Available online at http://bajas.edu.iq
https://doi.org/10.37077/25200860.2019.263
College of Agriculture, University of Basrah

Basrah Journal of Agricultural Sciences

ISSN 1814 – 5868 Basrah J. Agric. Sci., 32 (Spec. Issue 2): 134-139, 2019 E-ISSN: 2520-0860

Effect of Seaweed Extract Spray on Vegetative and Flowering Growth of Two *Narcissus* Species

Ayat H.M. Al-Khuzaey* & Fatimah A.H. Al-Asadi

Department of Horticulture and Landscape, College Agriculture University of Basrah, Iraq
***Corresponding author e-mail:** ayattfarah@gmail.com
Received 19 September 2019; Accepted 18 November 2019; Available online 22 November 2019

Abstract : An experiment was carried out in the Cloth Canopy, Agricultural Research Station, College of Agriculture, University of Basrah, during the agricultural season 2018-2019, to study the effect of the seaweed extract spray (0, 2 and 4 $m.L^{-1}$) on vegetative and flowering growth of two *Narcissus* species. Local white flowers (*Narcissus tazetta*) and the imported yellow flowers (*N. eastertide*). A factorial experiment with Randomized Completely Block Design (R.C.B.D) were used, with three replicates, the averages were compared using Least Significant Difference (L.S.D). When the plants reached treated at the emergence completion, leaves were sprayed to wetness full, with three times, the process was repeated every 15 days. The results showed that the white variety was significantly higher as well as plants treated with 4 $m.L^{-1}$ extract showed significant superiority in all studied traits, the interaction between the white variety and spraying with seaweed extract concentration of 4 $m.L^{-1}$ had a significant on the number of leaves5.00 leaf $plant^{-1}$, leaf area 818 cm^2, fresh and dry weights (30.16 and 15.70 g) of the vegetative total, flower stem length 45.55 cm, vase life 17.29 day. while the interaction between the yellow species and spraying with seaweed extract concentration of 4 $m.L^{-1}$ had a significant on fresh and dry weight of the flowers (16.80 and 1.73 g).

Key words: Flowering, Narcissus, Spraying, Seaweed Extract, Species, Vegetative Growth.

Introduction

Narcissus bulbs were Amaryllidaceae family plants, the most common annual winter bulbous in Iraq, cluster species *Narcissus tazetta* L. grow wild in the northern regions of Iraq, it spreads in Amadiyah, Shaqlawa, Sulaymaniyah and Mosul (Townsend *et al*., 1985). In Europe, there are large areas devoted to plant the flowers, the cultivated areas in Britain in 1990 was 3972 hectares, while in the Netherlands it was 1,639 hectares in 1992 (ADAS, 1992). The organic fertilizers and herbal extracts spray was widely the techniques, that have been used as bio stimulants for plant physiological functions. It contains stimuli and plant hormones that important for growth, leads to increased growth, as a result of nutrient uptake, as well as resistance to freezing and diseases, the output was positively reflected and its quality improved (Jassim & Al-Dulaimi, 2014).

Organic fertilization increases plant productivity from vegetative growth and the amount of volatile oil (Said Al-Ahl *et al*., 2009). Recent studies have shown that the *Narcissus* plant varied its growth and productivity according to different species. Miller (2002) indicated that a significant differences in vegetative and floral traits when cultivating *Narcissus* species (*Primeur*,

Excetion ice, *Pink charm* and *Carlton*). Al-Saad & Izzedine (2014) showed that the cheerfulness yellow variety of *Narcissus* plant significantly superior to Accent, mixed, Red Devon, while the mixed variety appeared early of the colour appearance date, the Accent c variety significantly exceeded of the flower diameter. Al-Asadi (2016) found that spraying *Freesia hybrid* L. with seaweed extract (5 mg. L^{-1}) gave the best results compared to concentrations 0 and 2.5 mg.L^{-1}. Al-Bayaty & Al-Kalefa (2017) noted that there was no significant effect when adding Alga 600 fertilizer at a concentration of (0 and 3 g L^{-1}) to tow species of *Narcissus* (Salome) white colour and (Tahiti) yellow colour.

The aim of this study is to investigate the effect of spraying with seaweed extract (Agazone) with three concentrations of 0, 2 and 4 m.L^{-1} on the vegetative and flowering growth of two *Narcissus* variety: The local white flowers (*N. tazetta*) and the imported yellow flowers (*N. eastertide*) .

Materials & Methods

Bulbs were planted in 26 cm diameter plastic pots, filled with a medium of 2: 1 river atomic and Peatmoss, several random samples of soil were taken before planting, to determine some of the chemical and physical properties that were conducted in the Central Laboratory of the College of Agriculture, University of Basrah (Table 1.).

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

Properties	Value
Electrical Conductivity (E.C.) ds.m^{-1}	1.54
pH	7.51
Available nitrogen (mg.kg^{-1})	171.00
Available phosphorus	4.64
Available potassium	57.17
Organic Matter %	1.84
Soil type	
Sand (g.kg^{-1})	861.8
Silt	80.84
Clay	57.36
Soil texture	Sandy loam

The solution was prepared from the extract, added the diffuser Tween 20, leaves were sprayed to wetness full, with three times, the process was repeated every 15 days. Spray fungicides and fertilizer with compound fertilizer 20: 20: 20 for all plants.

Traits at the flowering stage included vegetative growth, leaf length (cm), leaves number (leaf plant `The growth flowers stage included the flowering date (day), fresh and dry weight of the flower (g), length of flower stem (cm) and vase life (day).

A factorial experiment with Randomized Completely Block Design *(*RCBD*)* were used, with three replicates, Least Significant Difference (L.S.D) was used to compare the mean averages of the coefficients at the level 0.05 (Al-Rawi & Khalaf Allah, 1980).

The sea algae extract used in the experiment as proven in the label of the

container contains nitrogen as a free mineral and natural growth stimulants that include auxins, gibberellins, cytokinins, carbohydrates and amino acids, and minor mineral elements such as manganese, magnesium, calcium, zinc, boron and iron.

Results & Discussion

Effect of the spraying with seaweed extract on vegetative and flowering growth of two species *Narcissus*

Table (2). showed the significant superiority of the white species (*N. tazetta*) compared to the yellow species(*N. eastertide*) on vegetative growth traits. Spraying with seaweed extract had significant superior at a concentration of 4 $m.L^{-1}$ on leaves number, leaf area, soft and dry weight of the vegetative plant, which amounted to 4.944 leaf $plant^{-1}$, 646.4cm^2, 28.019 and 14.8876 g respectively, compared with the control treatment which was 4.333 leaf $plant^{-1}$, 489.3 cm^2, 21.500 and 10.7712 g respectively.

The interaction between the species and seaweed extract had a significant effect in improving the indicators of vegetative growth, white species with seaweed extract recorded the highest concentration of 4 $m.L^{-1}$ in vegetative traits, reached 5,000 $leaves^{-1}$, 818.8 cm^2, 15,7007 and 30,168 g respectively, comparing with untreated yellow variety plants with seaweed extract 4.067 $leaves^{-1}$, 376.6 cm^2, 2.9.8090 and 20.41 g respectively

.

Table (2): Effect of spraying with seaweed extract on vegetative growth of two *Narcissus* species.

Species	Seaweed extract ($m.L^{-1}$)	leaves number (leaf $plant^{-1}$)	leaf area (cm^2)	fresh weight of total vegetative (g)	dry weight of vegetative growth (g)
Y		4.430	421.2	23.238	11.9241
W		4.852	714.4	26.513	13.9930
L.S.D$_{0.05}$		0.0582	4.82	0.0553	0.03569
	0	4.333	489.3	21.500	10.7712
	2	4.644	567.7	25.108	13.2169
	4	4.944	646.4	28.019	14.8876
L.S.D$_{0.05}$		0.0713	5.90	0.0677	0.04193
Y	0	4.067	376.6	20.411	9.8000
	2	4.333	412.9	23.433	11.8889
	4	4.889	474.0	25.870	14.0746
W	0	4.600	601.9	22.589	11.7334
	2	4.956	722.5	26.783	14.5450
	4	5.000	818.8	30.168	15.7007
L.S.D$_{0.05}$		0.1008	8.35	0.0958	0.05734

The superiority of the white variety may be due to genetic factors (Sultan *et al*., 1992), the superiority of plants treated with seaweed extract, due to the extract content of nutrients, growth regulators and amino acids, which improve the vegetative growth represented by increasing the number of leaves (Al-Sahaf, 1989). Increasing the leaf area with increasing concentrations of seaweed extract due to the nutrients in the extract, including potassium, increases the metabolic activities of the plant,

formation of amino acids and protein, as well as chlorophyll formation, which important in the photosynthesis process, the carbohydrates formation, that lead to increased vegetative growth, which increases the size of the plant and leaf area, the weight gain of the vegetative growth when treated with the extract may be due to the components of seaweed extract of nutrients, which have a vital effect on plant activity, thus increasing their absorption of nutrient elements by the plant which increases the vegetative growth of the plant (Osman *et al*., 2010). Growth regulators, like cytokines, stimulate plant growth at lower temperatures (Dieleman *et al*., 1997).

Effect of spraying with seaweed extract on Flowering growth of two species *Narcissus*:

Table (3). Indicated that the flowering growth in white variety was significantly affected by seaweed extract**,** superiority in vase life, flower stem length, fresh and dry weight of flowers compared to yellow variety plants. Plant sprinkled with seaweed extract at a concentration of 4 m.L^{-1} recorded the highest rate on fresh weight flower ,dry weight and vasa life reached 8.8140 days, 37.696 cm, 0.9096 and 17.700 g respectively**,** compared with control treatment which amounted to 6.1133 days, 34.981 cm, 12.478 and 0.6625g respectively. The effect of the interaction between the seaweed extract and species was significant in improving flowering growth, white species treated with 4 m L^{-1} of seaweed extract record the highest rate in vase life, flower stem length, fresh and dry weight of flowers, reached 17.293 days, 45.553 cm 0.0859 and 0.8183 g respectively**,** compared to the untreated yellow variety 12.182 days, 26.620 cm respectively**,** while the lowest fresh and dry weight of the flowers resulted from the white variety untreated extract 0.0652 and 0.5742 g respectively.

Table (3): Effect of the spraying with seaweed extract on flowering growth of two *Narcissus* species.

Species	Seaweed extract (m.L^{-1})	Vase life (day)	length of flower stem (cm)	fresh weight of the flower (g)	dry weight of the flower (g)
Y		15.330	28.259	14.5106	1.4865
W		15.317	44.737	0.6896	0.0750
	L.S.D$_{0.05}$	0.1825	0.1454	0.01967	0.01388
	0	12.478	34.981	6.1133	0.6625
	2	15.792	36.816	7.8729	0.7702
	4	17.700	37.696	8.8140	0.9096
	L.S.D$_{0.05}$	0.1290	0.1781	0.02409	0.01700
Y	0	12.182	26.620	11.6524	1.2598
	2	15.700	28.317	15.0697	1.4664
	4	18.107	29.839	16.8097	1.7332
W	0	12.773	43.342	0.5742	0.0652
	2	15.883	45.316	0.6761	0.0739
	4	17.293	45.553	0.8183	0.0859
	L.S.D$_{0.05}$	0.1825	0.2519	0.03407	0.02404

Plants treated with seaweed extract were superior in flowering properties, as a result of seaweed extract contains zinc, a catalyst for oxidative stress in plant cells, regulates the consumption of sugars, increases the energy in the plant, participates in the formation of starch, increases the carbohydrate content and thus prolongs the flowering life of the plant (Jyung *et al.*, 1975; Al-Rayes, 1987). Seaweed extract contains an integrated composition of nutrients**,** increased plant readiness, transmission by vegetative parts**,** raising the efficiency of vital activities in vegetative total, cell division and elongation**,** increased length of flower stand (Al-Rayes, 1987). The reason for the increase in fresh and dry weight of flowers, important compounds of growth**,** increases the efficiency of photosynthesis**,** improved vegetative and radical growth, positively reflected in the increase in carbohydrate intake (Naseem, 2009).

Conclusions

We conclude from the study that the white variety was superior in all studied traits and spraying with seaweed extract with a concentration of 4 $m.L^{-1}$ the best concentrations used in the experiment.

Acknowledgment

We would like to the thank Department of Horticulture and Landscape Design, Prof. Dr. TahaY. M. Al-Edany from Department of Plant Protection for identification of the plants of this study. College of Agriculture, University of Basrah for space and resources and scientific for this research.

References

ADAS (1992). Areas and values. bulbs & allied Crops-England & Wales. agricultural development & advisory service bulbs crop notes. (Cited from Hanks, G. R. 1992. Narcissus. In De Hertogh, A. & Le Nard, M. (Eds.). The Physiology of Flower Bulbs. Elsevier, Amsterdam: 812pp.

Al-Asadi, Z.N. (2016). Responses of *Freesia hybrid* L. to the Spraying with Liquid Coconut and seaweed extract and effect of vegetative growth and yield. Basrah J. Agric. Sci., 29(2): 594-607.

Al-Bayaty, M.Y. & Al-Kalefa, A.K. (2017). Effect drench alga 600 and humic acid on growth and flowering of two cultivar from *Narcissus* spp. Tikrit J. Agric. Sci., 17(Spec. Issue) :30-38. (in Arabic).

Al-Rawi, K. M. & Khalaf Allah, A.M. (1980). Design and Analysis of Agricultural Experiments. Univ. Mosul Press: 488pp. (in Arabic).

Al-Rayes, A.H.J. (1987). Plant Nutrition. Part I: Aspects of Plant Nutrition. Min. High. Educ. Sci. Res., Univ. Baghdad .224 pp . (in Arabic).

Al-Sahaf, F.H. (1989). Applied Plant Nutrition. House of Wisdom, Min. High. Educ. Sci. Res., Univ. Baghdad: 258pp. (in Arabic).

Dieleman, J. A. F.; Verstappen, W. A.; Canden, B. N.; Kuiper, D. & Tromp, J.(1997). Cytokinins in *Rosa hybrida* in relation in to bud break. Physiol. Plant., 99(3): 456-464.

Jassim, A.H. & Al-Dulaimi, Q.L. (2014). Effect of adding organic fertilizers and foliar application of humic acid & seaweed extract in growth & green pod yield of broad bean (*Vicia faba* L.). Euphrates J. Agric. Sci., 6(1): 163-172. (In Arabic).

Jyung, W.H.; Ehmann, A. ; Schlender, K . K . and Scala, J . (1975). Zinc nutrition and

starch metabolism in *Phaseolus vulgaris* L. Plant Physiol., 55: 414-420.

Miller, W.B. (2002). Height control and the use of plant growth regulators on spring bulbs. Flower bulb research program. Green House Product News, 12(5): 8-14.

Naseem, M.G. (2009). Protected Agriculture, Fundamentals and Management. El-Maaref Establishment for Printing and Publishing. Fac. Agric., Sayed Pasha, Univ. Alexandria: 377pp. (in Arabic).

Osman, S.M.; Khamis, M.A. & Thorya, A.M. (2010). Effect of mineral and Bio-NPK soil application on vegetative growth, flowering, fruiting and leaf chemical composition of young olive trees. Res. J. Agric. Biol. Sci., 6(1): 54-63.

Saad, K.; Gh. I. & Izzedine, M.Y. (2014). Response of five species of tulip plant (*Tulipa gesneriana*) to the treatment of soaking with gibberellic acid solution. 2nd Int. Sci. Conf. Agric. Res. Univ. Kirkuk. Fac. Agric. 30-31/10/2013. (in Arabic).

Said Al-Ahl, H. A. H.; Hasnaa, S. A. & Hendawy, S. F. (2009). Effect of potassium hum ate & nitrogen fertilizer on herb and essential oil of oregano under different irrigation intervals. J. Appl. Sci., 2(3): 319-323.

Sultan, S.M.; Chalabi, T.M. & Sawaf, M. D. (1992). Decorations Plant. Dar Al Kutub Prin. Publ. Univ. Mosul: 446pp. (In Arabic).

Townsend, C.C.; Guest, E. (1985). Flora of Iraq. Min. Agric., Baghdad: Vol. 8: 440pp.