Impact of bud number per vine on growth, flowering, fruiting and yield characteristics of Black Magic grapevine

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ABSTRACT:

This study estimated the effects of different bud numbers per vine on vegetative development, flowering, fruiting, yield, and fruit quality of Black Magic grapevines to determine the optimal number of buds to be left on the vines to achieve the highest possible yield with the best fruit quality while maintaining vine vigor during two consecutive seasons, 2021/2022 and 2022/2023, in a private vineyard located in Wadi Al-Natrun, Beheira governorate, Egypt. The treatments were done as follows: 60 eyes (6 eyes × 10 canes), 66 eyes (6 eyes × 11 canes), 72 eyes (6 eyes × 12canes), 78 eyes (6 eyes × 13 canes), 84 eyes (6 eyes × 14 canes) and 90 eyes (6 eyes × 15 canes). The results showed that studied characteristics were significantly affected by all different bud number per vine in both studied seasons. It was found that vines pruned at 90 and 84 eyes per vine gave the best values of most studied features such as leaf area, shoot length, leaves total chlorophyll content, number of berries at harvest, average weight & volume berry, percentage of total soluble solids, cluster weight, yield per vine and yield per Feddan that produced an appropriate balance between growth aspects and productivity. Pruning can control production by selecting a suitable number of buds to supply the number of clusters the plant can carry, resulting in a good yield and quality of grapevine clusters.

KeyWords: Grapevines; Black Magic; Bud number; Pruning; Growth; yield characteristics.

INTRODUCTION:

Grapes are one of the most frequently farmed fruit crops on the planet, having great economic value in the production of fresh fruit, wine, juice and raisins (FAOSTAT, 2021). The Black Magic grape cultivar has acquired popularity among grape cultivars due to its distinct flavor, appealing look and good nutritional content (Smith *et al.,* 2018). However, optimizing this cultivar's productivity and fruit quality remains a problem for grape growers. Bud load, which refers to the amount of buds retained on the vine after pruning, is one of the essential elements impacting grapevine productivity and fruit quality (Keller, 2010).

The most essential cultural practice in grapevine management for preserving yield and productivity is pruning. Pruning strategies have been developed to preserve vine life while balancing fruit output, vegetative development, and yield. Pruning severity promotes individual shoot vigor at the expense of overall growth and crop (Weaver, 1976; Celik *et al.,* 1998). Pruning the vines for optimal cropping based on vigor is the most dependable method for balancing growth and yield. To sustain consistent vigor throughout its life, the vine should have a modest number of canes. Pruning rates can therefore balance canopy, vigor, and productivity. According to Eynard and Gay (1992) crop load versus vegetative development must be balanced in order to produce quality fruits. As a result, it was deemed necessary to evaluate the impact of various pruning severity levels on the performance of any grape cultivar under present climatic conditions.

Bud load management is critical in grapevine production because it directly influences the balance of vegetative growth and reproductive development (Reynolds *et al.,* 1996). Various grape varieties, notably Cabernet Sauvignon (Howell *et al.,* 1987), Chardonnay (Morris *et al.,* 2004) and Riesling (Reynolds *et al.,* 2004), have had substantial research into the relationship between bud load and grapevine performance. These studies have shown that adjusting bud load has a considerable impact on grape yield, fruit quality and vine vigor.

A small study was conducted on the influence of bud load on productivity and fruit quality in the Black Magic grape variety. However, studies on related cultivars can provide useful information. For example, Tregoat *et al.* (2002) discovered that increasing bud load resulted in higher yields but decreased fruit quality as determined by sugar content, acidity and phenolic compounds in Merlot grapevines. In contrast, Kliewer and Dokoozlian (2005) found that lowering bud

load resulted in increased fruit quality with higher sugar content and reduced acidity in Thompson Seedless grapes. Bud load affects grapevine yield because developing buds compete for resources such as water, nutrients and carbohydrates (Keller, 2010). A higher bud load may result in more clusters per vine, improving overall production. However, increasing resource competition can result in smaller berries and lower fruit quality (Howell *et al.*, 1987). A decreased bud load, on the other hand, may enable better resource allocation to individual clusters, resulting in larger berries and enhanced fruit quality (Kliewer and Dokoozlian, 2005).

Given the significance of bud load control in grapevine agriculture, a variety of pruning strategies have been developed to optimize bud load and achieve the appropriate balance of output and fruit quality. Each approach has advantages and disadvantages and the choice of pruning technique is dependent on factors such as cultivar, climate and vineyard management objectives (Keller, 2010).

The influence of bud load on production and fruit quality of the Black Magic grape cultivar is a complicated and nuanced problem that requires further research. Existing research on other grape varieties suggests that adjusting bud load can have a considerable impact on grapevine performance, with potential yield and fruit quality trade-offs. Understanding these correlations and optimizing bud load management practices will assist grape growers in getting the most out of their Black Magic grape crop in terms of both economic and sensory value. The ultimate target of this investigation is to determine the optimum number of buds to be left on the vines to achieve the highest possible yield with the best fruit quality while maintaining vine vigor by comparing the effects of different bud numbers per vine on vegetative growth, flowering, fruiting, yield, and fruit quality of Black Magic Grapevines, which can be recommended for cultivars under cane pruning systems.

MATERIALS AND METHODS:

This study employed six-year-old Black Magic Grapevines (Vitis vinifera L.) cultivated on sandy loam soil in a private vineyard in Wadi Al-Natrun, Beheira governorate, Egypt, during two seasons (2021/2022 and 2022/2023). The experiment was carried out on 90 vines (3 replicates with 5 vines/ treatment × 6 treatments) for all the treatments that grew similarly to the crops and went through identical agricultural practices. A design with randomized complete block design was employed to evaluate the results. Fertilization was carried out in the research region in accordance with the Egyptian Ministry of Agriculture's recommendations. The vines were spaced 2x3m apart and trellised using the Spanish Parron technique at the second week of February. Drip irrigation is used to water all grapevines. Winter trimming systems were installed around the end of December. Table 1 shows the chemical characteristics of the soil and water analyses performed according to Chapman and Pratt (1961).

The study included six treatments:

T1: 60 eyes (6 eyes × 10 canes).

T2: 66 eyes (6 eyes × 11 canes).

T3: 72 eyes (6 eyes × 12canes).

T4: 78 eyes (6 eyes × 13 canes).

T5: 84 eyes (6 eyes × 14 canes).

T6: 90 eyes (6 eyes × 15 canes).

Measurements:

Vegetative growth:

Leaf area (cm²): Used a portable leaf area meter (YMJ-A, Zhejiang Top Cloud Agri Technology Co., Ltd., China) to determine the average leaf area of twenty mature leaves abscised from the top of the growing stalk (6th or 7th leaf) at full bloom by Liu *et al.*, (2015).

Number of leaves/ shoots: On March 1st, 10 shoots per vine (from the spring flush) were found, with a very uniform diameter and length. At the end of each season, the number of leaves and shoots was recorded.

Fresh and dry weight of leaves (g): The leaf samples were newly weighed and oven-dried at 70 degrees Celsius until a consistent weight was achieved.

Shoot length (cm): After bud burst, 10 shoots per vine were randomly chosen and characterized to determine their maximum growth length (cm) in mid-May.

Coefficient of wood ripening: According to Bouard (1966), the quantity of wood ripening is estimated by dividing the length of the ripened region of the shoot by its entire length.

Total chlorophyll (SPAD): Total chlorophyll measurement (SPAD unit) using a chlorophyll meter (SPAD-502, Soil-Plant Analysis Department (SPAD) department, Minolta Camera Co., Osaka, Japan).

Flowering, fruiting, and yield characteristics:

Flowering and fruiting parameters:

*Fruit set number and percentage***:** Five clusters per vine with comparable development patterns were chosen, with three clusters in each vine. All open flowers/clusters were tallied during the blooming process. After finishing the fruit set, the number of fruit sets was counted, and the fruit set percentage was calculated using the following equation:

Initial fruit set % = (Total No. of set fruits /cluster) / (Total No. of opened flowers/cluster) × 100

Fruit drop %: The number of retained berries per bunch was counted fortnightly from fruit set until harvest, and the fruit drop percentage was computed as follows:

Fruit drop (%) = (Number of dropped berries / bunch)/(Total number of set berries / bunch) x 100

Retained fruits percentage:

The number of retained berries was counted at harvest and calculated as follows:

Retained fruits % = (No. of retained berries at harvest/bunch**) / (**No. of initial set berries/bunch) ×100

Yield characteristics*:*

Physical properties of the cluster: At harvest on June 1st, a representative sample of five clusters from each replication was gathered to determine*:*

Cluster weight (g).

Cluster width (cm).

Cluster length (cm).

Number of clusters per vine.

Berry physical parameters: At harvest, 150 berries were randomly picked from the basal, middle, and apical areas of the representative clusters to assess their physical and biochemical properties. Physical traits include:

Berry weight (g).

Berry volume (cm^3).

Berry firmness: Berry firmness ($lp/inch^2$) was measured using a pressure tester a penetrometer (mod. FT 327).

Berry biochemical characteristics: TSS (%) and total acidity (%), the biochemical components were determined as follows:

Total soluble solids percentage: The total soluble solids percentage was determined in 10 mL of berry juice filtrate using the refractometer equipment described in A.O.A.C. 2000.

Total acidity*:* The acidity of 10 mL of berry juice was determined. The titration procedure was used. The berry extract was mixed with 100 milliliters of distilled water. The overall acidity percentage was determined using titration with 0.1 N NaOH. Tartaric acid (%), equivalent to g/100 mL of juice (A.O.A.C. 2000), was used to indicate total acidity.

Total Yield*:* Individual vine yields were weighed, and the average yield per vine was adjusted. The average yield per Feddan was determined by multiplying the yield per vine by the number of vines per Feddan in tons at harvesting time.

Statistical analysis:

The F-value test was used to evaluate the data, and the means were compared using the L.S.D. at a 5% probability level (Snedecor and Cochran, 1980).

RESULTS AND DISCUSSION:

Vegetative growth:

Table (2) shows that varied bud number per vine of Black Magic Grapevines influenced leaf area, number of leaves/shoot length, fresh and dry weight of leaves, shoot length, coefficient of wood ripening, and total chlorophyll content of leaves throughout the 2021/2022 and 2022/2023 seasons.

The maximum figure for leaf area was achieved with 90 eyes per vine, followed by 84 eyes /vine in the first season and 78 eyes/vine, followed by 84 eyes / vine in the second season. Furthermore, 84 eyes per vine generated the most leaves or shoot length in the first season, followed by 90 eyes per vine in the second season, while 78 eyes per vine produced the most fresh and dry weight of leaves in both seasons. 90 eyes per vine produced the highest significant values of shoot length and total chlorophyll content in both seasons. In contrast, 84 eyes per vine produced the best coefficient of wood ripening value only in the second season, with minor results in the first. As a result, the increase in vegetative growth as measured by leaf area, number of leaves per shoot, leaf fresh weight, leaf dry weight, shoot length, coefficient of wood ripening, and total chlorophyll owing to bud load and vine treatments was directly

proportional to the number of buds remaining after pruning.

The obtained results are comparable with the findings of Ali et al. (2016), who demonstrated that increasing vine loads from 62 to 102 eyes per vine resulted in a progressive rise in leaf area and total chlorophyll in Superior seedless grapevines. Farag (2022) also discovered that moderate pruning of "Autumn Crisp" grapevines with a bud load of 84 buds per vine and a fruiting unit length of 4 buds per spur resulted in optimum vegetative growth characteristics. Furthermore, Mohamed (2023) observed that pruning Black Magic grape cultivars with 12 fruiting canes and 10 eyes per cane resulted in increased shoot length, number of leaves per shoot, leaf area, coefficient of wood ripening, and total chlorophyll.

A small bud load/vine can improve vegetative growth parameters by reducing shoot competition and increasing lateral bud bursting, growth, and leaf elongation (Bassiony, 2020).

Flowering, fruiting and yield characteristics:

Flowering and fruiting parameters:

Total number of opened flowers per cluster, total number of set fruits per cluster, percentage of fruit set per cluster, number of dropped fruits, percentage of significantly affected by different bud numbers per vine of Black Magic Grapevines during the 2021/2022 and 2022/2023 seasons, as shown in Table (3). Furthermore, the results clearly demonstrated that 84 eyes per vine provided the best values for total number of flowers per cluster in the second season while having no effect in the first season. Furthermore, in both seasons, 84 eyes per vine produced the highest significant values of fruit set per cluster. The highest percentage of fruit set per cluster was obtained with 84 eyes per vine in the first season and 78 eyes in the second season. Thus, 66 eyes per vine resulted in fewer fallen fruits in the first season and 90 eyes in the second. The same observation yielded lower percentages of fruit drop in the first season (72 eyes per vine) and 90 eyes in the second season. Moreover, the data clearly demonstrated that 84 eyes per vine in the first season and 90 eyes per vine in the second season provided the highest significant value of berries at harvest. According to the data, 72 eyes per vine yielded the highest proportion of retained berries in the first season and 90 eyes per vine in the second season.

Cluster characteristics and yield:

The effects of bud number per vine on cluster characteristics and yield of Black Magic Grapevines throughout the seasons 2021/2022 and 2022/2023 are shown in Table (4). The influence of bud number per vine on cluster weight, yield per vine and yield per Feddan data shows that vines pruned at 90 eyes per vine followed by 84 eyes per vine resulted in significantly higher values in both seasons. It showed that pruning is used to increase the bud number as give a suitable balance between plant vigor and production. As such, increasing bud load per vine increased the number of clusters per vine and yield. The maximum number of clusters per vine was associated with treatments with 90 or 84 buds per vine, which were statistically the richest in Black Magic grape.

Physical and biochemical characteristics of berries:

The data in Table (5) show that different bud number per vine of Black Magic Grapevines significantly affected berry physical parameters such as the average of weight and volume of 100 berry, berry firmness (Ib/inch^2), as well as berry biochemical characteristics such as the percentages of total soluble solids (TSS %) and total acidity (TA %) during the 2021/2022 and 2022/2023 seasons. In both seasons, vines trimmed at 90 eyes per vine outperformed vines pruned at 84 eyes / vine in terms of the average weight of 100 berries, average volume of 100 berries and the percentage of total soluble solids. In both seasons, 66 eyes / vine had the highest significant values of berry firmness. Lower overall acidity levels were obtained from 90 eyes / vine in both seasons.

The disclosed fruiting parameters and yield characteristics are comparable to those of Ali et al. (2016), who evaluated the influence of five vine loads on the fruiting of Superior grapevines cultivated in Egypt's Minia region: 62, 72, 82, 92, and 102 eyes per vine. He discovered that increasing the number of eyes per vine from 62 to 102 resulted in a gradual increase in berry setting percentage, yield expressed in weight and number of clusters per vine, cluster compactness, cluster weight and dimensions, T.S.S. percentage, T.S.S./acid, and a gradual decrease in titratable acidity percent. In a similar vein, Gaser *et al.*, (2017) showed that vines with extended pruning produced a greater number of bunches and yield per vine than vines with short pruning of Red Globe grapevines. Abo-ELwafa (2018)

discovered that vines trimmed at (96 bud/vine) 24spurs × 4 buds produced the maximum yield per vine in both Early Sweet grape seasons. Furthermore, Ghobrial (2018) investigated the influence of five different cane lengths, namely 6, 8, 10, 12 and 15 buds per cane, on the bud behavior, growth and production of Autumn Royal grapevines. He discovered that vines with 15 buds per cane produced a greater proportion of yield. Furthermore, Belal *et al.*, (2021) observed that increasing the number of buds per vine from 8 buds/m^2 (60 buds/vine) to 12 buds/m^2 (90 buds/vine) was associated with a rise in yield/vines and Feddan of Flame seedless grapevines. Furthermore, Mohamed (2023) observed that pruning at 12 fruiting canes and 10 eyes per cane resulted in a higher yield per vine, number of clusters per vine, cluster weight, berry weight, berry size, T.S.S.%, T.S.S./acid, and reduced overall acidity of the Black Magic grape cultivar.

According to Omar and Abdel-Kawi (2000), growing leaves result in a dense canopy with increased active photosynthesis and stored carbohydrates in Thompson seedless grapevines' new canes, which might explain the rise in production and properties. On the other hand, Ali et al. (2016) discovered that judicious pruning had a positive influence on leaf area, elements, and chlorophyll content, resulting in greater output and fruit quality in Superior grapevines.

CONCLUSION:

Under the conditions of this study, vines pruned at 90 and 84 eyes per vine provided the best vegetable growth , flowering, fruiting ,yield and cluster quality for the Black Magic grape cultivar. As a result, the following notes are recommended to achieve the greatest potential yield while maintaining vigor of the vine. This is appropriate for growers' revenue as well as domestic and foreign markets. As a result, output may be managed by pruning by selecting a suitable number of buds to determine the number of clusters the plant can carry before harvest. As a result, it is critical to explore the influence of various pruning intensities on grape cultivar performance in today's shifting climatic conditions.

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Table 1: Some water and soil chemical analysis of the experimental site.

Water chemical properties									
pH	EC dS/m	Ca^{++} (mg/L)	Mg^{++} (mg/L)	Na^{+}	K^{+}	Cl^{-} (mg/L)	SO_4^{--} (mg/L)	HCO_3^{-} (mg/L)	CO_3^{--}
6.47	1.55	4.88	2.09	8.33	0.19	11.65	.34	3.50	0.0
Soil chemical characteristics									
Soil Structure	EC (dS/m)	pH (1:2.5)	Soluble cations (meq/L)				Soluble anions (meq/L)		
Sandy loam	1.68	8.81	K^{+}	Ca^{++}	Mg^{++}	Na^{+}	Cl^{-}	HCO_3^{-}	SO_4^{-}
			.76	6.0	3.0	7.0	10.5	1.0	5.26

Table 2: Effect of bud number / vine on the leaf area, number of leaves/ shoot, fresh & dry weight, shoot length, the total chlorophyll content of leaves and coefficient of wood ripening of Black Magic Grapevines during 2021/2022 and 2022/2023 seasons.

Characteristics Treatments	Vegetative growth						
	Leaf area (cm^2)	Number of leaves/ shoot	Leaf fresh weight(g)	Leaf dry weight(g)	Shoot length(cm)	Coefficient of wood ripening	Total chlorophyll (SPAD)
2021/2022 season							
60 eyes	128.30 b	25.00 b	5.44 b	2.47 b	208.44 c	0.12 a	35.17 ab
66 eyes	138.39 ab	28.67 a	6.05 ab	2.59 ab	216.22 ab	0.12 a	34.93 ab
72 eyes	143.84 ab	27.56 ab	5.82 b	2.49 b	211.22 bc	0.12 a	33.94 b
78 eyes	148.29 ab	28.11 ab	6.63 a	2.82 a	220.89 a	0.13 a	34.43 ab
84 eyes	156.28 ab	29.11 a	6.52 a	2.72 a	217.10 a	0.11 a	36.85 ab
90 eyes	162.13 a	28.22 ab	6.00 ab	2.52 ab	221.33 a	0.11 a	36.93 a
2022/2023 season							
60 eyes	131.55 b	24.11 b	3.39 c	1.00 bc	210.22 ab	0.15 a	39.46 bc
66 eyes	125.64 b	26.56 ab	3.21 c	0.91 c	216.56 ab	0.13 ab	38.78 c
72 eyes	140.46 ab	24.56 b	4.33 ab	1.20 ab	208.00 b	0.10 b	39.24 c
78 eyes	158.39 a	25.22 ab	4.64 a	1.41 a	214.89 ab	0.14 a	39.16 c
84 eyes	142.78 ab	26.22 ab	3.60 bc	1.01 bc	207.67 b	0.17 a	41.40 ab
90 eyes	141.79 ab	27.89 a	3.91 abc	1.14 bc	219.22 a	0.13 ab	42.21 a

Means in each column followed by the same letter (s) are not significantly different at 5 % level.

Table 3: Effect of bud number per vine on flowering and fruiting parameters of Black Magic Grapevines during 2021/2022 and 2022/2023 seasons.

Parameters Treatments	No. of total flowers/cluster	Fruiting parameters					
		Fruit set		Fruit drop		Berries at harvest	
		No. of fruit set /cluster	Fruit set /cluster (%)	No. of dropped fruits	Fruit drop (%)	No. of berries at harvest	Retained berries (%)
2021/2022 season							
60 eyes	512.33 a	149.33 bcd	29.16 cd	31.67 c	21.14 bc	117.67 b	78.86 ab
66 eyes	497.00 a	135.67 d	27.29 d	23.33 c	17.09 c	112.33 b	82.91 a
72 eyes	490.00 a	151.67 bc	30.98 bc	24.67 c	16.16 c	127.00 a	83.84 a
78 eyes	501.33 a	162.67 b	32.46 b	46.00 b	28.20 ab	116.67 b	71.80 bc
84 eyes	510.67 a	203.67 a	39.86 a	69.67 a	34.07 a	134.00 a	65.93 c
90 eyes	496.67a	141.33 cd	28.46 d	30.00 c	21.18 bc	111.33 b	78.82 ab
2022/2023 season							
60 eyes	502.67 b	149.67 ab	29.80 ab	44.67 ab	29.61 a	105.00 bc	70.39 bc
66 eyes	488.00 b	127.67 c	26.13 b	24.33 bc	18.85 b	103.33 c	81.15 b
72 eyes	489.00 b	152.67 ab	31.25 a	49.00 ab	31.98 a	103.67 bc	68.02 bc
78 eyes	491.33 b	157.00 a	31.97 a	53.00 a	33.64 a	104.00 bc	66.36 c
84 eyes	590.00 a	159.33 a	29.28 ab	54.67 a	26.37 ab	117.33 ab	73.63 bc
90 eyes	494.67 b	138.33 bc	26.05 b	15.67 c	10.42 c	124.00 a	96.90 a

Means in each column followed by the same letter (s) are not significantly different at 5 % level.

Table 4: Effect of bud number per vine on cluster characteristics and yield of Black Magic Grapevines during 2021/2022 and 2022/2023 seasons.

Characteristics Treatments	Cluster characteristics					Yield	
	Cluster weight(g)	Cluster number	Cluster length (cm)	Cluster width(cm)	length/ width shape	Yield (kg/vin)	Yield Feddan (ton)
2021/2022 season							
60 eyes	642.17 ab	27.44 a	22.28 a	9.00 a	2.48 a	17.62 ab	12.33 ab
66 eyes	605.67 b	28.89 a	24.08 a	8.50 a	2.86 a	17.57 ab	12.30 ab
72 eyes	618.83 b	27.33 a	22.42 a	8.83 a	2.58 a	16.89 ab	11.82 ab
78 eyes	619.83 b	28.56 a	20.92 a	7.67 a	2.76 a	17.70 b	12.39 b
84 eyes	730.17 a	28.78 a	23.00 a	8.83 a	2.61 a	20.86 a	14.60 a
90 eyes	734.00 a	28.56 a	22.17 a	9.42 a	2.41 a	20.94 a	14.66 a
2022/2023 season							
60 eyes	653.67 cd	30.56 a	22.00 a	15.00 a	1.48 a	19.97 bc	13.98 bc
66 eyes	646.17 d	30.89 a	23.50 a	14.67 a	1.62 a	19.96 bc	13.97 bc
72 eyes	655.67 bcd	30.89 a	23.33 a	14.33 a	1.65 a	20.25 bc	14.18 bc
78 eyes	666.17 abc	29.11 a	21.83 a	14.50 a	1.55 a	19.40 c	13.58 c
84 eyes	671.00 ab	31.67 a	22.17 a	19.67 a	1.19 a	21.25 ab	14.87 ab
90 eyes	678.00 a	32.11 a	21.83 a	16.33 a	1.34 a	21.78 a	15.24 a

Means in each column followed by the same letter (s) are not significantly different at 5 % level.

Table 5: Effect of bud number per vine physical and biochemical characteristics of berries Black Magic Grapevines during 2021/2022 and 2022/2023 seasons.

Characteristics Treatments	Berry physical parameters				Berry biochemical characteristics		
	Average weight of 100 berry(g)	Average volume of 100 berry (cm^3)	Specific gravity (g/cm^3)	Fruit firmness ($Ib/inch^2$)	T.S.S (%)	Total acidity (%)	T.S.S/acid ratio
2021/2022 season							
60 eyes	640.00 b	597.00 b	1.07 a	3.83 ab	15.30 b	0.50 ab	30.79 ab
66 eyes	637.67 b	638.33 a	1.00 b	4.32 a	15.00 b	0.51 ab	29.29 ab
72 eyes	604.00 c	575.00 bc	1.05 ab	3.57 bc	15.18 b	0.54 ab	28.05 b
78 eyes	591.33 c	566.67 c	1.04 ab	3.31 bc	15.21 b	0.55 a	27.79 b
84 eyes	630.00 b	590.00 bc	1.07 a	3.15 c	15.22 b	0.52 ab	29.38 ab
90 eyes	679.67 a	636.33 a	1.07 a	3.23 bc	15.67 a	0.48 b	33.14 a
2022/2023 season							
60 eyes	670.33 ab	663.00 b	1.01 a	2.60 b	13.74 b	0.55 a	25.31 b
66 eyes	668.33 b	658.67 b	1.01 a	2.96 a	13.94 b	0.53 a	26.21 b
72 eyes	672.67 ab	665.00 b	1.01 a	2.84 ab	14.11 b	0.52 a	27.35 ab
78 eyes	673.33 ab	661.33 b	1.02 a	2.85 ab	13.79 b	0.51 ab	27.06 ab
84 eyes	677.00 ab	668.33 ab	1.01 a	2.79 ab	14.05 ab	0.50 ab	28.35 ab
90 eyes	683.67 a	680.00 a	1.00 a	2.68 ab	14.19 a	0.45 b	31.53 a

Means in each column followed by the same letter (s) are not significantly different at 5 % level.

تأثير عدد البراعم لكل كرمة علي النمو والإزهار والإثمار وصفات المحصول لعنب بلاك ماجيك

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الملخص العربي:

هذه الدراسة تعمل علي تقييم تأثير عدد البراعم المختلفة لكل كرمة علي النمو الخضري، الإزهار, الإثمار, المحصول وجودة ثمار العنب صنف البلاك ماجيك لتحديد العدد الأمثل للبراعم التي يجب تركها علي الكرمات لتحقيق أعلي محصول ممكن مع أفضل جودة للثمار مع الحفاظ علي قوة الكروم خلال موسمين متتاليين 2021/ 2022 و 2022/2023 م في بستان عنب خاص بوادي النطرون محافظة البحيرة. أجريت المعاملات علي النحو التالي 60 عين (6 عيون × 10قصبات), 66 عين (6 عيون × 11قصبات), 72 عين (6 عيون × 12قصبات), 78 عين (6 عيون × 13قصبات), 84 عين (6 عيون × 14قصبات) و90 عين (6 عيون × 15قصبات). أظهرت النتائج أن الصفات المدروسة قد تأثرت معنوياً باختلاف عدد البراعم لكل كرمة في موسمي هذه الدراسة. أظهرت النتائج أن الكرمات التي قُلمت علي 90و84 عين لكل كرمة أعطت أفضل القيم لمعظم الصفات المدروسة مثل مساحة الورقة, طول الطراح,محتوي الكلورفيل الكلي للأوراق,عدد الحبات المتبقية عند الجمع, متوسط وزن وحجم 100 حبة,النسبة المئوية للمواد الصلبة الذائبة, وزن العناقيد ,محصول الكرمة ومحصول الفدان مما حقق التوازن المناسب بين النمو والإنتاجية. لذلك يمكن التحكم في الإنتاج عن طريق التقليم حيث يتم اختيار كمية كافية من البراعم لتوفير عدد العناقيد التي يستطيع النبات اعطاء افضل محصول وجودة عناقيد.

الكلمات الاسترشادية: كرمات العنب, بلاك ماجيك, عدد البراعم, التقليم; النمو,خصائص المحصول.