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Effect of Variety and Clove Weight on some Vegetative Properties and Chemical Content of Garlic Plant (*Allium sativum* L.)

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Abstract *Two field experiments were carried out during the 2013/2014 season and 2014/2015 at the Department of Horticulture Department, Faculty of Agriculture, Omar Al-Mukhtar University in El-Beida - Libya, with the aim of studying the effect of the two varieties of garlic Allium sativum L., (Egyptian and Chinese), and the weight of its cloves used as very small seeds (1.3 g), small (2.2 g), medium (3.4 g), and large (4.5 g). The study was carried out according to the design of the complete randomized block with three replications, in both experiments. To study the main effects and the different interactions between these factors on the characteristics of vegetative growth, and the garlic leaf content of some mineral elements N, P, K and chlorophyll (a, b).The results obtained showed that there were significant differences between the studied varieties, where the Chinese variety Significantly superior the Egyptian variety in the average length of leaves during the two seasons of study, and in the average number of leaves during the first season, while the Egyptian variety Significantly superior on the leaf area in the two seasons of study, and excelled in dry weight For the leaves during the first season, the Egyptian variety excelled in its nitrogen content. While the Chinese variety excelled in its content of phosphorus and potassium, and in the leaf content of chlorophyll (b), while there were no significant differences in the leaf content of chlorophyll (a) for the two cultivars.*

The results also showed that there were significant differences in the weight of large used in increasing the growth characteristics of Garlic plants, as the leaf content of nitrogen and phosphorus and the content of garlic plants from chlorophyll increased significantly in both cultivars under study. The interaction between the cultivars and the weight of the also had a significant effect on the mineral elements (Nitrogen, Phosphorus, Potassium) in the Garlic leaves.

Keywords: *Garlic, Chlorophyll, Cloves weight, Cultivar, Variety.*

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I. Introduction

Garlic (*Allium sativum* L.) is considered one of the most important vegetable crops of the Alliaceae Garlic family after onions. Garlic is considered an important economic crop because of its high nutritional and medicinal importance, but it is not relied upon as a food source because it is consumed in small quantities, but its medicinal importance is proven in this area, therefore, Garlic is grown for its , which give many foods a special flavor. Garlic contains more than 100 chemical compounds, the most important of which is (Allicin), an amino acid that contains sulfur and consists of another compound that appears when garlic is cut or crushed and is responsible for the effective biological properties of garlic. According to FAO estimates (2017), the area planted with garlic in Libya was approximately 794 hectares; with an average productivity per hectare was 5,777 tons.

The use of large-sized as seeds for Garlic cultivation leads to a higher yield with an increase in the cost of production compared to the use of small-sized, which give less production and lower cost, so there is an urgent need to standardize the size of garlic used in propagation in order to obtain results Cost-effective and productive (Castellanus et al 2004). El-Mesirry and Radi, (2019) They conducted an experiment to study the effect of clove size in Garlic on vegetative and cropping characteristics, and the results obtained indicated that the characteristics of vegetative growth and yield and its components were affected significantly, and the difference in the size of the clove, and the results showed that the greater the size of the separation, the greater the values for all characteristics studied morally in both seasons.

Gabriel (2010) found that there were significant differences in plant growth between the varieties of garlic used in his study (Egyptian "Baladi", American, Chinese), the Egyptian variety outperformed both Chinese and American in plant height, number of leaves and leaf area of the plant, and the diameter of each neck Onion, on the other hand, the Chinese variety ranked first in the fresh and dry leaves weight also in total weight. Maksoud and Eloksh (1983) also studied the changes in the growth of three varieties of garlic

throughout the season, noting that the Chinese variety in plant growth outperformed the municipal and American varieties, in (number of leaves per plant, fresh weight of the total plant), especially in the early stages of growth And, regardless of the variety, the plants produced 50% of their total weight at the 20-26 week of cultivation for the municipal and American cultivars, and after 32 weeks for the Chinese variety.

Likewise EL-Mansi et al.(1988) Found the superiority of the municipal garlic variety in the height of the plant over the Chinese variety, while the opposite was with respect to the number of leaves per plant, the fresh weight of plant parts, the proportion of cloves. In a study by Memane (2008) and others on garlic plant where they found significant differences in each of the height of the plant, the number of leaves and the fresh weight of the plant, as these characteristics increased with increasing weight of the clove. Gauttam, et al. (2014) also found that the highest gradient significant values were obtained for both plant height, number of leaves, and total yield with increasing clove size.

The results of Gabriel (2010) showed that the Chinese cultivar ranked first among the varieties in its leaf content of nitrogen and potassium, while it occupied the last position in the content of its of nitrogen. Moreover, the American variety ranked first in the percentage of phosphorous in leaves, an average position in the percentage of potassium in leaves, nitrogen and potassium in the cloves, and the last in the proportion of nitrogen in leaves. On the other hand, the Egyptian variety ranked first in the content of its nitrogen as an intermediate (second) in the nitrogen leaf content and phosphorous content of its , and last in the leaf content of phosphorous and potassium and the clove content of potassium.

This, and it was collected by: EL-Mansi and others (1988), EL-Shabasi (1988), Naruka and (2002) Bharat, who unanimously agreed on the different classes of garlic in the leaf content of nitrogen, phosphorous and potassium. Several researchers mentioned the varieties in the quality of their bulbs, in terms of their content of dry matter, soluble solids, vitamins and nutrients.

The varieties differences of garlic in its nitrogen, phosphorous, and potassium content are due to the difference of the ability of the varieties in the absorption of nutrients from the soil EL-Aweel et al. (2000), along with the difference of these varieties in the content of their leaves from Chlorophill a and b, and thus their ability to benefit from light energy and representation Sestak & Catsky Scanning (1962), as well as its difference in germination speed, factors that collectively influence the differences in the content of both leaves and cloves of metallic elements. Zaki (1984) found that there was a significant difference in photosynthetic pigments between the three varieties of garlic that he tested (American, Egyptian, Chinese), and the Chinese variety was the highest in its content of chlorophyll a, b, a + b, while the American variety contained the least Value.

Abd el Hamed (1982) mentioned that the use of large garlic led to a significant increase in the dry matter of the plant during growth compared to medium or small , and it was found that large produced the highest yield at harvest and after drying as well as the largest bulbs, while the led Small to significantly reduced number of cloves in the head compared to medium or large cloves, but the average weight of the resulting cloves was not affected by the size of the cloves used in agriculture.Orloski and Kolota (1984) cultivated garlic with weights of 1.5-12 g in late October and last March and last April. The most important results were that the total yield increased, as did the quality of the bulbs by increasing the weight of the clove to the largest weight used.

Dhakulkar et al. (2009) found when studying the effect of clove size on garlic growth and productivity under the conditions of the Akula region in India that the average clove size (10 /12 g clove) gave the highest yield, while high-quality bulbs were produced from large clove (10/16 g). When studying Sankar and Lawande (2010), they found the effect of maternal clove size on growth, yield, and storage quality of VAR garlic G. 41, that the size of the mother's clove 1.4-1.5g recorded a higher growth in terms of plant height and number of leaves per plant, compared to less-weighted cloves. Dubey et al. (2010) found that the bulb yield on garlic correlated positively and significantly with neck thickness, bulb diameter, bulb size index, / bulb, and pericardium, total soluble solid matter ratio, dry matter, number of days from planting to harvest, and a reference for all of those characteristics to Genetic and phenotypic composition, indicating that selection based on these traits is useful in increasing yield.

So this study aims to know the effect of the variety and the size of the cloves (weight) on the characteristics of vegetative growth and the chemical content of some elements and to determine the appropriate variety of varieties circulating in the local market under the conditions of Gabal Al-Kadar in Libya, which reflects positively on the crop.

II. Material and Methods

A field experiment was carried out during the season 2014/2015 at the Department of Horticulture Department at the Faculty of Agriculture, Omar Al-Mukhtar University in Al-Bayda area in Jabal Al-Akhdar, with the aim of studying the effect of the size of garlic cloves (seeds) and varieties and their interactions on the vegetative traits and leaves content of nitrogen, phosphorous and potassium chlorophyll (a&b).

Soil analysis

Before carrying out the field experiment, several samples were taken from the soil with a depth of 20 cm to perform some natural and chemical analyzes, according to the method followed by Black (1965). Table (1) shows some of the natural and chemical characteristics of the soil of the experiment site in the study.

Table (1):- Some physical and chemical properties of soil.

Properties	Value	unit
Physical		
Hydrometer analysis		
silt	38.8	%
sand	11.4	%
clay	38	%
Bulk Density	1.35	$g.cm^3$
Porosity	49.24	%
Chemical		
pH	6.9	/
Ec	0.318	dS/m
Soluble ions		
Total N	0.34	%
Mg	1.2	meq/L
Available N	29.8	PPM
Available P	46.0	PPM
Available K	343.4	PPM
CaCO3	18.75	%

The main factors studied:

The first factor: An average of four weights of garlic used as seeds were studied as follows: very small (1.3 g), small (2.2g), medium (3.4g) and large (4.5g). The second factor included two varieties of garlic, the Egyptian and the Chinese variety.

Laboratory work before planting in the field:

An appropriate amount was allocated from the heads of each of the two tested garlic cultivars, and they were separated, sorted, and excluded weak, empty, injured, or insectically infected or with visible eye disease, then homogeneous cloves were chosen in the size, weight, and shape represented for each laboratory and for each laboratory size, and then soaked in water Cover them for 24 hours, then in Micronized Sulfur at a concentration of 5g/ liter of water for 20 minutes, after which they were cultivated on September 15 in both years of study.

Fieldwork:

The field was well prepared by cultivating it and adding the following quantities of fertilizer as a basic fertilizer based on the soil analysis done for the two experiment sites: poultry fertilizer, 20 m3, ammonium sulfate 50 kg, mono superphosphate 150 kg, agricultural sulfur, 100 kg / ha. Then the land was plowed again, as well as crawled and the drip irrigation network established, and the distance between the lines was 50 cm. The (consistent in shape and size for each variety) were planted in the field at the mentioned date on both sides of the drip irrigation hose, and all recommended service and care operations followed in the production of garlic were made, as the following fertilizer quantities were added during the growing season: urea fertilizer (46% N) at a rate of 100 kg / ha, phosphoric acid (80% P_2O_5) at a rate of 80 l / ha, liquid potassium (36% K_2O) at a rate of 100 l / ha. The above-mentioned fertilizers were added, divided in batches twice a week through the irrigation network during the irrigation of the crop, after 30 days of planting for 10 weeks, and a leafy fertilizer containing all the minor elements was sprayed every two weeks starting from the third month, also the pest prevention program was applied Insect and fungi, depending on what is recommended in the commercial production of garlic.

Studied measurements:

After 135 days of planting, five plants were randomly selected from each experimental unit, in each agricultural season and the following data were recorded on them: Average leaf length of the plant (cm): The number of leaves per plant and the leafy area of the plant (cm^2/ plant) where it was estimated using a method Wet weight according to Wallacce and Munger (1965) method. Average dry weight of plant leaves was calculated after drying them in a drying oven at a temperature of 70 ° C until the weight remains constant.

Plant content of nitrogen, phosphorous and potassium elements (%) and leaf content of chlorophyll (mg / 100g): After 135 days of planting, nitrogen, phosphorus, and potassium were estimated in the leaves of the plant, total nitrogen (N) was estimated using the AOAC method (1990) while phosphorus (P) was estimated

using a spectrophotometer using a spectrophotometer along the 470 nanometer wave. whereas the percentage of potassium (K) was estimated using the Flame photometer according to the steps mentioned by Jackson (1967). The leaf content of chlorophyll a, b and total chlorophyll was estimated by using the chromatic method according to the steps mentioned by Moran (1982), by taking a sample tablet from the fourth inner leaf of ten plants per experimental unit, and the chlorophyll a, b content was calculated on the basis of mg / chlorophyll / 100 grams wet weight of leaves, (All tests of the chemical properties (Nitrogen determination, Phosphorus, Potassium and Chlorophyll a and b in the leaves) were taken for the second season of study only)

Design and Statistical Analysis:

The study was carried out according to the design of the complete randomized block with three replications, in both experiments. Statistical analysis of each trait under study was conducted in the two seasons of cultivation, as described by Snedecor and Cochran (1980) and mean coefficients were compared according to Least Significant difference (LSD) at 5% level of significance.

III. Result and Discussion

Effect of varieties on the of vegetative growth characteristics of Garlic plants:

The results related to the effect of the varieties on the growth characteristics of garlic (Table 2) showed that the Egyptian variety outperformed the Chinese variety in the characteristic of the leafy area in both seasons of study, while it excelled in the dry weight of the leaves during the first season and the average number of leaves during the second season. On the other hand, the Chinese variety outperformed the Egyptian variety in terms of the average of the longest leaves, the dry weight of the leaves during the second season, the average number of leaves during the first season and the absence of significant differences in the characteristic of the average length of leaves during the first season. In general, there are differences between the varieties due to the genetic makeup of each variety and the results of this study coincided with the study conducted by Badawi and others (2004) under the conditions of the North Sinai region in Egypt, where they found the superiority of the Chinese variety over the municipal variety in growth in general.

Effect of clove size on Garlic plant growth characteristics:

The results shown in Table (2) illustrate the effect of the size of the used during the experiment on the characteristics of garlic growth during the two study years, where the results showed that there was a significant effect of the size of the on (the average length of leaves, the average number of leaves, the leafy area of the plant, the dry weight of the leaves) , And that the higher the weight of the lobe, the greater the percentage of previous growth characteristics, and the highest value of all the characteristics mentioned above was recorded at the size of the large cloves compared to the rest of the other sizes of weights of the tested cloves. Haydar, (2007) demonstrated that increasing the bulb size used in onion cultivation had a positive effect on the vegetative traits tested in his experiment on plant height and fresh weight of bulbs and their length and that the highest values were obtained by increasing the weight of bulbs used in onion cultivation. The superiority in the growth of the vegetative traits of garlic plants may be attributed to the increase in nutrients stored in the cloves used in agriculture, especially in the initial growth stages (Deka and Shadeque 1993). These results are also consistent with Kotagriwar et al. (1997), where they confirmed that the larger used in the cultivation of garlic resulted in an increase in the height of the plant, and this is also due to the previous reasons, which are the increased supply of food stored in the . These findings matched the findings of: Maksoud et al. ((1987, Stahlschmid et al. (1994), Muller and Monderdo (1998)).

Table (2):- The main effects of cultivars and the size of on the growth characteristics of vegetative growth: garlic plants for the two growing seasons.

Varieties	Cloves Size	Leaf length (cm)/ plant	Number of leaves / plant	Leaf area / plant (cm^2)	Dry weight of leaves gm / plant
		The first season			
Egyptian		48.9A	6.68B	379A	6.25A
Chinese		47.3A	6.92A	355B	5.59B
	Very small	45.1D	6.08D	303D	4.58D
	small	46.7C	6.70C	357C	5.45C
	medium	48.0B	7.05B	384B	6.17B
	Large	52.7A	7.37A	423A	7.50A
		The second season			
Egyptian		47.2B	7.47A	396A	4.25B

Chinese		**49.3A**	**6.94B**	**374B**	**5.24A**
	Very Small	**44.0D**	**6.43D**	**331D**	**3.48D**
	Small	**44.7C**	**7.07C**	**364C**	**4.42C**
	medium	**49.2B**	**7.36B**	**396B**	**5.13B**
	Large	**53.1A**	**7.95A**	**449A**	**5.96A**

The values followed by the same letter or alphabets within the set of averages for each attribute do not differ significantly between them according to Least Significant Difference (LSD) at 5% level of significance.

The effect of interaction between cultivars and the cloves size on the growth characteristics of Garlic plants:

The results shown in Table (3) clarify the overlap between the varieties and the size of the cloves and their effect on the characteristics of plant growth, and indicate that there are significant differences between the four lobed sizes for both cultivars, where the Egyptian variety outperformed the average length of leaves and the average number of leaves and the leafy area of the plant during the experiment at size Large cloves for both seasons compared to the rest of the overlap coefficients, while the Egyptian cultivar outperformed the dry weight of the leaves at the size of the large cloves of the first season of the experiment and the Chinese cultivar outperformed the size of the large cloves for the second season compared to the rest of the overlap coefficients and differences may be due to the superiority of each variety in a particular season due to the environmental conditions of the cultivation area. There is generally no constant, but it is noted that the Egyptian variety is superior to the Chinese variety when using a large size of cloves, despite the absence of significant differences between them in most cases of all studied characteristics.

These results were identical with that of Maksoud et al. (1986) by growing different weights of , large (6.5 g), medium (3.6 g), and small (2.1), and found that plant height, number of leaves, and dry weight of the plant increased with increasing clove weight up to (6.5g).

Table (3) the effect of interaction between cultivars and the Cloves Size on the characteristics of vegetative growth of Garlic plants for the two growing seasons.

Varieties	**Cloves Size**	**Leaf length (cm)/ plant**	**Number of leaves / plant**	**Leaf area / plant (cm^2)**	**Dry weight of leaves gm / plant**
		The first season			
Egyptian	**Very small**	**44.3E**	**6.35E**	**326G**	**4.92E**
	small	**47.6 B-D**	**6.75D**	**364E**	**5.75D**
	medium	**48.7BC**	**7.15B**	**394C**	**6.45C**
	Large	**55.2A**	**7.45A**	**431A**	**7.87A**
Chinese	**Very Small**	**45.9DE**	**5.82F**	**280H**	**4.25F**
	Small	**45.8DE**	**6.65D**	**351F**	**5.14E**
	medium	**47.4CD**	**6.95C**	**374D**	**5.87D**
	Large	**50.1B**	**7.30AB**	**414B**	**7.12B**
Egyptian		**The second season**			
	Very small	**42.2E**	**9.97D**	**343G**	**3.09F**
	small	**45.1D**	**7.30C**	**371E**	**3.88E**
	Average	**48.3C**	**7.62B**	**402C**	**4.61D**
Chinese	**large**	**53.3A**	**8.00A**	**467A**	**5.43B**
	Very small	**45.9D**	**5.90E**	**318H**	**3.87E**
	small	**48.4C**	**6.85D**	**355F**	**4.95C**
	medium	**50.2B**	**7.10CD**	**389D**	**5.65B**
	Large	**52.8A**	**7.90A**	**432B**	**6.48A**

The values followed by the same letter or alphabets within the set of averages for each attribute do not differ significantly between them according to Least Significant Difference (LSD) at 5% level of significance.

The content of Garlic leaves of Nitrogen, Phosphorus, Potassium and Chlorophyll.

The effect of Variety:

The Results shown in Table No. (4) indicate that there are significant differences between the Egyptian and Chinese cultivars in the content of garlic leaves from the nutritional elements (NPK), where the Egyptian cultivar outperformed its nitrogen leaf content over the Chinese cultivar, while the Chinese cultivar outperformed the Egyptian cultivar in Its leaf content is both phosphorous and potassium.

These results can be explained by the difference in the genotype of each variety, which was confirmed by many researchers, where they confirmed that the differences of garlic in their content of nitrogen, phosphorous and potassium to the difference in the ability of the varieties in the absorption of nutrients from the soil (EL-Aweel et al. (2000) In addition to the difference of these varieties in the content of their leaves from Chlorville A and B, and thus their ability to benefit from optical energy and photosynthesis Sestak and Bartos (1963) as well as their difference in germination speed, which are factors that collectively influence the differences in the content of both leaves and cloves of the elements Food.

The results of this study were similar to those mentioned by EL-Shabasi (1988), Naruka and Bharaz (2002), who unanimously agreed on the different classes of garlic in the leaf and cloves content of nitrogen, phosphorous and potassium elements.

The results also showed in (Table 4) the effect of the varieties on the content of garlic leaves of chlorophyll during the second season, where the results indicated that there were no significant differences between the two cultivars in their content of chlorophyll (a), while it was noted that the Chinese variety exceeded the Egyptian variety in the content of chlorophyll leaves (b).

The results were consistent with Zaki (1984) found that there was a significant difference in photosynthetic dyes between the three tested garlic varieties (American, Egyptian, Chinese), and the Chinese variety was the highest in its chlorophyll content (a + b, a, b) in When the American variety contained the lowest values.

Effect of clove size on Garlic leaf content of nutrients and chlorophyll:

The results related to the effect of cloves size on the leaf content of the nutrients showed that there were significant differences between the four sizes used during the experiment, as the size of the cloves increased, the leaf content of nitrogen and phosphorus increased and the highest value was recorded at the large lobe size of both nitrogen and phosphorous compared to other sizes.

As for potassium, the leaf content of potassium decreases by increasing the volume of, where its highest value was when the size of the clove is very small compared to the rest of the sizes (Table 4).

The explanation of these results is that the greater the size of the clove, the greater its content of mineral elements, which gives the largest vegetative and root group of the plant as the best plant growth at the size of large, which in turn makes the plant benefit from the most mineral content in the surrounding soil of nitrogen and phosphorus, while a decrease The content of potassium is due to the phenomenon of contrast and competition between the elements. Abrahem (2010) found that the high nitrogen level inhibits the absorption of potassium.

As for the effect of the size of the on the content of garlic leaves of chlorophyll, the results show in table (4), that there are significant differences between the four clove sizes used during the experiment for the second season in their content of chlorophyll (a, b), as the more the size of the clove, the greater the content of leaves of the chlorophyll (a and b), the highest value of chlorophyll (a, b) was recorded at the size of the large cloves compared to the rest of the other treatments within the experiment.

These results can be explained by the fact that large give the highest vegetative growth to the rise in nutrients, especially nitrogen, and the absorption of nitrogen from the soil, which in turn helps photosynthesis of the plant.

Table (4). Main effects of Varieties and cloves size of Garlic leaf contents of Nitrogen, Phosphorus, Potassium and Chlorophyll of the Second season.

Varieties	Cloves Size	% N	%P	%K	Chlorophyll (mg/100g fresh weight)	
					a	b
		Second season				
Egyptian		4.58 A	0.41 B	4.58 A	85.3A	35.6B
Chinese		4.24 B	0.42 A	4.24 B	86.1A	46.6A
	Very Small	3.35 D	0.32 D	3.35 D	77.1D	25.0D
	Small	4.04 C	0.38 C	4.04 C	84.0C	39.2C
	medium	4.71 B	0.43 B	4.71 B	88.2B	46.6B

	Large	**5.56 A**	**0.52 A**	**5.56 A**	**93.4A**	**53.6A**

The values followed by the same letter or alphabets within the set of averages for each attribute do not differ significantly between them according to Least Significant Difference (LSD) at 5% level of significance.

The effect of interaction between cultivars and the cloves size of Garlic plant on the content of leaves from nutrients:

The results shown in Table (5) indicate the effect of the interaction between the varieties and the cloves size of the on the leaf content of the nutrients (NPK), as the greater the volume of the clove used as seed, the greater the nitrogen and phosphorus rate and the lower potassium level inside the plant for both the Egyptian and Chinese cultivars, where it was The highest level of nitrogen at the size of the large clove of the Egyptian variety, and the highest level of phosphorus at the size of the large clove of the Chinese variety, while the highest value of potassium was recorded at the size of the very small clove of the Chinese variety, compared to the sizes of other cloves used in the experiment. The differences between the garlic varieties in their photosynthetic pigment content may be due to the differences in their genotype.

Where the results of Gabriel (2010) showed the superiority of the Chinese variety in the content of its leaves of nitrogen and potassium and the content of its cloves of phosphorus and potassium, while it occupied the last position in the content of its cloves of nitrogen between the tested varieties, and on the other hand, the Egyptian variety ranked first in the content of its cloves of nitrogen and in the middle between the varieties tested in nitrogen leaf content and the content of their cloves phosphorous, and small quantities in the leaf content of phosphorous and potassium and the clove content of potassium. With regard to the effect of interaction between the varieties and the size of the on the content of garlic leaves of chlorophyll, the results shown in Table (5) indicated the significant effect of the interaction between the varieties and the size of the on the content of the leaves of chlorophyll, where the size of the large clove achieved the highest concentration of both chlorophyll pigments (a, b) For the two cultivars, compared to the rest of the cloves.

As shown in Table (5), the Chinese variety exceeded the Egyptian variety in the content of chlorophyll (a and b) at the large size of the cloves, and the absence of significant differences for the rest of the cloves of the two cultivars in relation to chlorophyll (a).

These results can be explained by the fact that large cloves give the highest vegetative growth to the height of nutrients, especially nitrogen, and the absorption of nitrogen from the soil, which in turn helps photosynthesis of the plant, increases.).

Table (5): The effect of interaction between cultivars and the size of Garlic leaf content of nutrients during the second season.

Varieties	**Cloves size**	**% N**	**%P**	**%K**	**Chlorophyll (mg/100g fresh weight)**	
					a	**b**
		Second season				
Egyptian	**Very Small**	**3.54G**	**0.35G**	**2.93B**	**77.9E**	**23.1H**
	Small	**4.27E**	**0.35F**	**2.82BC**	**84D**	**32.7F**
	medium	**4.83C**	**0.42D**	**2.67CD**	**87.6C**	**38.1E**
	Large	**5.69A**	**0.50B**	**2.45E**	**91.7B**	**48.6C**
Chinese	**Very Small**	**3.16H**	**0.29H**	**3.37A**	**76.3E**	**26.9G**
	Small	**3.81F**	**0.40E**	**2.87B**	**83.9D**	**45.7D**
	medium	**4.59D**	**0.44C**	**2.78B-D**	**88.8C**	**55.1B**
	Large	**5.42B**	**0.55A**	**2.61DE**	**95.1A**	**58.6A**

The values followed by the same letter or alphabets within the set of averages for each attribute do not differ significantly between them according to Least Significant Difference (LSD) at 5% level of significance.

IV. Conclusion

We can recommend the use of other varieties of garlic, such as the American variety, the Spanish variety, and other imported varieties, as well as increasing the average size of the used as seeds, and conducting the experiment in more than one area of the Gabal Al-Kadar region, such as the coastal region, and the south of the Gabal Al-Kadar in Libya, where there is a difference in environmental conditions and soil quality in The both regions.

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