

THE EFFECTS OF PLASTIC COVERING ON YIELD AND QUALITY VARIETIES OF SOME TABLE GRAPES IN ALAŞEHİR (MANİSA)

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ABSTRACT

Table grapes are usually grown under plastic cover or sheet for earliness. In this work, outdoor grown Cardinal, Yalova İncisi and Yuvarlak Çekirdeksiz (Round Seedless) table grape cultivars were covered with UV+IR (Ultra violet+Infra red) type of polyethylene (PE) between mid-february and mid-april, in Alaşehir (Manisa) conditions. Phenological stages like bud-burst, blooming, veraison, and ripening, and growth, yield and quality characteristics of the cultivars were determined.

Plastic covering of grapevines of Cardinal, Yalova İncisi and Yuvarlak Çekirdeksiz (Round Seedless) markedly enhanced the dates of phenological stages and especially ripening for 27 days in Cardinal, for 29-30 days in Yalova İncisi and for 26-33 days in Yuvarlak Çekirdeksiz (Round Seedless) when compared with the outdoor ripening dates. Shoot lengths of plastic covered vines were always longer at each measuring date than those of controls. Plastic covering had no significant effect on yield and quality characteristics of berries and clusters measured at the harvest time. Air temperatures were always higher under plastic covers than those of the controls.

Key words: *Vitis vinifera* L., plastic covering, earliness, table grapes

ALAŞEHİR'DE (MANİSA) BAZI SOFRALIK ÜZÜM ÇEŞİTLERİNİN PLASTİK ÖRTÜ ALTINA ALINMASININ VERİM VE KALİTE ÜZERİNE ETKİLERİ

ÖZET

Sofralık üzümler, erkencilik sağlamak amacıyla esas olarak plastik örtü altında yetiştirilmektedir. Bu çalışmada, Alaşehir (Manisa) koşullarında, Cardinal, Yalova İncisi ve Yuvarlak Çekirdeksiz sofralık üzüm çeşitleri şubat ayı ortası ile nisan ayı ortası arasında, UV+IR (Ultra violet+Infra red) tipi polietilen (PE) örtü ile örtülmüş, Kontrol omcaları ise açık ortamda yetiştirilmiştir. Çeşitlerin, fenolojik gelişme safhaları; uyanma, çiçeklenme, ben düşme ve olgunlaşmanın yanısıra; gelişme, verim ve bazı kalite özellikleri üzerine olan etkileri belirlenmiştir.

Cardinal, Yalova İncisi ve Yuvarlak Çekirdeksiz asmalarının plastik örtü altında yetiştirilenleri ile açık ortamda yetiştirilenler karşılaştırıldıklarında, fenolojik safhalar itibarıyla en belirgin farklılık olgunlaşma tarihlerinde görülmüş, Cardinal'de 27 gün, Yalova İncisi'nde 29-30 gün ve Yuvarlak Çekirdeksiz'de 26-33 gün erkencilik sağlamıştır. Plastik örtü altındaki asmalarda sürgün uzunluğu her bir ölçüm tarihinde kontrol asmalarından daima daha uzun olmuştur. Verim, sal-kum ve tanenin kalite özellikleri hasat zamanında ölçülmüş ve plastik örtünün etkisinin önemli düzeyde olmadığı saptanmıştır. Plastik örtüler altındaki hava sıcaklığı kontrollerden daima daha yüksek olmuştur.

Anahtar kelimeler: *Vitis vinifera* L. Plastik örtü, erkenci, sofralık üzüm

INTRODUCTION

Turkey takes an important position in the viticulture of the world and ranks 5th in production and 4th place (Çoban and Kara, 2002). The most important region is Aegean region because of its high production capacity.

Protected cultivation of grapevines under plastic covers to advance the maturity is of great importance especially in the Mediterranean countries. These regions have a potential value for early ripening of table grapes under plastic covers without heating (Uzun, 1993).

Earliness achieved by this cultivation technique of Cardinal was 20 days in Cyprus, 19-20 days in France, 14-17 days in Turkey and 20-30 days in Italy (Vryonides, 1977; Pacini, 1989; Uzun and İlter, 1993; Uzun and Özbaş, 1995; Ergenoğlu *et al.*, 1999).

Plastic covering advanced ripening for 11 days for Tarsus Beyazı; 16 days for Perle de Csaba and Muscat Reine de Vigne; 21 days for Cardinal; 14 days for Perlette and Yalova İncisi in Tarsus (Aytaç, 1990; Ergenoğlu *et al.*, 1999). Maturity was advanced 15 days in Yuvarlak Çekirdeksiz (Round Seedless); 13 days for Cardinal; 17 days for Perlette; 19 days for Black Bagdat (in İzmir) and 19 days for Yalova İncisi; 30 days for Round Seedless under plastic covers (in Aydın) (Uzun, 1988; 1993; Uzun and İlter, 1993; Yüksel, 2001).

In this experiment, the effect of plastic covering on phenological stages like bud-burst, blooming, veraison, ripening, and growth, yield and quality characteristics of Cardinal, Yalova İncisi and Yuvarlak Çekirdeksiz (Round Seedless) grape cultivars were determined.

MATERIAL AND METHODS

This experiment was carried out in 2001-2002 at the grapevines of Cardinal, Yalova İncisi and Yuvarlak Çekirdeksiz (Round Seedless) in Alaşehir (Manisa). Cardinal and Yalova İncisi are early table grape cultivars and they ripen in the open field conditions of Alaşehir in mid-july. Yuvarlak Çekirdeksiz (Round Seedless) is a mid-season table grape cultivar and it ripens in mid-august in the outside conditions (Winkler *et al.*, 1974; Uzun, 1993; Çelik, 2002).

Cardinal and Yalova İncisi were grafted on 'Chasselas X Berlandieri 41 B' in 1994. The planting distances were 3.0 m between the rows and 2.0 m on the row. Yuvarlak Çekirdeksiz was grafted on 'Berlandieri X Riparia 5 BB' in 1990.

The planting distances were 2.80 m between the rows and 1.70 m on the row.

Each row of grapevines was covered 3.00 m in height and 5 m in width with UV+IR (Ultra violet+Infra red) type of polyethylene (PE), from mid-february to mid-april (Covered field is 400 m²).

Grapevines grown in the open field (Uncovered) were regarded as controls.

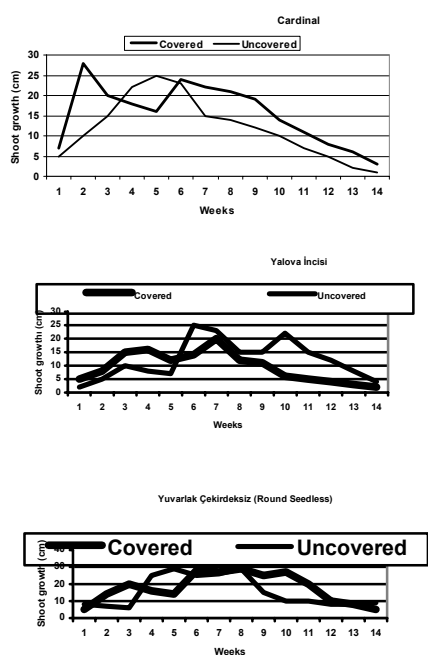


Figure 1. Shoot growth of plastic covered and uncovered vines.

Phenological stages were observed by using OIV (Office International de la Vigne et du Vin) and IBPGR (International Board For Plant Genetic Resources) methods (Anonymous, 1983).

Total soluble solids of juice (TSS) were determined with hand refract meter, and the acidity by titration with 0.1 N NaOH, as tartaric acid. Statistical comparisons were made at 5 % level with 't' test.

RESULTS AND DISCUSSION

Plastic covering of grapevines of Cardinal, Yalova İncisi and Round Seedless advanced the dates of phenological stages such as bud-burst, flowering, veraison and ripening (Table 1). Plastic covering hastened bud-burst for 17-31 days compared with vines grown in the open field. In all cultivars, bud-burst of covered vines were earlier in 2001 than in 2002. Bud-burst was of Yalova İncisi under plastic cover 7-10 days earlier than of other two cultivars in 2001.

Plastic covering advanced flowering 31-33 days in Cardinal, 25-27 days in Yalova İncisi and 35-39 days in Yuvarlak Çekirdeksiz (Round Seedless), depending on the years and veraison 28-30 days in Cardinal 23 days in Yalova İncisi, and 31 days in Yuvarlak Çekirdeksiz (Round Seedless).

Grapes of plastic covered vines ripen earlier 27 days in Cardinal, 29-30 days in Yalova İncisi and 26-33 days Yuvarlak Çekirdeksiz (Round Seedless), than outdoor grown vines.

Plastic covering of grapevines are highly effective in advancing phenological stages. This can be attributed to higher air temperatures under plastic

covers. At the same time, higher air temperatures in February under plastic covers have been accounted for earlier bud-burst in 2001 compared to in 2002. The differences between plastic covered and control vines with regard to the number of the days at bud-burst increased at later phenological stages.

Table 2 showed that shoot lengths under plastic covered vines were significantly longer than those of control vines.

Plastic covering had no significant effect on the yield and the quality characteristics of berries and clusters measured at harvest time. However, total shoot length and growth were significantly different between years. These results are in accord with findings of Uzun (1988), Uzun and İlder (1993) Uzun and Özbaş (1995), Ergenoğlu *et al.* (1999) and Yüksel (2001).

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Table 1. Effects of plastic covering on the dates of phenological stages of Cardinal, Yalova İncisi and Yuvarlak Çekirdeksiz (Round Seedless) (mm/dd)

Phenological stages	2001			2002		
	Covered	Uncovered	Difference (days)	Covered	Uncovered	Difference (days)
CARDINAL						
Bud-burst	03/16	04/02	17	03/22	04/05	14
Flowering	04/15	05/17	33	04/20	05/20	31
Verasion	06/07	07/05	28	06/15	07/15	30
Ripening	06/25	07/22	27	06/29	07/25	27
YALOVA İNCİSİ						
Bud-burst	03/10	04/10	31	03/08	04/06	29
Flowering	04/15	05/12	27	04/16	05/10	25
Verasion	06/02	06/25	23	06/05	06/28	23
Ripening	06/17	07/17	30	06/20	07/19	29
YUVARLAK ÇEKİRDEKSİZ (ROUND SEEDLESS)						
Bud-burst	03/10	04/06	27	03/14	04/10	28
Flowering	04/20	05/29	39	04/26	05/30	35
Verasion	06/15	07/16	31	06/19	07/20	31
Ripening	07/10	08/12	33	07/15	08/10	26

Table 2. Some characteristics of plastic covered and uncovered (control) vines of Cardinal, Yalova İncisi and Yuvarlak Çekirdeksiz (Round Seedless) at first harvest time

Characteristics	2001			2002		
	Covered	Uncovered	<i>t-test (P value)</i>	Covered	Uncovered	<i>t-test (P value)</i>
CARDINAL						
Yield (g/vine)	9200	9650	0.350	8400	8950	0.275
Cluster weight (g)	315	340	0.035	305	320	0.100
Cluster length (cm)	18.3	19.7	0.012	17.0	18.2	0.060
Cluster width (cm)	9.0	11.2	0.016	10.3	10.5	0.080
Berry weight (g)	5.0	5.2	0.530	4.8	5.1	0.150
Berry length (mm)	19.1	22.0	0.018	17.9	17.7	0.020
Berry width (mm)	18.0	21.7	0.020	16.9	17.3	0.016
Berry rupture point force (g)	322.5	311.7	0.085	305.7	300.4	0.345
Shoot weight (g/vine)	1800	1950	0.015	1700	1580	0.530
Shoot length (cm)	220.5	201.6	0.171	230.0	205.6	0.125
Total soluble solids (%)	14.6	14.8	0.350	14.1	14.0	0.020
Titrateable acidity (%)	0.724	0.680	0.010	0.625	0.640	0.015
YALOVA İNCİSİ						
Yield (g/vine)	8500	9100	0.600	7400	7600	0.100
Cluster weight (g)	450	470	0.200	420	430	0.050
Cluster length (cm)	22.4	24.3	0.050	20.5	21.0	0.025
Cluster width (cm)	11.8	11.9	0.015	11.3	10.9	0.200
Berry weight (g)	5.3	5.4	0.005	5.2	5.5	0.050
Berry length (mm)	24	24	0.001	23	24	0.010
Berry width (mm)	22	23	0.012	23	23	0.000
Berry rupture point force (g)	305	312	0.550	290	305	0.750
Shoot weight (g/vine)	1900	1980	0.450	1800	1850	0.025
Shoot length (cm)	230	218	0.170	220	211	0.530
Total soluble solids (%)	16.1	15.9	0.015	16.0	15.5	0.050
Titrateable acidity (%)	0.560	0.585	0.012	0.570	0.600	0.012
YUVARLAK ÇEKİRDEKSİZ (ROUND SEEDLESS)						
Yield (g/vine)	9300	10700	0.680	8400	9000	0.275
Cluster weight (g)	470	550	0.040	450	460	0.050
Cluster length (cm)	25.0	30.5	0.016	28.0	29.5	0.075
Cluster width (cm)	12.6	13.0	0.040	11.0	11.2	0.020
Berry weight (g)	3.4	3.6	0.036	3.0	3.1	0.010
Berry length (mm)	33	34	0.020	3.0	2.9	0.012
Berry width (mm)	29	27	0.100	3.0	2.8	0.016
Berry rupture point force (g)	380	410	0.140	350	350	0.001
Shoot weight (g/vine)	2350	2600	0.035	2250	2300	0.630
Shoot length (cm)	245	220	0.250	225	205	0.035
Total soluble solids (%)	16.5	16.9	0.200	16.6	16.3	0.012
Titrateable acidity (%)	0.730	0.760	0.025	0.800	0.850	0.010