

-I

(1) (2) (1)

10 2009 2008 2007

25 + / N 75) : (N. P. K)

(/K₂O 50+ /P₂O₅

30

%11

%4.5

:

30621. .

(2)

(1)

...

Effect of Mineral Fertilization Rates and Method of Superphosphate Application on Some Growth and Fruits Indicators of the Grapevine Cultivar, Al-Helwani

**M. Al-Shhadat⁽¹⁾; F. Abu Nuqta⁽²⁾
and M. Batha⁽¹⁾**

ABSTRACT

The research experiment was carried out during the 2007, 2008 and 2009, seasons on grape variety Al- Helawani (10 years old) to study the effect of N.P.K. fertilization rates and the triple superphosphate (T.S.P) application method on some fruits characters and growth indicators. Three fertilization N.P.K rates were used, rate 1 (75:25:50) kg/ ha, twofold and fourfold of rate 1, in three replicates in addition to control. The application of (T.S.P) was on soil surface and at 30 cm depth, the percent of leaf area, shoot length, the degree of berry colour, berry firmness were calculated. The results showed a significant increase of leaf area, shoot length and the Berry colour compared to control. The third rate was the best for increasing the leaf area and shoot length, while the first and second rates were increased the colour of Berry. At the same time, there was a gradual significant decrease in Berry firmness compared to control when the rate of fertilizer was increased. It was also noted a significant increase in leaf area (11%) and shoot length (4.5%) in deep T.S.P application compared to the surface application.

Key words: Grapevine, Berry colour, Berry firmness, Leaf area, Shoot length.

⁽¹⁾ Department of Horticulture Science, ⁽²⁾ Department of Soil Science, Faculty of Agriculture P.O.Box 30621, Damascus University, Syria.

(2008)
(*Vitis vinifera* L, cv.*Al-Helwani*.)

)
(Kornichik and (Abu Nuqta,1995; 2008
(1994) Plakeda,1962; Boublena,1960; Aroutunian; 1965)
Lonstroth
Bravdo (2000)

Monoterpene

Martin *et al.*, (2004)

Smolarz and (1997)

P N Mercik
Schyler Aurora
(2004 Salem *et al.*,) Ca K
11 Thompson seedless

(/ 200 150)

.(1:1:3)

(2005)

Gay Eynard (2000) . %41

/ 160-80-40-0

White Muscat

Hellman (1997)
(Kessel 2000)

(Smith and Kliewer, 1984)

Marschner (1997) (Jain, 2002)

Devlin and Witham (2001) .(Fredeen *et al.*, 1989)

(Conradie, 2001; :
Keller *et al.*, 1998; Martin *et al.*, 2004; Zerihun and Treeby, 2002)
Antep (1997)
(1989)

Mencarelli *et al.*, Lazslo and Saayman,1991; Sato and Yaman, 2003;
Sato *et al.*, 1997; Perez-Harvey *et al.*, 2000) 1994;

()

.(Rolle *et al.*, 2006 ; Ruiz-Hernandez, 1996)

(Hilbert *et al.*, 2003; Wade *et al.*, 2004)

ACPs (Okamoto *et al.*, 2003)
(Anthocyanoplasts)

:

ACPs

(2006) Zhu *et al.*,

(N.P.K)

-2

2009 2008 2007
(*Vitis vinifera* L,cv.Al-Helwani)

10

. 4x 4

: - 1-2

:

: -

pH

pH meter

pH

:pH

-

.2.5:1

:E.C -

: -

Olsen : -
 (Olsen *et al.*, 1954) N 0.2

660 (Spectrophotometer)

Skalar : -
 (Richards,1962)

: -

(Jackson, .1958)

() 5:1 : -

: -

Isaac and) Varian DTPA
 (1) (Jones , 2001) .Kerber (1971

(1)

%	%	%	EC dS/m	pH 2.5:1	%	%	%	()
2.01	0.10	11.76	1.15	7.83	58	19	23	25-0
1.20	0.05	10.16	1.16	7.79	60	18	22	50 -25
1.20	0.05	9.8	1.34	7.87	59	18	23	75-50
0.4	0.03	10.16	1.29	7.88	62	19	19	100 -75
(/)								()
B		Zn	Mn	Cu	Fe	p	k	()
0.34		0.99	9.02	1.48	4.12	13.9	675	25-0
0.32		0.61	7.62	1.38	5.23	7.7	400	50 -25
0.58		0.41	10.21	1.15	4.86	3.6	296	75-50
0.18		0.38	7.84	1.11	5.66	2.6	193	100 -75

Haploxerepts
 Typic Cambisols USAD.Tax. (2006)
 Carbonatic cinnamon soil FAO (1993)
 .(2009) (2004) (1989)
 (1)

PH
 .(Jones, 2001)

: -2-2
 3 63
 (Split Plot) 3
 (N,P,K)

(L.S.D)
 : Costate (C.V%) %5

0	NPK		
1	NPK	1	30
2	NPK	2	
3	NPK	3	
1	NPK	4	
2	NPK	5	
3	NPK	6	

: -3-2

25 + /N 75) ()
 /P₂O₅ 50 + /N 150) (/ K₂O 50 + /P₂O₅
 /P₂O₅ 100 + / N 300) (/ K₂O 100 +
) (/ K₂O 200 +
 : (%46 N

(3,2,1)
 .(6,5,4) 1 30

(9-7) : (15- 12) -4-2
 90 : 30 -1
 (1.5)
 : (Dvornic, 1965)
 × (5 ÷) = (2) -2
) -3
 .(2003
 Texture Analyser - 4
 (Rolle *et al.*, 2006; .Lee and Bourne, 1980)
 -3
 : -1-3
 (2)
 () (6) (5)
) (6) %57.3 (5) % 54.6
 (%51.7 (4)
 .(5)

(2)

.()

(²)				
103.3 e	0	NPK		
134.2 d	1	NPK	1	30
139.0 d	2	NPK	2	
148.0 c	3	NPK	3	
156.7 b	1	NPK	4	
159.7 ab	2	NPK	5	
162.5 a	3	NPK	6	
5.62	LSD _{0.05}		(Sig)	
2.28	C.V %			

%34.5 %29.9

(3)

(3,2,1)

%43.3

(Des Gachons *et al.*, 2005;

(2,1)

Grant and Matthews,1996; Hunter *et al.*, 2000; Smolarz and Mercik,1997; Salem *et al.*, 2004)

%11

) (3)

(NPK

) 30

(Fredeen *et al.*, 1989; Grant and Matthews, :

(1991

1996; Marschner, 1997; Radin,1990)

)

(3)

.(

(²)		
131.12 b		3 2 1
145.55 a	30	6 5 4
2.77	LSD _{0.05}	

(4)

%40.9

NPK

%50.3

%44.6

...

: (1998)
 (Marschner, 1986; Antep, 1997; Conradie, 2001; Delcroix, 1979;
 Keller *et al.*, 1998)

(NPK)

(Dvornic, 1965)

. (Carbonneau,1979)

()

(4)

(²)			
145.45 b	1	NPK	4, 1
149.35 b	2	NPK	5, 2
155.25 a	3	NPK	6, 3
103.25 c	0	NPK	
3.97	LSD _{0.05}		

:

-2-3

(5)

%43.5 %35.9

(4) (6) (5)

(6,5,4)

%45

(3) (3,2,1)

%42.7 %30.5 %29

:

(2) (1)

(Hunter *et al.*, 2000; Nicolantonakis, 2000; Salem *et al.*, 2004;
 .Smolarz and Mercik,1997)

)

(5)

.(

()				
131 d	0	NPK		
169 c	1	NPK	1	
171 bc	2	NPK	2	
187 a	3	NPK	3	
178 b	1	NPK	4	30
188 a	2	NPK	5	
190 a	3	NPK	6	
8.29	LSD _{0.05}		(Sig)	
2.77	C.V %			

(6)
%4.5

(Dey, 1988)

() (6)

()		
164.50 b		3, 2, 1
171.83 a	30	6, 5, 4
2.35	LSD 0.05	

Wild, (1988)

Jones *et al.*,1991) :

(Goldstein, 1986; Igual *et al.*, 2001;
(1954)

3

Hibbard (1935)
(1991)

(Antep,1997; Devlin and Witham, 2001)

(7)

%32

NPK

%44

%37

(Antep,1997; Conradie, 2001; Devlin
and Witham, 2001; Zerihun and Treeby, 2002)

() (7)

()			
173.50 b	1	NPK	4, 1
179.33 b	2	NPK	5, 2
188.50 a	3	NPK	6, 3
131.33 c	0	NPK	
3.97	LSD 0.05		

:

-3-3

(5,4,2,1)

(8)

(6,3)

(Martin *et al.*, 2004) (2008)

Hilbert *et al.*, 2003; Wade)

(*et al.*, 2004

Martin *et al.*, 2004;)

.(Okamoto *et al.*, 2003

(8)

.(

6 c	0	NPK		
9 a	1	NPK	1	30
8 ab	2	NPK	2	
7 bc	3	NPK	3	
8 ab	1	NPK	4	
8 ab	2	NPK	5	
6 c	3	NPK	6	
1.04	LSD _{0.05}		(Sig)	
7.85	C.V %			

(9)

30

()

(Hilbert *et al.*, 2003)

Chalcone synthase Phenylalanine Amonia

)

(9)

.(

7.50 a		3, 2, 1
7.00 a	30	6, 5, 4
0.62	LSD _{0.05}	

(10)
NPK

NPK

):

(Hilbert *et al.*, 2003 ; Martin *et al.*, 2004; 2008

() (10)

8.5 a	1	NPK	4, 1
8 a	2	NPK	5, 2
6.5 b	3	NPK	6, 3
6 b	0	NPK	
0.74	LSD _{0.05}		

:

-4-3

(11)

%42.5 30 (5) (4) %61.5 %55.8
 %46 %43.9 (3) (2) (1) (6)
 %61.8

(2008)
 (Lee and Bourne,1980)

(Demirsoy and Demirsoy, 2004) (R= -0.936)

pH Ruiz *et al.* (R= -0.862) pH
 (al., 2004)

(2000 ; Chang and Kliewer, 1991) :
 (R= -0.730)

...

(11)

.()

(² /)			
507.25 a	0	NPK	
352.44 b	1	NPK	1
347.09 b	2	NPK	2
313.48 c	3	NPK	3
355.94 b	1	NPK	4
325.50 c	2	NPK	5
314.04 c	3	NPK	6
18.36	LSD _{0.05}		(Sig)
2.73	C.V %		

(12)

(2000 ; Chang and Kliewer,1991)

Devlin and Witham (2001)

()

(Pectolytic Enzymes)

)

(12)

.(

(² /)		
375.68 a		3 , 2 , 1
380.06 a	30	6 , 5 , 4
8.58	LSD_{0.05}	

(13)

NPK

%61.6,%50.8,%43.2

Chang and 2008)

.(Kliewer,1991

(² /)	(13)		
354.19 b	1	NPK	4, 1
336.29 c	2	NPK	5, 2
313.76 d	3	NPK	6, 3
507.25 a	0	NPK	
12.98	LSD _{0.05}		

-4

-1

30

NPK

-2

-3

-4

()

-5

-6

-1

30

-2

()

NPK

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 .262 -239
- 265 (2009) . -2
 .275
- .207 -189: -2 (21) . (2005) . -3
- . (1998) . -4
 (NPK)
- . (2008) -5
- . (2008) . -6
- .32-15 -2 -(24) . (2003) . -7
 . ()
- .45
 . (2008) . -8
- . 222 -205 - 2 (24)
 . (2000) . -9
 .306
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 .395
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Received	2009/10/19	
Accepted for Publ.	2010/01/25	