

THE EFFECT OF THINNING BY REDUCING CERTAIN PARTS OF THE INFLORESCENCES OF THE ‘KHUSAYNE BELIY’ (*VITIS VINIFERA* L.) GRAPE CULTIVAR ON YIELD QUALITY

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Annotation. *This study investigates the effect of thinning the inflorescences of the ‘Khusayne beliy’ grape cultivar by removing certain parts before flowering on yield quantity and quality. Different thinning methods were applied, including removal of clusters from the upper, middle, and tip portions of the inflorescence in varying proportions. Results showed that thinning improved berry size, bunch uniformity, sugar content, and overall appearance, while total yield slightly decreased depending on the thinning method. Among the variants, thinning by alternately removing the middle part shoulders of the inflorescence produced the best quality grapes in terms of berry weight, diameter, and sugar content, making it a recommended practice for table grape production.*

Keywords: *Vitis vinifera*, Khusayne beliy, berry thinning, yield quality, table grape, inflorescence management

Introduction. If we look at the viticulture of different countries around the world, the total vineyard area in 2023 amounted to 7 million 300 thousand hectares [11], and the global grape production reached 80.1 million tons [12]. However, in 2023 the total grape yield decreased by 9.6% compared to the previous year [13]. Of the grapes produced worldwide, 71% is used for winemaking, 27% is consumed fresh, and 2% is used for drying (raisins) [14]. Currently, Italy, the USA, Spain, France, Turkey and several other countries are leading in overall grape production. In table grape production, India (2.95 million tons), Turkey (1.6 million tons), Brazil (1.75 million tons), Uzbekistan (1.7 million tons), Egypt (1.57 million tons) and other countries are dominant [15].

Thinning the berries on the grape bunch is used in the cultivation of high-quality table grape cultivars. Thinning is carried out when the berries reach pea size. During thinning, the less valuable berries at the top or tip of the bunch are removed. In very dense bunches, up to 30% of the berries may be removed to avoid flattening of the berries. After thinning, the flow of nutrients to the remaining berries improves, and the bunch weight increases by 20–30%. Thinning is performed manually using scissors with rounded tips [8].

Thinning grape bunches and berries is applied in the cultivation of table cultivars to obtain high-quality yields with an excellent appearance. The purpose of this practice is to regulate the yield and improve quality by removing small berries or the terminal parts of the bunch. Thinning creates favorable conditions for ventilation and light exposure of the berries. The berries develop good coloration, the size of the resulting bunches increases, and their marketability and transportability improve. The grape bunches are cut manually using long-bladed scissors [10].

Berry thinning is the removal of certain parts of the bunch after it has formed, and it is primarily used in table grape production. Improving quality is achieved by controlling bunch size, preventing excessive compactness, and maintaining shape. All types of thinning can be used to reduce yield, but they are more often applied for other purposes, such as removing late-ripening or diseased berries. The main types of manual thinning include thinning of inflorescences, bunches, and berries. Manual thinning is a specialized technique that allows workers to select bunches with the best size and shape for the market, which later saves time during harvest [2]. Inflorescence thinning can be carried out at the beginning of shoot development, because inflorescences are easily visible before the leaves expand. Early removal of inflorescences can slightly increase both bunch size and sugar content of the harvest [4]. The cultivation of table grapes relies on many viticultural practices to ensure good yield and high quality. A common practice to improve fruit quality is thinning of the bunch or berry during ripening, which affects sugar content, pH, total acidity, flavor development, and color [6, 5].

Materials and Methods. The experiments were carried out in the vineyard fields of “Gulbog Burkhon” farm, located in the Parkent district of Tashkent region. The experiments are conducted in accordance with the requirements of the methodological manual authored by X.Ch. Boriyev et al. “Mevali va rezavor mevali o‘simliklar bilan tajribalar o‘tkazishda hisoblar va fenologik kuzatuvlar metodikasi” (2014) [1], V.F. Moiseychenko “Методика учетов и наблюдений в опытах с плодовыми и ягодными культурами” (1987) [9], and A.J. Winkler’s “General Viticulture” [7]. The vines were planted at a 3 × 3 m spacing and grown on a vertical trellis system. The thinning experiment was carried out 8 days before flowering of the inflorescences by manually removing a certain portion of the total bunch length using scissors. The grape yield was harvested in August when it reached biological maturity.

Results and discussion. Berry thinning improves berry size, bunch appearance, and uniform coloration and ripening of the berries. Consumer satisfaction depends on the attractive appearance of grape bunches, since table grapes are not processed. Removing the lower part of the bunch results in fewer clusters remaining on a shorter rachis. The following table presents the effect of thinning—by reducing certain parts of the

inflorescences before flowering—on the yield quantity and quality of the ‘Khusayne Bely’ grape cultivar (Table 1).

From the table, it can be seen that the total bunch weight was highest in the control variant, amounting to 459.3 g, while the lowest value was recorded in the variant where thinning was performed by removing the upper part of the inflorescence—306.1 g. However, the highest single-berry weight was observed in the variant where thinning was carried out by alternately removing the middle part of the inflorescence (7.7 g), and the smallest value was recorded in the control variant (6.6 g), which is 1.1 g lower than the former.

Table 1

The effect of thinning—by reducing certain parts of the ‘Khusayne Bely’ inflorescences before flowering—on yield quantity and quality

Replication number	Total cluster weight, g	Weight of a berry, g	Berry diameter mm	Sugar content, %	Total acidity, g/l
Control	459,3	6,6	15,0	17,2	3,02
Thinning by removing the upper shoulders of the inflorescence	306,10	6,90	15,10	17,30	3,00
Thinning by alternately removing the middle shoulders of the inflorescence	415,20	7,70	17,20	19,70	2,70
Thinning by removing 1/2 of the tip of the inflorescence	350,20	7,30	17,00	18,50	2,80
Thinning by removing 1/3 of the tip of the inflorescence	400,20	7,30	17,00	19,20	2,80
Thinning by removing 1/6 of the tip of the inflorescence	410,30	6,80	15,90	18,20	2,91
Thinning by removing 1/12 of the tip of the inflorescence	458,00	6,80	15,80	18,00	3,00

The diameter of a single berry also corresponded to these indicators: the largest berry diameter was found in the variant where thinning was carried out by alternately removing the middle of the inflorescence (17.2 mm), while the smallest value was recorded in the control (15.0 mm). The highest sugar content of the berries was also noted in the variant where thinning was performed by alternately removing the middle

part of the inflorescence (19.7%), while the lowest sugar content was observed in the control (17.2%). Regarding total acidity, the opposite trend was observed: the highest acidity level was recorded in the control variant (3.02 g/l), while the lowest value occurred in the variant where thinning was done by alternately removing the middle part of the inflorescence (2.7 g/l).

According to Turkish researcher A. Dardeniz [3], when the berries were 5–7 mm in size, tipping of the bunches (removing 1/12, 1/6, and 1/3 of the bunch length) performed on the Uslu and Cardinal cultivars resulted in larger, uniformly shaped clusters. After flowering, when the clusters had formed, removing a portion of the bunch led to clusters that ripened 3–5 days earlier, were shorter in length, wider in width, uniformly shaped, and more attractive in appearance. As a result, it is recommended to apply bunch-tip removal at levels of 1/3 and 1/6 of bunch length for the Uslu and Cardinal grape cultivars.

Conclusion. Cluster thinning is a crucial process in table grape production for obtaining high-quality grapes, since in addition to visual characteristics such as cluster compactness, shape, and berry size—which greatly influence market price—factors such as the space allotted per berry and sugar concentration also affect the final product quality. Among the thinning variants performed by reducing certain parts of the inflorescences before flowering, the highest quality indicators were observed in the variant where thinning was carried out by alternately removing the middle part of the inflorescence.

References

1. Boriyev X.Ch. et al. Mevali va rezavor mevali o‘simliklar bilan tajribalar o‘tkazishda hisoblar va fenologik kuzatuvlar metodikasi. - Tashkent – 2014. – p. 6-20.
2. Creasy G.L., Creasy L.L. Grapes. – Wallingford (UK); Cambridge, MA: CABI, 2009. - P.149-150.
3. Dardeniz A. Effects of Cluster Tipping on Yield and Quality of Uslu and Cardinal Table Grape Cultivars. // ÇOMÜ Ziraat Fakültesi Dergisi (COMU Journal of Agriculture Faculty), 2014. - №2(1). – P. 21–26.
4. Dokoozlian N.K. and Hirschfelt D.J. The influence of cluster thinning at various stages of fruit development on Flame Seedless table grapes. // American Journal of Enology and Viticulture, 1995. - 46(4). – P. 429–436. DOI: 10.5344/ajev.1995.46.4.429
5. Ezzahouani A., Williams L.E. Trellising, fruit thinning and defoliation have only small effects on the performance of ‘Ruby Seedless’ grape in Morocco. // J. Horticult. Sci. Biotech., 2003. – 78. – P. 79–83.

6. Ough C.S., Nagaoka R. Effect of cluster thinning on vineyard yields on grape and wine composition and wine quality of Cabernet Sauvignon. // Am. J. Enol. Viticult., 1984. – 35. – P. 30–34.
7. Winkler A. J. et al. General viticulture. California: University of California, 1974. 710 p.
8. Верновского Э.А. Технология возделывания и использование винограда. Москва, Агропромиздат – 1990. С. 172.
9. Мойсейченко В.Ф. Методика учетов и наблюдений в опытах с плодовыми и ягодными культурами. Киев – 1987. С. 69.
10. Серпуховитина К.А., Морозова Г.С., Смольякова В.М. Промышленное виноградарство. – Москва: “Агропромиздат”, 1991. - С.330.
11. www.statista.com,
12. <https://en.m.wikipedia.org/wiki>
13. <https://winedatareserhear.com>
14. www.nj.gov/seasonality-chart
15. www.statista.com