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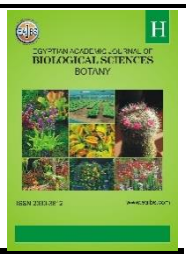

Effect of Soil Conditioners,Seaweed Extracts and Chemical Fertilizers: onGrowth, Flowering and Bulbs Production of*Narcissus tazetta*L. subsp."Italicus"Plant.

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ABSTRACT

Narcissus tazetta L. subsp. "Italicus" belongs to the family "Amaryllidaceae", which is one of the most important ornamental bulbs plant, landscape, and cut flowers plant. So, it needs a balanced fertilization program to produce flowers of good marketing characteristics, healthy bundle growth and new developing bulbs of size and ideal weight suitable for flowering in the new season.

Because most Egyptian lands suffer from high alkalinity, so the time has come to use safe alternative fertilizers. Those are able to make the element in a suitable form to absorption by plants without any toxicity to the soil. Green compost fertilization contains organic acids, which can chelate metallic elements, enhance the ability of them to absorption via plant and improve the properties of soil. Also, the chelate fertilizers have the same role, those can make inorganic nutrients are easier and faster to pass into the plant tissue directly via foliar spray or soil drench, also even in alkaline and calcareous soil conditions.While, seaweed extracts have many nutrients, vitamins, growth hormones and/or regulators, carbohydrates and amino acids, all of which stimulate plant growth.

This experiment aimed to study the effect of soil conditioners "El-Zahra compost" (ZC), the chelating chemical fertilizer "Nutricomplex 20-20-20" (N20) and seaweed extracts "Algifert" (Alg) as a foliar spray and soil drench application on growth, flowering, bulb production and chemical constituents of *Narcissus tazetta* L. subsp. “Italicus" plants. This study was conducted during two cropping years 2015/16 and 2016/17 at El-Harrery village, El Montaza, The East of Alexandria, Egypt.The eight transactions were executed as follow : 1- Control media "without any fertilizers", 2- (ZC) [" El-Zahra compost" 10% from pot volume], 3- AlgS + AlgD ["Algifert" 1g/l foliar spray + 1g/l soil drench], 4- N20S+N20D ["Nutricomplex 20-20-20" 1g/l foliar spray + 1g/l soil drench], 5- ZC + AlgS+D [10% compost + "Algifert" (1g/l foliar spray + 1g/l soil drench)], 6- ZC+ N20S+D [10% compost + ["Nutricomplex 20-20-20" (1g/l foliar spray + 1g/l soil drench), 7- AlgS + N20D ["Algifert" 1g/l foliar spray + ["Nutricomplex 20-20-20" 1g/l soil drench] and the last 8- AlgD + N20S ["Algifert" 1g/l soil drench + "Nutricomplex 20-20-20" 1g/l foliar spray]. All the transactions had significant values compared to control. But the highly significant values resulted from the treatment of ZC+ AlgS+D in most growth characteristics followed by ZC+ N20S+D or AlgS+AlgD in some cases. Thus, when obtaining the highest quantity and quality of the vegetative growth, flowering characteristics, bulb production and chemical composition of *Narcissus tazetta* L. subsp. “Italicus" plant, it is preferable to add leaves compost to the growing soil with the addition of foliar spray and soil drench with either elements chelators or seaweed extracts.

INTRODUCTION

Narcissus species is one of the important varieties of family "Amaryllidaceae". Subspecies *Narcissus tazetta* L. subsp. "Italicus" is widely spread in the Mediterranean from southern France to Greece. It is cultivated under Egyptian environmental conditions with vegetative organs "bulbs" not by seeds. It is distinguished from other varieties by a slender scape with distinctly two-edged, holds about 6-10 flowers/spike. The perianth diameter of flowers is extended from 1.5 to 2 inches across. The crown color is sulfur-yellow deep (William, 1875). The narcissi has an important historical and artistic since the ancient Egyptian civilization and the Greco-Roman period based on mythology and continued until the modern era. It has an important coordinating value as ornamental bulbs plant in landscape design, botanical gardens and flowering pot plants in/outdoor. Also, it is suitable for picking, growing wild in green meadows and rocky gardens. In addition, it has medical and pharmaceutical importance that cannot be overlooked (Michael and Lerner, 2001). Because it is a bulbous plant, it needs a balanced fertilization program to produce flowers of good characteristics, healthy vegetative growth and new developing bulbs of size and ideal weight suitable for flowering in the new season and/or commercial production and export (Gabra, 2017).Achieve to good qualities of plants including growth, flowering, and bulbs productivity are dependent on the nutritional balance of plant through the suitability of macro and micronutrients for absorption(Sidhu *et al*., 2019). So, fertilization with microelements contributed to significantly improving the characteristics, qualities and productivity of many crops as well as macro elements (Aske *et al*., 2017 and Yadav *et al*., 2018). Major components like N, P and K are involved in the representation of carbohydrates, proteins, fats, oils, enzymes, hormones and few plant pigments. But, the excessive use of agrochemicals may cause toxicity to plants, soil erosion and exposes it with both humans and animals to risk (Sahibin *et al*., 2002 and Gabra, 2004).

Because most Egyptian lands suffer from high alkalinity, so the time has come to use the safe alternative fertilizers that make the element in a suitable form to absorption by plants, also even in alkaline and calcareous soil conditions. Green compost or leaves compost is a product from agricultural waste or plant debris from gardens. It is one of the many compost techniques in the world, which are used to fertilize ornamental plants and improve the properties of soil (Popescu and Popescu, 2015). It also contains organic acids, especially humic acid which have the ability to chelate mineral elements and release them for uptake via plants such as Fe, Zn, Cu and Mn (Chen *et al*., 1999 and Ahmad *et al*., 2013).

In addition, the major, minors and micro/trace nutrients found in chelate fertilizers can make the metallic nutrients are easier and faster to pass into the plant tissue directly via foliar spray or soil drench. Because most physiological diseases of plants are due to the lack of trace elements like iron so, iron chelates became commonly used fertilizers for plant nutrition. One of the characteristics of these chelating complexes' "chelated ligands" is that they form lined bonds with a metal cation. Those bonds give it solubility and more stability. In this way, the element remains available to plant uptake and does not hold onto the soil particles depends on the kind of chelate ligands such EDTA, DTPA, HEEDTA (Schmidt and Steinbach, 2000).

While, the seaweed extracts have many nutrients and full of many vitamins, growth hormones and/or regulators, carbohydrates and amino acids, all of which stimulate plant growth. The use of seaweed extracts eliminates the use of any chemical fertilizers NPK or reduces their dosages (Gabra, 2010). She recorded that when "Promex" [the commercial product of seaweed extracts] was added to 12.5% compost at the rate of 1g/l as foliar spray application on *Gladiolus hybrida*, L. cv "Rose Supreme", the chemical fertilization was

dispensed with or decreased NPK dose to three quarter when it was added to them at the same rate and it decreased NPK dose to half when added both of them to 7.5% compost. But the dosage of 3/4 NPK with "Promex", on *Narcissus tazetta* L. cv. "Polyanthus Narcissus" gave the highly significant growth parameters, flowering characters, and bulbs productivity and chemical compositions. While,Babarabie *et al*., 2018 explained that the addition of conditioners such as vermicompost to garden soil could improve the important traits of Narcissus flower, including flower life, sprouting rate and scape diameter, thus reducing the use of chemicals. Also, the addition of leaf mold to growing media increased the flower longevity to 7 days.

Also, Shafeek*et al*., 2015 indicated that foliar application of yeast extract, seaweeds extract and licorice extract together on, due to the highest stimulation effect on bundle growth characters of *Allium cepa* L. plants, total bulb yield and its components like N, protein and dry matter as a percentage of bulb tissues. While, El-Afif *et al*., 2009recorded that,most plant growth parameters were significantly increased by foliar spraying with seaweed extracts "Algifert" of summer squash such early and total yield. Moreover, an increase in NPK content in the leaves as compared with control during two growing seasons. The interaction between seaweed extracts and organic nitrogen fertilizer sources and rates gave the highest values of vegetative characters. They concluded that the maximum net return was obtained with foliar spraying by seaweed extracts [1g/l] in combination with 200 % of FYM, followed by rice straw compost at 200 % of recommended rate/fed., respectively, comparing with control. Moreover, the application of organic manure affects the properties, texture and fertility of the soil. Also, Nour *et al*., 2010 studied the effect of foliar spray with seaweed extracts ("Algifert" 1g/ l and 2g/ l), four tomato hybrids and their interaction on growth, dry weight, flowering, yield and chemical constituents of tomato plants (*Lycopersicon esculentum* Mill.) under sandy soil conditions. They elucidated that spraying tomato hybrids with seaweed extracts at a rate of 1g/ l gave maximum values of plant growth characters, leaves number and dry weight. And the interaction treatment between the hybrid K615 and foliar spray with seaweed extracts at 2g/ l gave the highest values of leaves and shoots number /plant, leaf area, dry weight, N% and protein % concentrations. Sivasankari *et al*., 2006 soaked the seeds of *Vigna sinensis* with seaweed liquid fertilizers. They founded the low concentration of 20% of solution extracts soaked improved seedling growth parameters, root length and increased the concentration of pigments, protein, amino acid in shoot and root. Saeedi *et al*., 2015 studied the effects of calcium amino acid chelates and calcium chloride (CaCl2) on flower production, quality, and vase life of "Cinderella Lime" lisianthus flowers. They recorded that, the highly significant concentrations of calcium in flowering stems were found in plants treated with calcium amino acid chelates than others treated with amino acids only or control treatment. Treatment with calcium methionine chelate led to significantly higher flower numbers, calcium amino acid chelates increased the fresh and dry weight of the flowering stems. Kashif *et al*., 2014 explained that foliar fertilizer treatment with NPK (17:17:17) gave the highly significant flowers number plant^{-1}, anumber of leaves plant^{-1}, buds diameter, flowers diameter, flowers fresh and dry weight of *Dahlia hybrida* cv. Fresco. Also, treated plants with NPK (15:32:7) + micropower increased the leaf area, branches number/plant, emergence date for thefirst flower, blooming period and number of tubers/plant. While the treatment of NPK (15:32:7) + chelated mix micro-nutrients improved the plant height and also the length of the branches. So, the mixture of macro and micro-nutrients as the foliar application had apositive impact on the growth and yield. Chohura*et al*., 2012 investigate the effect of four chelates, differing in the percentage of Fe content and the kind of Fe bonding ligand: Fe 8 Forte (EDTA+HEEDTA), Fe 9 Premium (DTPA), Fe 13 Top (EDTA) and Liberal Fe DP7 (DTPA) applied in 3 doses 50, 75,100 mg Fe/l dm^{3}of growing media, on the yield and fruit quality of the tomato cultivar

grown in peat substrate. Each fertilization treatment with different iron sources had the same effect in early yield. Plant Fertilization with Fe 9 Premium (DTPA) was the best marketable yield of tomato fruits, while the lowest has resulted from the treatment with Fe 13 Top (EDTA) chelate. The optimal dose of these nutrients for marketing quality and early yield was 50 mg Fe/l dm^3.

Geries *et al.,* 2016 studied the application of foliar spray with salicylic acid with/without some micronutrients (Fe, Zn and Mn) on the growth, bulbs yield and storage ability of onion bulbs variety Giza Red. They founded that combination with salicylic acid (at the rate of 200 ppm) and mixture micronutrients (Fe + Zn + Mn) at the rate of 2 ml /l gave the longest bundle, highest leaf area, heaviest bulb weight and increased the marketable quality of bulbs and total bulbs yield. Also, it gave the lowest value in weight loss as a percentage after 180 days of storage. But the foliar spray with mixture micronutrients only gave the highly significant value of nutrition in bulb tissues.

MATERIALS AND METHODS

This study was conducted during two consecutive cropping years, from fall 2015 to spring 2016 and the same at the second 2016 till spring 2017, at El-Harrery village, El Montaza the second district, The East of Alexandria, Egypt. The aim of the study was to make a comparison between organic soil conditioners from leaves compost "El-Zahra" (ZC), the chelating chemical fertilizer "Nutricomplex 20-20-20" (N20) and seaweed extracts "Algifert" (Alg) as a foliar spray and soil drench application. All of these impacts on growth, flowering, bulb production and chemical constituents of *Narcissus tazetta* L. subsp. “Italicus" plants.

Plant Materials and Cultivation Methods:

The bulbs of [*Narcissus tazetta* L. subsp. "Italicus"] were imported from the Netherlands and obtained from the nursery of Faculty of Agriculture, Kafr El-Sheikh University, Egypt. The mean of mother bulbs circumference was 10-11.5 cm and weights were 30.5-32 g for each season. These were planted on 3rd and 7th October 2015and 2016 in 10 cm depth from soil surface of plastic pots of 20cm diameter, which filled with 5kg of sand-clay mixture soil at arate of 2:1 by volume. The mean analysis of soil mixture before planting during both seasons 2015/16 and 2016/17 is shown in table (1).

Table 1: The physical and chemical analysis of initial soil mixture:

The physical analysis		**The chemical analysis**								
Sandy-loam soil		Organic Matter	Total N	Total P	K	Fe	Zn	Cu	pH	Ec
Sand	64.38%	%	%	%	%	mg/kg				dS/m
Clay	22.14%	1.026	0.407	0.035	0.652	1.81	1.05	1.43	7.9	1.62
Silt	13.48%									

Fertilizer Materials and Adding Methods:

1- The chelating chemical fertilizer is represented by the "Nutricomplex 20-20-20" (N20) component from tradecorp© A ROVENSA Company. It is containing from 20% N, 20% P2O5 and 20% K2O with many chelating micronutrients. The doses were foliar spray and soil drench at the rate of 1g/l at 3 times in three phases. The firststage was added after bulbs sprouting [when the length of the vegetative bundle was reached at 10cm], the second dose after emergence bloom and the last one after picking flowers.Irrigation "soil drench" doses were given simultaneously with spray doses at the same concentrations, according to

field capacity/pot without drainage loss. The analysis of "Nutricomplex 20-20-20" is shown in table (2).

Table 2: Chemical analysis of "Nutricomplex 20-20-20"* fertilizer:

Total N	20 % w/w	EDTA	Fe	0.06	% w/w
P2O5	20 % w/w		Mn	0.04	
K2O	20 % w/w		Zn	0.02	
Stable interval of pH for chelated fraction EDTA	4 -10		Cu	0.01	
			B	0.02	
			Mo	0.003	

*The analysis of "Nutricomplex 20-20-20" is on the product bottle and the company brochures

2- The seaweeds extract "Algifert" (Alg) is the commercial product for "SIDASA-Egypt Company for Fertilizers, Pesticides and Chemicals ". This synthetical product is prepared as an aqueous extract of *Ascophyllum nodosum* algae granules. It contains many nutrients and chelated minerals, many simple and complex carbohydrates, amino acids, phytohormones, alginic acid and mannitol. The analysis of "Algifert" is shown in table (3). The doses, adding methods and times number were like the same of "Nutricomplex 20-20-20".

Table 3: Chemical analysis ofseaweed extracts "Algifert"*:

Dry mater %	**92-98**	**Proteins %**	**7±1**	**Macronutrients**				**Micronutrients**			
Moisture %	7±0.5	Carbohydrates %	40±5	Total N %	1±0.5	Ca %	0.2±0.05	Fe ppm	125±20	Zn ppm	55±5
Organic matter %	50±5	Alginic acid %	15±5	P %	2±0.5	S %	2±0.5	Cu ppm	3.5±0.5	Bo ppm	100±10
Ash (minerals) %	50±5	Mannitol %	5.5±1	K %	10±2	Mg %	0.5-0.9	Mn ppm	8.5±2	Mo ppm	1-5
pH for 250g extract/l	5.5±0.5	Density Kg/m³	750± 50	Growth hormones							
Color	Brown			IAA %	0.03	ABA %	0.01	Adenine (cytokinin) %			0.02
Vitamins (ppm):		V. B_1 V. B_2 V. B_{12}	6.8 6.0 0.04	V. C V. D V. E	300.0 4.0 70.0			Provit. A Niacin			40.0 70.0

*Norwegian Institute of Seaweed Research Oslo, Norway

3-The compost"El-Zahra" (ZC) is a product from "Bany-Swafe Company for Organic Fertilizers". This compost is a botanical product 100% from the medicinal and aromatic plant wastes for a period of up to 4-5 months. It contains macro and micronutrients without any artificial additives. Also, it is free from weed seeds, nematodes and pathogens. It works to improve the physical, chemical and biological properties of poor soils. The compost was added while preparing the pots with cultivation media at the rate of 10% per pot volume. The analysis of the compost "El-Zahra"is shown in table (4).

Table 4: Chemical analysis of the compost "El-Zahra":

Moisture %	25±5	C/N	1:18	Macronutrients		
pH	7.5±0.5	Ec ds/m	1.7±0.3			
Organic matter %	40±5	Weight of m³ (kg)	570±50	Total N%	Total P%	Total K%
Ash %	32 ±3	Organic C %	38.5±2	1.6±0.2	0.81	1.09

The Statistical Analysis and Transactions:

The statistical analysis of the experiment was CRD (Complete Randomized Design), and means of the different treatments were compared using Duncan´s Multiple Range Test according to (Snedecor and Cochran, 1974) as 3replicat and 3pots for both of them inter 8 transactions as a follow:

1- Cont. [Control media "without any fertilizers"].
2- ZC [" El-Zahra compost" 10%].
3- AlgS + AlgD ["Algifert" 1g/l foliar spray + 1g/l soil drench].
4- N20S+N20D ["Nutricomplex 20-20-20" 1g/l foliar spray + 1g/l soil drench].
5- ZC + AlgS+D [10% compost + "Algifert" (1g/l foliar spray + 1g/l soil drench)].
6- ZC+N20S+D [10% compost+["Nutricomplex 20-20-20"(1g/l foliar spray+1g/lsoil drench).
7- AlgS+ N20D ["Algifert" 1g/l foliar spray + ["Nutricomplex 20-20-20" 1g/l soil drench].
8- AlgD + N20S ["Algifert" 1g/l soil drench + "Nutricomplex 20-20-20" 1g/l foliar spray].

The Estimated View Data As Follow:

1- The vegetative [bundle] growth and flowering characteristics were measured at the flowering stage. The bundle growth data were [leaf length (cm), number of leaves, leaf diameter (cm), leaf area (m^2), leaves fresh and dry weight (g)]. And the flowering data were [emergence date (day**)**, showing color date (day), flowering date (day) and inflorescence length (cm), scape circumference (cm), number of florets/scape, florets diameter (cm) and inflorescence fresh and dry weight (g)].

2- The bulbs productivity was recorded after the end of season at pre-yellowish of leaves in June 2016 and 2017. The data were [number of bulbs, bulb circumference (cm) and total bulbs fresh and dry weight (g)].

3- The chemical composition such astotal chlorophyll [mg/g fresh weight of leaves] was determined during the flowering stage for each season due to Moran (1982) using aspectrophotometer. And N, P and K% were determined in dry leaves, by acolorimetric method according to Evenhuis and Deward (1980), Trough and Meyer (1939) and Brown and Lilliland (1946), respectively. All of thechemical analyses of plants were carried out by the Hort. Res. Inst. ARC. Giza, Egypt.

RESULTS AND DISCUSSION

Effect of soil conditioners "El Zahra compost", seaweed extracts "Algifert" and chelate chemical fertilizer "Nutricomplex 20-20-20"on bundle growth parameters, flowering characteristics and bulbs productivity of *Narcissus tazetta* L. subsp. “Italicus"plant.

The Bundle Growth Parameters:

The variable parameters that were taken on the bundle growth of Narcissi plants are shown in Table (5) for both cropping years 2015/16 and 2016/17, influenced by fertilization transactions. And the latter all indicated a significant increase in vegetative growth rates, such as leaf length (cm), leaf diameter (cm), leaf area (m^2) and leaves number/bundle, leaves fresh and dry weight (g) compared with the lowest values of control treatment. The highly significant increase in leaf length, leaf area, leaves dry weight in both years resulted from the treatment of ZC+AlgS+D. But the treatment of ZC+N20S+D gave the highly significant value of leaf diameter in both years, number of leaves in 2^{nd} year and leaves fresh weight in 1^{st} year. While the results were equal in significance between the two previous treatments in data of leaves number/ bundle and leaf diameter in 1^{st} year. Also, the results did not show any significant difference values between the treatments of ZC+AlgS+D and AlgS+AlgD in dry weight of leaves in 2^{nd} year. The results indicate that the addition of chelated micro and macro mineral nutrients or seaweed extract forms improved the efficiency of plants to absorb

the elements, which reflected on the health and quality of vegetative growth. Also, the presence of compost in growing media provided the soil fertility and textureand increased the organic or inorganic nutrients which improved the spread and efficiency of roots uptake. These results were consistent with the findings of Schmidt and Steinbach, 2000; Gabra, 2010;Kashif *et al*., 2014; Babarabie *et al*., 2018.

Table 5: Effect of fertilization transactions onbundle growth measurements of *Narcissus tazetta* L. subsp. “Italicus"for both cropping years 2015/16 and 2016/17.

Ertilization transactions	Leaf length (cm)		No. of leaves/bundle		Leaf diameter (cm)		Leaf area (m^2)		Leaves F.W. (g)		Leaves D.W. (g)	
	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y
Cont.	45.15f	45.79f	19.40f	18.82e	1.45f	1.49e	5.36f	6.97e	40.65f	42.42d	5.03ef	4.17c
ZD	49.23e	48.65e	21.83e	20.00de	1.50e	1.60cd	6.136e	7.53de	43.09e	46.75c	5.32ef	5.06b
AlgS+AlgD	51.93d	51.6bcd	23.2bcd	21.75c	1.7abc	1.67bc	6.83d	8.69c	49.52b	46.95c	6.94b	6.35a
N20S+N20D	50.68de	50.47d	21.91de	20.96cd	1.6bcd	1.69b	7.44c	8.04cd	44.9de	43.53d	6.0cd	4.23c
ZC+AlgS+D	60.81a	59.85a	26.08a	24.67b	1.77ab	1.73b	10.87a	10.95a	50.12b	53.81a	8.1a	6.12a
ZC+N20S+D	57.43b	52.43b	24.50ab	26.35a	1.80a	1.86a	8.66b	10.10b	57.79a	50.46b	6.13c	5.29b
AlgS+N20D	54.70c	51.95bc	22.75cd	23.88b	1.60cd	1.70b	7.12cd	8.59c	46.21c	48.79b	5.96cde	5.06b
AlgD+N20S	51.69d	50.66cd	24.35bc	20.88cd	1.53de	1.59d	7.00cd	9.47b	45.45d	50.52b	5.40def	5.16b

The Flowering Characteristics:

Data in Tables (6 & 7) was shown the flowering characteristicsof Narcissus plantsfor both cropping years. All fertilization treatments had significantly increasedonflowering characteristics [emergence date, showing color date, flowering date, inflorescence length, scape circumference, number of florets/ scape, florets diameter, inflorescence fresh and dry weight], compared with control. But the significant values of the treatment were equal to the addition of chemical chelators or/ seaweed extracts with compost at the treatments of ZC+AlgS+D and ZC+N20S+D in most characteristics, followed by treatments of AlgS+N20D and/or AlgS+AlgD in earlier flowering data such asemergence date, showing color date in both years and [flowering date, inflorescence dry weight in 2nd year] and inflorescence fresh weight 1st y. While the transaction of ZC+AlgS+D was the only one with thehighest significant value of inflorescence length data, [scape circumference and inflorescence fresh weight at 2nd y], the number of florets/ scape, [florets diameter and inflorescence dry weight 1st y]. These results confirm that seaweed extracts either spraying or soil drench each then added for compost has the strongest effect because it contains many growth stimulants, plant hormones, regulators, and vitamins in addition toinorganic nutrients. These evidences are consistent with concluded of El-Afif *et al*., 2009; Gabra, 2010; Nour *et al*., 2010 and Shafeek *et al*., 2015.

Table 6: Effect of fertilization transactions onflowering characteristics of *Narcissus tazetta*L. subsp."Italicus"for both cropping years 2015/16 and 2016/17.

Fertilization transactions	Emergence date (day)		Showing color date (day)		Flowering date (day)		Inflorescence length (cm)	
	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y
Cont.	126.5a	129.5a	152.0a	154.33a	156.0a	158.00a	40.80g	44.93f
ZD	124.5ab	125. 7ab	147.0b	147.33b	150.33b	150.33b	42.70f	47.42de
AlgS+AlgD	121.5bc	119. 3cd	139.0cd	132.33de	142.0c	141.00c	44.64e	47.97cd
N20S+N20D	121.0bc	115.0def	141.0c	141.33c	138.5cd	134.17d	46.57d	46.62ef
ZC+AlgS+D	109.0e	112.3f	128.83f	128.33e	131.33e	130.83d	58.70a	54.79a
ZC+N20S+D	111.0e	114.3ef	129.5ef	131.5e	131.33e	134.33d	52.44b	51.68b
AlgS+N20D	113.0de	117.0de	132.67ef	139.0c	135.33de	143.50c	50.26c	49.99bc
AlgD+N20S	117.0cd	123.0bc	135.33de	137.33cd	143.33 c	140.67c	48.39cd	50.92b

Table 7: Effect of fertilization transactions onflowering characteristics of *Narcissus tazetta*L. subsp."Italicus"for both cropping years 2015/16 and 2016/17.

Fertilization transactions	Scape circumference (cm)		No. of florets /scape		Florets diameter		Inflorescence F. w.(g)		Inflorescence D. w. (g)	
	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y
Cont.	1.80d	1.74f	5.67f	6.33e	4.55e	4.55e	7.42f	7.86e	0.584e	0.590e
ZD	1.96bc	1.85e	6.30e	6.83d	4.60e	4.85d	8.18e	8.43d	0.567e	0.627de
AlgS+AlgD	2.03bc	2.08b	6.50de	7.07cd	4.67de	5.05bc	9.10ab	9.07bc	0.693b	0.700abc
N20S+N20D	2.00bc	1.95cd	6.67cde	7.20c	4.77cd	4.90cd	8.73cd	8.86c	0.596de	0.677bcd
ZC+AlgS+D	2.07ab	2.25a	8.33a	8.00a	5.10a	5.12ab	9.36a	9.94a	0.867a	0.763a
ZC+N20S+D	2.20a	2.10b	7.44b	7.65b	4.95b	5.25a	8.99abc	9.28b	0.661c	0.733ab
AlgS+N20D	1.90cd	1.89de	7.0bcd	7.33bc	4.83bc	4.95cd	8.82bcd	8.89c	0.624d	0.633cde
AlgD+N20S	2.00bc	1.98c	7.11bc	7.55b	4.88bc	4.97bcd	8.62d	8.93c	0.617d	0.690bcd

The Bulb Productivity:

Data in Table (8) showed that alltransaction of fertilizationhad increasing significant values compared with control in parameters of anumber of bulbs, bulb circumference, and total bulbs fresh and dry weight. The improvement of developing bulbs resulted from the transaction of ZC+AlgS+D in most cases like thenumber of bulbs and bulbs dry weight. While, the results did not record any significant differences between this transaction and others AlgS+AlgD and/or ZC+N20S+D in data of thenumber of bulbs and total bulbs fresh weight at 2nd y, respectively. However, the significant values of bulb circumference 1sty were equal between the transactions of ZC+AlgS+D, ZC+N20S+D, AlgS+AlgD, AlgS+N20D and AlgD+N20S. These resulted indicated that all the treatments were fertilized with seaweed extracts either with compost or with chelators, gave the highest marketing of bulbs in terms of size and weight. Because the interaction between seaweed extracts and chelate fertilizers contains the organic, nutrients, vitamins, growth hormones from extracts and macro and microelements from chelators. All of these nutrients are included in the representation of carbohydrates, portions, and amino acids in the storage organs which are the bulbs here. These results are in harmony with those of Sivasankari *et al.*, 2006; Chohura *et al*., 2012; Kashif *et al*., 2014; Popescu and Popescu, 2015 and Geries *et al.,* 2016.

Table 8: Effect of fertilization transactions on bulbs productivity of *Narcissus tazetta*L. subsp."Italicus" for both cropping years 2015/16 and 2016/17.

Fertilization transactions	No. of bulbs		Bulb circumference (cm)		Total bulbs fresh weight (g)		Total bulbs dry weight (g)	
	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y
Cont.	4.00f	3.25f	11.43d	11.01e	34.28e	33.43d	10.06f	10.09e
ZD	4.67e	4.00e	12.50bc	12.04d	40.39cd	41.02c	11.89e	12.03d
AlgS+AlgD	5.41bc	6.75a	13.42ab	13.6b	40.57cd	45.00b	14.49b	14.89b
N20S+N20D	4.72de	4.25de	12.28cd	12.87c	42.26c	39.76c	12.28de	12.22d
ZC+AlgS+D	6.50a	6.87a	13.06abc	13.3bc	51.70a	50.68a	15.39a	16.27a
ZC+N20S+D	5.60b	6.00b	13.55a	15.19a	49.30b	49.74a	14.13b	14.23bc
AlgS+N20D	5.0bcd	4.75cd	12.80abc	13.44bc	40.52cd	41.39c	13.36c	13.97c
AlgD+N20S	4.77cd	5.20c	12.72abc	12.99bc	39.88d	40.80c	13.87bc	12.87d

Chemical Components:

Results of theeffect of fertilization transactions on chemical components of *Narcissus tazetta*L. subsp."Italicus" are presented in Table (9). All data noticed that the treatments of ZC+AlgS+D and ZC+N20S+D were unique in achieving the highest values of total chlorophyll content and N, P and K percentage. The reason for this due to the high amount of nutrients available for plant uptake derived from theapplication of foliar spraying and soil drench in the presence of compost. Also, the ease of transporting these elements like

Fe and Mg pass plant tissues, which led to the balanced proportions of its components. All of these consistent with what Sivasankari *et al.*, 2006; Gabra, 2010; Chohura *et al*., 2012; Babarabie *et al*., 2018 mentioned.

Table 9: Effect of fertilization transactions on chemical components of *Narcissus tazetta*L. subsp."Italicus" for both cropping years 2015/16 and 2016/17.

Fertilization transactions	Total Chlorophyll mg/g		N%		P%		K%	
	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y	1st Y	2nd Y
Cont.	1.74g	1.89e	1.65	1.59	0.203	0.211	2.24	2.16
ZD	2.01f	2.28cd	1.89	1.92	0.219	0.237	3.06	3.02
AlgS+AlgD	2.80b	2.74b	1.99	2.01	0.280	0.305	3.12	3.15
N20S+N20D	2.00f	2.43c	1.95	2.05	0.269	0.297	3.06	3.11
ZC+AlgS+D	3.03a	3.07a	2.17	2.19	0.312	0.317	3.15	3.20
ZC+N20S+D	2.50c	2.80b	2.12	2.20	0.305	0.299	3.28	3.23
AlgS+N20D	2.25d	2.09de	2.06	2.14	0.288	0.312	3.09	3.17
AlgD+N20S	2.12e	2.11de	2.04	2.07	0.269	0.301	3.02	3.05

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ARABIC SUMMARY

تأثير محسنات التربة ومستخلصات الاعشاب البحرية والتسميد الكيماوي علي نمو وإزهار وإنتاج أبصال نبات النرجس الإيطالي"*Narcissus tazetta* L. subsp. "Italicus" .

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نبات النرجس تازيتا الإيطالي ("*Narcissustazetta* L. subsp. "Italicus") ينتمي للعائلة "Amaryllidaceae" وهو أحد أهم نباتات أبصال الزينة وتنسيق الحدائق و زهور القطف. ولذلك فهي تحتاج لبرامج تسميد متوازنة لانتاج ازهار ذات مواصفات تسويقية جيدة ونمو صحي للحزمة الخضرية وأبصال جديدة ذات حجم ووزن مثالي مناسب للإزهار في الموسم التالي.

ولأن معظم الأراضي المصرية تعاني من ارتفاع نسبة القلوية، لذلك فقد حان الوقت لأستخدام الاسمدة البديلة الآمنة والتي لديها القدرة علي جعل العناصر في صورة صالحة للامتصاص بواسطة النبات دون حدوث أي سمية للتربة. حيث يحتوي سماد الكمبوست النباتي علي أحماض عضوية يمكنها أن تخلب العناصر المعدنية وتعزز قابليتها للأمتصاص بواسطة النبات وتحسن من خصائص التربة. أيضا الاسمدة المخلبية والتي لها نفس الدور حيث تجعل العناصر الغذائية غير العضوية أسهل وأسرع لأختراق أنسجة النبات مباشرة عن طريق الرش الورقي أو من خلال الري حتي في حالة التربة القلوية أو الجيرية . بينما تحتوي مستخلصات الأعشاب البحرية علي العديد من العناصر الغذائية والفيتامينات وهرمونات/ منظمات النمو و الكربوهيدرات والاحماض الأمينية وهذه كلها تحفز من نمو النبات.

تهدف هذة التجربة لدراسة تأثير محسنات التربة " كمبوست الزهرة " (ZC) والسماد الكيماوي المخلبي" نيوتريكومبليكس 20-20-20 " (N20) و مستخلصات الأعشاب البحرية " الجيفيرت "(Alg) للمعاملة بالرش الورقي والري وتأثيرهم علي النمو والازهار وانتاج الأبصال والتحليل الكيماوي لنبات النرجس الإيطالي . أجريت هذة الدراسة خلال عامي 2016/2015 و 2017/2016 في قرية الحريري بالمنتزة - شرق الاسكندرية . حيث تم تنفيذ ثماني معاملات علي النحو التالي : 1- معاملة الكنترول (دون إضافة أي تسميد) . 2- (ZC) كمبوست الزهرة " 10% من حجم إصيص الزراعة " . 3- AlgS + AlgD (الألجيفرت بمعدل 1جم/لتر رش ورقي +1جم/لتر ري للتربة) . 4- N20S+N20D (نيوتريكومبليكس 20-20-20 بمعدل 1جم/لتر رش ورقي + ري للتربة بمعدل 1جم /لتر). 5- ZC +AlgS+D (10% كمبوست الزهرة + الرش و الري بالألجيفرت بمعدل 1جم/لتر) . 6- ZC+ N20S+D (10% كمبوست الزهرة + الرش والري بالنيوتريكومبليكس 20-20-20 بمعدل 1جم/لتر). 7- AlgS + N20D (الرش الورقي بالألجيفرت 1جم/لتر + الري بالنيوتريبلكس 20-20-20 بمعدل 1جم/لتر. 8- AlgD + N20S(الري بالألجيفرت 1جم/ لتر + الرش بالنيوتريكومبلكس 20-20-20 بمعدل 1جم/لتر . فإتضح إن كل معاملات التسميد كانت لها قيم معنويه مقارنة بمعاملة الكنترول . ولكن القيم الأعلي معنويا نتجت عن معاملة (ZC+ AlgS+D) أي التسميد بالكمبوست 10% مع الرش والري بمستخلصات الاعشاب البحرية بمعدل 1جم/لتر في معظم صفات النمو متبوعا بمعاملة ZC+ N20S+D أو AlgS+AlgD في بعض الحالات . ومن ثم فللحصول علي أعلي جودة نوعية وكمية للنمو الخضري ومواصفات تزهير وإنتاجية للأبصال وتركيب كيميائي لنباتات النرجس الأيطالي فمن الأفضل إضافة التسميد بالكمبوست النباتي من الاوراق المتحللة لتربة النمو مع اضافة الرش الورقي والري إما بالعناصر المخلبية أو بمستخلصات الأعشاب البحرية .

الكلمات المفتاحية : نرجس تازيتا ، الأبصال المزهرة، التسميد المخلبي ، مستخلصات الأعشاب البحرية ، محسنات التربة .