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Effects of Some Applications on Yield and Yield Components of Tilki Kuyruğu Grape Variety

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Abstract

This study was conducted on grownTilki Kuyrugu grape variety (*Vitis vinifera* L.) in Mersin province in Turkey in 2016. The cultivar is 12 years old and grown on their own roots and evaluated as table. The effects on yield and yield components were researched of Control (C), 1/3 Cluster Tip Reduction (1/3 CTR), Shoot Tip Reduction (STR), Humic Substance (HS), 1/3 CTR+STR, 1/3 CTR+HS, STR+HS, 1/3 CTR+STR+HS applications in Tilki Kuyrugu grape variety. The results were obtained as the highest fresh grape yield were (9.86 kg/vine) with 1/3 CTR and (9.77 kg/vine) with HS applications; the highest cluster weight were (328.78 g) with 1/3 CTR, (325.56 g) with HS, (309.89 g) with 1/3 CTR+STR and (305.11 g) with STR applications; the highest 100 berry weight was (512.89 g) with STR application; the highest maturity index was (57.12) with STR+HS application; the highest must yield were (730.00 ml/kg) with 1/3 CTR+STR, (723.33 ml/kg) with HS, (710.00 ml/kg) with STR, (693.33 ml/kg) with 1/3 CTR+HS and (693.33 ml/kg) with STR+HS applications. 1/3 CTR and HS applications can be increased fresh grape yield. Additionally, 1/3 CTR, STR, HS and 1/3 SUK + SUA applications can be increased bunch weight in Tilki Kuyruğu grape variety.
Keywords: Cluster tip reduction, humic substances, shoot tip reduction, Tilki Kuyruğu grape variety, yield, yield components

Öz

Tilki Kuyruğu Üzüm Çeşidinde Bazı Uygulamaların Verim ve Verim Unsurları Üzerine Etkileri

Bu çalışma, 2016 yılında Mersin ili'nde yetiştirilen Tilki Kuyruğu (*Vitis vinifera* L.) üzüm çeşidinde gerçekleştirilmiştir. Bu çeşit 12 yaşında olup, kendi kökü üzerinde yetiştirilmekte ve sofralık olarak değerlendirilmektedir. Araştırmada, Kontrol (K), 1/3 Salkım Ucu Kesme (1/3 SUK), Sürgün Ucu Alma (SUA), Hümik Madde (HM), 1/3 SUK+SUA, 1/3 SUK+HM, SUA+HM, 1/3 SUK+SUA+HM uygulamalarının Tilki Kuyruğu üzüm çeşidinde verim ve verim unsurları üzerine etkileri incelenmiştir. En yüksek taze üzüm verimi (9,86 kg/asma) 1/3 SUK ve (9,77 kg/asma) HM uygulamaları ile; en yüksek salkım ağırlığı (328,78 g) 1/3 SUK, (325,56 g) HM, (309,89 g) 1/3 SUK+SUA ve (305,11 g) SUA uygulamaları ile; en yüksek 100 tane ağırlığı (512,89 g) SUA uygulaması ile; en yüksek olgunluk indisi (57,12) SUA+HM uygulaması ile; en yüksek şıra randımanı (730,00 ml/kg) 1/3 SUK+SUA, (723,33 ml/kg) HM, (710,00 ml/kg) SUA, (693,33 ml/kg) 1/3 SUK+HM ve (693,33 ml/kg) SUA+HM uygulamaları ile elde edilmiştir. Tilki Kuyruğu üzüm çeşidinde, taze üzüm verimini artırmak 1/3 SUK ve HM, salkım ağırlığını artırmak için 1/3 SUK, SUA, HM ve 1/3 SUK+SUA uygulamaları tavsiye edilebilir.
Anahtar Kelimeler: Salkım ucu kesme, hümik madde, sürgün ucu alma, Tilki Kuyruğu üzüm çeşidi, verim, verim unsurları

Introduction

Grape is a very important fruit species in Turkey. It is producing 67.067.129 tons of grapes from 6.969.373 hectares in the World (FAO, 2016). Turkey has the 5th with 461.956 hectares of viticulture area, and the 6th with 3.650.000 tons of production in Turkey (TÜİK, 2016).

TKI–Humas; the liquid is a natural organic soil conditioner, produced from leonardit and low–quality lignite. It has humic acid and fulvic acid (12%) (Gezgin, 2013). Humic substances (HS) are useful in microbial activity by increasing conversions as a result of the stimulating plant growth hormones.

Blauer Portugieser grapevine variety was studied two different yield reductions based on cluster thinning. Blauer Portugieser significantly decreased titratable acidity in grape and wine, and increased pH in wine. While yield per vine was significantly decreased. °Brix was increased in grape (Reščič et al., 2015). Lateral floral clusters was removed in 'Houman' grape plants. Floral cluster application was increased berry size, fruit weight and the total content of soluble solids. But, the level of titratable acidity was decreased (Zhang et al., 2016).

Hasandede grape variety was investigated in grafted on 5 BB rootstock in 2011. The highest berry weight was found with Control K (3.57 g) application. The highest ^{o}Brix was identified with C (17.47%) application. The highest maturity index was determined with 1/3 Cluster Tip Reduction (56.95) and 1/3 Cluster Tip Reduction+Humic Acid (56.70) applications (HS) (Akın ve Sarıkaya, 2012). TSS ratio increased with the application of humic acid in Ercis grape variety (Yaşar, 2005). Ercis grape cultivar (*V. vinifera* L.) was determined the effects of humic acid applications. Grape yield and cluster weight was not found effects of humic acid application (Cangi et al., 2006).

Uslu (*V. vinifera* L.) and Cardinal (*V. vinifera* L.) grape cultivars were conducted in Canakkale in Turkey. When the berries were 5–7 mm, the clusters were tipped at 1/3rd, 1/6th and 1/12th of the cluster length. In Uslu, cluster length (cm), cluster width (cm), cluster compactness (1–9), number of berries/cluster (n), berry weight (g) and titratable acidity (TA) (%) parameters were affected by the applications. In Cardinal, cluster length (cm), cluster compactness (1–9), number of berries/cluster (n), berry weight (g), total soluble solid (TSS) (%), titratable acidity (TA) (%) and maturity index parameters were affected by the applications. Yield was not affected by cluster tipping in Uslu and Cardinal grape cultivars. It was concluded that the cluster tipping applied to Uslu in a proportion of one–third and to the Cardinal in a proportion of one–sixth of the cluster length would be positively sufficient in terms of increasing the grape quality (Dardeniz, 2014).

Alphonse Lavallee grape cultivar was investigated in Konya in Turkey. The results were obtained as the highest cluster weight (302.31 g) with 18 bud/vine application; the highest berry weight (6.31 g) with 23 bud/vine + TKI–Humas (soil) and (6.79 g) with 28 bud/vine + TKI–Humas (soil) applications; the highest maturity index (36.95) with 18 bud/vine + TKI–Humas (soil) application (Sarıkaya and Akın, 2016).

A study was concluded to determine the effects different concentration of humic acid and acetic acid foliar application in a grape (*Vitis vinifera* L.) orchard at Kashmar region. Grape yield was increased with spray treatments (Asgharzade and Babaeian, 2012). Superior seedless grapevine was carried out to determine some productivity and quality values. Cluster weight and maturity index were increased by HS compared with control vines (Ibrahim and Ali, 2016). Kabarcık (*Vitis vinifera* L.) grape cultivar was conducted to determine the effects on yield and quality. Humic acid application was increased fresh grape yield and must yield values (Akın and Alağöz, 2016).

The objective of this study was to determine the effects of Control, 1/3, 1/6, 1/9 Cluster Tip Reductions, Humic Substance and combined applications in Tilki Kuyrugu grape variety.

Materials and Methods

Tilki kuyruğu grape variety is consumed as table grape, yellow–green skin, seedy, matures in the middle of September. The present study was conducted with three different applications as three replication.

Experimental design;

1) Control (C), 2) 1/3 Cluster Tip Reduction (1/3 CTR), 3) Shoot Tip Reduction (STR), 4) Humic Substance (HS), 5) 1/3 CTR+STR, 6) 1/3 CTR+HS, 7) STR+HS, 8) 1/3 CTR+STR+HS.

The effects on yield and yield components of this application in Tilki Kuyrugu grape variety were determined. 63 vines were used in total in this study.

1/3 Cluster Tip Reduction (1/3 CTR): It was cut one third of the cluster length. The 1/3 cluster reduction of all clusters were applied in the berry set period without the control vines.

Shoot Tip Reduction (STR): From 40 to 45 cm long and 10 cm from the ends of the shoots located on the cluster part was cut off.

TKI–Humas Composition: TKI–Humas; leonardit produced from low–quality lignite, containing 12% humic and fulvic acid is a liquid natural organic soil conditioner. Total Organic Matter: 5%; Humic Acid + Fulvic Acid: 12%; Water Soluble Potassium Oxide (K_2O–3%), PH: 11–13.

Implementation of TKI–Humas on Soil: 333 ml TKI–Humas/5 lt water for each vine was applied. Applications were made in the evening near the cool hours.

1.TKI–Humas was applied to soil before bud burst,

2.TKI–Humas was applied to soil before blooming.

Fresh Grape Yield (kg/vine): It is calculated by weighing collected all cluster in the vine

Cluster Weight (g): It was found by dividing the total grape yield with the number of grape cluster obtained from each parcel.

100 Berry Weight (g): It was calculated 25 berries weight collected using the method (Amerine and Cruess, 1960) and multiply by 4 and weighs 100 grams.

Must Yield (ml/kg): With squeezing of 1 kg from the grapes collected by chance, given in ml/kg.

Maturity Index (°Brix /TA): It was determined with the division of °Brix to TA. °Brix (total soluble solid substance) (%) was determined by squeezing the grapes (berries) collected from the vines using the method (Amerine and Cruess, 1960) and keeping the resulting juice at 20 °C in a digital refractometer device (Atago RX 7000 Alpha). TA (titratable acidity) (g/l) was calculated by using the titration method from the juice squeezed from the same grapes. Pipette 5 ml of the grape juice and 50 ml of pure water in the beaker taken to be completed were subjected to titration with 0.1 N NaOH (Nelson, 1985).

The research was planned in a completely randomized block design as a simple factorial experiment, and analysed by JMP statistical package program (version 7.0; SAS Institute, Cary, NC, USA).

Results and Discussion

The effects of all of the applications on fresh grape yield, cluster weight, berry weight, must yield and maturity index in Tilki Kuyrugu grape variety were found statistical significant.

Effects of Applications on Fresh Grape Yield

The result of applications on fresh grape yield was found statistical significant (Fig. 1). The highest fresh grape yield were obtained (9.86 kg/vine) with 1/3 CTR and (9.77 kg/vine) with HS applications compared to C (6.65 kg/vine). In similar studies, Grape yield was significantly decreased in Blauer Portugieser grapevine variety (Reščič et al., 2015). Grape yield was increased by removingof lateral floral clusters in 'Houman' grape plants (Zhang et al., 2016). Ercis grape cultivar (*V. vinifera* L.) on grape yield was not affected by humic acid application (Asgharzade and Babaeian, 2012). However, grape yield was increased with spray treatments of humic acid in a grape (*Vitis vinifera* L.) vinyard at Kashmar region (Ibrahim and Ali, 2016).

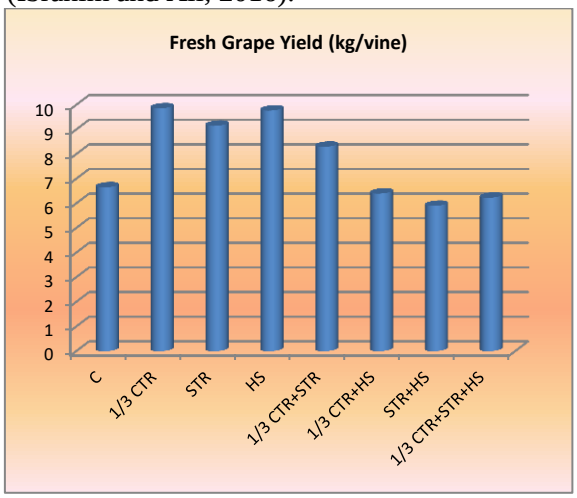

Figure 1. Effects of applications on fresh grape yield

Effects of Applications on Cluster Weight

A different response according to applications in terms of cluster weight was found statistical significant (Fig. 2). It was increased 48.39% with 1/3 CTR (328.78 g) application compared to C (221.56 g). In similar studies, while cluster weight of Ercis grape cultivar (*V. vinifera* L.) was not affected by humic acid application, cluster weight was increased by HS application in Superior seedless grapevine (Ibrahim and Ali, 2016).

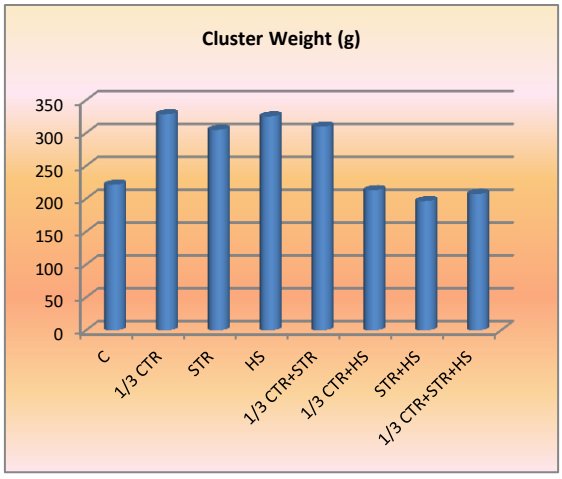

Figure 2. Effects of applications on cluster weight

Effects of Applications on 100 Berry Weight

The result of applications on 100 berry weight was found statistical significant (Fig. 3). The highest 100 berry weight was obtained (512.89 g) with STR application compared to C (396.12 g) application. In similar studies, berry weight was increased by removing of lateral floral clusters in 'Houman' grape plants (Zhang et al., 2016).

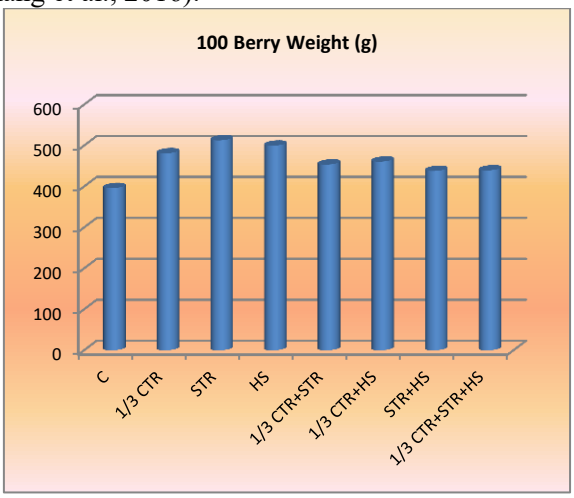

Figure 3. Effects of applications on 100 berry weight

Effect of Applications on Must Yield (Grape Juice)

The result of applications on must yield is determined as a statistical significant (Fig. 4). It was increased 8.95% with 1/3 CTR+STR (730.00 ml/kg) application compared to C (670.00 ml/kg).

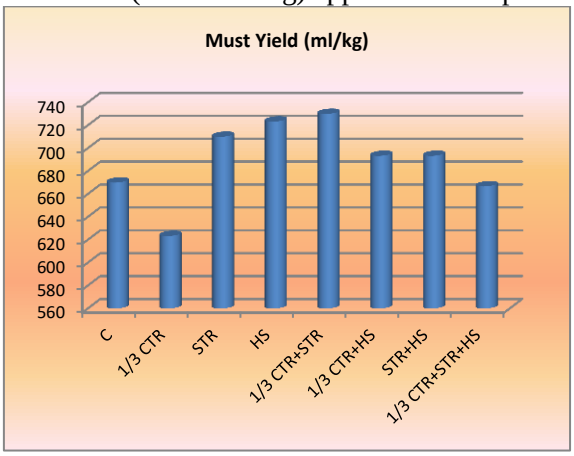

Figure 4. Effects of applications on must yield

Effects of Applications on Maturity Index

Maturity index was found statistical significant (Fig. 5.). Maturity index was higher with (57.12) STR+HS application than C (48.89). In similar studies, maturity index was increased by HS application in Superior seedless grapevine (Ibrahim and Ali, 2016).

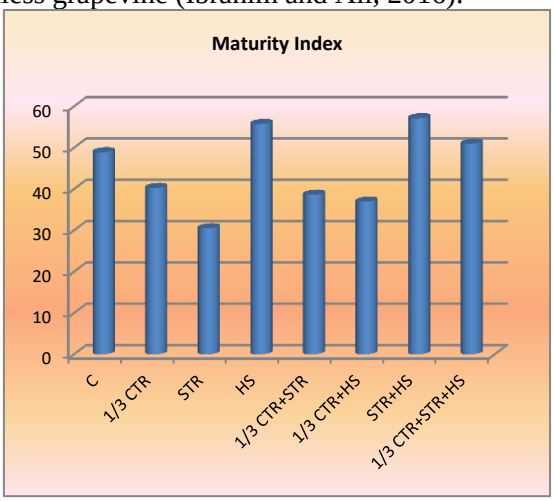

Figure 5. Effects of applications on maturity index

Conclusion

Consequently, we can recommend to improve fresh grape yield with 1/3 CTR and HS applications, 100 berry weight with STR, maturity index with STR+HS applications.

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