Response of Picual Olive Trees To Mineral and Bio-Nitrogen Fertilization

SOUROUR, M.S.M.
Horticulture Research Institute, A.R.C., Egypt.

ABSTRACT

The present study was conducted during 2006 and 2007 seasons in a private orchard in Alex- Cairo desert road on 13 years old picual olive trees to study the effect of mineral and bio-nitrogen fertilization comparing to traditional nitrogen fertilization on yield, leaf mineral and fruit quality. The annual rate per tree were 1000, 2000 and 3000 gm ammonium nitrate (NH_4NO_3) with or without 100 and 200 gm Halex biofertilizer. The results reaveled that, in both experimental seasons, fertilization of picual olive trees with 2000 gm ammonium nitrate +200 gm Halex per tree significantly increase the yield per tree, leaf P, K content, fruit weight and dimensions with highest oil and unsaturated fatty acids content .On the other hand, 3000 gm ammonium nitrate + 200 gm Halex treatment significantly increase leaf N content and gave the lowest saturated fatty acids content. Therefore, under this conditions of this study and resembling conditions, using the above mentioned treatment 2000 gm ammonium nitrate + 200 gm Halex may be a good recommendation for fertilizating picual olive trees in order to obtain highest yield with good fruit quality.

INTRODUCTION

Olives (*Olea europaea L.*) is a major agricultural crop in the Mediterranean basin. Olive tree has an important role in the development of new agricultural societies for many reasons; i.e. the highly nutritional values of its fruit oil, its many industrial production of fruit and seeds. In addition, olive trees are more tolerance to the hard conditions in new reclaimed lands at desert regions.

In Egypt, the majority of agriculture depends on chemical fertilizers, which is energy consuming and expensive (Soliman, 2001). Moreover, the nitrogenous fertilizers are lost via nitrate reduction, denitrification and ammonia volatilization (Zaghloul, 2002). Also, some nitrogenous fertilizers can be leached to the surface and underground water causing environmental pollution (Attia, 1990). Therefore, the use of biofertilizers is a particular interest to avoid the previously mentioned problems, accompanied by the urgent demand to protect agroeco system from damage (sustainable agriculture) (Herridge *et al.*, 1994).

Biofertilizers are microbial inoculants (preparations containing living micro organisms) which enhance production by improving the nutrients supplies of trees. There are number of inoculants with possible practical application in crops where they can serve as useful components of integrated plant nutrient supply systems. Such inoculants may help in increasing crop productivity by increasing biological N Fixation availability or uptake of nutrients through solublilization or increasing absorption, stimulation of plant growth through hormonal action or antibiosis or by decomposition of organic residues.

Recently, the real challenge of many investigators in the agricultural research field is to stop using high rates of agro- chemicals which negatively affect human health and environment.

Growth, nutritional status of trees, yield and fruit quality of olives trees were greatly improved by the application of biofertilizers (Abou El- Khashab *et al.*, 2005 and Safia A. Taleb *et al.*, 2004). Using of improved and combined inoculum formulations held very much promise for increasing yield in many important crops (Tiwary *et al.,* 1998 on banana; Soliman, 2001 on banana and guava and Zaghloul, 2002 on potato).

Therefore, the objective of the present study was carried out to investigate the effect of the application of mineral and biofertilization treatments on yield, fruit quality and leaf mineral content of Picual olive trees.

MATERIALS AND METHODS

This study was carried out during two successive seasons; 2006 and 2007 on 13- years- old on picual olive trees grown in calcareous soil in a private orchard located at Alexandria- Cairo desert road (about 30 km from Alexandria). The experimental soil was analyzed before starting the experiment and the analysis data are presented in Table (1).

Fifty four of picual olive trees were uniform as possible, chosen randomly for this study.

The following treatments were done:

1. 1000gm ammonium nitrate (NH_4NO_3)/tree/year (traditional application, control).
2. 1000 gm ammonium nitrate (NH_4NO_3) + 100 gm Halex/tree/year.
3. 1000 gm ammonium nitrate (NH_4NO_3) + 200 gm Halex/tree/year.
4. 2000 gm ammonium nitrate (NH_4NO_3)/ tree/ year.
5. 2000 gm ammonium nitrate (NH_4NO_3) + 100 gm Halex/tree/year.
6. 2000 gm ammonium nitrate (NH_4NO_3) + 200 gm Halex/tree/year.
7. 3000 gm ammonium nitrate (NH_4NO_3)/tree/year.
8. 3000 gm ammonium nitrate (NH_4NO_3) + 100 gm Halex/tree/year.
9. 3000 gm ammonium nitrate (NH_4NO_3) + 200 gm Halex/tree/year.

The treatments were arranged in Randomized Complete Blocks Design, in which each treatment replicated three times with two trees for each replicate; i.e. 9 treatments X 6 replicate = 54 trees.

Ammonium nitrate commercial fertilizer (33 % N) was divided into three equal doses and broadcasted on the soil surface in March, May and August. Halex bio fertilizer was supplied by plant pathology Dept. Fac. of Agric., University of Alexandria. The bio fertilizer was made up of mixture of dinitrogen fixing bacteria Azotobacter spp., Azospirillum sp., and Klebsiella sp., engineered for higher N-Fixation. The biofertilizer was used as a suspension at two levels 100 and 200 gm / tree. The inoculation was applied twice a year (in March and June).

Each experimental tree annually received 1.5 kg calcium super phosphate (15.5 % P_2O_5) and 5 Kg cattle manure in January.

At full bloom (at the last week of April), twenty healthy shoots representing the previous spring sprouted shoot (5 in each direction) were chosen, labeled and flowers per shoot were counted.

In May, the number of set fruits per shoot were recorded for chosen shoots and fruit set percentage was calculated.

At harvest stage (in October), yield per tree was estimated and a sample of 80 fruits per experimental tree were taken at random for quality determination. In each sample physical properties including fruit, pulp and seed weights, fruit volume and dimensions as well as fruit length and width were determined. In addition, oil content percentage of fruits was determined according Juan (1990).

For leaf mineral content determination, a sample of leaf per tree were randomly collected in the first week of September (Jones and Benton, 1994) washed and then dried to a constant weight at 70°C and ground by stainless steel rotary knife. The ground dried material of each sample was digested with sulphuric acid and hydrogen peroxide according to Evenhuis and Dewaard (1980). Suitable aliquots were taken for the determine of N, P and K.

Nitrogen and phosphorus were determined colorimetrically according to Evenhuis (1976) and Murphy and Riely (1962), respectively. Potassium was determined by flame- photometer according to Chapman and Pratt (1961).

The moisture percentage was determined after the fruits flesh was oven dried to a constant weight at 60°C. The oil content of the fruits were determined by Soxhalt fat- extracting apparatus using petroleum ether (A.O.A.C., 1980).

Saturated and unsaturated fatty acids were determined in the oil samples by gas liquid chromatography (Annon, 1966).

Data were subjected to the proper statistical analysis according to Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

The response of picual olive trees to mineral and bio- nitrogen fertilization resulted in:-

I- Yield, number of flowers per inflorescence and fruit set:

Concerning the effect of fertilization treatments on yield, the obtained results in Table (3) indicated that 2000 gm ammonium nitrate + 200 gm Halex treatment significantly increased each of yield traits, i.e. number of flowers per inflorescence and fruit set percent and yield per tree than those of control and the other treatments. There were no significant differences found by addition 200 gm Halex with either 2000 or 3000 gm ammonium nitrate treatments in the number of flowers per inflorescence and fruit set percent parameters. However, 1000 gm ammonium nitrate (control) treatment significantly gave the lowest values. These results are in agreement with those obtained by Abd El- Hameed (2002), Safia *et al.*, (2004), Abou El- Khashab (2005) and Hegazi *et al.*, (2007) on olive and Mansour and Shaaban (2007) on Orange.

Many investigators referred to the promotion which occurred in growth due to application of bio fertilizer (N_2- Fixers) might be attributed to its effect on increasing the availability of N- Fixed and the higher N- uptake by plants (Subba Rao, 1984). The improve in flowering measurements resulted by bio fertilizers application may be attributed to the stimulating effect of the absorbed nutrients on photosynthesis process which certainly reflected positively on measurements of both flowering and fruiting aspects (Youssef *et al.*, 2001 and Zaghloul, 2002).

II- Fruit quality:

1.Physical properties:

Concerning the effect of mineral and bio- nitrogen fertilization on fruit physical properties, the obtained data are listed in (Tables 3, 4, and 5).
It is evident that in the two experimental seasons, both of fruit weight and flesh weight significantly increased by both of 2000 gm ammonium nitrate + 200 gm Halex and 3000 gm ammonium nitrate + 200 gm Halex treatments than those of other treatments. However, seed weight was not affected by any of the studied treatments as mentioned in Table (3).

As regard to the flesh percentage and dimensions of fruits, the experimental data in Tables (4 and 5) revealed that, 2000 gm ammonium nitrate + 200 gm Halex at treatment significantly increased fruit dimensions than those of other treatments in 2006 and 2007 seasons. Morever, there were no significant differences in fruit width by addition 200 gm Halex with either 2000 or 3000 gm ammonium nitrate per tree also, there were no significant differences found between 2000 gm ammonium nitrate with either 100 or 200 gm Halex per tree in flesh percent. On other hand, fruit volume was extremely affected by 3000 gm ammonium nitrate + 200 gm Halex treatment (Table 4). These results were coinciding with the findings of Haggag, (1996), Abd El- Hameed (2002), Abou- Taleb *et al.*, (2004) and Abou El- Khashab *et al.*, (2005) on olive trees and Tayeh (2003) on citrus.

2.Chemical Constituents:

Experimental data concerning the effect of mineral and bio- nitrogen fertilization on chemical constituents of picual olive fruit are presented in Tables (5, 6, 7 and 8).

a) Oil Content:

In both seasons, present results of oil percentage are similar to the above- mentioned result of flesh percentage, whereas it significantly was increased by 2000 gm ammonium nitrate + 200 gm Halex treatment (Table 5).

b) Moisture Content:

Its clear from Table (5) that in two experimental seasons, 1000 gm ammonium nitrate (control) significantly recorded higher moisture content than those of other treatments in most cases, followed with 1000 gm ammonium nitrate + 100 gm Halex treatment. There were no significant differences found between 1000 gm ammonium nitrate (control) and 1000 gm ammonium nitrate + 100 gm Halex treatment. The stimulus effect of bio fertilizers application may be attributed to the promotion effect on the parameters of plant growth which are enable to absorb more minerals by its root system and thus reflected on the total fruit yield and its properties. Findings of many investigators give a real support to our results (Rizk and Shafeek 2000 and Ali *et al.*, 2001).

c) Fatty Acids Composition:

C_1- Saturated Fatty Acids:

Data show in Table (6) indicated that saturated fatty acids, i.e. myristic, palmitic, arachidic in both seasons and stearic in the second season were significantly decreased due to the highest rates of bio fertilization of the studied treatments. While, stearic fatty acid was not affected by nitrogen and bio-fertilization in the first season. There were no significant differences found by addition 1000 (control) with 2000 gm ammonium nitrate treatments.

C_2- Unsaturated Fatty Acids:

The obtained data in Table (7) revealed that in both experimental season, 2000 gm ammonium nitrate + 200 gm Halex treatment significantly increased Oleic, Linoleic and Lionlenic acids. However, 3000 gm ammonium nitrate + 200 gm Halex treatment significantly increase palmitoleic acid content than those of other treatments. There were no significant differences between addition 2000 and 3000 gm ammonium nitrate with 200 gm Halex treatments in the first season for linoleic and palmitoleic acids and in the second season for oleic acid. These results are in accordance with those previously reported by Gomaa *et al.*, (2006) on prickly oil lettuce, they found that unsaturated fatty acids increased by bio fertilization treatments.

III- Leaf mineral content:-

The data representing the effect of mineral and bio- nitrogen fertilization on leaf mineral content of Picual olive trees shown in Table (8).

A) Nitrogen:

It is obvious that in the two experimental seasons, 3000 gm ammonium nitrate + 200 gm Halex treatment significantly increased leaf nitrogen content than those of other treatments followed by 2000 gm ammonium nitrate + 200 gm Halex treatment. There were no significant differences found by addition 2000 or 3000 gm ammonium nitrate with 200 gm Halex on the leaf nitrogen content. These results are in line with those reported by Abd El- Hameed (2002), Safia *et al.*, (2004), Abu El-Khashab *et al.*, (2005) and Hegazi *et al.*, (2007) on olive trees.

B) Phosphorus:

The results showed that in both seasons, 3000 gm ammonium nitrate + 200 gm Halex or 2000 gm ammonium nitrate + 200 gm Halex treatments had significantly higher leaf phosphorus content than those of remained treatments. These findings are in agreement with those previously found by Abd El- Hameed (2002), Safia *et al.*, (2004), Abu El- Khashab *et al.*, (2005) and Hegazi *et al.*, (2007) on olive trees.

C) Potassium:

It was appeared that 2000 gm ammonium nitrate + 200 gm Halex treatment significantly recorded higher leaf potassium content than those of all other treatments. These results are in line with those obtained by Abd El- Hameed (2002), Safia *et al.*, (2004), Abu El-Khashab *et al.*, (2005), Hegazi *et al.*, (2007) on olive and Mansour and Shabaan (2007) on orange.

This improving effect of leaf N and P content may be attributed to NP fertilization and also to that the bacteria present in the bio fertilizers are working as N_2- Fixers (Frankenberger and Arshad, 1995 and Ruiz Lozano *et al.*, 1995). Also, Noel *et al.*, (1996) reported that bacteria present in the bio fertilizers secret promoting substances or organic acids that enhance nutrient uptake. Moreover, the hormonal exudates of the bio fertilizers bacteria can modify root growth morphology and physiology resulting in more absorption of nutrients (Monib *et al.*, 1990).

CONCLUSION

Generally, it could be concluded that the treatment of 2000 gm ammonium nitrate and 200 gm Halex/ tree could be recommended to improve yield and fruit quality of olive trees picual cv. under the same conditions of this study.

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Table (1): Chemical and Mechanical Analysis of the experimental soil before starting the study

Depth (cm)	Ec Ds/ m	pH	$CaCO_3$ %	Cations (meq/ L)				Anions (mq / L)			Sand	Silt	Clay	Texture
				Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	Cl^{-}	SO_4^{--}				
0 - 30	2.30	8.36	38	10.50	3.50	14.5	0.10	10.00	11.3	7.30	64.01	16.71	19.28	Sandy Loam
30 – 60	2.72	7.96	46.80	4.50	55.50	17.0	1.20	4.00	12.0	2.20	66.56	7.72	25.72	Sandy Clay Loam
60 – 90	3.52	8.20	41.70	6.00	8.00	18.7	1.30	4.50	17.5	12.00	65.23	11.59	23.18	Sandy Clay Loam

Table (2): Effect of Mineral and bio-nitrogen fertilizers on the number of flowers per inflorescences, fruit set and yield of picual olives in 2006 and 2007 seasons:

Treatments Per Tree/ Year	No. of Flowers/ inflorescence		Fruit Set (%)		Yield (Kg / tree)	
	2006	2007	2006	2007	2006	2007
1000 gm NH_4NO_3 (Control)	11.66	11.00	7.77	9.05	13.39	15.47
1000 gm NH_4NO_3 + 100 gm Halex	12.66	13.00	9.02	11.66	15.59	17.87
1000 gm NH_4NO_3 + 200 gm Halex	15.00	16.00	11.60	14.80	17.01	19.76
2000 gm NH_4NO_3	13.33	14.00	10.88	11.78	15.62	17.01
2000 gm NH_4NO_3 + 100 gm Halex	16.66	18.00	14.93	15.79	17.50	20.77
2000 gm NH_4NO_3 + 200 gm Halex	19.00	19.66	18.93	20.39	21.54	23.76
3000 gm NH_4NO_3	15.66	16.66	12.97	14.77	15.93	19.76
3000 gm NH_4NO_3+ 100 gm Halex	17.66	18.33	14.57	17.04	16.34	20.70
3000 gm NH_4NO_3+ 200 gm Halex	18.66	19.00	18.05	19.53	19.97	22.92
L.S.D. (0.05)	2.26	1.01	1.61	1.53	1.45	1.67

Table (3): Effect of Mineral and bio- nitrogen fertilizers on fruit, flesh and seed weight of picual olives in 2006 and 2007 seasons:

Treatments Per Tree/ Year	Fruit Weight (gm)		Flesh Weight (gm)		Seed Weight (gm)	
	2006	2007	2006	2007	2006	2007
1000 gm NH_4NO_3 (Control)	3.00	2.93	2.03	1.94	0.97	0.98
1000 gm NH_4NO_3 + 100 gm Halex	3.24	3.31	2.23	2.32	1.02	1.00
1000 gm NH_4NO_3 + 200 gm Halex	3.70	3.82	2.66	2.76	1.04	1.05
2000 gm NH_4NO_3	3.11	3.50	2.12	2.44	0.99	1.06
2000 gm NH_4NO_3 + 100 gm Halex	4.33	4.51	3.32	3.41	1.01	1.10
2000 gm NH_4NO_3 + 200 gm Halex	5.44	5.72	4.33	4.61	1.11	1.11
3000 gm NH_4NO_3	3.91	4.12	2.91	3.13	1.00	1.00
3000 gm NH_4NO_3+ 100 gm Halex	4.14	4.83	3.05	3.78	1.04	1.04
3000 gm NH_4NO_3+ 200 gm Halex	4.28	5.16	3.25	4.04	1.08	1.11
L.S.D. (0.05)	0.731	0.555	0.770	0.566	N.S.	N.S.

Table (4): Effect of Mineral and bio- nitrogen fertilizers on Fruit volume, length and width of picual olives in 2006 and 2007 seasons:

Treatments Per Tree/ Year	Fruit Volume (cm^3)		Fruit Length (cm)		Fruit Width (cm)	
	2006	2007	2006	2007	2006	2007
1000 gm NH_4NO_3 (Control)	2.66	3.00	1.43	1.70	1.40	1.43
1000 gm NH_4NO_3 + 100 gm Halex	2.96	3.30	1.76	1.86	1.43	1.50
1000 gm NH_4NO_3 + 200 gm Halex	3.23	3.70	1.93	2.00	1.50	1.66
2000 gm NH_4NO_3	3.00	3.46	1.83	1.90	1.66	1.60
2000 gm NH_4NO_3 + 100 gm Halex	3.56	4.06	2.20	2.33	1.86	1.80
2000 gm NH_4NO_3 + 200 gm Halex	4.00	4.93	2.40	2.63	2.10	2.13
3000 gm NH_4NO_3	4.13	4.26	2.03	2.20	1.80	1.73
3000 gm NH_4NO_3+ 100 gm Halex	4.73	4.80	2.06	2.20	1.90	1.80
3000 gm NH_4NO_3+ 200 gm Halex	5.10	5.43	2.10	2.33	2.00	2.00
L.S.D. (0.05)	0.556	0.532	0.158	0.153	0.123	0.132

Table (5): Effect of Mineral and bio- nitrogen fertilizers on fruit flesh, moisture and oil percent of picual olives in 2006 and 2007 seasons:

Treatments Per Tree/ Year	Flesh Percent		Moisture Percent		Oil Percent	
	2006	2007	2006	2007	2006	2007
1000 gm NH_4NO_3 (Control)	67.47	66.13	77.13	73.75	22.35	24.06
1000 gm NH_4NO_3 + 100 gm Halex	68.74	69.62	76.47	71.77	23.97	26.34
1000 gm NH_4NO_3 + 200 gm Halex	71.81	72.36	73.20	68.75	26.24	29.31
2000 gm NH_4NO_3	67.99	69.07	74.28	71.69	24.42	26.21
2000 gm NH_4NO_3 + 100 gm Halex	75.95	75.56	71.59	69.55	27.91	29.39
2000 gm NH_4NO_3 + 200 gm Halex	79.39	80.42	68.12	66.75	30.72	33.92
3000 gm NH_4NO_3	73.38	75.76	71.92	66.39	27.36	29.23
3000 gm NH_4NO_3+ 100 gm Halex	74.36	78.30	71.55	65.61	28.03	30.09
3000 gm NH_4NO_3+ 200 gm Halex	75.61	78.32	70.83	65.28	29.03	30.99
L.S.D. (0.05)	6.452	5.144	2.807	4.211	0.606	0.500

Table (6): Effect of Mineral and bio- nitrogen fertilizers on saturated fatty acids in the oil of picual olives fruits in 2006 and 2007 seasons:

Treatments Per Tree/ Year	Myristic (%)		Palmitic (%)		Stearic (%)		Arachidic (%)	
	2006	2007	2006	2007	2006	2007	2006	2007
1000 gm NH_4NO_3 (Control)	0.73	0.67	24.26	23.59	5.68	5.13	1.74	1.80
1000 gm NH_4NO_3 + 100 gm Halex	0.59	0.49	22.15	22.58	5.64	4.76	1.59	1.60
1000 gm NH_4NO_3 + 200 gm Halex	0.36	0.35	17.79	19.22	5.61	4.33	1.35	1.31
2000 gm NH_4NO_3	0.42	0.54	23.52	21.36	5.67	4.69	1.41	1.51
2000 gm NH_4NO_3 + 100 gm Halex	0.26	0.41	21.36	18.37	5.60	4.24	1.15	1.19
2000 gm NH_4NO_3 + 200 gm Halex	0.20	0.30	18.16	16.96	5.57	4.03	0.99	0.90
3000 gm NH_4NO_3	0.33	0.42	20.37	20.37	5.66	4.83	1.12	1.25
3000 gm NH_4NO_3+ 100 gm Halex	0.24	0.35	19.98	18.96	5.61	4.54	0.95	0.83
3000 gm NH_4NO_3+ 200 gm Halex	0.15	0.21	17.41	17.50	5.50	4.14	0.75	0.68
L.S.D. (0.05)	0.05	0.06	0.89	0.72	N.S.	0.33	0.12	0.12

Table (7): Effect of Mineral and bio- nitrogen fertilizers on unsaturated fatty acids in the oil of picual olives fruit in 2006 and 2007 seasons:

Treatments Per Tree/ Year	Oleic (%)		Linoleic (%)		Linolenic (%)		Palmitoteic (%)	
	2006	2007	2006	2007	2006	2007	2006	2007
1000 gm NH_4NO_3 (Control)	55.35	56.68	4.56	3.54	1.59	1.40	1.53	1.62
1000 gm NH_4NO_3 + 100 gm Halex	57.72	58.75	6.40	4.32	2.30	2.04	1.69	1.69
1000 gm NH_4NO_3 + 200 gm Halex	61.77	61.53	7.51	6.58	3.20	2.83	2.05	1.92
2000 gm NH_4NO_3	58.67	59.61	7.33	4.18	2.45	2.04	2.06	2.15
2000 gm NH_4NO_3 + 100 gm Halex	62.23	61.60	8.59	6.40	3.21	2.91	2.40	2.41
2000 gm NH_4NO_3 + 200 gm Halex	65.45	64.45	9.32	9.28	4.52	3.90	3.12	3.07
3000 gm NH_4NO_3	60.41	62.51	8.46	5.43	2.69	2.33	2.77	2.33
3000 gm NH_4NO_3+ 100 gm Halex	62.25	63.61	8.61	7.40	3.30	2.52	2.88	2.74
3000 gm NH_4NO_3+ 200 gm Halex	64.79	64.41	8.86	8.39	3.77	3.01	2.88	3.36
L.S.D. (0.05)	1.17	0.73	0.66	0.41	0.47	0.32	0.31	0.27

Table (8): Effect of Mineral and bio- nitrogen fertilizers on nitrogen, phosphorus and potassium content (percent on dry weight basis) of picual olives in 2006 and 2007 seasons:

Treatments Per Tree/ Year	Nitrogen (%)		Phosphorus (%)		Potassium (%)	
	2006	2007	2006	2007	2006	2007
1000 gm NH_4NO_3 (Control)	0.98	1.02	0.218	0.245	0.50	0.60
1000 gm NH_4NO_3 + 100 gm Halex	1.07	1.21	0.248	0.284	0.62	0.70
1000 gm NH_4NO_3 + 200 gm Halex	1.25	1.30	0.329	0.408	0.78	0.82
2000 gm NH_4NO_3	1.24	1.32	0.273	0.333	0.63	0.75
2000 gm NH_4NO_3 + 100 gm Halex	1.46	1.55	0.331	0.425	0.80	1.06
2000 gm NH_4NO_3 + 200 gm Halex	1.78	1.88	0.495	0.574	1.23	1.89
3000 gm NH_4NO_3	1.43	1.52	0.436	0.508	0.84	0.92
3000 gm NH_4NO_3+ 100 gm Halex	1.62	1.76	0.461	0.544	0.86	1.19
3000 gm NH_4NO_3+ 200 gm Halex	1.82	1.95	0.497	0.575	0.89	1.34
L.S.D. (0.05)	0.14	0.13	0.04	0.05	0.09	0.16

الملخص العربى

إستجابة أشجار الزيتون صنف البيكوال للتسميد النيتروجينى المعدنى والحيوى

مرفت صديق محمد سرور

معهد بحوث البساتين – مركز البحوث الزراعية–الجيزة–مصر

أجرى هذا البحث خلال عامى ٢٠٠٦–٢٠٠٧ فى مزرعة خاصة تقع على طريق إسكندرية – القاهرة الصحراوى على أشجار زيتون صنف البيكوال عمرها ١٣ سنة وذلك لدراسة تأثير التسميد النيتروجينى المعدني والحيوى مقارنة بالتسميد النيتروجينى التقليدى المطبق وذلك على كل من المحصول والمحتوى المعدنى للأوراق وجودة ثمار الزيتون. وقد كانت المعدلات السنوية المستخدمة للشجرة هى ١٠٠٠ ، ٢٠٠٠ ، ٣٠٠٠ جرام نترات أمونيوم مع أو بدون ١٠٠ ، ٢٠٠ جرام من السماد الحيوى الهاليكس.

وقد أشارت النتائج الى أنه خلال موسمى الدراسة فإن تسميد الأشجار بـــ ٢٠٠٠ جرام نترات أمونيوم + ٢٠٠ جرام هاليكس وذلك للشجرة الواحدة قد أدى الى زيادة معنوية فى محصول الشجرة ومحتوى الأوراق من عنصرى الفوسفور والبوتاسيوم ، وكذلك الى زيادة فى وزن وأبعاد الثمرة ومحتواها من الزيت والأحماض الدهنية غير المشبعة (الأولييك ، اللينوليك ، اللينولينك و البالميتوليك).

ومن ناحية أخرى فإن تسميد الأشجار بـــ ٣٠٠٠ جرام نترات أمونيوم + ٢٠٠ جرام هاليكس للشجرة قد أدى الى زيادة معنوية فى محتوى الأوراق من النيتروجين وتقليل محتوى الثمار من الأحماض الدهنية المشبعة (الميرستيك ، البالمتيك ، الاستياريك و الأراكيديك).

وعليه:– فإنه تحت ظروف هذه الدراسة والظروف المماثلة فإن استخدام المعاملة ٢٠٠٠ جرام نترات أمونيوم + ٢٠٠ جرام هاليكس للشجرة تعتبر توصية جيدة لتسميد أشجار الزيتون صنف البيكوال وذلك للحصول على أعلى محصول مع أفضل جودة للثمار.