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Using Some Technical Operations For Improvement of Quality of King Ruby Grapes

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THIS investigation was conducted for two successive seasons (2014 & 2015) on King Ruby cultivar in a private vineyard at El-deer village, Aga Center, Dakahlia Governorate, Egypt. The chosen vines were fifteen years old, planted in a clay soil under surface irrigation system, spaced at 2 x 3 m using spur pruning under bilateral cardon trellis method with supporting by double T system. This study was carried out to disclose the effect of manual thinning either removing one quarter of the clusters or removing the terminal quarter of the cluster solely after fruit set or in combination with leaf basal removal after fruit set or with trunk girdling at veraison stage.

The results showed that all conducted treatments were effective in improvement the quality of King Ruby grapes as compared with control. Although the vines for which the terminal quarter of the clusters is removed alone or in combination with leaf basal removal or girdling or with leaf basal removal and girdling decreased cluster weight as compared with the vines for which one quarter of the clusters is removed alone or in combination with leaf basal removal or girdling or with leaf basal removal and girdling but gave the highest yield and improved physical and chemical properties of berries such as berry weight, volume, length and width as well as SSC, SSC/acid ratio, total anthocyanin, total sugar, decreased total acidity in berry juice and decreased the percentage of shot berries /cluster.

The application of removing the terminal quarter of the clusters after fruit set in combination with leaf basal removal after fruit set and girdling at verasion stage gave the best values in yield and improved physical and chemical characteristics of berries.

Keywords: Grape, King Ruby, Manual thinning, Leaf basal removal and Girdling.

Grape (*Vitis vinifera* L) is suggested to be one of the most important fruits for local consumption and export. In Egypt, grape is considered the second major fruit crop after citrus. The total cultivated area of grape in Egypt reached about 192873 feddans among them about 164310 feddans fruitful with a total production about 1434666 tons according to the statistics of the Ministry of Agriculture (2013). Ruby Seedless cultivar become one of the most important table grapes both in local and export markets. Small berry size and little coloration were produced during the last several years which affect the fruit

quality. The grape grower donated all cultural practices a great attention to improve the yield and berry quality.

Good quality in table grape represents a combination of medium size cluster of uniform large perfect berries with colour, pleasant flavour and texture. There are many factors of grape growing enter into the production of quality. Some of these factors have direct effect on the vine and its fruits such as cluster thinning, summer pruning and girdling treatments Winkler *et al.* (1974) and Kamiloğlu (2011).

Manual thinning of berries to increase berry weight, size and improve the quality of the grapes as mentioned by Omran *et al.* (2004), Abd El-Wahab (2006), Aisha *et al.* (2006), Abd El-Fattah *et al.* (2009), El-Hussanny (2009) and Abd El-Razek e*t al.* (2010). Also, Kamiloğlu (2011) reported that juice quality (TSS, TSS /acidity and Total anthocyanin) increased as compared to the control by the cluster thinning.

Cluster thinning is a method of the yield regulation, with the removal of part of cluster, consequently, the yield per leaf area will be lower and the grape and wine quality will be improved Fazekas *et al.* (2012).

Summer pruning consists of the removal of any vegetative tissues during the growing seasons including shoot thinning, cluster tendril if present, leaf removal, tipping, pinching, and topping of shoot. This practice is very important for vine life, training, vigor, quality and productivity Abd El-Ghany (2005).

Leaf removal is important in canopy management. Sunlight-exposed fruits contain more sugar and less acid than non-exposed fruits Koblet (1984). Removing basal leaves slightly changed temperature, atmospheric humidity, wind speed, and leaf wetness around grape clusters English *et al.* (1990).

Many investigators explained the effect of leaf removal on the total soluble solids, anthocyanin and acidity of grape berries. They found that sunlight-exposed fruits are generally greater in total soluble solids, anthocyanin and lower in titratable acidity, compared to non exposed fruits or canopy shaded Ferree *et al.* (2004), Kliewer & Dokoozlian (2005), Santesteban & Royo (2006) and Prajitna *et al.* (2007).

Reynolds *et al.* (2006) mentioned that leaf basal removal increased color intensity and anthocyanin in berries. Also, Abd El-Razek *et al.* (2010) found that defoliation play an essential role in improving fruit quality of 'Crimson Seedless' Grapes.

Girdling which consists of removing a small section of phloem (about 4mm in width) from around the trunk to produce large berries of grapes intended for table use or to enhance fruit maturity by enhancing coloration or accumulation of

sugar (Williams & Ayars (2005) and Abu-Zahra & Salameh (2012). Also, girdling grapevine at veraison stage increases accumulation of carbohydrates in the parts above girdle and resulted in enhancing the development of colour and SSC% and therefore hasten maturity (Fawzi & Eman (2003) and Omar & Girgis (2005).

Rather *et al.* (2011) suggests that girdling and growth regulators application are a desirable practice to enhance berry ripening and fruit quality in grape cv. Perlette.

The target of the present study is to disclose the effect of clusters thinning solely or in combination with leaf basal removal or girdling as possible means for improving cluster and berry quality of King Ruby grapes.

Materials and Methods

This investigation was carried out during two successive seasons (2014 & 2015) in a private vineyard at El-deer village, Aga Center, Dakahlia Governorate, Egypt. The experiment was conducted on 15-year-old King Ruby grapevines cultivar .Vines cultivated at 2m within- rows and 3m between-rows. The vines are grown in a clay soil under surface irrigation system under bilateral cardon trellis method with supporting by double (T) system. During January of each experimental season, the tested vines were spur- pruned by leaving 6 spurs with 2 eyes on each cardon. The total load was 48 buds. Eighty one vines, uniform in vigor as possible, were chosen for this study, all vines received the cultural managements, such as fertilization, irrigation, disease and pest control that commonly performed in that district. When cluster development reached (7-10 cm in length) crop load was adjusted to 28 clusters per vine. The experiment consists of nine treatments arranged in a complete randomize block design, each treatment include 3 replicates, each contain 3 vines.

The treatments were as the following :

T1 - Control (Un-thinned vine).
T2 - Removing one quarter of the clusters number.
T3 - Removing one quarter of the clusters number + Leaf basal removal.
T4 - Removing one quarter of the clusters number + Girdling.
T5 - Removing one quarter of the clusters number + Leaf basal removal + Girdling.
T6 - Removing the terminal quarter of the cluster.
T7 - Removing the terminal quarter of the cluster + Leaf basal removal.
T8 - Removing the terminal quarter of the cluster + Girdling.
T9 - Removing the terminal quarter of the cluster + Leaf basal removal + Girdling.

Cluster thinning treatments was carried out after fruit set as follows :

- Control (Un-thinned vine) number of clusters fixed to 28 clusters per vine.

- Removing one quarter of the clusters number, thus retained 21clusters per vine.
- Removing the terminal quarter of the cluster thus retained 28 clusters per vine.

Leaf basal removal was done after fruit set, all subjacent leaves from the cluster to the basal of shoot were removal except the adjacent leaf of the cluster.

Girdling was carried out at veraison stage by removing a narrow ring of the bark (3 mm) entirely around the trunk.

Measurements

Yield

At harvesting time when SSC % in berry reached about 16-17 % in control Hamza (2013), six clusters /vine were weighted and the average cluster weight was multiplied by number of clusters/vine and hence average yield/vine was calculated.

Physical properties

A sample of 6 clusters /vine was taken for determining: Average cluster weight (g), Average cluster length and width (cm), Average of berry weight (g), berry volume (cm^3) and berry length and width (cm). While the percentage of shot berries of cluster was calculated by dividing weight of shot berries by weight of total berries per cluster.

Chemical properties

- Soluble solids content (SSC %) was determined by using a hand refractometer.
- Total acidity percentage was determined according to A.O.A.C. (1980).
- SSC/acid ratio was calculated by dividing the percentage of SSC by total acidity.
- Total anthocyanin of the berry skin (mg/100g fresh weight) were calculated accordin to Husia *et al.* (1965).
- Total sugars (%) were determined according to Sadasivam and Manickam (1996).
- Total carbohydrates in the canes (%) were determined at winter pruning according to Hedge and Hofreiter (1962).

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 (1980). Averages were compared using the new L.S.D. values at 5% level.

Results and Discussion

Yield and physical properties of cluster

Data in Table 1 showed that the vines for which the terminal quarter of the cluster was removed alone (T6) or in combination with leaf basal removal (T7) or girdling (T8) and leaf basal removal in combination with girdling (T9) significantly increased yield/vine than the vines for which one quarter of the clusters number was removed alone (T2) or in combination with leaf basal removal (T3) or girdling (T4) and leaf basal removal in combination with girdling (T5). In this respect, girdling treatment (T8) and leaf basal removal in combination with girdling treatment (T9) under removing the terminal quarter of the cluster gave the highest values when compared with the other treatments during the two seasons of study.

These results are in agreement with those obtained by Omran *et al.* (2004) who found that one quarter cluster removal (one quarter apical main stem of cluster was cut) increased yield/vine as compared with control. Abd El-Wahab (2006) reported that girdling trunk at version stage improved yield/vine. El-Hussanny (2009) found that removing one third of flower cluster and girdling trunk of Roomy Red increased yield /vine

Also, data revealed that the average cluster weight was significantly higher from the vines for which one quarter of the clusters number was removed alone (T2) or in combination with leaf basal removal (T3) or girdling (T4) and leaf basal removal in combination with girdling (T5) than those obtained from the vines for which the terminal quarter of the cluster was removed alone (T6) or in combination with leaf basal removal (T7) or girdling (T8) or leaf basal removal in combination girdling (T9) and control (T1). In this respect, girdling treatment (T4) alone or in combination with leaf removal (T5) under removing one the quarter of the clusters number produced the highest values of cluster weight compared with other treatments in both season of study.

These results are in agreement with those reported by many investigators such as Aisha *et al.* (2006) who found that removing one quarter of the clusters number at berry set significantly increased cluster weight compared with control. Also, Abu-Zahra (2010) found that girdling the canes at berry set significantly increased cluster weight. In addition, Abd El-Razek *et al.* (2010) found that leaf basal removal and leaf basal removal in combination with fruiting thinning improved cluster weight.

With respect to cluster length and width the data showed that girdling treatment (T4) alone or in combination with leaf basal removal (T5) under removing one the quarter of the clusters number gave the highest values of cluster length while girdling treatment (T8) alone or in combination with leaf basal removal (T9) under removing the terminal quarter of the cluster gave the highest values of cluster width.

TABLE 1. Effect of clusters thinning, leaf basal removal and girdling on yield and physical properties of King Ruby grapevines clusters in 2014 and 2015 seasons.

Characteristics / Treatments			Yield (kg/vine)		Cluster weight (g)		Cluster length (cm)		Cluster width (cm)		Shot berries (%)	
			2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
T1	Control		12.95	13.11	462.66	468. 33	25.33	25.66	12.00	12. 33	14.38	13.96
T2	Removing one quarter of the clusters number	without	11.49	11.63	547.00	553.66	27.00	27.33	13.00	13.33	9.40	8.92
T3		Leaf basal removal	11.34	11.50	540.00	547.66	26.66	26.33	12.66	13.00	9.88	9.16
T4		Girdling	11.60	11.84	552.60	564.00	27.33	28.00	13.66	13.00	9.10	8.73
T5		Leaf basal removal + Girdling	11.83	11.98	563.33	570.66	28.00	29.00	13.33	13.60	9.05	8.24
T6	Removing the terminal quarter of the clusters	without	13.29	13.44	474.60	480.00	19.00	19.33	14.33	14.66	6.47	5.98
T7		Leaf basal removal	13.06	13.38	466.30	478.00	19.33	19.00	14.00	14.33	6.60	6.19
T8		Girdling	13.66	13.85	488.00	494.66	19.33	19.66	14.66	14.66	6.10	5.37
T9		Leaf basal removal + Girdling	13.78	14.15	492. 00	505.33	19.00	19.33	14.66	15.00	5.83	5.48
New L. S. D. at 5%			0.49	0.46	19.11	19.45	1.36	1.27	1.30	1.10	0.48	0.23

The obtained data are in accordance with those Omran *et al.* (2004), Abd El-Wahab (2006) and Abd El-Razek *et al.* (2010). They found that cluster thinning, girdling and leaf basal removal increased cluster width.

Concerning the percentage of shot berries /cluster, it was found that the vines for which the terminal quarter of the cluster was removed alone or in combination with leaf basal removal or girdling and leaf basal removal in combination with girdling (T6, T7, T8, and T9) significantly decrease percentage of shot berries/cluster than the vines for which one quarter of the clusters number was removed alone or in combination with leaf basal removal or girdling or leaf basal removal in combination with girdling and control (T2, T3, T4, T5 and T1). In this respect, girdling treatment (T8) and leaf basal removal in combination with girdling treatment (T9) under removing the terminal quarter of the cluster gave the lowest values when compared with other treatments during the two seasons of study.

These results are in agreement with those obtained by Aisha *et al.* (2006) who found that cluster thinning at berry set decreased the percentage of shot berries/ cluster of King Ruby grapevines as compared with control.

Physical properties of berries

Data in (Table 2) indicated that all thinning treatments used either removing one quarter of the clusters number or removing the terminal quarter of the cluster alone or in combination with leaf basal removal or girdling and leaf basal removal in combination with girdling significantly increased 100 berry weight and 100 berry volume as well as enhancing berry length and width as compared with control. Vines were removing the terminal quarter of the cluster alone (T6) or in combination with leaf basal removal (T7) or girdling (T8) and leaf basal removal in combination with girdling (T9) recorded the highest values as compared with other treatments, where girdling treatment (T8) and leaf basal removal in combination with girdling treatment (T9) under removing the terminal quarter of the cluster gave the best results in this respect in both seasons of study.

These results are in harmony with those many investigators such as Omran *et al.* (2004) and Abd El-Fattah *et al.* (2009) who found that removing 25% apical portion cluster significantly increased berry weight, volume, length and diameter.

Also, Abd El-Razek *et al.* (2010) reported that leaf basal removal alone and leaf basal removal in combination with fruit thinning treatments producing the heaviest berry weight, the largest volume, improved berry length and width as compared with control.

In addition, Abd El-Wahab (2006), Abu-Zahra (2010) and Abu-Zahra and Salmeh (2012) they mentioned that girdling the canes or trunk recorded the highest values for berry weight, size, length and diameter as compared with control.

TABLE 2. Effect of clusters thinning, leaf basal removal and girdling on physical properties of King Ruby grapevines berries in 2014 and 2015 seasons.

Characteristics / Treatments			100 Berry weight (g)		100 Berry volume (cm^3)		Berry length (cm)		Berry width (cm)	
			2014	2015	2014	2015	2014	2015	2014	2015
T1	Control		285	287	258	266	1.74	1.77	1.63	1.65
T2	Removing one quarter of the clusters number	without	322	326	302	310	1.85	1.89	1.68	1.72
T3		Leaf basal removal	315	318	292	296	1.82	1.90	1.65	1.68
T4		Girdling	38	335	307	320	1.88	1.95	1.73	1.75
T5		Leaf basal removal + Girdling	338	347	314	328	1.90	1.96	1.77	1.79
T6	Removing the terminal quarter of the clusters	without	360	368	338	348	1.92	1.98	1.70	1.75
T7		Leaf basal removal	358	362	332	344	1.88	1.95	1.68	1.72
T8		Girdling	370	385	350	366	1.96	2.00	1.80	1.79
T9		Leaf basal removal + Girdling	382	392	358	370	1.98	2.20	1.85	1.87
New L. S. D. at 5%			24.00	21.00	21.00	19.00	0.08	0.13	0.10	0.10

Chemical properties of berries

Data in Table 3 and 4 revealed that all thinning treatments used either removing one quarter of the clusters number or removing the terminal quarter of the cluster alone or in combination with leaf basal removal or girdling and leaf basal removal in combination with girdling significantly increased SSC%, SSC/acid ratio, total sugar and total anthocyanin in berry skin and gave the least acidity of berry juice as compared to control during the two seasons of study. Where girdling (T4) and leaf basal removal in combination with girdling (T5) treatments under removing one quarter of the clusters number as well as girdling (T8) and leaf basal removal in combination with girdling (T9) treatments under removing the terminal quarter of the cluster gave the highest values in SSC%, SSC/acid ratio, total sugar and least acidity of the juice. While leaf basal removal

(T3) and leaf basal removal in combination with girdling (T5) treatments under removing one quarter of the clusters number as well as leaf basal removal (T7) and leaf basal removal in combination with girdling (9) treatments under the terminal quarter of the cluster gave the highest values in total anthocyanin in berry skin as compared to other treatments in both seasons of study.

TABLE 3. Effect of clusters thinning, leaf basal removal and girdling on SSC %, acidity % and SSC/ acid ratio of King Ruby grapevines berries in 2014 and 2015 seasons.

Characteristics / Treatments			SSC (%)		Acidity (%)		SSC/Acid ratio	
			2014	2015	2014	2015	2014	2015
T1	Control		16.40	16.06	0.505	0.518	32.48	31.00
T2	Removing one quarter of the clusters number	without	17.00	16.86	0.476	0.485	35.71	34.76
T3		Leaf basal removal	17.26	17.40	0.468	0.458	36.88	37.99
T4		Girdling	18.20	18.26	0.430	0.425	42.33	42.96
T5		Leaf basal removal + Girdling	18.53	18.66	0.420	0.410	44.12	45.51
T6	Removing the terminal quarter of the clusters	without	17.40	17.53	0.468	0.462	37.18	37.94
T7		Leaf basal removal	17.86	18 .00	0.452	0.445	39.51	40.45
T8		Girdling	18.60	18.53	0.415	0.419	44.81	44.22
T9		Leaf basal removal + Girdling	18.86	19.00	0.407	0.400	46.34	47.50
New L. S. D. at 5%			0.56	0.66	0.02	0.02	3.21	3.52

The obtained results are in agreement with the findings of Omran *et al.* (2004), Abd El-Wahab (2006), Aisha *et al.* (2006), El-Hussanny (2009), Abd El-Fattah *et al.* (2009), Abd El-Razek *et al.* (2010) and Fazekas *et al.* (2012) they all reported that manual thinning was found to increase SSC %, SSC/acid ratio, total sugar and total anthocyanin in berry skin and reduce total acidity in berry juice.

Also, Abd El-Razek *et al.* (2010) found that leaf basal removal and leaf basal removal in combination with fruit thinning significantly increased SSC %, SSC/acid ratio, total sugars and total anthocyanin in berry skin and decreased the total acidity of Crimson Seedless grapevines. In additions, Abd El-Wahab

(2006), El-Hussanny (2009), Abu Zahra (2010), Abd El-Razek *et al.* (2010), Ratther *et al.* (2011) and Abu Zahra & Salmeh (2012) they found that trunk girdling or cane girdling increased SSC %, SSC/acid ratio, total sugars and improved berry colorations while decreased acidity of berry juice.

Concerning the effect of manual thinning, leaf basal removal and girdling treatments on total carbohydrates in canes the data in Table 4 showed that all thinning treatments used either removing one quarter of the clusters number or removing the terminal quarter of the cluster alone or with girdling treatments gave significant increased total carbohydrates in canes as compared to control. Where girdling treatment (T4) and leaf basal removal in combination with girdling treatment (T5) under removing one quarter of the clusters number as wells as girdling treatment (T8) and leaf basal removal in combination with girdling treatment (T9) under removing the terminal quarter of the cluster gave the highest values in this respect as compared with other treatments during the two seasons of study.

TABLE 4. Effect of clusters thinning, leaf basal removal and girdling on total sugars, total anthocyanin in berries and total carbohydrates in cans of King Ruby grapevines in 2014 and 2015 seasons.

Characteristics / Treatments			Total Sugars (%)		Total Anthocyanin (mg/100g F.W.)		Total Carbohydrates (%)	
			2014	2015	2014	2015	2014	2015
T1	Control		13.49	13.10	28.09	29.8	21.63	22.50
T2	Removing one quarter of the clusters number	without	14.11	13.94	33.60	34.43	23.84	24.58
T3		Leaf basal removal	14.23	14.27	36.06	37.13	22.96	23.47
T4		Girdling	15.47	15.65	35.85	36.26	25.78	26.53
T5		Leaf basal removal + Girdling	15.82	15.94	38.09	39.10	26.25	27.13
T6	Removing the terminal quarter of the clusters	without	14.62	14.69	34.63	35.66	23.44	23.95
T7		Leaf basal removal	14.96	15.14	38.13	38.10	22.58	22.62
T8		Girdling	16.05	15.82	37.68	37.80	24.47	25.37
T9		Leaf basal removal + Girdling	16.25	16.37	39.46	40.68	25.22	26.13
New L. S. D. at 5%			0.60	0.56	0.42	0.36	1.18	0.85

The data are in agreement with Abd El-Wahab (2006) who reported that girdling trunk at version stage alone or in combination with all berry thinning treatments increased total carbohydrates in canes as compared to control in the two seasons of study.

The improvement of yield, physical and chemical characteristics of cluster and berries as a result of using manual thinning, leaf basal removal and girdling treatments may be due to manual thinning which is a method of the yield regulation. With the removal one part of the clusters, the yield per leaf area will be lower hereby the yield and quality will be improved. Fazekas *et al*. (2012).

Regarding the leaf basal removal treatment, leaf basal removal is important in canopy management. Sunlight-exposed fruits contain more sugar and less acid than non-exposed ones Koblet *et al.* (1984). Removing basal leaves slightly changed temperature atmospheric humidity, wind speed and leaf wetness around grape clusters English *et al.* (1990). Sunlight-exposed fruits are generally greater in total soluble solids and anthocyanin and lower in titratable acidity compared to non-exposed fruits or canopy shaded Ferree *et al.* (2004), Kliewer & Dokoozlian (2005), Santesteban & Royo (2006) and Prajitna *et al.* (2007).

Concerning the girdling treatment, girdling grapevines increases carbohydrate concentration above girdle which the transport sugars from leaves to the root system is effectively blocked and resulted in large berries intended for table use or to enhance fruit quality by enhancing berry coloration or accumulation of sugars Williams & Ayars (2005) and Abu Zahra & Salmeh (2012).

Conclusion

According to the results obtained from this present study, it can be concluded that technical operations such as manual thinning, leaf basal removal and girdling considered to be very important in 'King Ruby grapevines' vineyards for improving fruit quality. Where treatment of removing the terminal quarter of the clusters in combination with leaf basal removal after fruit set and girdling at veraison stage gave the best values in yield, berry weight, berry size, SSC%, total sugar and total anthocyanin in berry skin as well as decreased the acidity in berries and decreases the percentage of shot berries /cluster. Moreover, increased total carbohydrates in canes.

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استخدام بعض العمليات الفنية لتحسين جودة العنب الكنج روبى

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أجريت هذة الدراسة خلال موسمى ٢٠١٤ و ٢٠١٥ فى مزرعة خاصة فى قرية الدير التابعة لمركز أجـــا محافظة الدقهلية على كرمـــات عنب كنج روبى عمرها ١٥ سنة ومنزرعة فى تربة طينية وتروى بالغمر ومنزرعة على مسافة ٣x٢ م ومرباه بالطريقة الكردونية وتحت نظام تدعيم حرف T المذدوج.

وفى هذة الدراسة تم استخدام طريقتين من الخف اليدوى لعنقود العنب الاولى بازالة ربع عدد العناقيد لكل شجرة والثانية بازالة الربع السفلى لكل عنقود مع اجراء عملية ازالة الاوراق القاعدية للافرع (أسفل العنقود) وذلك بعد العقد وايضا اجراء عملية التحليق لجزع الكرمة عند بداية التلوين وذلك بهدف تحسين صفات الجودة لهذا الصنف .

وقد اشارت النتائج الى الاتى:

- أن جميع المعاملات المستخدمة أدت الى زيادة فى صفات الجودة لصنف العنب الكنج روبى بالمقارنة بالكنترول.
- على الرغم من أن الاشجار التى تم عمل خف لها بازالة الربع السفلى للعنقود سواء منفردة أو مع اجراء عملية التوريق أوعملية التحليق أو مع العمليتين معا سجلت قيم أقل لوزن العنقود بالمقارنة بالاشجارالتى تم عمل خف لها بازالة ربع عدد العناقيد سواء منفردة أو مع اجراء عملية التوريق أو عملية التحليق أو مع العمليتين معا الا ان هذة الاشجار (التى تم عمل خف لها بازالة الربع السفلى للعنقود) سجلت أعلى القيم بالنسبة للمحصول و صفات الجودة فى العنقود والحبات من حيث زيادة عرض العنقود وزيادة وزن وحجم الحبة وطول وعرض الحبة وزيادة نسبة المواد الصلبة الذائبة والسكريات الكلية وصبغة الانثوثيانين فى قشرة الحبات وخفض نسبة الحبات الصغيرة (الحصرم) فى العنقود بالاضافة الى زيادة نسبة الكربوهيدرات الكلية فى القصبات .
- ولذلك لتحسين صفات الجودة للعناقيد وحبات العنب وزيادة المحصول فى صنف العنب الكنج روبى يوصى بعمل خف للعناقيد بازالة الربع السفلى لها مع ازالة الاوراق أسفل العنقود بعد العقد مع اجراء عملية التحليق للكرمات عند بداية التلوين.