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EFFECT OF FOLIAR SPRAYING WITH SEAWEED EXTRACT (ACADIAN) AND CHELATED IRON ON THE GROWTH AND YIELD OF CORMS OF GLADIOLUS HYBRIDA (CARTAGO)

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Abstract

The study was conducted in the wooden canopy of the Department of Horticulture and Landscape Engineering / College of Agriculture / University of Kirkuk, for the period from October 1, 2020 to May / 2021, to find out the effect of foliar spraying with a concentration of (0.1) $g.l^{-1}$ for each of Seaweed extract and chelated iron in the growth and production of corms of Gladiolus hybrida of the cultivar (Cartago), the factorial experiment was designed according to the randomized complete block design (R.C.B.D.), with three replications, and the results were summarized as follows :

1- Foliar spraying with organic fertilizer at a concentration of 1 $g.l^{-1}$ gave a significant increase in the length of the longest leaf (91.19) cm, and the total number of leaves was (10.22) leaves. $plant^{-1}$, the largest number of corms and cormels and their fresh weight, and the largest diameter of corms (1.23 corms. $plant^{-1}$, 3.83 cormel. $plant^{-1}$, 59.64 g, 7.86 g, 6.45 cm), respectively.

2-The foliar spray with chelated iron at a concentration of 1 g. L^{-1} caused a significant increase in the length of the longest leaf (88.29) cm, the total number of leaves was (10.66) leaves. $plant^{-1}$, the largest number of corms and cormels and their fresh weight, and the largest diameter of corms (1.23 corms. $plant^{-1}$, 4.18 cormel.$plant^{-1}$, 56.98 g, 6.98 g, 6.26 cm), respectively.

3- Show the bilateral interaction between the application of organic fertilizer and chelated iron at a concentration of 1 g. L^{-1} had a significant, positive effect on improving most of the studied traits, as the length of the longest leaf was (100.77) cm and the highest average number of total leaves was (12.88) leaves. $Plant^{-1}$, the largest number of corms (1.46) corm. $Plant^{-1}$, number of cormels (4.56) cormel.$Plant^{-1}$, the largest fresh weight of corms was (60.93) g, the largest fresh weight of cormels was (9.06) g, and the largest diameter of corms was (6.70) cm.

Keywords: chelated iron, growth, corms, Acadian, Gladiolus

Introduction:

Ornamental bulbs represent an important rank among flowering plants and occupy an important part in gardens. They can also be grown in anvils, ponds and balconies because of the distinctive leaves, beauty of their flowers, multi-colors, sizes and varieties, lack of pest infestation, speed of flowering and reproduction year after year, in addition to the fact that many of them are cut flowers. The mission (Al-Ghitani,

1978). The original habitat of the Gladiolus plant is the Sahara Desert in Africa , mostly South Africa. According to the scientist Jindal (1968), its original habitat is the tropical regions of southern Africa, the Mediterranean basin region, Europe and Mascarenes Island. According to the scientist Ameh (2011), the genus Gladiolus includes 260 species of perennial herbs belonging to the Iris family (Iridaceae), of which 10 species are native to Europe and 250 species belong to sub-Saharan Africa.Species of the genus Gladiolus can be divided into winter-flowering and summer-flowering varieties and hybrids, in addition to the modern summer-blooming hybrids (Modern Summer Blooming Hybrids), which exceed 1000 varieties, and summer-flowering (Goldblatt et al., 2000; Shakya, 2006).

Gladiolus is one of the most important bulb crops that are grown commercially. It is distinguished from other flowering bulbs by being able to plant it at any time of the year and produce its flowers almost throughout the year without the need for glass houses (Tawagen, 1987). The bulb of the gladiolus is a corm resulting from the enlargement of the basal part of the stem. It consists of internodes surrounded by the bases of squamous leaves, which are the same bases of leaves from which the old onion grew last season. It is useful in protecting the bud in the axil of each of them. It is not recommended to remove them before planting (Muzaffar,1987) and the gladiolus flowers are among the best cut flowers because of their good advantages in terms of their multi-colour, the length of the flower stalks, and the density of the flowers. Gladiolus multiply commercially by corms and cormels. Gladiolus is also considered a fast crop, as the period from planting the corms to picking the flowers takes only three months, and the gladiolus flowers are distinguished by their ability to stay in good condition after picking them for a relatively long period if care is taken with a water change. Vases daily (Rasul, 1984).

Gladiolus hybrids are among the preferred and distinctive cut flowers, due to their different sizes, color grades and excellent life span in vases. The Gladiolus plant is also used for coordinating and decorative purposes, and it is used as herbal plants on the edges of gardens and in the formation of landscapes or as potted plants (Kumar et al., 2008, Memon et al2009) (Gladiolus plants and their various parts are used as food, medicine, and as antibiotics to treat some infections (Nguedia, et al., 2004) Some compounds that are used in the treatment of some digestive diseases are also prepared from the corms (Gauchan et al., 2009). Gladiolus ranks eighth in the global trade of cut flowers and has a long international history (Halder et al., 2007; Ahmad et al., 2008).Foliar feeding is more efficient than ground feeding in rapid treatments for nutrient deficiencies that appear clearly on plant leaves. As the leaf is the basis for the process of photosynthesis, in addition to the possibility of mixing foliar fertilizers with pesticides used to control diseases and insect pests, which saves a lot of time, effort and money. Foliar feeding is the best technology for fertilization because of the high benefit of Nutrients and lack of environmental pollution, and the most efficient and economical method is compared to land fertilizer additions for plants (Mallarino, 2003).

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Foliar fertilization is one of the important methods to avoid nutrient deficiencies in the soil, especially micronutrients, as the addition of microelements in foliar fertilization is a successful approach to deal with the symptoms of nutrient deficiencies in plants (Kessel, 2006). According to Baldotto and Baldotto 2013, mineral nutrition plays an essential role in growth, production, flower quality, and corms production in gladioli. Nutrients are usually secured through the use of chemical fertilizers, and the extensive use of these fertilizers has side effects in groundwater pollution and negative impact on microorganisms in the soil. Alexander and Schroder (1987) confirmed that plant leaves have the ability to absorb nutrients, just like the roots, and that foliar fertilization is more economical than ground fertilization, because the amounts of nutrients used in foliar fertilization are less than ground fertilization. And that foliar feeding is one of the modern and successful methods of absorbing nutrients by plant leaves, especially when there are problems in the soil, including high salinity, large content of lime or gypsum, or its ability to fix nutrients or precipitate them, which reduces the readiness of nutrients and their absorption by plant roots. (2013). Fernandez et al. The seaweed extract has an important role when used on the plant, due to the nutrients it contains, vitamins, hormones, some organic and amino acids, as it is used to improve the nutritional status of the plant, and this leads to an increase in vegetative growth and the quantity and quality of yield for various plants (El-Maniem and Spinelli 2008.Abd -Allah et al. 2009). The results showed for Al-Saad and Al-Zubaidi (2021) a significant increase in the number of developing buds (4.86 bud. Plant^{-1}) and the total number of leaves (11.30) leaves. Plant^{-1} and the total content of chlorophyll in the leaves (1.79) (CCI) and the largest number of corms and cormels and their fresh weight and diameter of the corms (4.23 corms. Plant^{-1}, 3.03 cormels. Plant^{-1}, 5.13 g, 2.25 g, 3.27 cm) on successively after foliar spraying with seaweed extract (Acadian) at a concentration of 2 g. L^{-1} for saffron plant.

Mazrou (2019) confirmed in a study conducted on Gladiolus grandiflorus L. Acadian seaweed extract was used in two concentrations (0.1) g. L, as the treatment with Acadian led to the improvement of all the characteristics of vegetative and flowering growth and the production of corms.

Iron is one of the essential elements for plant growth and plays an important role in photosynthesis reactions and in the formation of chlorophyll. It is important in enzyme systems that play a key role in redox reactions in the process of plant respiration. Its deficiency causes chlorophyll deterioration and yellowing of plant leaves (Malkaouti and Tehrani 2005). Iron is also an important element, as it is an activator for enzymes that participate in the oxidation and reduction processes, and it also helps in building chlorophyll. Most plants need quantities of iron that exceed their needs from other nutrients (2004, Bauer et al). One of the most widely used forms of iron is chelated iron, as the chelated compounds keep the element in a form that is easy to absorb and transport by the plant, and it does not decompose in the soil. Fe-EDDHA and F-EDTA are considered chelated iron compounds commonly used in many plants (Shalt ,2006). Iron is an essential micronutrient for plant growth, a

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cofactor for approximately 140 enzymes, catalyzes unique biochemical reactions, and plays many essential roles in plant growth and development, including formation of chlorophyll, thylakoid, and growth of chloroplasts (Mohammadi pour et al.,2013; Abdel-Salam al., 2016). Horesh and Levy (1981)emphasized that foliar spraying of chelated iron to compensate for its deficiency is better than adding it to the soil, and Mengel and Kirby (1982) showed that iron plays an important role in the process of protein formation due to its contribution to nitrate reduction and its role in raising the capacity of Soil revival in the fixation of atmospheric nitrogen, as it is involved in the formation of RNA,while the results of (2020) Fadhil and Jader showed that there is a significant effect of foliar fertilization with chelated iron at a concentration of 150 mg. L on the rate of plant height, the number of leaves, and the number of branches of broad bean plants, as It gave the highest mean of 74.67 cm, 147.3 leaves, and 6.48 branches of Plant^{-1}, respectively, compared to the control plants that gave the lowest mean, as it reached 60.11 cm, 121.1 leaves.Plant^{-1} and 4.94 branches.Plant^{-1} straight the same.

Materials and methods :

The study was carried out in the wooden canopy, affiliated to the Department of Horticulture and Landscape Engineering, College of Agriculture, University of Kirkuk, for the period from 1 October, 2020 to May, 2021. The study included a study of the effect of foliar spraying with seaweed extract and chelated iron on the growth and production of corms of a plant. Gladiolus hybrida of the cultivar (Cartago), cultivation was carried out in plastic pots with a capacity of (6.725) kg of soil and with a diameter of (24) cm, with one bud in each pot. This is to prepare the land of the house in which the experiment is to be conducted, by plowing it, smoothing it, and leveling it so that it becomes on one level and free from the remnants of the weeds growing in it, and to prevent the growth and entry of the weeds into the pots, and in order to preserve the materials and solutions that are added to the plant, we put plastic pots Under each pot, then the pots were filled with a medium mixture consisting of sandy soil. A number of its physical and chemical characteristics are shown in Table No. (1) and House Moss, at a rate of (2:1), arranged and distributed according to the scheme of the experiment that was designed by the factorial experiment according to the design of complete randomized sectors (R.C.B.D.), with three sectors, and three plants per experimental unit. The leaves were sprayed with organic fertilizer on 25/10/2020 at a concentration of (0.1) g.L^{-1} at the stage of starting the formation of the third leaf of the plants, and after a week it was sprayed with chelated iron on 1/11/2020, at a concentration of (0.1) g.l^{-1}, after preparing it in the form of an aqueous solution, by adding a liter of distilled water at the rate of one spray at the stage of starting the third leaf and to the degree of complete wetness. Spraying in the early morning using a hand sprayer. Drops of the dispersant (baby shampoo) were added to the spray bottle to facilitate the process of sticking and spreading to the surface of the leaves. For the purpose of protecting the cultivated plants from fungal and insect infections, the

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growth of the bushes was monitored and weeded whenever needed. The process of irrigating the plants and removing the bushes was carried out on a regular basis whenever needed, as a weekly preventive program was followed consisting of the insecticide Solde origin (India) the active substances in which (Acetamiprid 2% + Bifenthrin 2% + Alphacypermethrin 5%) in an amount of (2 ml) 1 liter of water) sprayed on the leaves, and the week after that, sprayed with (1) g each of the fungicide Tai Sa. M Taisam contains the active substance Thiophanate- methyl 70% WP and 1 gm of the fungicide Finish It contains 35% of the active substance: Metalaxyl i.e. in an amount of (2 g.L^{-1} water) as it was added to the soil and spraying was repeated with the two pesticides every week and in a row Until the end of the growing season, as for fertilization, the neutral compound fertilizer (N.P.K.) (20:20:20) was added on 11/13/2020 uniformly to all treatments, at a rate of (1) g. The third leaf from the plant and the second after a month of the first batch, and after the complete yellowing of the leaves and their drying and removing the dust from them, the corms and corms were extracted and the following characteristics were studied: The total number of leaves (leaf. $Plant^{-1}$), the length of the longest leaf (cm) and it was measured by tape measure from the surface of the soil to the longest leaf, the number of corms and cormels. $Plant^{-1}$, fresh weight of corms and cormels (g) and it was calculated after removing the outer skin and cleaning it from dust It was weighed with a sensitive electric scale, and the diameter of the corms (cm) using a foot (Vernier), and the data were analyzed according to the statistical program (SAS) for data analysis, and the Duncan's Multiple Range Test was used to compare averages at the level of probability (0.05) (Al-Rawi and Khalaf, 1980).

Table No. (1): physical and chemical analysis of the used soil before planting *

Value	Standard Unit	Characteristics
0.756	mg . kg^{-1}	Nitrogen
1.2	mg. kg^{-1}	Phosphorus
40	mg. kg^{-1}	Potassium
8.50	L^{-1} .meq	Ca
4.50	L^{-1} .meq	Mg
7.52	-	pH
0.15	ds . m^{-1}	E.C.
70	mg. kg^{-1}	TDS
820	g . kg^{-1}	Sand
120	g. kg^{-1}	Clay
60	g. kg^{-1}	Silt
1.1	g. kg^{-1}	Organic matter
Loamy Sand		Soil texture

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* Soil analysis was carried out in the soil laboratory of the Kirkuk Directorate of Agriculture.

Results and discussion:

1- characteristics of vegetative growth

1-1: Length of the longest leaf (cm): The results appear in Table No. (2) with the presence of significant differences in the average length of the longest leaf, and the highest rate was (91.19) cm when spraying the plants with a concentration of 1g.l^{-1} of seaweed extract (Acadian)while the lowest average leaf length was (71. 89) cm when the comparison treatment of organic fertilizer, and the reason for the increase in the average leaf length may be attributed as a result of encouraging seaweed extract to increase cell division, elongation and multiplication, which led to an increase in leaf length, and this is consistent with what Al-Saad found And Al-Zubaidi (2021). While the treatment of spraying with a concentration of 1 g.L^{-1} of chelated iron gave a significant superiority over the rest of the treatments, in which the mean of the longest leaf was (88.29) cm compared to the comparison treatment, which gave the lowest leaf length (74. 79) cm. The increase may be due to the role of iron in the cleavage of Cell differentiation and elongation, as well as its effect on important processes in plants, including increasing the effectiveness of photosynthesis and other metabolic activities, including metabolism, carbohydrate transport, and protein building, and increasing vegetative growth characteristics such as increasing the number of leaves and increasing leafy area, given that leaves are the main source for making food , which leads to an increase in the amount of Manufactured nutrients that move from the leaves to the roots, and then lead to better root growth and increase, and this in turn leads to an increase in the length and size of the root, and then an increase in its diameter. The interaction between the organic fertilizer and chelated iron had a significant effect on the length of the longest leaf, as the spraying treatment with a concentration of 1g.L^{-1} of seaweed extract (Acadian) and chelated iron gave the largest leaf length and reached (100. 77) cm compared to the comparison treatment of sea extract and iron. Claws, which gave the least length of the leaf, which reached (67. 97) cm. The reason for this is due to the chelated iron, which is considered one of the most stable iron fertilizers in the growth medium, which facilitates its absorption by the plant, and it has a role in increasing the content of the leaves of nutrients as it encourages the increase of divisions and elongation of cells, as well as a balance in food processing in the tissues of the leaf (Al-Nuaimi 2000) and thus led to an increase in plant height. Also, the seaweed extract had a significant effect on the increase in plant height, as it exceeded the level (1) g. L significantly higher than the comparison treatment, and this may be due to the fact that marine extracts are considered one of the important and effective factors in increasing the readiness of elements for plants, as they are a rich source of many nutrients that have an effect on increasing vegetative growth (Spinelli et al., 2009).

Table No. (2): Effect of foliar spraying with seaweed extract (Acadian) and chelated iron on the length of the longest leaf (cm) of Gladiolus hybrida cv. Cartago

Mean of seaweed extract)Acadian(	1 g . L $^{-1}$	0 g. L $^{-1}$	chelated iron / seaweed extract)Acadian(
71.89 b	75.81 b	67.97 c	0 g. L $^{-1}$
91.19 a	100.77 a	81.61 b	1 g. L $^{-1}$
	88.29 a	74.79 b	Mean of chelated iron

*** Transactions with similar letters do not differ significantly between them at a probability level of 5% according to the Duncan polynomial test.**

1-2: The total number of leaves (leaf. plant^{-1}): The results indicated in Table No. (3) that the highest rate of the number of leaves appeared when the treatment was at a concentration of 1 g. L^{-1} of seaweed extract (Acadian), reaching 10.22 leaves. Plant^{-1} and the lowest value was when the comparison treatment reached 7.03 leaves. plant^{-1}, and the reason for the increase in the number of leaves may be attributed to the role of seaweed extract (Acadian) in increasing the rate of vegetative growth of the plant, because it contains the necessary elements N.P.K. In addition to growth regulators (Auxin and Gibbirilins Cyotkinins), this is consistent with the findings of Al-Saad and Al-Zubaidi (2021). While the results indicate that the difference in the levels of chelated iron in the Gladiolus plant led to a significant increase in the number of leaves, the plants treated with the level of 1g. L^{-1} were superior of chelated iron had a significant superiority, as the number of leaves was 10. 66 leaves. Plant^{-1}, compared to the lowest number of leaves, 6.59 leaves. Plant^{-1} when treated as a comparison. The increase in the characteristics of vegetative growth when iron was added may be attributed to the increase in the efficiency of photosynthesis by increasing the rate of total leaf area, which was positively reflected in the increase in photosynthetic products necessary for the construction of proteins and carbohydrates, which led to an increase in the growth of other vegetative parts, such as increasing plant height and number of leaves. Or because of the effect of iron on increasing the activity of some physiological processes such as building proteins, respiration, and building nucleic acids RNA and DNA .And to show the effect of the bilateral interaction of the levels of spraying with organic fertilization (Acadian) and between chelated iron, the results showed in Table (3) that there were significant differences in the average number of leaves for the study treatments compared to the comparison treatment, as the results showed that the plants treated at the level of 1 g. L^{-1} of organic fertilizer and chelated

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iron had a significant superiority in the average number of leaves ,12.88 leaves . Plant-1 compared to the control treatment, which had the number of leaves at the lowest average of 5. 63 leaves. plant-1. The reason for the increase in the number of leaves may be attributed to the role of the seaweed extract (Acadian) and the chelated iron used in this study, as they work to increase the permeability of cellular membranes, which leads to an increase in the transfer of nutrients from outside the cell to the cytoplasm, which increases the efficiency of the plant in carrying out the building process. photosynthesis and cell division, and thus the increase in the number of leaves.

Table No. (3): Effect of foliar spraying with seaweed extract (Acadian) and chelated iron on the total number of leaves (leaf. plant-1) of Gladiolus hybrida cv. Cartago.

Mean of seaweed extract)Acadian(	1 g. L -1	0 g. L -1	chelated iron / seaweed extract)Acadian(
7.03 b	8.44 b	5.63 d	0 g. L -1
10.22 a	12.88 a	7.55 c	1 g. L -1
	10.66 a	6.59 b	Mean of chelated iron

*** Transactions with similar letters do not differ significantly between them at a probability level of 5% according to the Duncan polynomial test.**

2- Characteristics of the product

1-2: Number of Corms (Corm. Plant-1)

It is evident from Table (4) that seaweed extract (Acadian) had a significant effect on the average number of corms, as the plants treated with the 1 g.L-1 level were superior. had a significant superiority in the average number of corms, 1.23 corm. plant -1 compared to the lowest number of corms, which was 1.00 corm. Plant-1 when the comparison treatment of the plant, and this is consistent with what was reached by Al-Saad and Al-Zubaidi (2021). As for the plants treated with chelated iron, the results from Table (4) showed that the plants treated with level 1g.l-1 had the highest number of corms, which amounted to 1.23 corms. plant -1 compared to the lowest number of corms 1.00 corm. Plant-1 when the comparison treatment of chelated iron. While the results of the bilateral interaction showed superiority of plants treated at the level of 1 g. L-1 of seaweed extract (Acadian) and chelated iron was superior to the highest rate of the number of corms, 1.46 corms. plant-1, as measured by the lowest number of corms 1.00 in the comparison treatment of chelated iron and the two concentrations (0,1) of seaweed extract. This may be attributed to the contribution of

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organic fertilizer (Acadian) and chelated iron in regulating the hormonal content in plant tissues, which has a close relationship with stimulating plant growth and unfolding.

Table No. (4): Effect of foliar spraying with seaweed extract (Acadian) and chelated iron on the number of corms (Corm. plant^{-1}) of Gladiolus hybrida cv. Cartago

Mean of seaweed extract)Acadian(	1 g . L $^{-1}$	0 g. L $^{-1}$	chelated iron / seaweed extract) Acadian(
1.00 b	1.00 b	1.00 b	0 g. L $^{-1}$
1.23 a	1.46 a	1.00 b	1 g . L $^{-1}$
	1.23 a	1.00 b	Mean of chelated iron

*** Transactions with similar letters do not differ significantly between them at a probability level of 5% according to the Duncan polynomial test.**

2-2: Number of cormels (cormel . Plant^{-1})

It is clear from Table (5) that there are no significant differences for seaweed extract (Acadian). As for plants treated with chelated iron, the results of Table (5) showed the superiority of plants treated with level 1g. L^{-1} with the largest number of creams, which amounted to 4.18 cormel. Plant $^{-1}$ compared to the lowest number of cormels 2.83 cormel.Plant^{-1} when the comparison treatment of chelated iron . While the results of the two-way interaction showed the superiority of plants treated at the level of 1 g. L^{-1} of seaweed extract (Acadian) and chelated iron gave the highest average number of cormels 4.56 cormel . Plant^{-1} compared to the lowest number of cormels 2.56 cormel .Plant^{-1} when the comparison treatment of chelated iron and marine extract (Acadian).

Table No. (5): Effect of foliar spraying with seaweed extract (Acadian) and chelated iron on the number of cormels (cormel . Plant^{-1}) of Gladiolus hybrida cv. Cartago.

Mean of seaweed extract)Acadian(	1 g. L $^{-1}$	0 g. L $^{-1}$	chelated iron / seaweed extract) Acadian(
3.18 a	3.80 ab	2.56 b	0 g. L $^{-1}$
3.83 a	4.56 a	3.10 b	1 g. L $^{-1}$
	4.18 a	2.83 b	Mean of chelated iron

*** Transactions with similar letters do not differ significantly between them at a probability level of 5% according to the Duncan polynomial test.**

3-2: Corms diameter (cm): The results appear in Table No. (6) with the presence of significant differences in the average corms diameter, and the highest rate reached (6.45) cm when spraying the plants with a concentration of 1g.l^{-1} of seaweed extract (Acadian). while the lowest average diameter of the corms was (5.71) cm in the comparison treatment of organic fertilizers, and this is consistent with what Mazrou (2019) stated, while the treatment of spraying at the level of 1g.L^{-1} of chelated iron gave a significant superiority over the rest of the treatments, in which it reached The largest diameter (6.26) cm compared to the lowest diameter of the corms (5.89) cm in the comparison treatment, and the interaction between the seaweed extract and chelated iron had a significant effect on the average diameter of the corms, as it gave the spray treatment at a concentration of 1 g. L^{-1} of organic fertilizer and chelated iron had the largest diameter of the cortex, which was (6.70) cm, compared to the lowest diameter of the cortex, which amounted to (5.59) cm, when the comparison treatment of organic fertilizer and chelated iron .The reason for this may be attributed to the role of organic fertilizers in increasing the content of leaves and corms of macro and micro nutrients.

Table No. (6): Effect of foliar spraying with seaweed extract (Acadian) and chelated iron on corm diameter (cm) of Gladiolus hybrida cv. Cartago.

Mean of seaweed extract)Acadian(	1 g. L $^{-1}$	0 g. L $^{-1}$	chelated iron / seaweed extract)Acadian(
5.71 b	5.82 bc	5.59 c	0 g. L $^{-1}$
6.45 a	6.70 a	6.19 b	1 g. L $^{-1}$
	6.26 a	5.89 b	Mean of chelated iron

*** Transactions with similar letters do not differ significantly between them at a probability level of 5% according to the Duncan polynomial test.**

4-2: Fresh weight of the corms (g.): The results appear in Table No. (7) with the presence of significant differences in the average fresh weight of the vines, and the greatest fresh weight was (59. 64) g. when spraying the plants with a concentration of 1g.L^{-1} of fertilizer. Organic, and this is consistent with the findings of Mazrou (2019), while the lowest rate of fresh weight was (51. 67) g. when compared to seaweed extract, and the reason for this increase may be due to the role of nutrients provided by organic additions, whether single or joint, in vegetative growth and syphilis, which was reflected positively in the production of corms of the gladiolus plant. While the treatment of spraying with a concentration of 1 g.l^{-1} of chelated iron had no significant

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effect, and the interaction between seaweed extract and chelated iron had a significant effect on the average fresh weight of the corms, as it gave a treatment with a concentration of 1 g. L^{-1} of organic fertilizer and chelated iron had the highest fresh weight and reached (60.93) g., compared to the lowest weight, which amounted to (50.32) g. when the comparison treatment of seaweed extract and chelated iron. This can be attributed to the indirect role of iron in chlorophyll synthesis and thus increases the efficiency of photosynthesis and carbohydrate synthesis (Hatwar et al., 2003).

Table No. (7): Effect of foliar spraying with seaweed extract (Acadian) and chelated iron on fresh weight of corms (g) of Gladiolus hybrida cv. Cartago.

Mean of seaweed extract)Acadian(	1 g. L^{-1}	0 g. L^{-1}	chelated iron / seaweed extract) Acadian (
51.67 b	53.03 ab	50.32 b	0 g. L^{-1}
59.64 a	60.93 a	58.35 ab	1 g. L^{-1}
	56.98 a	54.33 a	Mean of chelated iron

*** Transactions with similar letters do not differ significantly between them at a probability level of 5% according to the Duncan polynomial test.**

5-2: Fresh weight of the cormels (g.): The results appear in Table No. (8) with the presence of significant differences in the average fresh weight of the cormels , and the largest weight was (7.86) g. when spraying the plants with a concentration of 1g.l^{-1} of organic fertilizer, while the lowest average fresh weight was (4.52) g. when compared to organic fertilizer treatment , and this is due to seaweed extract rich in macro and micro nutrients and plant hormones such as auxins, gibberellins and cytokinins that stimulate cell division and increase cell volume as well as lead to a balance of physiological and vital processes And increase the effectiveness of photosynthesis and improve growth qualities. While the treatment of spraying with a concentration of 1 g.l^{-1} of chelated iron gave a significant superiority over the rest of the treatments, in which the average fresh weight was (6.98) g. compared to the lowest weight (5.40) g. in the comparison treatment, and there was a bilateral interaction between the herbal extract Marine and chelated iron had a significant effect on the fresh weight index of the cormels, as the spray treatment gave a concentration of 1 g. L^{-1} of organic fertilizer and chelated iron had the highest fresh weight and reached (9.06) g, compared to the lowest weight, which amounted to (4.15) g when the comparison treatment of seaweed extract and chelated iron .

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Table No. (8): Effect of foliar spraying with seaweed extract (Acadian) and chelated iron on the fresh weight of cormels (g) of Gladiolus hybrida cv. Cartago.

Mean of seaweed extract)Acadian(	1 g . L $^{-1}$	0 g. L $^{-1}$	chelated iron / seaweed extract)Acadian(
4.52 b	4.90 c	4.15 c	0 g. L $^{-1}$
7.86 a	9.06 a	6.66 b	1 g . L $^{-1}$
	6.98 a	5.40 b	Mean of chelated iron

*** Transactions with similar letters do not differ significantly between them at a probability level of 5% according to the Duncan polynomial test.**

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