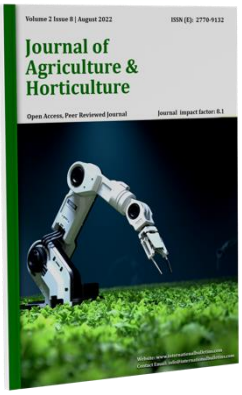

BEFORE FLOWERING PERIOD CLUSTER TIPPING AND THINNING AND THEIR EFFECTS ON YIELD AND QUALITY OF JUPITER WINE GRAPE CULTIVAR

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https://doi.org/10.5281/zenodo.13132126

Annotation. This article presents information on the effect of thinning Jupiter cultivar on the size of grape bunches, development of clusters and chemical composition by removing some parts before flowering. In the experiment, among the types of thinning, thinning was carried out by removing the shoulders of the upper part of the clusters, thinning by removing the middle laterals and cutting 1/2, 1/3, 1/6 and 1/12 from the tips of the clusters. According to the results, it was found that the most optimal among the options for the Jupiter cultivar is to thin out the laterals of the middle part of the cluster before flowering. In this option recorded the best results according to the development and composition of the grape cluster and berries.

Keywords: Thinning, bunch, berry, tipping, shoulders, flowering, laterals, period, part.

Introduction. The characteristic color, flavor, and texture of the variety are characteristic of good quality table grapes, which are medium-sized bunches with uniformly large, perfect berries. Consequently, the production of quality seedless grapes increasingly requires skilled labor, specialized services, and the use of new technologies, like specific thinning techniques [5, 11]. Thinning involves the removal of flower clusters before they bloom and of immature clusters or parts of them after the fruit has set. During this process, the activities of grapevine are concentrated into the remaining parts, preventing bunch compactness due to the removal of living parts [6]. Berry thinning reduced bunch size and altered bunch shape, leading to improved fruit quality [9]. To control yields, a management practice has been developed. Many studies have found that grape bunch thinning tends to decrease acidity and increase soluble solids and pH by reducing the number of grape bunches [4, 2]. Berry thinning is an alternative to bunch thinning [3]. It involves removing the tips of all grape bunches to obtain blunted bunches. Although some studies found higher quality grapes and earlier maturity by removing berries from the shoulders and top of the cluster rather than from the tips [10, 1]. It has been proposed that berry-cluster thinning can be used to prevent over compactness of table grapes, saving labor and time. This technique differs from berry thinning, which involves removing individual berries, which takes a lot of time and money. The technique involves removing four or five berry clusters located along both sides of the rachis, followed by bunch tipping after fruit set [7]. It is efficient to reduce bunch compactness by thinning berries between 7 and 18 mm in diameter on 'BRS Vitoria' seedless grapes, resulting in a high incidence of medium loose bunches and a lower incidence of very dense bunches with optimum yield. It is recommended to avoid thinning or brushing flower clusters before anthesis as this leads to very loose bunches with lower yields [8]. We used this technique before flowering vines. This article presents information about the effect of

removing upper and middle laterals and tipping cluster before flowering on the quality of grapes.

Materials and methods. The experiments were carried out in the fields belonging to Uzumfermer.uz LLC. Uzumfermer.uz LLC is located in Qibray district of Tashkent region. These fields are located in the north-eastern part of Tashkent region, on the plains of $69^{0}26$ east longitude and $41^{0}21$ north latitude on the Greenwich scale. In the experimental field, the vines were planted at a distance of 3x3 m. Experiments on thinning grape berries, selected for study in scientific work, were tried in the period before flowering. In our experiment, among the types of thinning, thinning by removing the laterals of the upper part of the clusters before the flowering of the vines (UPCT), thinning by removing the laterals of the middle part of the clusters alternately (MPCT), and thinning by cutting 1/2 (CT1/2), 1/3 (CT1/3), 1/6 (CT1/6), 1/12 (CT1/12) from the tip of the clusters and control (C) were carried out. The most optimally shaped clusters are left one on each branch. The thinning experiment was carried out before flowering of clusters. Total soluble solid (TSS) and total acidity (TA) in the pulp were determined using a hand refractometer (Master Kit, Atago, Tokyo, Japan). Phenological observations carried out according to the Buriev Kh. Ch et al. [12], and Lazarevsky M.A. [14] methods, in all variants of the phenophase, that is, the growth of buds, flowering, ripening of fruits, ripening of shoots, and the beginning and end of the falling leaves on the grapevines. The statistical analysis of the results obtained in the field experiments is calculated according to the method of B.A. Dospekhov [13].

Result and discussion. Some cultivars produce three to four grape bunches per shoot, and usually the basal grape bunches closest to the cane are the largest. The pre-flowering stage of cluster development is the best time for hand thinning part of clusters, because the clusters are not covered with leaves and the grape berries have not yet developed and compacted. In the table below, we can see the types of thinning and the length of the clusters before and after thinning (Table 1).

Table 1. Options for thinning and tipping the clusters of Jupiter cv. in the period before flowering and the average length of the clusters

Types of thinning experiment	Initial length of cluster, cm	Length of cluster after thinning, cm	Removed part of cluster, cm
C	12,4	-	-
UPCT	10,7	6,6	4,1
MPCT	11,6	11,6	-
CT1/2	10,6	5,3	5,3
CT1/3	9,7	6,5	3,4
CT1/6	9,8	8,2	1,6
CT1/12	11,4	10,6	0,9

According to Table 1, 7 options total with control and 10 samples were obtained as a return for each options. In the period before flowering, the length of the clusters separated for the experiment ranged from 6,1 cm to 15,1 cm, and their average length was equal to 10,8 cm. In the control option, the length of the clusters ranged from 11,1 cm to 14,6 cm, with an average of 12,4 cm. In this version, the clusters are not processed or cut. In the option UPCT mainly 7-

8 laterals are removed from the upper part of the clusters. In this option, the initial length of the clusters was from 9,8 cm to 12,1 cm to an average of 10.7 cm, and after thinning decreased from 5,0 to 8,4 cm to an average of 6,6 cm. In the option of MPCT, the initial length of the clusters ranged from 9,9 cm to 14,1 cm and averaged 11,6 cm, and even after thinning, the average length of the clusters does not decrease, because only the middle part of the clusters is thinned. Further thinning experiments were aimed at removing a certain amount from the tip of the clusters. In this experiment, 4 different amounts of removal of the tips of the clusters were tested. In the CT1/2 option, the initial length of the clusters is from 7,5 cm to 14,6 cm with an average of 10,6 cm after thinning, their length is decreased from 3,7 cm to 7,3 cm with an average of 5.3 cm. In the CT1/3 option, the initial length of cluster was from 8,8 cm to 12,1 cm, on average 9,7 cm, after treatment, from 5,3 cm to 8,1 cm, it was 6.5 cm on average. In the CT1/6 option, the initial length of the clusters was from 6,1 cm to 15,1 cm to an average of 9,8 cm after thinning decreased from 5,1 to 12,6 cm to an average of 8,2 cm. In the CT1/12 option, the initial length of the clusters was from 9,2 cm to 14,1 cm to an average of 11,4 cm after thinning decreased from 8,7 to 13,0 cm to an average of 10,6 cm. The length of the parts removed from the clusters as a result of thinning is listed in the last row of the table. It is acceptable to thin out the grape brine 2-3 weeks before the grapevine blooms. Because during this period, lateral shoulders and flowers in the cluster are well developed and separated, cause less damage to the left parts of cluster. This, in turn, is important for the further development of clusters and the amount of harvest. The amount of thinning is determined by the size and strength of the grape clusters. After thinning measures, the length and diameter of grape berries and bunches were measured several times. The period of their greatest growth and development continued rapidly until the period of verasion. Measurements of the effects of pre-flowering thinning experiments on the structure and composition of grape bunches and berries are presented in the table below (Table 2).

Table 2. The influence of thinning and tipping of clusters before the flowering period on the structure and composition of grape bunches and berries

Types of thinning experiment	Average length of grape bunches, cm	Average weight of grape bunches, gr	Average diameter of the berries, mm	Average weight of berries, gr	The average TSS of berries, %	The average TA of berries, %
C	12,7	208,8	12,8	2,9	19,8	0,9
UPCT	9,6	184,9	13,2	2,8	18,9	1,04
MPCT	13,2	215,3	14,8	3,4	20,7	0,8
CT1/2	8,9	189,5	13,9	3,1	19,6	0,98
CT1/3	9,4	188,3	13,0	2,8	18,7	1,12
CT1/6	11,6	201,7	13,4	2,9	18,5	1,08
CT1/12	12,8	208,3	12,8	2,8	18,1	1,04

It can be seen in the above table that there were changes in the growth and development of clusters after thinning. The C option clusters grew to an average of 0,5 cm after the treatment. Among the options, on MPCT the average length of grape heads was the highest (13,2 cm). This is 0,5 cm more than the control option and in the next, the CT1/12 option was recorded (12,8 cm). The least grown grape bunches were found in the CT1/2 option (8,9 cm) and this is

3,8 cm less than the control. The highest value of the average weight of the grape head was observed in the MPCT (215,3 g), while the lowest value was observed in the UPCT (184,9 g). The highest amount of the average diameter of berries was recorded in berries of the MPCT (14,8 mm), and the lowest value was recorded in the CT1/12 (12,8 mm). The smallest amount of berry diameter showed the same value as the control. The highest indicator of the average weight of berries was determined in MPCT option berries (3,4 g), while the lowest indicator was determined in UPCT and CT1/3 (2,8 g). The TSS level of the berries was the highest in the MPCT (20.7%) and control (19.8%) options. The highest amount of total acidity was found in the CT1/3 (1,12%), and the lowest in the MPCT (0,8%). From this table, it can be concluded that the option of thinning by alternately MPCT, grape bunches and berries prevailed over other options in all indicators. Also, the grape berries of this option ripened 5-6 days earlier than others. This is the reason for their success in commercial matters. In some options, yield was not affected by the applications but found under the more influence of years. The results showed that the different thinning treatments respectively reduced the compactness of the grape bunches and significantly affected the mass simultaneous ripening of the berries.

Conclusion. All methods evaluated in our experiments affected the shape and structure of the grape bunches. From this experiment, we can conclude that by thinning, by removing a certain part of the clusters, the ground is created for the further development of the berries (by opening space and nutrition). With the help of thinning, the berries reach the maximum size, while preventing the deformation of the berries, due to the high nutrient absorption ratio, it prevents low color and sugar content in the berries in the inside of the grape bunches, and improves the quality of the rest of the berries. Among the options studied in the experiment, it was found that thinning by by removing the laterals of the middle part of the clusters alternately is the most optimal option for Jupiter cv.

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