

( )

\* *Chrysanthemum hortorum* Hort.

2 1

( )  
 2011/2/3 2010/6/25 \ \  
 0) (Mg) 1- . (100 50 0) (BA) 1- . (1000 500  
*Chrysanthemum hortorum* Hort.  
 2010/9/4 2010/8/4 2010/10/1 2010/9/1 2010/8/1 2010/10/4  
 (R.C.B.D.)  
 : .0.05  
 1- . 1000 1- . 50

Zeatin  
 1- . 1000 1- . 100  
 50 . ( )  
 1- . 1000 1- .  
 (24.97 27.25) 1- . (74.12 80.42)  
 .Mg EDTA (BA) :

Asteraceae

*Chrysanthemum indicum* L.

Chakravarty ) *Chrysanthemum morifolium* Ramat  
 .(, 1976

*Chrysanthemum × hortorum*

Narumi .(1995 )

(2008)

.2012/9/24

2011/12/20

Eid

2010/6/20 50 25 (2010)  
 10 7 20 17 1- 100  
 2010\6\25  
 1 : 2 20  
 %50  
 1- 3.100 50  
 (2006, Hassan) (Kuepper ,  
 1 2003)  
 \ (Brayan, 1999)  
 (1 )  
 STENDER FRANCE SARL  
 .(2 ) (2000 )  
 .(1989 ) (2009)  
 : (1)

1- 4 3 2 1 0  
 1- 2

	-----	
700	1- .	
140	1- .	
160	1- .	
7.6	-----	pH
1.8	1- .	EC
4.1	1- .	Mg <sup>+2</sup>
7.2	1- .	Ca <sup>+2</sup>
4.9	1- .	Na <sup>+</sup>
0.1	1- .	K <sup>+</sup>
8.6	1- .	Cl <sup>-</sup>
6.6	1- .	SO <sub>4</sub> <sup>-2</sup>
1.55	1- .	HCO <sup>3-</sup>
8.5	1- .	

Mg BA  
 (BA)  
 (Mg EDTA)

### Materials and Methods

( )  
 \ \  
 2011/2/3 2010/6/25

6-Benzylaminopurine (BA)  
 (Mg EDTA )

: (2)

pH	Salt content g.L <sup>-1</sup>	mg.L <sup>-1</sup>		
		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
5.5 – 6.0	0.9	140	160	180

(1000 500 0 )  
(100 50 0)

Multiples  
0.05

Duncans Range Test

(2000)

2010\7\8

15

Full

( 7 -5 )

expansion

30-25

0.5 (20:20:20) N.P.K

×

=

500 2010\8\10 2010\7\10

1-

1- 3

1- ( 1000 500 0 ) Mg

2010\9\1 2010\8\1

2010\10\1

° 70

(Memmert 600)

0 ) BA

2010\8\4

1- ( 100 50

( HR-200)

2010\10\4 2010\9\4

Mg

BA

Tween 20

663 645

UV-visible Spectrophotometer

( Shimadzu )

(R.C.B.D.)

2/1

° 20

(1976 Goodwin)

(1956 Duboies)

(2003) Kjedadhl method (Oven)

Atomic absorption spectrophotometer

(1989a) (1975 A.O.A.C.) Zeatin

UV-visible Spectrophotometer

(1996 Unyayar)

1

3 3 3 5 3 12)

3 60 ( )

3 15 3 25

pH (7) (Oven)

( 1) ( HR-200) 70

0) 269

1- ( 10 8 6 4 2

(3) 45 30

1- 100

56.97 61.27 %1 3 500

50 1- (  $\frac{1}{2}$  )

4.5 pH

(1991 )

(1965 Stevenson Kohl )

(1999) Reda  
1- 50

(<sup>2</sup> 2355.44 2595.48)

1991 )  
(2010) Ibrahim .( 20.69 23.91 )  
73.36 78.18 ) (

(1989) El-Sayed . 1- 100 .  
1- 100

Sink – Source

(4)

Senescence

50 )  
(71.89 77.82) 1- Tayama ) .(2010  
( 0.307 0.331) (1990 Carver  
( 23.08 25.69 )

RNA – Protein

0.274 0.286) ( 63.18 68.44) .( 1962 Sugiura )  
( 18.73 19.50) ( (2004) Davies

Senescence

Abd El-Aziz .  
(2010) Smolen (2007)

(3)

1- 50  
( 41.53 49.36)  
( 14.23 16.40)  
( 37.37 43.99 )  
( 12.73 14.43)

(1980)  
(2009)

(4)

Abou – Eid (2006) Leila  
 Zeatin 1- 50  
 1- 75 ( 100 . 83.70 86.39 )  
 (% 0.499 0.516 )  
 100 0.380 ( 100 . 78.72 80.77 )  
 Zeatin 1 (% 0.364 )  
 ( 1- 5.422 5.986 )  
 ( 1- 4.486 4.639 ) 50  
 1-

, Amylase , Ribonuclease  
 Protein alkinase Nitrate reductase , Catalase

Al ( 2000 )  
 .(2003) – Humaid

( 2007 Boonman )

: (3)

( )		( 1- 100. )		( )		( . <sup>2</sup> )		( )		1- .		
12.73 c	14.43 c	37.37 c	43.99 c	69.30 c	c2672.	17.64 c	20.30 c	2005.96 c	2282.45 c	51.14 c	55.25 c	0
14.23 a	16.40 a	41.53 a	49.36 a	73.36 a	78.18 a	20.69 a	23.91 a	2355.44 a	2595.48 a	54.31 b	58.34 b	50
13.14 b	15.48 b	38.75 b	47.22 b	b570.9	75.99 b	18.88 b	21.07 b	2140.48 b	2395.07 b	56.97 a	61.27 a	100

.0.05

\*

(4)

Zeatin				100.		( )		( )				
4.486 c	4.639 c	0.364 c	0.380 c	78.72 c	80.77 c	18.73 c	19.50 c	0.274 b	0.286 b	63.18 c	68.44 c	0
5.297 b	5.778 b	0.499 a	0.516 a	83.70 a	86.39 a	23.08 a	25.69 a	0.307 a	0.331 a	71.89 a	77.82 a	50
5.422 a	5.986 a	0.416 b	0.431 b	82.01 b	83.05 b	22.30 b	24.19 b	0.277 b	0.288 b	65.43 b	70.43 b	100

.0.05

\*

(5)

(2009)

(5)

Ribulose

bisphosphosphate carboxylase

Calvin cycle

1000  
 ( 46.10 51.06)  
 ( 13.94 16.18)

(2000)

14.74) ( 35.05 42.07)

( 12.84 (1989b )

ATP

Donald

ATP

(2004)

)

(1989)

1000

74.28)

1000

0.327)

(68.27

(2005)

23.85 25.53) ( 0.304  
 70.01) (  
 19.44 21.12) ( 0.264 0.273) ( 64.81  
 (1977 ) (  
 (1988 ) .(6 )  
 (1993) - -

(2009)  
 (2010 Slawomir Borowski )

(1989 )

(1984 Mastalers)  
 (2009)

: (5)

( )		- 100. ) ( 1		( )		( .2 )		( )		1-		
12.84 c	14.74 c	35.05 c	42.07 c	63.58 c	67.89 c	17.14 c	19.56 c	1950.00 c	2194.96 c	50.39 c	54.78 c	0
13.32 b	15.39 b	36.51 b	47.44 b	73.39 b	77.10 b	18.88 b	21.45 b	2152.37 b	2462.54 b	53.50 b	57.60 b	500
13.94 a	16.18 a	46.10 a	51.06 a	76.64 a	81.43 a	21.19 a	24.26 a	2399.51 a	2615.50 a	58.53 a	62.47 a	1000

.05

\*



: (6)

Zeatin				1- 100.		( )		( )				1-
4.479 c	4.932 c	0.367 b	0.383 c	77.76 c	79.88 c	19.44 c	21.12 c	0.264 c	0.273 b	64.81 b	70.01 c	0
5.340 b	5.686 b	0.391 b	0.407 b	81.91 b	83.58 b	20.82 b	22.73 b	0.290 b	0.306 a	67.43 a	72.39 b	500
5.386 a	5.785 a	0.522 a	0.538 a	84.75 a	86.75 a	23.85 a	25.53 a	0.304 a	0.327 a	68.27 a	74.28 a	1000

.05

\*

53.98) 1- .  
 15.27 17.56) ( 50.71  
 ( 29.61 35.43) ( )  
 ( 12.01 13.81)  
 .(7 ) 1- . 100  
 (8) 66.92) 1- . 1000  
 48.42 52.52) ( 62.98  
 1000 1- . 50 ( )  
 80.42) 1- . 50 1- . 50  
 ( 0.322 0.348) (74.12 1- . 1000  
 ( 24.97 27.25) .2 2502.68 2753.97)  
 ( 0.240 0.251) (61.93 66.88) 26.64) ( )  
 ( 16.65 17.33) 85.98) ( 22.98  
 . ( 1- 100 . 81.89  
 (8) 15.82) ( .2 1737.14 1855.79)  
 1- . 50 1- 100 . 60.84 61.98) ( 13.84  
 1- . 1000 ( )  
 1- 100 . 85.89 88.97) .(7 )  
 0.708) ( )  
 . 71.48 73.25) (% 0.691  
 (% 0.343 0.359) ( 1- 100  
 1000 1- . 50

1- . 100  
 1- . 1000  
 1- . 5.455 6.122) Zeatin  
 - . 2.813 3.247) ( 1  
 : (7)

( )				100. ) ( 1-		( )		( . <sup>2</sup> )		( )		1- .	- : 1
12.01 g	13.81 f	29.61 f	35.43 f	60.84 f	61.98 f	13.84 e	15.82 g	1737.14 f	1855.79 g	48.42 g	52.52 f	0	0
12.81 f	14.52 e	37.72 d	46.32 d	70.69 d	76.23 c	19.34 c	21.48 d	1956.59 e	2352.09 e	50.41 f	54.41 e	500	
13.36 cd	14.97 d	44.78 b	50.22 b	76.37 b	78.56 b	19.74 b	23.59 b	2324.14 b	2639.48 b	54.58 d	58.82 d	1000	
13.49 c	15.32 c	37.91 d	45.87 e	65.34 d	69.67 e	19.72 b	22.08 c	2205.08 c	2419.81 d	50.20 f	54.71 e	0	50
14.02 b	16.32 b	35.96 e	48.23 c	72.86 c	78.88 b	19.37 c	23.02 b	2358.56 b	2612.67 c	54.72 d	58.62 d	500	
15.18 a	17.56 a	50.71 a	53.98 a	81.89 a	85.98 a	22.98 a	26.64 a	2502.68 a	2753.97 a	58.02 b	61.68 b	1000	
13.03 e	15.08 cd	37.62 d	44.91 e	64.57 e	72.01 d	17.85 d	20.79 e	1907.77 e	2309.27 f	52.56 e	57.11 e	0	100
13.13 de	15.34 c	35.84 e	47.76 cd	76.61 b	76.21 c	17.94 d	19.85 f	2141.97 d	2422.87 d	55.37 c	59.77 c	500	
13.27 d	16.01 b	42.80 c	48.98 c	71.66 cd	79.77 b	20.84 ab	22.56 c	2371.70 b	2453.06 d	62.98 a	66.92 a	1000	

.0.05

\*

(8) :

Zeatin				1- 100.		( )		( )				1-	1-
2.813 g	3.247 e	0.343 f	0.359 e	71.48 e	73.25 e	16.65 d	17.33 f	0.240 d	0.251 e	61.93 f	66.88 d	0	0
5.320de	5.332 d	0.366 e	0.381 d	80.17 d	82.37 d	17.72 d	18.66 e	0.281bc	0.293 d	63.39 d	68.63cd	500	
5.325 d	5.337 d	0.384 d	0.399 d	84.50ab	86.68 b	21.81 b	22.52 d	0.300 b	0.314 c	64.23 d	69.81 c	1000	
5.206 f	5.618 c	0.395 cd	0.412 c	81.48 c	84.57 c	22.36bc	25.02 b	0.290 b	0.315 c	69.91 b	74.72 b	0	50
5.308 e	5.821 b	0.411 c	0.428 c	83.72 b	85.63bc	21.92 b	24.81 c	0.310 ab	0.329 b	71.65 b	78.31ab	500	
5.378 c	5.896 b	0.691 a	0.708 a	85.89 a	88.97 a	24.97 a	27.25 a	0.322 a	0.348 a	74.12 a	80.42 a	1000	
5.418 b	5.932ab	0.362 e	0.377 de	80.31cd	81.82de	19.31 c	21.02 d	0.262 c	0.252 e	62.58 e	68.44cd	0	100
5.391 bc	5.905ab	0.395 cd	0.411 cd	81.84 c	82.74 d	22.83 b	24.73 c	0.280 bc	0.295 d	67.25 c	70.23 c	500	
5.455 a	6.122 a	0.490 b	0.506 b	83.87 b	84.60 c	24.77 a	26.81 a	0.290 b	0.318 c	66.45 c	72.62bc	1000	

.05

\*

1- 1000

:

-3

-1

1- 50

-2

*Erysimum cheiri*

.55 - 43 : 2 1 .

2009

	2010 . . . .
1989 a . . . .	.317 – 307 . . . .
.259 – 31 :	2009 . . . .
1989 . . . .	
	<i>Dianthus caryophyllus</i> L. var
226	“Chabaud” L
1989b . . . .	
	1993 . . . .
.320	
1988 . . . .	
	2003 . . . .
1977 . . . .	
251 . . . .	.NARC
1991 . . . .	.172
	2000 . . . .
251 . . . .	
2010 . . . .	
<i>Eruca sativa</i> Mill.	487 . . . .
	2000 . . . .
215 . . . .	681 . . . .
2000 . . . .	2005 . . . .
	. <i>Gerbera jamesonii</i>
772 . . . .	
	1980 . . . .
1995 . . . .	
	1991 . . . .

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## Effects of Cytokinin Hormone (BA) and Chelated Mg on Growth and Flowering of *Chrysanthemum hortorum* Hort.

Arshad Naji Al-hasnawi<sup>1</sup> and Jamal Ahmed Abbass<sup>2</sup>

### ABSTRACT

The experiment was conducted in two locations. The first one was applied in Babylon Governorate (Jennt Al-Ahlam) nursery. The second location was applied in the Department of Horticulture and Landscape \ College of Agricultural \ University of Kufa during the period of 25/6/2010 until 3/2/2011 to study the effect of spraying three concentrations of Benzyladenine (BA) i.e. 0, 50, 100 mg.L<sup>-1</sup> and three concentrations of Chelated Magnesium i.e. 0, 500, 1000 mg.L<sup>-1</sup> on the vegetative and flowering growth of *Chrysanthemum* plant "*Chrysanthemum hortorum* Hort." with three spraying times i.e. 1/8/2010, 1/9/2010 and 1/10/2010 for Chelated Magnesium, and 4/8/2010, 4/9/2010, 4/10/2010 for Benzyladenine (BA) for the first location, while for the second location the foliar applications were done after one day of the first location spraying. The experiment was conducted as a Randomized Complete Block Design (R.C.B.D.) in factorial arrangement with three replicates. Duncan's Multiple Range Test was used at a probability level of 0.05 to compare the treatment means.

The results showed that spraying plants with Benzyl adenine at a concentration of 50 mg.L<sup>-1</sup> or Chelated Magnesium at a concentration of 1000 mg.L<sup>-1</sup> increased significantly all studied characteristics which gave the highest leaf area, shoot dry weight, leaf contents of total chlorophyll, mean number of fruits, root dry weight, number of petals, flower dry weight, vase life, total soluble carbohydrates, and the percentage of Nitrogen and Magnesium while plant height and Zeatin were increased significantly with using Benzyl adenine at a concentration of 100 mg.L<sup>-1</sup> or Chelated Magnesium at 1000 mg.L<sup>-1</sup> as compared to the control treatment. Results revealed that; the interaction between the plant treated with 50 mg.L<sup>-1</sup> BA concentration and Chelates Magnesium with 1000 mg.L<sup>-1</sup> increased significantly all the studied characteristics in the two locations that produced the highest number of petals (80.42, 74.12) and vase life (27.25, 24.97 day), in comparison to the treatment values in the control treatment.

**Keywords:** *Chrysanthemum hortorum* Hort., Benzyl adenine (BA), Chelates Magnesium Mg EDTA.

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