Middle-East Journal of Scientific Research 12 (6): 751-759, 2012
ISSN 1990-9233
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DOI: 10.5829/idosi.mejsr.2012.12.6.1751

Influence of Nile Compost Application on Growth, Flowering and Chemical Composition of *Amaranthus tricolor* under Different Irrigation Intervals

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Abstract: A pot experiments were carried out in the greenhouse of National Research Centre, Dokki, Giza, Egypt during two successive summer seasons of 2010 and 2011. The main objective of this study was to investigate the effect of different rates of Nile compost (0, 100 and 200g/pot) under different water intervals (2, 4 and 6 days) on growth, flowering and chemical composition of *Amaranthus tricolor* plant. Irrigation intervals treatments have a depressing effect on different growth characters (stem, length, stem diameter, leaves number/plant, stalk length of inflorescences, inflorescences length, inflorescences number/plant and fresh and dry weight of stem, leaves and inflorescences) by increasing irrigation intervals. On the contrary, root length and fresh and dry weight of roots was increased with decreasing water interval. The same behavior was noticed concerning photosynthetic pigments, total sugars percentage as well as N, P and K percentages. Data also indicated that all growth parameters, flowering characters, chlorophyll a, b and carotenoids content, total sugar percentage, N, P and K percentages were increased by increasing the concentration of Nile compost up to 200 g/pot compared with the untreated one. These applications may be recommended for overcoming the harmful effect on growth, flowering and chemical composition of *Amaranthus tricolor* plant grown under different irrigation intervals.

Key words: Ornamental plant · *Amaranthus tricolor* · Compost · Irrigation intervals

INTRODUCTION

Amaranthus tricolor is an ornamental plant known as Bhaji in India. Although, it is native to South America, many varieties of amaranth can be found across the world in a myriad of different climates due to it being a carbon fixation plant, which allows it to convert carbon dioxide into biomass at an extremely efficient rate when compared to other plants. Cultivars have striking yellow, red and green foliage [1]. The leaves may be eaten as a salad vegetable as well as the stems. In Africa, it's usually cooked as a leafy vegetable. It's usually steamed as a side dish in both China and Japan [2]. Its ability to adapt to diverse growing conditions such as low nutrient soil and a wide range of temperature and irradiation, as well as its tolerance to drought stress, emphasize the possible use of this species as a nutrition green crop in semi-arid regions [3]. Stress has been defined as any environmental factor capable of inducing a potentially injurious strain in plant. Water is a major constituent of tissue, a reagent in chemical reaction, a solvent for and mode of translocation for metabolites and minerals within plant and is essential for all enlargements through increasing turgor pressure. Several authors indicated the promotes effect of the high levels of water supply on growth parameters including, Sayed [4] on *Khaya senegalensis* and Metwally *et al*. [5] on Roselle indicated that plant height, stem diameter and fresh and dry weight of leaves, stem and root decreased with prolonging the water intervals. Mazher *et al*. [6] on *Melia azedarach* and Mazher *et al*. [7] on *Bauhinia variegate*, observed that plant height, stem diameter, fresh and dry weight of leaves, stems and roots were increased by increasing soil moisture but root length and fresh and dry weight of root were decreased. Ibrahim [8]

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on *Simmondsia chinensis*, Mazher *et al*. [9] on *Jatropha curcas* and El-Quesni *et al*. [10] on *Matthiola incana* they found that, chlorophyll a, b and carotenoids contents were increased as soil moisture content decreased. In addition, to the total sugar, N, P and K concentrations were also stimulated gradually by decreasing water supply.

Land reclamation is a major policy targets in Egypt. Sandy soil should constitute a substantial part of the Egyptian cultivated land now and in the future. Sandy soil which mainly characterized by light texture, week structure, very low organic matter, water retention and nutrient contents. Compost (organic fertilizer) help to modify the physical condition of soils, by improving water capacity, aeration, drainage and friability and the darker color of organic matter means that soil warm up faster. Compost provide the energy needed for increasing microbiological activity and also help to protect plants from temporary gross excess of mineral salts and toxic substances and from rapid fluctuations in soil reaction by means their high absorption capacity exerting the buffering action [11-14]. The objective of the present study was to assess the role of compost on growth, flowering and chemical composition of *Amaranthus tricolor* in reducing the harmful effect of water stress.

MATERIALS AND METHODS

A pot experiments were carried out in the greenhouse of National Research Center, Dokki, Giza, Egypt during 2010 and 2011 seasons to investigate the effect of different rates of Nile compost on growth and chemical constituent of *Amaranthus tricolor* plant grown under different water intervals. The soil of the experimental site was sandy. The experimental soil characterized by 79.5 % coarse sand, 10.4 % fine sand, 4.3 % silt and 5.8 % clay, pH 7.7, EC_e 1.5 dS/m, $CaCO_3$ 2.51 %, K^+ 0.4, Na^+ 2.4, Ca^{++} 1.2, Mg^{++} 0.7, Cl^- 1.8, $SO_4^=$ 0.1 meq/L. The physical and chemical properties of the soil were determined according to Chapman and Pratt [15]. Seeds of *Amaranthus tricolor* were sown on 15th March in both seasons. The seeds (5-7) were planted in each pot 30 cm diameter filled with 10 kg soil. The seedling was thinned at 3 weeks from sowing leaving two seedlings/ pot. Nile compost was mixed with the soil at three rates, $comp_1$, $comp_2$ and $comp_3$ (0, 100 and 200 g/pot) before planting. Chemical analysis of the organic fertilizer was determined by using standard methods described by A.O.A.C [16]. Results of these analyses are presented in Table 1. The plants were kept under different irrigation intervals (every 2, 4 and 6 days) after 30 days after planting. The experimental design was completely randomized in 6 replication. The available commercially fertilizer kristalon (NPK, 19:19:19) produced Phayzen Company, Holland was applied at the rate of 5.0 g/pot in three equal doses after 4, 8 and 16 weeks from sowing.

The following data were recorded: Root length (cm), stem diameter (cm), stem length (cm), leaves number/plant and number of inflorescences per plant, inflorescences length (cm), stalk length of inflorescences (cm) and fresh and dry weight of inflorescences (g). Total sugars percentage in leaves, stems and roots was determined according to Dubois *et al*. [17]. Chlorophyll a, b and carotenoids contents were determined in leaves according to Saric *et al*. [18]. Nitrogen, phosphorus and potassium were determined in all plant organs according to the method described by Cottenie *et al*. [19].

Statistical Analysis: The obtained data were subjected to statistical analysis of variance according to the method described by Snedecor and Cochran [20] and the combined analysis of the two seasons was calculated according to the method of Steel and Torrie [21].

RESULTS AND DISCUSSION

Vegetative Growth: The results presented in Tables 2-4 indicated that, the above - ground vegetative growth including stem length, stem diameter, leaves number/plant, fresh and dry weight of stems and leaves were gradually increased with decreasing irrigation intervals. The highest values for all these parameters were

Table 1: Chemical constituents of Nile compost

	Macro nutrients contents (%)			Micro nutrients (ppm)						
Source	N	P	K	Fe	Mn	Zn	Cu	pH	C/N ratio	OM %
Nile compost	1.35	0.52	0.85	161	310	61	35	7.50	14:1	32.9

Table 2: Effect of different rates of compost on root length (cm), stem length (cm), stem diameter (cm) and leaves number/plant of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons)

Characters	Compost (g/pot) (B)															
	Root length (cm)				Stem length (cm)				Stem diameter (cm)				Leaves number/plant			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	13.77	15.07	17.90	15.58	138.3	152.0	159.9	150.1	4.07	4.430	5.430	4.64	66.00	72.00	84.33	74.11
4 days	15.27	18.13	20.63	18.01	125.9	132.9	136.5	131.8	3.63	4.130	4.830	4.20	63.00	71.33	75.00	69.78
6 days	18.20	18.87	22.20	19.76	110.8	119.2	126.2	116.7	3.17	3.730	4.300	3.73	39.33	45.33	54.33	46.33
Mean	15.75	17.35	20.24	--	125.0	134.7	140.9	--	3.62	4.100	4.860	--	56.11	64.11	70.00	--
L.S.D. 0.05 A	0.51				3.3				0.16				4.47			
B	0.51				3.3				0.16				4.47			
A*B	0.89				5.7				0.28				7.75			

Table 3: Effect of different rates of compost on fresh weight of roots, stems and leaves (g) of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons)

Characters	Compost (g/pot) (B)											
	Roots fresh weight				Stem fresh weight				Leaves fresh weight			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	14.37	17.30	19.43	17.03	85.43	90.07	114.0	96.50	73.07	79.90	93.61	82.19
4 days	16.23	17.67	20.33	18.08	77.53	86.43	107.3	90.42	67.63	75.40	85.90	76.31
6 days	17.13	18.80	22.33	19.42	71.63	78.57	92.3	62.83	60.37	70.27	77.43	69.36
Mean	15.91	17.92	20.70	--	78.20	85.02	104.5	--	67.02	75.19	85.65	--
L.S.D. 0.05 A	0.76				1.64				3.02			
B	0.76				1.64				3.02			
A*B	1.32				2.84				5.22			

Table 4: Effect of different rates of compost on dry weight of roots, stems and leaves (g) of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons).

Characters	Compost (g/pot) (B)											
	Roots dry weight				Stem dry weight				Leaves dry weight			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	4.90	5.60	6.20	5.57	20.9	23.2	25.30	23.13	22.2	25.9	27.5	25.2
4 days	5.40	5.90	6.80	6.03	18.9	20.3	22.40	20.53	18.9	20.7	21.6	20.4
6 days	5.70	6.60	7.23	6.51	15.7	18.3	19.00	17.67	16.5	18.6	21.4	18.8
Mean	5.33	6.03	6.74	--	18.5	20.6	22.23	--	19.2	21.7	23.5	--
L.S.D. 0.05 A	1.41				0.46				0.57			
B	1.41				0.46				0.57			
A*B	2.45				0.80				0.98			

obtained with irrigation every 2 days. Such increases were estimated by 32.05%, 24.40%, 59.96%, 53.59%, 18.50%, 30.90% and 33.83%, respectively compared with irrigation every 6 days. According to El-Monayeri *et al*. [22] indicated that, this may be due to the vital roles of water supply at adequate amount for different physiological processes such as photosynthesis, respiration, transpiration, translocation, enzyme reaction and cells turgidity occurs simultaneously. Such reduction could be attributed to decrease in the activity of meristemic tissues responsible for elongation. As well as the inhibition photosynthesis efficiency under efficient water condition [23]. These results are in line with those obtained by Ibrahim [8] on *Jatropha curcas*, Ibrahim *et al*. [24] on *Helichrysum bracteatum* and El-Quesni *et al*. [10] on *Matthiola incana*. On the contrary, roots length, fresh and dry weight of roots gave an opposite manner which they gradually increased with increasing irrigation intervals. Numerically, root length, fresh and dry weight of roots were increased by 26.83% and 15.60%, 14.03% and 6.17% and by 16.88% and 8.26% with irrigation every 6 and 4 days, respectively in comparison with irrigation every 2 days. The lower water supply causes the root system to penetrate deeper and extending wider in the soil with higher root system researching for moisture in lower. These results are in agreement with those reported by Ibrahim [8] on *Simmonsia chinensis* [9] on *Jatropha curcas* and El-Quesni *et al.* [10] on *Matthiola incana*.

Data also indicated that application of Nile compost up to 200 g/pot significantly and gradually increased root length, stem length, stem diameter, leaves number/plant, fresh and dry weight of root, stem and leaves of *Amaranthus tricolor*. The highest values for all these characters were obtained with application of 200 g/pot Nile compost. Such increments were estimated by 28.51, 12.72, 34.25, 24.75, 30.11, 33.67, 27.80, 26.45, 20.16 and 22.40%, compared with untreated plants, respectively. The superiority fertility value of Nile compost may be due to the higher degree of decomposition as well as its higher nutrients contents. It is well known that organic fertilizer has favorable effect on physical characters of the soil and could favorably affect the activities of lower organisms that work over the stock of plant nutrients in the soil and make them available for immediate use [25]. El-Naggar [26] mentioned that an organic fertilizer contributes to plant growth by improving soil structure. Furthermore, organic fertilizer encourage the fresh and dry weight of plant through the simulation effect on the meristematic activity of tissues, where these organic fertilizers are rich in N, P, K and other minerals which required propellant growth [27]. These results are in line with those obtained by Mazher *et al*. [28] on *Jatropha curcas*, Abd El-Aziz *et al*. [14] on *Matthiola incana* and El-Quesni *et al*. [10] on *Matthiola incana*.

Regarding, the interaction between water intervals and Nile compost rates, data presented in Tables 2-4 revealed that, application of Nile compost rates under different irrigating intervals significantly increased all previous growth characters compared to without application Nile compost. This may be due to that Nile compost improving soil structure thereby improving aeration and retention of moisture and also by serving as a source of essential nutrients such as N, P and micronutrients as well as it profoundly affects the activities of micro flora organisms [26]. The highest values due to (irrigation every 2 days intervals x compost 200 g/pot) for all growth parameters, except root characters (6 days intervals x compost at 200 g/pot) for root length, fresh and dry weight of roots.

Flowering Characteristics: Five parameters pertaining to flowering characters were evaluated which included: stalk length of inflorescences, inflorescences length, inflorescences number/plant, fresh and dry weight of inflorescences. Data in Tables 5 and 6 showed that all flowering characters followed the same trend as that of the growth parameters. The increments on previous characters were 27.88, 31.34, 39.28, 32.40 and 28.43%, respectively, for irrigation every 2 days compared with irrigation every 6 days. Drought-related reduction in flowering characters of plants could be ascribed to the stress sensitivity of reproductive processes and

Table 5: Effect of different rates of compost on Stalk length of inflorescences (cm) and Inflorescences length (cm) of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons).

	Compost (g/pot) (B)							
Characters	Stalk length of inflorescences				Inflorescences length			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean
2 days	21.70	22.60	26.73	23.68	19.60	20.97	22.17	20.90
4 days	19.10	20.53	24.17	21.27	17.67	18.07	20.20	18.64
6 days	16.40	18.07	21.07	18.51	14.03	15.93	17.80	15.92
Mean	19.07	20.40	23.98	--	17.01	18.32	20.06	--
L.S.D. 0.05 A	0.83				0.53			
B	0.83				0.53			
A*B	1.44				0.91			

Table 6: Effect of different rates of compost on inflorescences number/plant, fresh and dry weight of inflorescences (g) of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons)

Characters	Compost (g/pot) (B)											
	Inflorescences number/plant				Fresh weight of inflorescences (g)				Dry weight of inflorescences (g)			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	20.67	24.00	30.00	24.89	15.43	18.77	20.00	18.06	7.43	9.33	9.93	8.90
4 days	18.33	20.67	26.33	21.78	13.70	16.60	17.93	16.07	6.30	8.17	9.37	7.94
6 days	14.67	17.33	21.61	17.87	10.83	13.80	16.30	13.64	5.23	6.97	8.60	6.93
Mean	17.89	20.67	26.00	--	13.32	16.39	17.19	--	6.23	8.16	9.30	--
L.S.D. 0.05 A	1.41				0.46				0.57			
B	1.41				0.46				0.57			
A*B	2.45				0.8				0.98			

Table 7: Effect of different rates of compost on Chlorophyll (a), (b) and carotenoids (mg/g f.w) of *Amaranthus tricolor* leaves grown under different irrigation intervals (Average values of 2010 and 2011 seasons)

Characters	Compost (g/pot) (B)											
	Chlorophyll (a)				Chlorophyll (b)				Carotenoids			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	1.353	1.765	1.963	1.694	0.831	0.967	1.253	1.017	0.931	1.231	1.435	1.199
4 days	1.871	2.531	2.831	2.411	0.911	1.431	1.563	1.302	1.231	1.335	1.535	1.367
6 days	2.453	2.696	2.975	2.708	1.312	1.567	1.731	1.537	1.531	1.621	1.755	1.636
Mean	1.892	2.331	2.59	--	1.018	1.323	1.516	--	1.231	1.396	1.575	--

the biochemical and molecular back ground of stress responses which can only be interpreted in association with the responses occurring in the vegetative organs [29]. This result is in line with those reported by Mazher *et al*. [9] on *Jatropha curcas* and Ibrahim *et al*. [24] on *Helichrysum bracteatum*. Data in Tables 5 and 6 indicated that flowering characteristics significantly increased with increasing Nile compost rate. These results illustrated that Nile compost could play an important role in improving the plant growth and the nutrient status of the plant and maintain the fertility of the soil, this due to slow releasing N, P, K and some important microelements [27]. The obtained results were in harmony with the finding obtained by El-Quesni *et al*. [10] on *Matthiaola incana*.

Regarding the role of Nile compost on elevated the negative effect of water intervals on *Amaranthus tricolor* plants, data revealed that addition of Nile compost at the two rates increased all flowering parameters. In this respect, it can be assumed that the depressive effect of water deficiency of flowering characters and other relevant physiological activities can be alleviated and/or modified to some extent, by addition Nile compost to the soil.

Chemical Composition

Photosynthetic Pigments: Data in Table 7 indicated that, the content of three photosynthetic pigments (chlorophyll a, b and carotenoids) was increased by increasing irrigation intervals up to 6 days intervals. Accordingly, it can be stated that irrigation every 6 days was the most effective irrigation treatment for promoting the synthesis and accumulation of the three photosynthetic pigments. These results are in accordance with those obtained by Mazher *et al*. [7] on *Bauhinia variegate* and El-Quesni *et al*. [10] on *Matthiola incana*. Water deficit induced reduction in chlorophyll content has been ascribed to loss of chloroplast membranes, excessive swelling, distortion of the lamellae vesiculation and the appearance of lipid droplets [30].

Concerning the effect of the Nile compost on photosynthetic pigments, data revealed the positive and active of the Nile compost on pigments content in leaves of *Amaranthus tricolor* plant as compared with control plants and other treatments. Organic fertilizer play an important role in plant growth, as they are source of plant nutrients, moreover, they improve soil properties and promote water use efficiency by plant. This is quite expected to enhance photosynthesis [14].

Regarding, the interaction of the two factors under study, application of 200g/pot Nile compost was more effective on pigments content with irrigation every 6 days intervals. The present results are in harmony with the finding of El-Quesni *et al*. [10] on *Matthiola inacna*.

Total Sugars Percentage: Data in Table 8 indicated that, total sugars percentage took the same trend like photosynthetic pigments in regard to the influence of irrigation treatments. Total sugars percentages were gradually augmented as the irrigation level was sloping downward. This may be due to the fact that during the course of drought stress active solute accumulation of compatible solutes such as carbohydrates is claimed to be an effective stress tolerance mechanism [31]. As for the effect of Nile compost on total sugars percentage, data showed that Nile compost application either 100 or 200 g/pot increased total sugars percentage in the different plant organs of *Amaranthus tricolor* plants as compared with untreated plant. The increase in total sugars percentage may be due to the high ability of organic matter in rendering soil nutrients more available and chelation of these elements by humic substances. This helps to increase the respiration role, the metabolism and enhance carbohydrates content accumulation [32] which consequently affects plant growth.

In this context, the interaction between irrigation intervals and Nile compost application, revealed that the combination of both factors on total sugars percentage was more effective than application each of them singly. The highest values were obtained by the application of 100 g/pot Nile and irrigation every 6 days.

Nutrients Content: Data in Tables 9-12 indicated that N, P and K were gradually increased with decreasing the irrigation intervals. Regarding irrigation intervals from 2 and up to 6 days increased the previous nutrients concentrations. This may be due the leaching of the minerals from soil. Similar results were reported by Mazher *et al*. [6] on *Taxodium distichum* and El-Quesni *et al*. [10] on *Matthiola incana*. From the given data in the same Tables, it can be concluded that increasing Nile compost application increased N, P and K percentages. This result may be due to the highest mineralization rate due to great microbial activity. Also, it may be due to the beneficial effect of high rate of compost applied to plant than that for mineral fertilizers through previous mechanism leading to a reduction in soil pH values and consequently increasing macro- and micro- nutrients [33]. Data also indicated that N, P and K content were increased with the interaction between application of Nile compost and irrigation intervals in different plant organs,

Table 8: Effect of different rates of compost on total sugars percentage of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons)

	Compost (g/pot) (B)											
Characters	Root				Stem				Leaves			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	13.45	13.96	14.55	13.99	15.53	15.96	16.43	15.97	21.31	23.35	26.35	23.67
4 days	14.35	15.36	17.12	15.61	15.85	16.67	17.11	16.54	24.63	25.63	26.67	25.64
6 days	15.69	17.43	18.51	17.21	16.35	17.12	17.96	17.14	26.17	27.76	29.13	27.69
Mean	14.50	15.58	16.73	--	15.91	16.58	17.17	--	24.04	25.58	27.38	--

Table 9: Effect of different rates of compost on nitrogen, phosphorus and potassium percentages in inflorescence of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons)

	Compost (g/pot) (B)											
Characters	N				P				K			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	0.36	0.37	0.39	0.37	0.35	0.36	0.90	0.37	2.51	2.67	2.81	2.66
4 days	0.37	0.39	0.41	0.39	0.39	0.41	0.45	0.42	2.85	2.96	3.35	3.05
6 days	0.38	0.4	0.47	0.41	0.41	0.42	0.48	0.43	3.12	3.39	3.51	3.34
Mean	0.37	0.39	0.42	--	0.38	0.4	0.44	--	2.83	3.01	3.22	--

Table 10: Effect of different rates of compost on nitrogen, phosphorus and potassium percentage in root of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons).

Characters	Compost (g/pot) (B)											
	N				P				K			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	0.22	0.26	0.28	0.25	0.24	0.26	0.28	0.26	0.89	1.11	1.21	1.07
4 days	0.33	0.35	0.38	0.35	0.32	0.33	0.48	0.38	1.24	1.89	2.33	1.82
6 days	0.36	0.39	0.42	0.39	0.32	0.35	0.58	0.42	1.30	2.07	2.84	2.07
Mean	0.30	0.33	0.36	--	0.29	0.31	0.45	--	1.14	1.69	2.13	--

Table 11: Effect of different rates of compost on nitrogen, phosphorus and potassium percentage in stems of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons).

Characters	Compost (g/pot) (B)											
	N				P				K			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	0.27	0.29	0.33	0.30	0.26	0.32	0.32	0.30	2.31	3.31	3.54	3.05
4 days	0.32	0.35	0.36	0.34	0.34	0.36	0.42	0.37	3.55	4.40	4.60	4.18
6 days	0.34	0.42	0.44	0.40	0.35	0.38	0.44	0.39	3.61	4.54	4.80	4.32
Mean	0.31	0.35	0.38	--	0.32	0.35	0.39	--	3.16	4.08	4.31	--

Table 12: Effect of different rates of compost on nitrogen, phosphorus and potassium percentage in leaves of *Amaranthus tricolor* grown under different irrigation intervals (Average values of 2010 and 2011 seasons)

Characters	Compost (g/pot) (B)											
	N				P				K			
Irrigation (A)	0	100	200	Mean	0	100	200	Mean	0	100	200	Mean
2 days	1.91	2.29	2.39	2.20	0.11	0.12	0.13	0.12	2.51	2.79	2.91	2.74
4 days	2.50	2.58	2.66	2.58	0.13	0.21	0.23	0.19	3.33	3.75	3.99	3.69
6 days	2.58	2.97	3.19	2.91	0.15	0.22	0.24	0.20	3.58	3.97	4.09	3.88
Mean	2.33	2.61	2.75	--	0.13	0.19	0.20	--	3.14	3.50	3.66	--

the highest values was recorded with irrigation 6 days intervals x 200g/pot Nile compost compared with the other treatments.

From the above-mentioned results, it can be concluded that Nile compost decreased the hazard effect of water stress, in addition had a favorable effect on growth, flowering and chemical constituents of *Amaranthus tricolor*.

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