



Investigation the effects of green pruning treatment and local position of Berry on fruit quality traits measured and seed length growth in berry in Seedless Askari grape varieties of shrubs (*Vitis vinifera* L.)

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Abstract. The effects of green pruning on fruit quality traits were investigated. In industry food science Lab Science and Technology Park Khorasan Razavi province situated in 10 km of Mashhad is done. And its effect in different situation of berry on the punicle, in terms of seed length growth and fruit growth in Seedless grape varieties of Askari grapes in 2013 in commercial Vineyard place on the Kalakub village (20 km north of Mashhad) were investigated. In the spring of 2013 Green pruning different treatments (1-control, 2- traditional green pruning as a removal 4-5 mature leaves from the lower per branch 3- pound arrangement and remove Seedlings grown on the old branches that in addition charge is grown. And, as well as growing remove tributaries the 4- third treatment+ topping branches growing from 20 seedlings) in a randomly complete block design with two replications for Askari grapes variety was used. The design as a Factorial trial with two factors inserted in above analyze based on randomly complete block design. Which none of factors and their interactions on seed length were not significant effects but on number of seeds formed in factor berry of berry situation in punicle were significant effects in 1% level. Green pruning treatments on fruit quality traits was non-significant effects.

Keywords: Green pruning treatments- fruit quality traits, local position of berry, seed length growth, variety

1. INTRODUCTION

Mechanical harvesting grapes for industrial uses and juice preparation, otherwise it is done by hand. The temperature of 1C° for three to six months, the punicles are kept. In some cases Sulfur dioxide is used. Changes in diameter (size), acid quantity and sugar grapes during its growth, has been shown that increase growth (diameter) of the fruit, the same stone fruits, is the bisigmoid curve. In the second phase of growth curve, which increases the size of seed, in fruit diameter change was not found. Subsequent fruit growth and its beginning of the process ripen to seed maturation is coincide. In the third phase of growth curve, sugar increases and acidity decreases (2010 Jackson et al.). How distribution of these acids in grapes are different. Tartaric acid accumulation more in the outer portion of fruit growing, is occurred, while malic acid accumulates mainly in the flesh. During the early stages of fruit development, and malic acid accumulates immediately before the change color of the fruit. Appropriate acidity of the grape production processed also depends on the concentration of the acids. As well as hydroxyl synamic acids during the early stages of fruit growth is accumulated. These acids accumulate in flesh and skin fruit and their importance are due to their role in the browning reactions. On the other hand, they are volatile precursors phenols. Tannins which are monomeric compounds during the first stage of fruit growth is accumulated. Tannins in skin tissues and as well as seed stored and almost absent in the flesh, and they are the bitter grapes factor produces processed and also their stable color. Storage of other compounds such as minerals, amino acids, micronutrient and aromatics (such as methoxy Pyrazines) as well as during the first phase of fruit growth is occurred. (Kennedy, 2002). The beginning second phase of fruit growth /ripening is coincided with softening and its color change The size of fruit from the beginning second

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stage of fruit growth until harvest time nearly doubled. Many solutes that accumulate in the first stage of fruit growth until harvest time will not be lost. But due to increase fruit volume, their concentration decreased significantly. A number of compounds produced in the first stage of fruit growth during the second phase is decreased. The most of them is Malic acid. It is noteworthy that its reduction of values that depend on weather conditions. So that the production of acid in the warmer is less than cooler areas.

Tannins as well as in the second stage of fruit growth period significantly was reduced. Reduction of tannins in seed, due to its oxidation after stabilization in seed coating is then stabilized. In temperate climates, the accumulation of sugar in the fruit, is faster and more than cooler areas. Also the fruit acidity more decreased and its value is faster at a lower level is stable (Erez, 2000). In study(1987) Koblet topping act in the twelfth and sixteenth situations leaves on a branch Piont noir grape varieties at three different times of 4, 12 and 23 July were examined. According to their results total leaf in the control and topping situation was similar, because lateral branches in topping situation had large leaves. In shrub control, chlorosis leaves were than higher topped shrub. Sugar fruits are very positive influence of enlargement of lateral shoots leaves. Early topping, led to fruit ripening accelerated, because early growth of lateral branches replace older leaves and vice versa, topping late has had detrimental effects. As a result of Hakimi Rezai (2000) different levels of lopping actions (10 to 70% of green pruning) during two weeks after full bloom on yield and sugar content was effectively and treatment 40% remove foliage the most impact has been. Different levels of cropping on the ph value and organic acid berries is unaffected .

Kavoussi et al (2009), the effects of treatment the number of punicle per shrub(from 25 to 50 in the control and shrub and more than 50 punicles), as well as topping the branches (control 1.4, 1.3and 1.2 length) to the qualitative and quantitative traits have been investigated. According to their report among the various level the number of punicle from 25 to 35 numbers in shrub to control the % solid solution there is significant difference, so that the maximum percent soluble solids relevant to treatment 25 punicles in shrub and minimum percent was relevant to treatment 50 punicles in shrub .The impact of 25-35 punicles in shrub was similar and treatment higher than 40 punicles per shrub had the same effect.

As well as from the percentage of soluble solids between control Treatment and various levels there isn't significant difference .

According to their results between treatment 25 punicles in shrub to control and treatment 50 punicles in shrub from total percent there is significant difference, so that the max percent of total acid relate to thin treatment 50 punicles in shrub and the minimum percent was relate to thin treatment 25 punicles in shrub, the treatments 25-45 punicles in shrub from the mentioned index, there isn't significant differences. Also from percent of total acid between control treatment and different levels of topping there is significant difference but between various levels of topping there is not significant differences .According to Kavoussi et al., (2009), between the total different levels of the panicle in shrub to control average yield per shrub(kg), there is significant differences. By increasing the number of higher punicle from certain amount (the limit depends to power growth or actual charge), the amount of soluble solids, the ratio of total acid content of soluble solids, fruit juice reaction (ph) reducing but the total acid percent and yield show increase. If proper balance punicle, with leaf area Carbohydrates distribution to panicles is more and enough has been done and the quality will be better. Due to quality characteristics of grape juice include sugar, acid, ratio of sugar to acid, vitamin C direct depend to sunshine and especially Vegetative branches is high and cause to creating coverage and shading on fruit better quality. The results thinning effect of panicles and topping, from Increase the quality characteristics of grape juice especially in cold regions direct depend to sunshine. The interactions time and pruning intensity on quantitative and qualitative traits grape variety was significant difference.

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So that according to Asadi et al(2011) to treatment remove 25% of branches in 20 of July of current year, the largest and longest punicle, the largest berry and the highest performance and lowest total soluble solids acidity is reached. To a certain variety, at a reasonable time the intensity of green pruning is more tangible. The grapes after the second stage of growth - from the bisigmoid curve – sugar materials gradually increase and acid materials decreases gradually.

2. MATERIALS AND METHODS

The experiment in commercial orchards located in the village Kalakub (20 km north of Mashhad) were performed. Beginning in the fall of 2013, three times the required number of shrubs with a 50-40 charge (number of buds that n after pruning shrubs should be remain) seedlings were selected. Given the seed length growth branches and sub-branches, additional growth was estimated.

Determined by the formula charging, were determined. Then, among them, randomly, shrubs were selected for the experiment. A total of 60 trees that were growing more uniform and their charge was 40 to 50 for Experiment 1 was considered. Branches were pruned shrubs in winter of 5 buds. In the spring of 2013 green pruning treatments include:

1- control(without pruning): in this treatment green pruning on the shrubs wasn't performed and all of buds on shrubs located on annual branches, Bough and arms were given the opportunity to grow.

2- The traditional green pruning in the region: in the treatment about 5-4 mature leaves (which are producer substrate) of the bottom of per branch to panicles were cut down.

3- Chinese Pounds and removal of seedlings grown on the bough and old arms that in addition charge is grew. The type of pruning in the first time and before branches growth is more than 20 cm, was performed. As well as. Tributaries growing in the summer and before it leaves more to be excluded. .

4- the third treatment + cropping the growing branches of 20 buds: the purpose of cropping Prevent consumed from young leaves and prevent of additional seed length growth and conducted substrates of source leaves to other storage including fruit and seed. The effect of berry position in panicle on the seed length growth of seeds in a factorial experiment format with a randomized complete block design was analyzed. Minitab statistical software was used for statistical analysis of data.

3. QUANTITATIVE AND QUALITATIVE PRODUCT MEASUREMENTS AND OTHER INDICES

3.1. Chemical methods

Including the measurement of sugar, total acidity in terms of the dominant acid (tartaric acid in grapes), ph, respiration, fruit, juice, dry weight, ash, starch, ascorbic acid and the aromatic substances. The relationship sugar (brix), total acidity in tartaric acid and ph were determined as follows fruits. For each fruit shrubs were chosen randomly in freezer bags. After marking, the qualitative characteristics of the fruits were stored in a refrigerator at a temperature of 7 ° C. Quality performance, including sugar, acidity (ph) and total acidity was measured in terms of tartaric acid. Sugar or Brix (Bx) with a hand refractometer and ph was measured using a ph

meter model Hanna made in Italy. After the fruit juice preparation, the measurements were performed. To measure the organic acids, extracts prepared and diluted at a certain level 1.0 with naoh titration was normal. The results of titration of the organic acid, tartaric acid is the predominant grape. Using a formula based on the amount of tartaric acid, the ph values were determined..

3.2. Berry sugar measurement

Much of soluble solids (TSS) comprise berry sugar. Some fruits such as grapes, sugar is a quality index. The amount of sugar in the repined has increased and the amount of sugar, which may include reducing sugars such as sucrose or glucose and fructose in different products is variable. For quantitative sugars measurement were used to handy refractometer. Refraction is based on a refractometer. Light passes through the two heterogeneous environment break, the refractive index seed length growth with increasing concentration increases. The Sugar obtained than to different refractometer with various units is expressed, but it is mostly brix (Brix) or percent respectively. Brix is equal grams of sugar in 100 g fruit juice. As noted in this study, using a handy refractometer at harvest time, the brix values of berry juice in the varieties and the treatments were defined .

3.3. Ph of berry juice measurement

Ph of Fruits is usually around 5.3. Product resistance against bacterial and fungal diseases depends on the acidity of the product. Bacterial and fungal infections are resistant to produce a lower ph than at ph greater growth. As mentioned above, to measure the ph of berry juice Hanna ph meter model was used. The first ,ph meter to tampons 9, 7, 4 regulate and 10 to 20 ml of berry juice was measured by a ph meter.

3.4. The organic acids of fruit juice measurement

The organic acids of fruit to ripening gradually decreases. By measuring acid degree of maturity of some fruits such as grapes can be identified. Organic acids are causing sour taste of the fruit. The amount of fruit acid from to 50 meq per 100 g of product can be exist.

3.5. Total acidity of fruit juice

Free organic acids set and its salt that is in fruit called total acidity. Phenol .01 normal poured. This solution was titrated with normal .01 hydroxide. End Titration formation reddish is considered.. Phenol colorless in acidic and in alkaline environment is red into Beaker 10ccthe fruit juice was poured (20 to 40 ml of water were added) and within the 2 to 3 drops of reagent is added . To prepare a solution of phenol .01 gram of powder with 90% ethanol soluble and the solution was brought to 100 ml. The following equation was used to calculate the amount of organic acids.

$$A=S,N.F.E/C*100$$

A= acid in fruit juice(g/100 ml) S= used naoh (ml)

N= Normality naoh(.01 n)

F= factor naoh

E= equivalent acid

C= fruit juice(ml)

The equivalent of some acid as follow:

Acid sitric(C₆H₈O₇) to array

Acid malic (C₄H₆O₅)

Acid tartaric(C₄H₆O₆)

E:mol/ body capacity E=M/n and meq =1.1000 eq

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N(Normal): eq/1

F(Factor) or normal coefficient: the number of eq/1. So the normal solution has one factor

Of below formula used for calculate total acidity in juice acid tartaric or grape water.

Sample content(ml)/1000*.075* naoh normality* naoh(ml)= acidity(g/l)

Acid tartaric constant number= .,075

Used juice content=5cc

Also. Total acidity same used acidity amount is in report.

In qualitative traits measurements, the design as a randomly block.

4. RESULTS AND DISCUSSION

After securing the data normality by Minitab software to analyze them.

Treatment a include 4 pruning level(a1: control, a2: 4-5 leaf removal, a3: pruning without topping a4: Pruning with topping)

Treatment b include 3 level position berry(b1: Top, b2: middle and b3: low)

Table 1. Analysis of variance traits measured the length of the seed test

Seed length	Seed per berry	Degrees of freedom	Variance source
0.02	0.33	2	Block
0.08 ^{ns}	0.07 ^{ns}	3	A
0.09 ^{ns}	0.49 ^{**}	2	B
0.10 ^{ns}	0.07 ^{ns}	6	A*b
0.15	0.08	70	Error
8.87	11.5	Variance coefficient(%)	

*,** ns represent significant difference in 1%,5%.and non- significant difference respectively

Table 2. the comparison of average main effects measured the length of seed test.

Main effect	Levels	Seed per berry	Seed length(mm)
Pruning	Control	2.3a	4.3a
	4-5 mutual leaves removal in down branch	2.3a	4.5a
	Green pruning without topping	2.4a	4.3a
	Green pruning with topping	2.5a	4.5a
Berry position	High	2.2a	4.4a
	Mid	2.6a	4.5b
	Low	2.3b	4.3a

Common characters per trait and for each main type represent lack of significant difference based on Duncan test .(p=5%)

Table 3. The comparison of average interaction pruning in berry position for measured traits the seed length

Pruning	Berry position	Seed per berry	Seed length
Control	High	2.2b	4.4a
	Mid	2.5ab	4.2a
	Low	2.4ab	4.3a
4-5 mutual leaves removal in low branch	High	2.0ab	4.4a
	Mid	2.5ab	4.5a
	Low	2.4ab	4.6a
Green pruning without topping	High	2.3ab	4.4a
	Mid	2.7ab	4.5a
	Low	2.3ab	4.1a
Green pruning with topping	High	2.5ab	4.4a
	Mid	2.8ab	4.7a
	Low	2.3ab	4.2a

Common characters per trait and for each main type represent lack of significant difference based on Duncan test .(p=5%)

Table4. Analysis of variance traits measured the acidity and brix

Acidity in acid tartaric	Naoh used .1n	Brix	PH	Degrees of freedom	Variance source
0.061	0.056	0.912 ^{ns}	0.015 ^{ns}	2	Block
0.053 ^{ns}	0.019 ^{ns}	0.064	0.058	3	Pruning
0.055	0.048	0.214	0.0048	6	Error
6.5	8.98	2.75	1.7	Variance coefficient(%)	

*,** ns represent significant difference in 1%,5%.and non- significant difference respectively.

Table 5. The comparison of average various treatments on measured traits.

Levels	PH	Brix	Used .1 naoh normal (ml)	Acidity in acid tartaric(g/l)
Control	3.78a	16.62a	2.33a	3.50a
4-5 mutual leaves removal in low branch	3.84a	16.78a	2.51a	3.75a
Green pruning without topping	3.87a	16.84a	2.5a	3.75a
Green pruning with topping	3.87a	16.98a	2.46	3.55a

Common characters per trait and for each main type represent lack of significant Difference based on Duncan test .(p=5%)

5. CONCLUSIONS AND RECOMMENDATIONS

The design as a factorial test with two factors are inserted in the above based on randomized complete block design is analyzed. There is any factors and their interaction on seed length significant difference but on formed seed in berry of factor of berry position in panicle there is

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significant difference($p=1\%$). Green pruning treatments on fruit quality traits were non-significant effects. It is recommended that further research work and the number of repetitions performed in more integrate until the complete results is obtained.

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