

## EVALUATION OF SOME OLIVE CULTIVARS UNDER SOUTH TAHRIR REGION

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### ABSTRACT

This work was executed during the two growing seasons of 2004 & 2005 on eight olive "*Olea europaea* L." cultivars: Manzanillo, Coratina, Koroneiki, Chemlali, Wardan, Picual, Dolce, and Arbiquine. Trees were grown at Ali Mubarak farm in South Tahrir region Research Station. The objectives of this study to evaluate these cultivars were among 46 cultivars collection in this region. These trees were planted in sandy soil besides, it received the annual fertilizers program and irrigated with Nile water using drip irrigation system. Concerning the tree characteristics, Chemlali and Koroneiki cvs. surpassed other cultivars in plant height and trunk circumference. On the other hand, Dolce and Wardan cvs. were the least in plant height and canopy of the tree. Meantime, Coratina cv. trees achieved the highest values of canopy circumference, shoot length and shoot diameter. The reverse was true for Wardan and Picual cvs.. Whereas, Coratina and Picual cvs. exhibited the highest assimilation area. Arbiquine cv. gave the highest number of internodes and number of leaves/shoot and Wardan cv. gave the highest leaf area. However, Manzanillo cv. exhibited the least leaf area and both Manzanillio and Wardan cvs. gave the least number of internodes. As relating to full blooming, Chemlali cv. Was the earlier, but Koroneiki cv. was the latest one. Chemlali and Koroneiki cvs. has the highest significant number of inflorescence/shoot and sex expression percentage. Dolce cv. exhibited the longest fruit and seed besides, warden and picual cvs. showed the highest fruit diameter. As for seed diameter, Manzanillo cv. surpassed other cultivars. in this character. Reversly, Arbiquine cv. seed was the shortest in length and Chemlali cv. was the least in width. Manzanillo cv. was the highest fruit weight while, Wrdan cv. was the highest flesh/seed ratio. The same cultivar and Picual cv. showed the highest flesh weight in 2004&2005, respectively. Arbiquini and Chemlali cvs. gave the highest fruit set percentage, while Manzanillo cv. exhibited the least one. The highest oil percentage were in picual and Aarbiquine cvs., however Chemlali cv. was the least in oil percentage. Dolce and Picual cvs. surpassed other cultivars in yield. On the contrary, Chemlali and Aarbiquine cvs. were the least in yield. Eventually, we can recommend planting Dolce, Picual and Aribquine cvs. under The Region of South Tahreer for table, double purpose and oil consumption, respectively. In addition, studying on the rest of the cultivars low in production has to be carried.

**Keywords:** Olive, Cultivars, Vegetative growth, Flowering, Fruit characteristics, Oil, Yield.

### INTRODUCTION

Olive is one of the most important plants that have been mentioned in Holy books. It is a blessing tree which can create the communities and keep the social attitudes and economic income steady and in progress. Olive "*Olea europaea* L." belongs to family Oleaceae which have different cultivars for oil extraction and for pickling, while its by products are used for different purposes (Abou El-Nassar, 1985). The olive tree has been cultivated in Egypt

for thousands of years (Anagnostopoulos 1951). Olive production plays an important role in the economy of different countries such as Spain, Italy, Greece, Turkey, Cyprus and Tunisia. This tree is planted where the other crops can't thrive because it can tolerate drought and salinity (Abou El-Khashab 1997 and 2002). Therefore, the planted area is stretched to reach about 120,000 Feddans in Egypt according to the statistics of the Ministry of Agriculture (2004). The importing of olive cultivars is subjected to different ecological and agroecosystems resulting in positive or negative mutations under different conditions (Weiyang *et al.*, 1998). Therefore, there were many researches of evaluation under different circumstances and adaptability (Rallo 1995; Al-Kadi 1997; Eassa, 2000; Ouazzani *et al.*, 2001; Lopez *et al.*, 2004 and Hosseini *et al.*, 2004). The objective of this work was to evaluate eight olive cultivars ( Manzanillo, Coratina, Koroneiki, Chemlali, Wardan, Picual, Dolce and Arbiquine) included in 46 olive cultivars collection under the region of South Tahrir for the resistance of bud unsurvival which reduce the production of some cultivars, on the bases of vegetative and flowering growth, fruit characteristics, fruit and oil production.

## MATERIAL AND METHOD

The present study was carried out during 2004 and 2005 growing seasons on eight olive cultivars (Manzanillo, Coratina, Koroneiki, Chemlali, Wardan, Picual, Dolce and Arbiquine) included in a collection of about 46 olive cvs. (8 years old). This collection in the South of Tahrir region at Ali Mubarak farm Research Station where the partial die back phenomenon of terminal bud in olive trees is found in this area which affect the production of these cultivars.. The trees under study were uniform in shape and size as possible and planted 5 X 5 meters apart and grown in sandy soil and irrigated with drip irrigation from the Nile water (El- Nassr canal). Soil analysis is listed in Table (1). The trees received normal fertilization and cultural practices in the farm.

**Table (1): Experimental soil macro and micro elements (ppm) analysis**

Macro elements (%)					Microelements (ppm)				
N	P	K	Ca	Mg	Fe	Mn	Zn	B	Cu
100	5.1	120	578	71	10.5	8.7	22	0.1	0.87

Annual fertilizers per feddan, 20m<sup>3</sup> organic manure, 200Kg superphosphate (15%P<sub>2</sub>O<sub>5</sub>), 500Kg ammonium sulphate (20.5% N) and 200Kg potassium sulphate (45% K<sub>2</sub>O). Treatments were replicated five times and arranged in a complete randomized block design, each replicate consists of one tree.

The following parameters were determined in the two successive seasons.

### Vegetative growth:

Number of leaves/shoot, shoot length, length of internodes and shoot diameter (cm).

**Flowering characters:**

Flowering date, number of inflorescences/shoot, sex expression (%), and fruit set (%) which were measured two weeks after full blooming.

**Fruit characters and yield:**

Length and diameter of fruits (cm), length and diameter of seeds (cm), Fruit, seed and flesh weight (g.) and flesh/seed ratio. Fruit oil content as fresh weight (%) were determined using Soxhelt apparatus. Fruit yield was determined as (Kg/tree).

**Statistical analysis:**

The experiment included in this study followed a complete randomized design in a factorial experiment. The obtained data was subjected to analysis of variance (ANOVA) according to Snedecor and Cochran (1980). Differences between treatments were compared by Duncans multiple range test described in the SAS (SAS).

**RESULTS AND DISCUSSION**

Evaluation of eight olive cultivars (Manzanillo, Coratina, Koroneiki, Chemlali, Wardan, Picual, Dolce and Arbiquine) under the region of Tahrir during 2004 & 2005 growing seasons where the problem of bud unsurvival existis. This problem needs the best cultivars which can thrive, withstand and give reasonable production under the conditions of this region.

**Vegetative growth:**

Data in Table, (2) showed that Chemlali and Koroneiki cvs. exhibited the highest plant height and Trunk circumference. Whereas, Coratina surpassed the other cultivars in canopy circumference. On the other hand, Wardan cv. gave the lowest values in trunk and canopy circumferences. Meanwhile, Dolce cv. was the least in plant height only.

**Table, (2): Plant height, trunk circumference and canopy circumference of some olive cultivars in 2004& 2005 growing seasons.**

Cultivars	Plant height (m) Mean of the two seasons	Trunk (m) circumference Mean of the two seasons	Canopy circumference (m) Mean of the two seasons
	(2004 & 2005)	(2004 & 2005)	(2004 & 2005)
Manzanillo	3.570A	0.4100BC	10.327CD
Coratina	3.703A	0.4833AB	14.067A
Koroneiki	3.737A	0.5267A	12.070BC
Chemlali	3.803A	0.5067A	13.803AB
Wardan	2.960BC	0.3933C	8.967D
Picual	3.733A	0.5333A	12.420AB
Dolce	2.873C	0.4733A-C	9.460D
Arbiquine	3.423AB	0.4733A-C	13.737AB

The morphological identification e.g vegetative growth (shoot length, shoot diameter, Number of internodes, and length of internodes) showed in Table (3). Data revealed that, Coratina olive cv. gave the highest shoot length

and shoot diameter compared to the other cultivars during the two growing seasons (2004&2005). On the contrary, Wardan and Picual cvs. showed the least shoot length and diameter, respectively during 2004 & 2005 growing seasons.

Arbiquine cv. exhibited the superior number of internodes while, Manzanillo cv. demonstrated the most reduced number in both seasons compared to the other cultivars under study. As for length of internodes, Picual and Wardan cvs. presented the highest one, on the other hand Manzanillo and Coratina cvs. recorded the lowest values of internodes length in 2004 and 2005, respectively.

**Table (3): shoot length, shoot diameter, number and length of internodes of some olive cultivars in 2004 & 2005 growing seasons.**

Cultivars	Shoot length (cm)		Shoot diameter (mm)		Number of internodes (cm)		Length of internodes (cm)	
	2004	2005	2004	2005	2004	2005	2004	2005
Manzanillo	14.0B	14.0BC	2.3AB	2.30CD	4.67E	6.0D	0.339D	0.438D
Coratina	21.67A	27.67A	2.67A	2.70A	12.0BC	11.67BC	0.555C	0.425D
Koroneiki	16.0B	23.00A	2.30AB	2.20D	12.0BC	13.67AB	0.752BC	0.597BC
Chemlali	17.33B	16.67B	2.53AB	2.50BC	11.0BC	9.33C	0.629C	0.558CD
Wardan	9.00C	7.33D	2.57AB	2.53AB	8.0D	6.33D	0.888AB	0.878A
Picual	13.00 BC	12.67B-D	2.27B	2.20D	12.67B	9.33C	1.013A	0.737B
Dolce	14.00 B	10.33CD	2.33AB	2.40B-D	9.67CD	6.33D	0.752BC	0.638BC
Arbiquine	16.33 B	24.67A	2.37AB	2.37B-D	15.0A	16.00A	0.921AB	0.657BC

Means followed by the same letters within the same column are not significantly different P =0.05.

Data in Table, (4), revealed that Aarbiquine cv. exhibited the highest significant number of leaves/shoot in both seasons. Meantime, Wardan cv. gave the least significant number of leaves/shoot in both seasons whereas, Picual cv. gave the least number of leaves/shoot in the first one only. Concerning area/leaf Wrдан cv. surpassed other cultivars in this respect, while area/leaf of the Manzanillo cv. was minimized compared to the other cultivars in 2004 & 2005 seasons. Whileas, there wasn't any significant difference between cultivars in 2005 growing seasons. Although Coratina cv. comes in the first rank in assimilation area in the first season, Picual cv. surpassed in the second one and the reverse was true for Picual and Dolce cvs. in the first and second season, respectively.

**Table (4): Number of leaves/shoot, area/leaf, and assimilation area of some olive cultivars in 2004 & 2005 growing seasons.**

Cultivars	Number of leaves/shoot		Area /leaf (cm <sup>2</sup> )		Assimilation area (cm)	
	2004	2005	2004	2005	2004	2005
Manzanillo	23.67B	23.0AB	2.76C	3.03A	65.36B	69.89BC
Coratina	23.0B	23.0AB	4.32A	4.44A	99.04A	102.95AB
Koroneiki	24.0B	27.0AB	2.81BC	3.06A	67.48AB	82.60AC
Chemlali	22.0B	19.0BC	3.39A-C	3.29A	74.77AB	61.56BC
Wardan	15.67C	12.33C	4.37A	4.60A	69.73AB	57.01BC
Picual	15.0C	30.33A	4.24A	4.30A	64.94B	135.78A
Dolce	21.67B	13.33C	4.12A-B	3.33A	89.26AB	42.05C
Arbiquine	30.67A	32.0A	3.05A-C	3.10A	92.81AB	98.35A-C

This characterization can go in harmony with the bases of identification of Ouazzani *et al.*, (2001) and Hosseini *et al.*, (2004). They reported that morphological and biological characters are used to evaluate numerous olive germplasm cultivars. Moreover, this is important both from commercial and nutritional points of view, building upon and in conjunction with molecular genetics program.

**Flowering:**

Data in Table, (5) revealed that the different cultivars under study were varied in the date of full bloom. Chemlali cv. was the earlier one, followed by Wardan then Dolce cvs. On the other hand, Koroneiki cv. was the latest one in full blooming date. The rest of the cultivars were intermediate in dates of full blooming. According to number of inflorescence/shoot Chemlali and Koroneiki cvs. gave the highest number of inflorescence in the first and second season, respectively. On the contrary, Coratina and Wardan cvs. showed the least number of inflorescence/shoot in 2004&2005, respectively.

**Table (5): Flowering date, number of inflorescence/shoot and sex expression of some olive cultivars in 2004 & 2005 growing seasons.**

Cultivars	Flowering date		Number of inflorescence/shoot		Sex expression (%)	
	2004	2005	2004	2005	2004	2005
Manzanillo	2/4	6/4	4.33AB	16.00A	76.67E	84.00C
Coratina	5/4	7/4	2.67B	14.67A	98.67AB	88.67BC
Koroneiki	10/4	12/4	4.33AB	17.33A	94.00C	99.33A
Chemlali	20/3	22/3	5.67A	10.33B	100.00A	100.00A
Wardan	25/3	27/3	3.00B	5.33C	96.67BC	94.67AB
Picual	1/4	5/4	4.00AB	5.67C	64.33F	62.33D
Dolce	28/3	31/3	5.00AB	8.00BC	98.00AB	97.33A
Arbiquine	7/4	11/4	4.33AB	17.00A	80.00D	100.00A

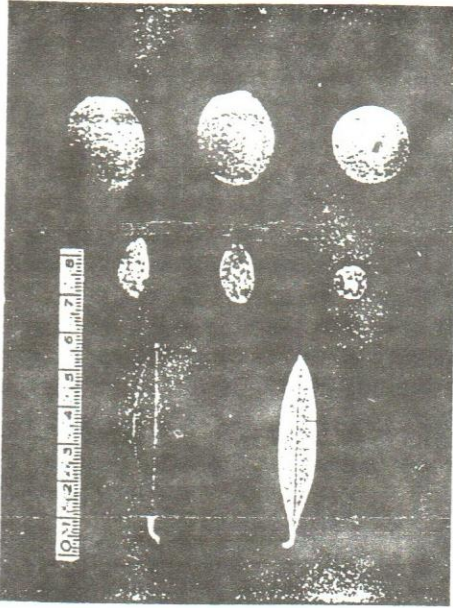
Means followed by the same letters within the same column are not significantly different  $p=0.05$

Chemlali cv. confirmed the superior sex expression percentage in 2004&2005 seasons while Arbiquine cv. gave the highest value in the second season only. On contrast, Picual cv. exhibited the least sex expression percentage during the two seasons. Arbiquine and Chemlali cvs. showed the highest fruit set percentage in 2004 and in 2005 seasons, respectively. The reverse was true, for Manzanillo cv..

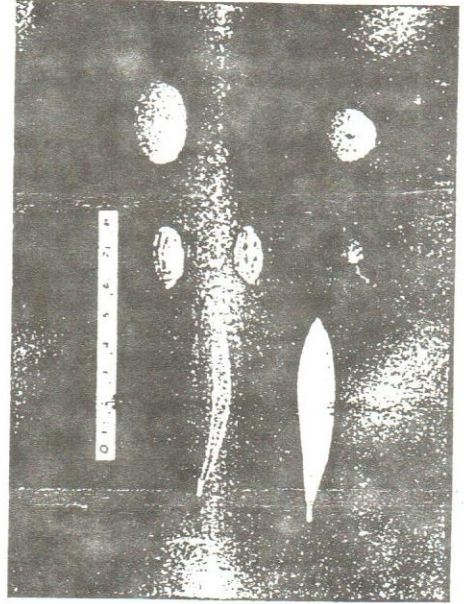
These identification characteristics coincide with Rallo *et al.*, (1995) who evaluated the spread of cultivated olive varieties, surveying and cataloging varieties held in collection for flowering, comparative trials and obtaining new varieties in Spain.

**Fruit characteristics:**

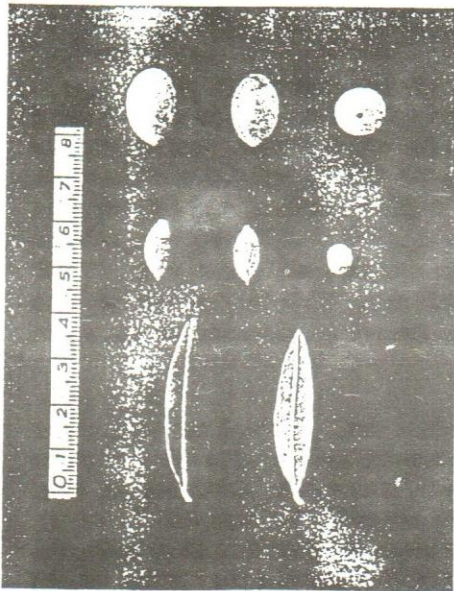
Data in Table, (6 & pictures) indicated that, Chemlali cv. showed the least fruit length, fruit diameter and seed diameter compared to other cultivars under study during the two growing seasons. Meanwhile, Arbiquine cv. seed length was minimized significantly in both seasons. On contrast, Dolce cv. exhibited the longest fruit in both seasons when compared to other cultivars. As for the fruit diameter, Wardan and Picual cvs. showed the highest values during 1<sup>st</sup> and 2<sup>nd</sup>, respectively.



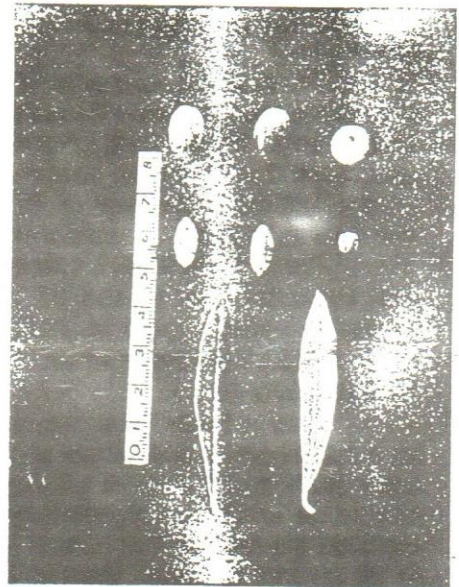
**Manzanillo**



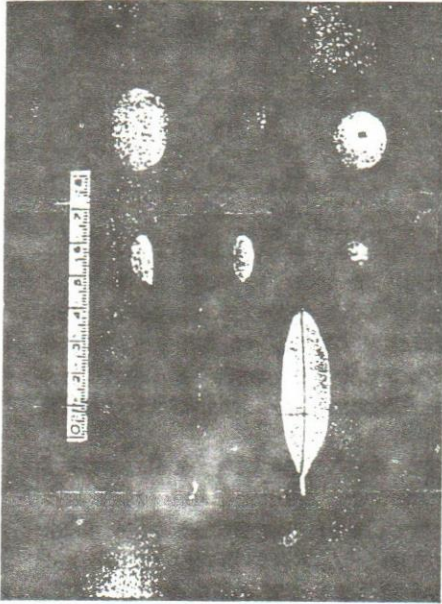
**Coratina**



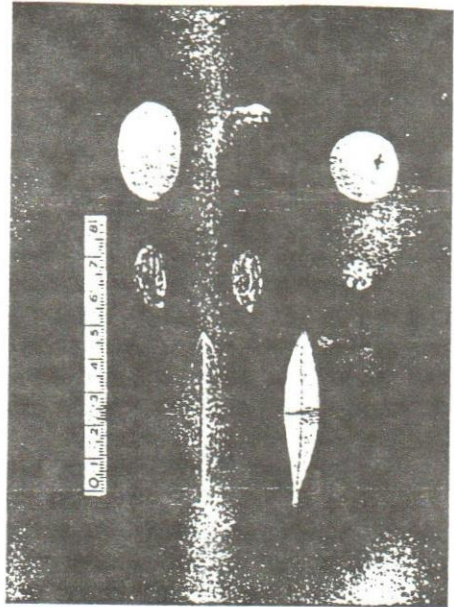
**Koroneiki**



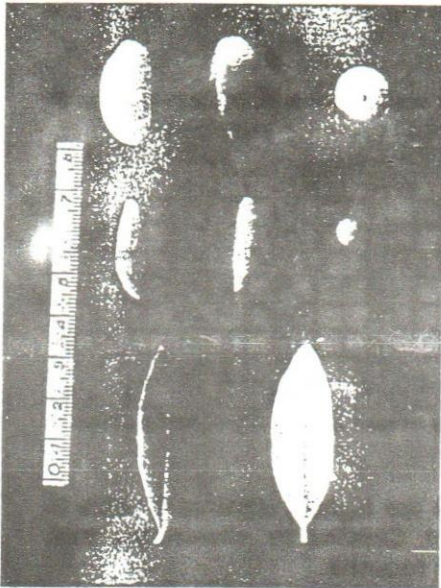
**Chemlali**



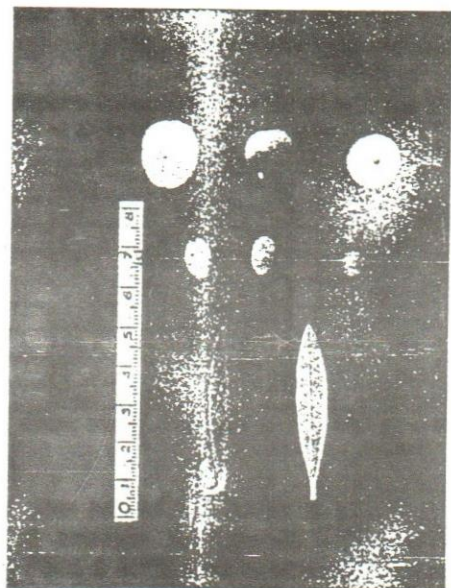
**Wardan**



**Picual**



**Doice**



**Arbiquine**

Table (6): Fruit length, fruit diameter, seed length and diameter of some olive cultivars in 2004 &amp; 2005 growing seasons.

Cultivars	Fruit length (cm)		Fruit diameter (cm)		Seed length (cm)		Seed diameter (cm)	
	2004	2005	2004	2005	2004	2005	2004	2005
Manzanillo	2.66CD	2.79B	2.21A	2.21B	1.7BC	1.76C	1.1A	1.15A
Coratina	2.58D	2.59C	1.66B	1.66D	1.97AB	1.96B	0.93B	0.93B
Koroneiki	1.92E	1.98D	1.30D	1.33F	1.47C	1.5E	0.64D	0.63E
Chemlali	1.77E	1.64E	1.15D	1.03G	1.45C	1.36F	0.62D	0.58F
Wardan	2.88AB	2.52C	2.22A	1.79C	1.75BC	1.62D	0.90B	0.74 CD
Picual	2.79BC	2.82B	2.13A	2.29A	1.90AB	1.83C	1.08A	1.12A
Dolce	3.04A	3.23A	1.48C	1.76C	2.26A	2.40A	0.80C	0.77C
Arbiquine	1.90E	1.66E	1.62BC	1.38E	1.40C	1.22G	0.78C	0.71D

According to the seed characters, Dolce cv. was the superior cultivar in seed length compared to other cultivars in both growing seasons. The reverse was true for Arbiquine cv. in this character. Meantime, Manzanillo cv. had the highest seed diameter among the olive cultivars under study during the two growing seasons. On the other hand, Chemlali cv. obtained the least seed diameter in both seasons.

Concerning fruit weight, seed weight, flesh weight and flesh/seed ratio, data in Table (7) revealed that, Chemlali cv. Showed the least fruit weight in both seasons, on the contrary Manzanillo cv. surpassed other olive cultivars in fruit weight in both growing season. Seed weight of Picual cv. exhibited the highest significant value followed by Manzanillo cv. in 2004 season only. The reverse was true in 2005 season. However, Chemlali and Koroneiki cvs. exhibited the least significant difference in seed weight in 2004 and 2005 growing seasons, respectively. Meantime, Wardan cv. surpassed other cultivars in flesh weight in the first season and Picual cv. in the second one, followed by Manzanillo cv. During both seasons in this respect. The reverse was true for Chemlali cv. which gave the least flesh weight during the two growing seasons of study.

Table (7): Fruit weight, seed weight, flesh weight and flesh/seed ratio of some olive cultivars in 2004 &amp; 2005 growing seasons.

Cultivars	Fruit weight (g.)		Seed weight (g)		Flesh weight (g.)		Flesh/seed ratio	
	2004	2005	2004	2005	2004	2005	2004	2005
Manzanillo	6.56A	6.52A	0.89B	0.92A	1.12B	1.06B	1.01BC	0.92E
Coratina	3.60D	3.65D	0.84BC	0.79C	0.72C	0.73D	0.78C	0.79F
Koroneiki	1.25F	1.20F	0.31F	0.25F	0.66CD	0.69DE	1.03B	1.10C
Chemlali	0.92G	0.92G	0.30F	0.26F	0.53D	0.45F	0.87BC	0.78F
Wardan	5.96B	3.92C	0.82C	0.48D	1.32A	1.04B	1.47A	1.41A
Picual	5.55C	5.12B	0.96A	0.85B	1.04B	1.17A	0.98BC	1.04CD
Dolce	3.42D	5.08B	0.75D	0.80C	0.69CD	0.99C	0.88BC	1.30B
Arbiquine	2.27E	1.68E	0.49E	0.37E	0.83CD	0.67E	1.06B	0.94DE

Means followed by the same letters within the same column are not significantly different  $p=0.05$ .

In addition, flesh/seed ratio showed the highest significant value in Wardan cv. during both seasons. In contrast, Coratina cv. showed the least flesh/seed ratio in both 2004 & 2005 growing seasons.

Fruit and endocarp of olive fruit characters were used by Hosseini *et*



*al.*, (2004) as a bases of morphological traits in the evaluation of olive germplasm in Iran. On other fruit species e.g guava Pandey *et al.*, (1997) reported that, number of fruits/plant, length, width and weight of fruit were positively associated with each other on germplasm evaluation.

**Fruit set, yield (Kg/tree) and fruit oil content (%):**

Arbiquine and Chemlali cvs. showed the highest fruit set percentage in 1<sup>st</sup> and in 2<sup>nd</sup> seasons, respectively. The reverse was true for Manzanillo cv. in both seasons ( Table, 8). As for fruit oil content (%) as fresh weight of the aforementioned eight olive cultivars under the region of South Tahrir, it is clear that, Arbquine and Picual cvs. showed the highest significant fruit oil content compared to other cultivars under study during the two growing seasons (2004 &2005). On the contrary, Chemlai cv. gave the least fruit oil content (%) in both seasons. However, there wasn't significant difference between the remainder of the olive cultivars in the content of fruit oil during the two growing seasons.

**Table (8): Fruit set, oil percentage and yield (Kg/tree) of some olive cultivars in 2004 & 2005 growing seasons.**

Cultivars	Fruit set (%)		Oil (%) as fresh weight		Yield (Kg/tree)	
	2004	2005	2004	2005	2004	2005
Manzanillo	5.40D	4.47D	15.97B	16.45A	22.33A	20.0B
Coratina	22.40B	14.67B	15.42B	15.53A	8.33B	11.33C
Koroneiki	25.83B	17.23AB	15.48B	15.54A	10.0B	6.67CD
Chemlali	28.47AB	19.70A	13.11C	12.98B	8.0B	7.0CD
Wardan	27.00B	12.83BC	15.31B	15.21A	13.33B	7.0CD
Picual	7.13CD	8.60CD	16.91A	16.99A	24.33A	28.33A
Dolce	14.00C	15.17AB	15.68B	15.65A	27.0A	28.0A
Arbiquine	35.93A	8.53CD	17.32A	16.99A	10.0B	3.0D

Means followed by the same letters within the same column are not significantly different P =0.05.

Concerning the yield (Kg/tree), it is obvious that Dolce and Picual cvs. surpassed significantly other cultivars in fruit yield during the two growing seasons (2004 &2005) followed by Manzanillo cv.. On the contrast, Chemlali and Coratina cv. gave the least values in the first growing season. Whereas, Arbquine and Koroneiki cvs. showed the least yield value in the second season only. The rest of cultivars exhibited the intermediate fruit production values in both seasons.

Rallo *et al.*, (1995) depend on oil yield and quality as a selection and breeding trait in obtaining new varieties. Al-Kadi, (1997) based the economic evaluation of olive production on olive fruit yield and oil content. Ouazzani *et al.*, (2001) reported that, numerous olive varieties based on 15 plant characteristics, and on oil content (%) on agronomic evaluation: contribution to the certification of olive plants.

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تقييم بعض أصناف الزيتون تحت ظروف منطقة جنوب التحرير  
كمال بشير عيسى، محمد عبد الشكور العراقي وسهير السيد شعراوي  
قسم بحوث الزيتون وفاكهة المناطق شبه الجافة - معهد بحوث البساتين - مركز البحوث الزراعية

تم إجراء هذا البحث في موسمي نمو (٢٠٠٤، ٢٠٠٥) على ثمانية أصناف زيتون (منزانيلا، كوراتينا، كروناكي، شمالي، وردان، بيكوال، دولسي، أربكوين)، عمر ٨ سنوات منزرعة في مزرعة على مبارك البحثية بمنطقة جنوب التحرير. والهدف من هذا البحث هو تقييم هذه الأصناف حيث تم إختيارها من بين ٤٦ صنف في مجمع وراثي. وهذه الأشجار منزرعة في أرض رملية وتم تسميدها ببرنامح التسميد الموصى به وكانت تروى بمياه النيل بنظام الري بالتنقيط. وكانت نتيجة التقييم كالآتي:  
بالنسبة للوصف الخضري للأشجار تفوق صنفى الشمالي والكروناكي فى إرتفاع الأشجار ومحيط الجذع، ومن ناحية أخرى كان صنفى الدولسى والوردان هما أقل فى إرتفاع ومحيط المجموع الخضري. وفى نفس الوقت فإن صنف الكوراتينا كان أعلى فى طول محيط المجموع الخضري وفى طول الفرع الثمري وقطره. والعكس كان صحيحا بالنسبة لصنفى الوردان والبيكوال.  
فى حين تفوق صنفى الكوراتينا والبيكوال فى مساحة المسطح التمثيلى للشجرة. أما بالنسبة لصنف الأربكوين فقد أعطى أعلى عدد من السلاميات والأوراق على الفرع، وأعطى أيضا صنف الوردان أعلى مساحة ورقية. ولكن صنف المنزانيلا أعطى أقل مساحة ورقية كما أعطى صنفى المنزانيلا والوردان أقل عدد من السلاميات على الفرع.

أما فيما يتعلق بميعاد التزهير فلقد كان صنف الشمالي أكثر تبكيرا فى ميعاد إكتمال التزهير. بينما كان صنف الكروناكي أكثر الأصناف تأخيرا.  
وقد أعطى صنفى الشمالي والكروناكي أعلى زيادة معنوية فى عدد النورات على الفرع والنسبة الجنسية. وبالنسبة لمواصفات الثمرة فقد أعطى صنف الدولسى أعلى طول لكل من الثمرة والبذرة كما أعطى صنفى الوردان والبيكوال أعلى معنوية لقطر الثمرة. كما تميز صنف المنزانيلا بأعلى طول للبذرة وأعلى وزن للثمرة وعلى العكس تماما كان صنفى الأربكوين والشمالي أقل قطر للبذرة. فى حين أعطى صنف الوردان أعلى نسبة لحم/البذرة والبيكوال كان أعلى فى وزن لحم الثمرة فى موسمي النمو (٢٠٠٤، ٢٠٠٥) على الترتيب. وكذا أعطى صنفى الأربكوين والشمالي أعلى نسبة عقد للثمار فى حين كان أقل نسبة عقد فى صنف المنزانيلا.

بينما تميز صنفى البيكوال والأربكوين فى نسبة الزيت، فى حين كان صنف الشمالي أقل فى نسبة الزيت. أما صنفى الدولسى والبيكوال فقد تفوقا على باقى الأصناف فى كمية المحصول. وعلى العكس كان أقل الأصناف فى كمية المحصول هو الشمالي والأربكوين. وأخيرا يمكن أن نوصى بزراعة صنفى الدولسى كصنف تحليل أسود وصنف البيكوال (وهو صنف ثنائى الغرض) وكذا الأربكوين وهو صنف زيتى فى منطقة جنوب التحرير. ويوصى بإستكمال الدراسة للأصناف الأخرى التى يقل الإنتاج بها فى هذه المنطقة.

