

**EFFECTS OF THE NITROGEN SOURCE, TRANSPLANTING TIME AND GROWING MEDIUM ON PHOTOSYNTHESIS, GROWTH RATE AND MACRONUTRIENTS CONCENTRATION OF SAPLINGS OF TWO OLIVE CULTIVARS**

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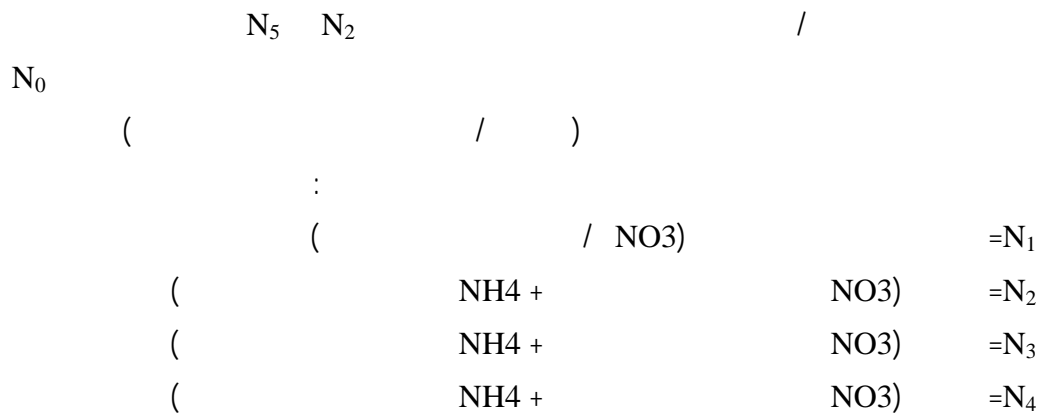
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Table 1. Effects of medium on olive growth parameters.

Shoot root length ratio	Root length (cm)	Photosynthesis 2 ( $\mu\text{molm}^{-2}\text{s}^{-1}$ )	Photosynthesis 1 ( $\mu\text{molm}^{-2}\text{s}^{-1}$ )	Leaf area ( $\text{mm}^2$ )	Leaf number	Internode length (cm)	Plant height (cm)	Media
3.6 a	30 b	7.3 a	4.7 a	678 a	75 a	2.8 a	108 a	(Soil)
2.4 b	35 a	6.1 b	4.5 b	651 b	67 b	2.4 b	88 b	(Perlite)

† In each column means followed by the same letters are not significantly different at 5% level of probability.

Table 2. Effects of medium on olive macronutrients level.

(% K-			(% P			(% N -			Media
Stem	Root	Leaf	Stem	Root	Leaf	Stem	Root	Leaf	
0.85a	1.35b	0.95a	0.1a	0.14a	0.17a	0.87a	1.6a	2.0a <sup>†</sup>	(Soil)
0.84a	1.4a	0.97a	0.08b	0.1 b	0.15b	0.82b	1.5b	1.8b	(Perlite)

† In each column means followed by the same letters are not significantly different at 5% level of probability.

Table 3. Effects of cultivar on olive growth parameters.

Shoot root length ratio	Root length (cm)	Photosynthesis 2 ( $\mu\text{molm}^{-2}\text{s}^{-1}$ )	Photosynthesis 1 ( $\mu\text{molm}^{-2}\text{s}^{-1}$ )	Leaf area ( $\text{mm}^2$ )	Leaf number	Internode length (cm)	Plant height (cm)	Cultivar
3.1 a	36 a	5.8 b	4.2 b	583 b	80 a	2.8 a	113 a	(‘Arbiquina’)
2.9 b	30 b	7.6 a	4.8 a	750 a	65 b	2.5 b	83 b	(‘Roughani’)

† In each column means followed by the same letters are not significantly different at 5% level of probability.

Table 4. Effects of cultivar on olive. macronutrients level.

(% K-			(% P			(% N -			Cultivar
Stem	Root	Leaf	Stem	Root	Leaf	Stem	Root	Leaf	
0.63b	1.1b	0.7b	0.1a	0.14a	0.19a	0.94a	1.53a	2.0a	('Arbiquina')
1.0a	1.5a	1.1a	0.07b	0.11b	0.12b	0.74b	1.4b	1.8b	('Roughani')

† In each column means followed by the same letters are not significantly different at 5% level of probability.

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Table 5. Effects of transplanting time on olive growth parameters.

Shoot root length ratio	Root length (cm)	Photosynthesis 2 ( $\mu\text{molm}^{-2}\text{s}^{-1}$ )	Photosynthesis 1 ( $\mu\text{molm}^{-2}\text{s}^{-1}$ )	Leaf area ( $\text{mm}^2$ )	Leaf number	Internode length (cm)	Plant height (cm)	Time
3.5 a	33.3 a	7.6 a	4.7 a	700 a	81 a	2.8 a	115 a <sup>†</sup>	(Spring)
2.5 b	33 a	6.1 b	4.1 b	650 b	61 b	2.5 b	80 b	(Autumn)

† In each column means followed by the same letters are not significantly different at 5% level of probability.

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Table 6. Effects of transplanting time on olive macronutrients level.

(% K-			(% P			(% N -			Time
Stem	Root	Leaf	Stem	Root	Leaf	Stem	Root	Leaf	
0.7b	0.7b	0.9b	0.10a	0.13a	0.16a	0.88a	1.6b	2.0a	(Spring)
0.9a	1.0a	1.0a	0.08b	0.11b	0.15b	0.81b	1.4a	1.8b	(Autumn)

† In each column means followed by the same letters are not significantly different at 5% level of probability.

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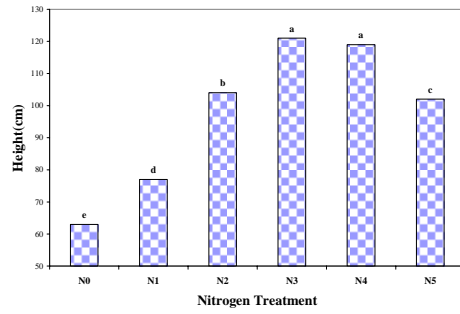


Fig. 1. Effects of nitrogen treatments on olive height.

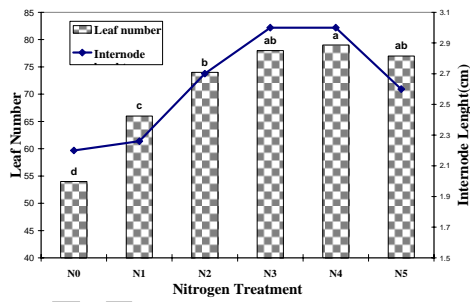


Fig. 2. Effects of nitrogen treatments on olive leaf number and internodes length.

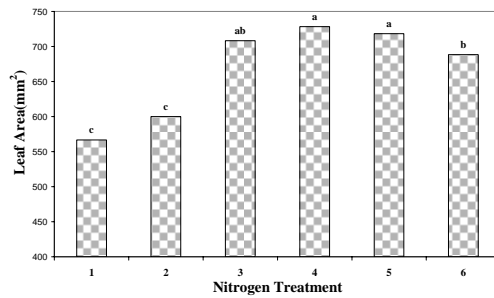


Fig. 3. Effects of nitrogen treatments on olive leaf area.

( NH<sub>4</sub> + NO<sub>3</sub> ) N<sub>2</sub>  
 / NO<sub>3</sub> ) N<sub>1</sub> N<sub>3</sub>

(N<sub>0</sub>)

N<sub>3</sub>

N<sub>4</sub>

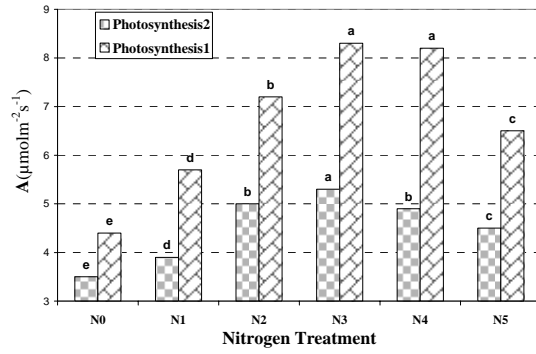


Fig. 4. Effects of nitrogen treatments on olive photosynthesis.

† In each column means followed by the same letters are not significantly different at 5% level of probability .

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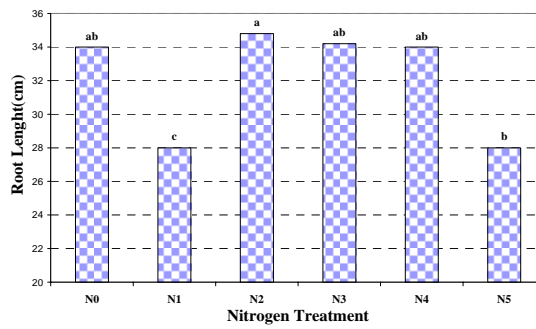


Fig. 5. Effects of nitrogen treatments on olive root length.

N<sub>4</sub> N<sub>3</sub>

N<sub>0</sub>

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$N_0$   $N_4$   $N_5$   $N_5$   
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 $N_2$

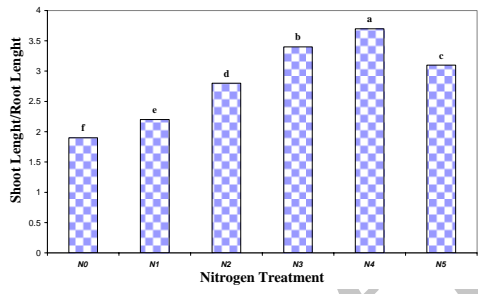


Fig. 6. Effects of nitrogen treatments on olive shoot length/root length.

$(N_1)$   $(N_0)$   $(N_3)$   
 $(N_4)$   $(N_4)$   $(N_3)$   
 $(N_1)$   $(N_0)$   
 $(N_4)$   $(N_3)$   
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 $(N_3)$   $(N_4)$

Table 7. Effects of nitrogen on olive macronutrients level.

(% K)			(% P)			(% N)			Nitrogen Treatment
Stem	Root	Leaf	Stem	Root	Leaf	Stem	Root	Leaf	
0.75 e	1.07 d	0.8 e	0.1 a	0.11 d	0.159 c	0.6 f	1.2 e	1.6 d <sup>†</sup>	N <sub>0</sub>
0.89 b	1.3 c	0.9 c	0.07 c	0.09 e	0.15 e	0.7 e	1.3 d	1.7 c	N <sub>1</sub>
1 a	1.5 a	1.1 a	0.08 b	0.11 d	0.152 d	0.87 d	1.59 c	2 b	N <sub>2</sub>
0.82 c	1.45 b	1.03 b	0.09 b	0.12 c	0.153cd	0.9 c	1.74 a	2.1 a	N <sub>3</sub>
0.84 c	1.45 b	0.9 d	0.1 a	0.14 b	0.188 b	0.94 b	1.7 b	2.13 a	N <sub>4</sub>
0.79 e	1.31 c	0.8 e	0.1 a	0.15 a	0.2 a	0.97 a	1.6 c	2 b	N <sub>5</sub>

<sup>†</sup> In each column means followed by the same letters are not significantly different at 5% level of probability.

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N-NH<sub>4</sub> N-NO<sub>3</sub>

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