17.2	30.3	44.8	63.1	82.3	122.0	60.1	7.3	11.0	13.3	17.3	19.0	27.3	15.9
	Covering type 5	18.1	33.2	50.6	65.3	86.7	109.8	60.6	5.0	7.0	11.0	15.7	18.1	23.6	13.4
	Without covering 6	18.0	30.1	45.5	11.6	95.1	144.6	65.8	7.7	10.7	14.0	17.0	20.0	25.1	15.7
Vine Spryed with water 7		-	-	6.0	19.9	45.2	166.4	39.6	-	-	-	4.0	7.7	30.3	7.0
Period av.		15.7	27.7	42.7	59.5	82.7	134.8		6.1	9.0	12.6	16.1	18.4	26.7	
N.LSD 0.05		**P= 13.609 T= 14.387 T.P = 15.165**							**P= 1.158 T= 1.761 T.P =5.337**						
Second season(2000)															
Vine sprayed with dormex	Covering type 1	19.5	31.6	47.2	63.2	85.5	119.5	61.1	5.7	9.0	11.3	14.0	17.7	21.8	13.2
	Covering type 2	20.0	33.4	49.3	69.8	90.8	134.1	66.2	7.4	10.0	17.3	19.2	21.0	25.2	16.7
	Covering type 3	18.9	28.3	46.7	62.2	85.1	119.1	60.0	8.0	11.3	15.0	19.3	23.2	28.7	17.6
	Covering type 4	16.3	25.2	42.4	57.1	80.1	116.2	56.2	7.3	10.3	13.7	17.2	21.3	25.7	15.9
	Covering type 5	15.1	24.8	41.9	55.8	83.1	118.1	56.5	7.7	9.7	13.0	16.2	19.6	22.8	14.8
	Without covering 6	20.1	29.1	46.2	63.1	89.2	140.3	64.7	7.7	10.7	14.7	16.4	18.3	23.0	15.1
Vine Spryed with water 7		-	-	-	17.4	47.9	190.6	42.6	-	-	-	3.7	7.3	25.3	6.0
Period av.		15.7	24.6	39.1	55.5	80.2	133.9		6.2	8.7	12.1	15.1	18.3	24.6	-
N.LSD 0.05		**P= 13.985 T=12.892 T.P = 17.422**							**P= 1.065 T= 1.158 T.P =4.260**						

Table 4. Effect of some covering types and Dromex treatments on prunings weight, leafe area and number of clusters per vine and Heat unit accumulated from vine plastic covering to harvesting of Flame Seedless grapevines (1999 and 2000 seasons).

Treatments		Pruning Weight/vine (g)	Leaf area (cm)	number of cluster/ vine Feb. 5th	Feb. 20th	March 5th	March 20th	Abril 5th	Treat av.	Heat units °C During Covering Period	From Covering To harvesting	Gained during season	Gained Per day
First Season(1999)													
Vine spryed with dormex	Covering type 1	750	111.1	2.33	4.00	8.3	13.0	13.0	8.1	630.2	935.3	839.0	8.0
	Covering type 2	1016.4	97.0	4.00	5.00	8.33	11.0	11.0	7.8	630,2	839.3	935.3	8.9
	Covering type 3	950	109.3	3.00	6.7	10.0	12.0	12.0	8.7	630.2	911.0	863.3	8.2
	Covering type 4	908	112.3	2.00	5.7	8.2	9.7	9.7	7.1	630.2	1041.0	733.3	7.0
	Covering type 5	824	104.3	1.7	6.00	8.7	9.7	11.0	4.4	630.2	1384.5	389.8	3.7
	Without covering 6	641	150.4	1.7	4.00	7.00	9.0	10.0	6.3	630.2	1597.9	-	-
Vine Spryed with water 7.		885	126.0	--	–	–	--	9.3	1.9	630.2	1774.3	-	-
Period av.		-	-- --	2.1	4.4	7.2	9.2	10.8					
N.LSD 0.05		18.57	3.231	P= 1.167 T= 1.234 T.P = 1.570									
Second Season(2000)													
Vine spryed with dormex	Covering type 1	760	104.2	3.00	7.7	9.7	12.0	12.0	8.9	674.9	1094.2	821.1	7.7
	Covering type 2	916	99.5	4.00	7.0	8.7	11.0	11.0	8.3	674.9	999.7	915.6	8.6
	Covering type 3	935	110.3	3.00	6.0	8.0	10.0	10.0	7.4	674.9	1154.4	760.9	7.2
	Covering type 4	850	113.3	4.00	7.0	9.0	11.0	11.0	8.4	674.9	1357.4	557.9	5.2
	Covering type 5	806	106.4	2.6	6.33	7.7	9.7	12.0	7.7	674.9	1662.9	252.4	2.4
	Without covering 6	625	134.5	2.33	7.33	9.3	10.3	11.0	8.0	674.9	1712.9	-	-
Vine Spryed with water 7		835	141.6	--	--	--	--	10.0	2.0	674.9	1915.3	-	-
Period av.		--	-- --	2.7	5.9	7.4	9.1	11.0	--				
N.LSD 0.05		37.83	5.141	P= 1.260 T= 1.412 T.P = 1.570									

Table 5. Effect of some covering types and Dormex treatments on number of clusters / vine , cluster weight, yield / vine and cluster characteristics of Flame Seedless grapevines (1999 and 2000 seasons).

	Treatments	Yield Per vine (kg)	No of clusters Per vine	Cluster weight (g)	Cluster characterestics				
					Volume (cm^3)	Length (cm)	Width (cm)	No. of berries per cluster	Rachis weight (g)
First Season(1999)									
Vine sprayed with dormex	Covering type 1	6.374	13.0	490.2	449.8	24.4	13.7	298.6	13.2
	Covering type 2	6.047	11.0	676.8	568.8	25.8	14.7	356.8	18.0
	Covering type 3	5.700	12.0	474.9	465.6	24.7	13.4	250.3	12.6
	Covering type 4	5.064	9.7	522.1	50.2.2	26.5	13.9	359..8	14.1
	Covering type 5	6.323	11.0	574.8	499.2	26.3	13.8	238.5	15.5
	Without covering 6	6.492	10.0	649.2	642.7	28.6	16.8	394.4	17.4
Vine Spryed with water 7		7.596	9.3	816.0	808.6	32.6	17.7	458.4	21.2
N.LSD 0.05		0.482	1.975	137.15	101.01	1.19	2.12	119.21	4.91
Second Season(2000)									
Vine sprayed with dormex	Covering type 1	6.545	12.0	545.4	500.0	27.1	12.9	256.0	14.8
	Covering type 2	6.446	11.0	586.0	542.5	27.3	13.1	287.3	15.7
	Covering type 3	6.389	10.0	638.9	597.1	27.7	14.0	313.2	16.8
	Covering type 4	5.277	11.0	479.7	470.2	26..2	13.3	262..1	12.8
	Covering type 5	6.010	12.0	500.9	439.4	24.1	13.4	270.7	13.3
	Without covering 6	5.886	11.0	535.0	457.3	24.5	13.5	289.2	14.2
Vine Spryed with water 7		6.959	10.0	695.9	662.7	29.9	15.7	421.7	18.6
N.LSD 0.05		0.361	1.135	96.25	98.22	1.42	1.87	122.71	3.51

Table 6. Effect of some covering types and Dromex treatments on berry characteristics of Flame Seedless grapvines (1999 and 2000 seasons).

	Treatments	100 berries		Juice extracted form 100 berries		Juice quality		Berries	
		Weight (g)	Volume (ml)	Weight (g)	Volume (ml)	TSS %	pH	Firmness (gm)	Diameter (mm)
				(1999) Season					
Vine sprayed with dormex	Covering type 1	192.56	184.26	89.36	85.7	18.9	3.45	216.1	14.76
	Covering type 2	189.7	183.26	101.99	99.32	18.4	3.71	215.4	14.16
	Covering type 3	185.32	183.2	88.2	84.8	18.4	3.14	222.2	15.18
	Covering type 4	171.86	171.4	82.76	80.1	17.9	3.1	216.9	13.26
	Covering type 5	166.24	165.2	80.62	78.42	17.5	3.06	221.1	14.08
	Without covering 6	164.96	162.4	76.86	74.52	16.35	2.96	180.1	13.18
Vine Spryed with water 7		177.96	175.3	75.02	71.16	15.55	3.2	148.2	12.9
N.LSD 0.05		3.44	2.92	2.8	3.3	0.97	0.07	0.04	0.65
				(2000) Season					
Vine sprayed with dormex	Covering type 1	213.22	195.16	113.4	109.82	19.41	3.23	224.50	15.38
	Covering type 2	204.32	188.6	107.2	105.52	18.30	3.20	217.93	14.60
	Covering type 3	203.72	189.92	110.42	104.86	18.30	3.30	222.40	15.20
	Covering type 4	183.32	179.8	100.72	96.76	17.96	3.10	187.40	13.53
	Covering type 5	185.5	162.62	97.22	93.12	17.90	3.02	229.40	14.06
	Without covering 6	184.66	157.4	83.46	80.26	16.23	2.98	182.90	14.13
Vine Spryed with water 7		164.76	157.2	83.6	81.62	15.25	3.10	154.80	13.40
N.LSD 0.05		2.24	2.24	2.1	2.1	0.88	0.06	1.81	1.21

Table 7. Structure of additonal cost per feddan of some PE covering types on Flame Seedless grapevine.

Treatments	* Steel bar/row				** Polyethylene (PE) Anual depresiation						Addition Labor	***Anual additions	
	Number	length m.	weight kg	cost L.E.	length m.	width m.	weight kg	cost L.E.	steel bar L.E	PE L.E.	cost L.E.	cost per row	L.E. per feddan
Vine sprayed with dormex: Covering type 1	12	6	4.8	62.4	80	6	86.400	432	10.40	144.00	10.00	164.00	3280.0
Covering type 2	12	6	4.8	62.4	80	6	86.400	432	10.40	155.66	15.00	181.06	3621.2
Soilcover					70	2	8.820	+35 467					
Covering type 3	-	-	-	-	80	5	72.000	360	-	120.00	10.00	130.00	2600.0
Covering type 4	-	-	-	-	80	4	57.600	288	-	96.00	5.00	101.00	2020.0
Covering type 5	-	-	-	-	80	2.5	36.000	180	-	60.00	5.00	65.00	1300.0
Without covering 6	-	-	-	-	-	-	-	-	-	-	-	-	-
Vine Spryed with water 7	-	-	-	-	-	-	-	-	-	-	-	-	-

* Steel bar thickness Ø = 75 mm and were used for 6 years
** PE Film were used for 3 years
*** Feddan = 20 row

Table 8. Production and economical indicators of some covering types and Dromex treatments of Flame Seedless grapevine.

	Treatments	* Yield (kg)		Harvesting Date	Price 1kg L.E.	Total return per feddan L.E.	Additional cost per feddan L.E.	Cross margin per feddan L.E.	Changes in gross margin %	Cross additional cost ratio
		vine	Feddan **							
Vine sprayed with dormex	Covering type 1	6.459	4.521	April 30	5.00	22.605.0	3,280.0	19,325.0	152.0	5.9
	Covering type 2	6.246	4.372	April 21	6.00	26,232.0	3,621.2	22,610.8	196.0	6.2
	Covering type 3	6.044	4.231	May 3	5.00	21,155.0	2,600.0	18,555.0	143.0	7.14
	Covering type 4	5.170	3.619	June 11	3.00	10,857	2,020.0	8,837	16.0	4.3
	Covering type 5	6.166	4.316	June 13	3.00	12,948.0	1,300.0	11,648.0	52.4	8.9
	Without covering 6	6.189	4.332	June 21	2.00	8,664.0	-	8,664.0	13.0	-
	Vine Spryed with water 7	7.277	5.094	June 26	1.50	7,641.0	-	7,641.0	0.00	

* Averoge yield of the two seasons ** Feddan = 700 vines

temperature around the vines and thereby increase heat unit accumulation which induce early budburst, growth and fruiting. However, a parallel investigation under the same condition on the effect of plastic covering was reported by Imai *et al.* (1981) who found that berries from vines grown at 20°C matured better and earlier than those grown at lower temperatures. Novello *et al.* (1998) mentioned that covering with plastic film resulted in higher temperatures surrounding the buds and earlier budbreak. Novello *et al.* (2000) added that covering Maltide grapvines increased growing degree days accumulation and advanced budbreak.

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تأثير بعض طرز التغطية بالبول إيثيلين والمعاملة بالهيدروجين سيناميد على النمو الخضرى والنضج المبكر فى العنب الفليم سيدلس

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فى تجربة لدراسة تأثير بعض طرز التغطية بالبولى إيثلين الشفاف وكذلك المعاملة بالدرومكس (سيناميد الهيدروجين ٥٪) على العنب الفليم سيدلس النامى فى أرض رملية تعانى من إنخفاض الخصوبة وتروى بماء به نسبة عالية من الاملاح بنظام الرى بالتنقيط فى منطقة القصاصين بمحافظة الإسماعيلية فى موسمى ١٩٩٩- ٢٠٠٠م.

تم رش الكرمات (عمر ٥ سنوات) بالدرومكس فى ١٥ ديسمبر بعد إجراء عملية التقليم الشتوى وأجريت طرز التغطية بالبولى إيثيلين (المعاملات) وذلك فى موسمى الدراسة كما يلى :

تم تغطية الكرمات بطريقة الأنفاق العالية بالبولى إيثلين الشفاف (T_1) - (T_2) مثل (T_1) بالاضافة إلى تغطية سطح التربة بالبولى إيثيلن الشفاف . (T_3) غطيت الكرمات بفرد رقائق البولى إيثلين فوق الأسلاك من الجهتين حتى سطح الأرض ودفن البولى إيثيلين فى التربة (T_4) مثل (T_3) ولكن رقائق البولى إيثيلين لم تدفن فى التربة (T_5) مثل (T_4) ولكن رقائق البولى إثيلين كانت على بعد ٧٥ سم من سطح الأرض (T_6) كرمات رشت بالدرمكس بدون تغطية ، (T_7) كرمات رشت بالماء وبدون تغطية .

وأوضحت النتائج المتحصل عليها فى موسمى الدراسة مايلى :

المعاملات (T_1 & T_2) أدت إلى تبكير تفتح البراعم مسجلة أعلى القيم فى هذا الصدد ، وكذلك أعلى القيم فيما يتعلق بالنسبة المئوية للتفتح ، كما أوضحت النتائج

المتحصل عليها أن المعاملات T_1, T_2, T_3 بكرت في جمع المحصول (أعلى القيم للتبكير) بمتوسطات (٥٣ ، ٦٢ ، ٥٦ يوم) ، (٥٠، ٥٦، ٤٣ يوم) وذلك في موسمى الدراسة على التوالى ، بالإضافة إلى ذلك فإن هذه المعاملات الثلاثة الأولى حسنت من صفات الجودة فيما يتعلق TSS ، pH ووزن وحجم العصير المستخرج من ١٠٠ حبة .

كما أوضحت النتائج أيضاً أن رش كرمات العنب الفليم سيدلس بالدرومكس بعد التقليم الشتوى وبدون تغطية أدى إلى زيادة عدد الأوراق / فرخ ، وكذا النسبة المئوية لتفتح البراعم .

بالإضافة إلى ذلك فقد أعطت المعاملة (T_7) ، وهى تمثل كرمات المقارنه (بدون رش للدرومكس وبدون تغطية)، أعلى محصول / كرمة ، وكذا أعلى متوسط الوزن العنقود ، كما أدت هذه المعاملة إلى زيادة كلاً من طول الفرخ ومساحة الورقة ووزن نواتج التقليم ومن وجهة النظر الإقتصادية فيما يتعلق بتكاليف التغطية وأعلى عائد (هامش الربح) لمساحة فدان فقد تفوقت المعاملة T_2 (التغطية بطريقة الأنفاق العالية بالبولى إيثيلين مع تغطية سطح التربة) عند مقارنتها ببقية المعاملات المذكورة والتى ينصح بأتباعها تحت مثل هذه الظروف.