

EVALUATION OF SOME INTRODUCED OLIVE CULTIVARS UNDER NORTH SINAI
CONDITIONS-EGYPT
(b) CULTIVARS AT EL-SHEIKH ZUWAYID REGION

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ABSTRACT

Nineteen olive cultivars grown under North Sinai condition were evaluated at El-Sheikh Zuwayid region. Cultivars used were Manzanillo, Aswad Lybias, Nabasi Mohassan, Karidelya, Itrana, Jabaa, Coratina, Jolit, Conservollia, Bella di Spagna, Techernuola, Nabali Saadeh, Chiperssino, Tanch, Picholine, Sorany, Kaissy, Douaibly and Mawi Abo Shoka. Different cultivars are significantly varied with regard to tree growth, flowering and fruiting. In addition, they differed from year to another in their productivity. Generally, shoot length was significantly the tallest in Coratina, and Douaibly trees, while Itrana, Chiperssino, and Conservollia cvs. had higher trunk diameter. However, the highest tree height was recorded by Chiperssino, and Conservollia. Techernuola and Coratina gave the highest leaf area in both years. Overall, Aswad Lybia recorded the lowest values in this concern. As for the percentage of sex expression, Kaissy, Bella di Spagna and Tanch, were the highest in both seasons, while Picholine and Bella di Spagna, gave the highest No. of axis per inflorescence, but Coratina, Conservollia and Bella di Spagna had the longest inflorescence length. The highest yield came from Conservollia, Tanch and Coratina, cvs., while the reduction in the tendency towards alternation of bearing was recorded by Techernuola and Conservollia cultivars. Concerning fruit weight, flesh weight and pit weight, Itrana and Tanch were the highest in this respect, while oil content was significantly higher in Carotina, Karidalya and tanch cvs those other ones.

Generally, the important commercial characteristics such as yield, regular bearing, and some fruit properties were obtained from Tanch, Conservollia, Cheperssiono Itrana and Manzanillo cvs.

INTRODUCTION

Olive was originated in the ancient times in the eastern side of the Mediterranean Sea. Olive had spread to all the countries around the Mediterranean Sea basin, which is still the major region of olive production until today. The total olive acreage is estimated by 108322 about feddan according to the Ministry of Agricultural Statistics, (2001). while the total acreage in Sinai is estimated by 18622 feddan.

As the utilization of plant genetic resources has become of a high priority in the Agriculture policy of Egypt as an efficient tool to cultivate the new reclaimed areas, a collection of different olive cultivars has been introduced and cultivated by Desert Research Center in El-Sheikh Zuwayid in order to evaluate their adaptability and suitability under North Sinai condition in comparison with the commonly cultivated olive cultivar (Manzanillo)..

Different parameters were considered to evaluate the different studied cvs such as vegetative characteristics, flowering habitats and blooming, fruit physical and chemical characteristics and tree productivity. Since the time of floral bud emergence in olive is dependent on several factors including the

environmental conditions, weather data and chilling hours were recorded during the two seasons.

This study was conducted to evaluate some different olive cultivars under North Sinai conditions in order to make use of their genetic potentiality to develop olive industry in Sinai.

MATERIALS AND METHODS

This study was conducted on 19 olive cultivars grown in the gene bank field of Desert Research Center, El-Sheikh Zuwayid, North Sinai Governorate during the two growing seasons (1999 and 2000). These cultivars are Manzanillo, Aswad Lybia, Itrana, Coratina, Techernuola, Bella di Spagna, Tanch, Chiperssino, Karidalya, Nabali Saadeh, Jolit, Conservollia, Nabali Mohassan, Picholine, Jabaa, Douaibly, Mawi Abou Shoka, Sorany and Kaissy.

The trees were about seven years old grown in sandy soil at 6 X 6m apart under drip irrigation system from a well of about 1500 ppm salinity and subjected to the common horticultural

practices. Three trees as replicates for each evaluated cultivar were selected.

To study vegetative growth, trunk diameter and tree height were measured, twenty new spring shoots per tree were randomly selected, tagged and measured in mid September. Leaf area was determined as an average of 20 mature leaves (per tree) from the medium nodes of the spring cycle shoots.

Flowering

Flowering was studied to determine inflorescence emergence, the time of beginning, full, and the end of blooming. The number of axes per inflorescence was counted as the average of 20 shoots of one-year-old per tree. Samples of 30

inflorescences were taken from each tree for determining the number of flowers per inflorescence and estimating the percentage of perfect flowers as well as inflorescence length.

Blooming in relation to chilling hours

Maximum and minimum daily temperatures for El-Sheikh Zuwayid were analyzed by using data base computer system to determine the mean number of chilling hours (from October - May on which the minimum temperature (= 7.2 C°), which were previously suggested by Denney and Mc Eachern, 1983 as an indicative parameter to floral initiation in olive.

The environmental data of El-Sheikh Zuwayid City, North Sinai Governorate is given in table (1).

Table (1): The environmental data of El-Sheikh Zuwayid City, North Sinai Governorate, Egypt during 1999 and 2000 seasons (monthly average).

Month 2000	Ws Km/h	Air temp C°	Rh %	Total Rain mm	Total SLR W/m ²	ET mm	Total temp. <7.2 C°
Season 1999							
January	8.95	13.73	70.85	85.85	3.94	1.64	58
February	8.00	14.15	72.61	2.29	5.52	2.23	25
March	8.50	16.58	73.57	19.65	7.26	2.74	2
April	7.70	18.06	71.06	0.25	7.95	3.79	0
May	7.29	21.28	75.14	0.51	9.34	4.18	0
Jun	6.68	24.27	78.84	0.00	9.41	4.53	0
July	6.21	26.18	79.00	0.25	8.98	4.46	0
August	5.87	27.03	75.14	0.00	8.54	4.38	0
September	5.63	25.92	74.84	0.25	7.58	3.90	0
October	6.65	23.32	75.49	25.40	5.91	2.80	0
November	4.87	19.53	68.98	2.03	4.47	2.17	0
December	4.82	14.99	81.25	79.71	3.32	1.25	5
Season 2000							
January	8.62	19.15	84.39	11.69	0.15	1.61	17
February	8.72	19.57	82.99	9.37	0.16	1.92	13
March	9.87	21.76	77.75	4.31	0.24	3.05	0
April	9.35	23.15	82.67	18.54	0.29	3.44	0
May	8.15	26.13	86.20	0.00	0.32	4.00	0
Jun	8.91	28.55	85.81	3.56	0.34	4.51	0
July	8.23	30.31	87.47	0.00	0.32	4.48	0
August	7.48	31.52	85.00	0.00	0.29	4.31	0
September	7.79	30.51	81.72	0.00	0.27	4.02	0
October	6.96	27.85	83.70	21.60	0.21	2.92	0
November	6.76	25.62	69.92	2.28	0.16	2.52	1
December	5.76	21.50	67.69	2.78	0.14	1.89	8
Ws Km/h	Wind speed		AIR TEMP C°		Air temperature		
Rh %	Relative Humidity		SLR W / m ²		Solar radiation		
Total temp<7.2 C°	Chilling hours per month (Total Temp<7.2 C°)						
ET mm	Evapotranspiration in millimeter.						

Yield per tree and alternate bearing index

Olives were harvested for each cultivar at the normal time and ripening stage for the area when about 75% of the olives reached violet colour, the weight of total yield for each individual tree was determined in the two seasons as kilogram.

Alternate bearing index = $100 \times \frac{\text{difference between two successive yields}}{\text{sum of two successive yields}}$.

If the result indicated more than 25% this means that the tree has an alternate bearing habit according to the previous equation suggested by Wilcox (1944).

Fruit quality

At harvest, 50 fruits per tree were taken at random to determine: fruit weight, pit weight, flesh weight, flesh /fruit and oil content was determined as D. wt. basis by extraction the oil from the fruit flesh (50 g) by means of Soxhlet for extraction apparatus using petroleum ether of 60 - 80°C boiling point as restored (A.O.A.C., 1980).

Final evaluation

An arbitrary scoring based on average data of the two years was made for all cultivars in this study. The important commercial characteristics such as average tree yield, regular bearing and fruit characteristics were evaluated as followed:

A score of 20 points was assigned to yield of the tree, fruit weight and oil content. A score of 30 points was assigned to flesh/fruit weight. For regular, a score of 10 points was assigned whereas a score of 20 points was used for oil content.

The best grade of each property had the maximum points, while the poorest one equal to zero. The other grades had values depending upon the range between the two extremes.

The total points were calculated by summing the various points of the different properties for each cultivar.

Different cultivars were arranged descendingly according to the total points.

The obtained data were subjected to the analysis of variance. The data were tabulated and statistically analyzed according to the complete randomized block design method. The means were compared using Duncan's multiple range test at 5% (Waller and Duncan 1980).

RESULTS AND DISCUSSION

1- Vegetative growth

As for trunk diameter table (2), shows that Itrana followed by Mawi Abou Shoka and Chiperossino cvs. had the highest value of trunk

diameter in the first season. While in the second one, Conservollia followed by Mawi Abou Shoka, Itrana and Chiperossino had the highest value of trunk diameter. On the other hand, Nabali Mohassan followed by Karidalya, Sorany and Aswad Lybia recorded the lowest trunk diameter value in the first season. While in the second one, Aswad Lybia followed by Nabali Mohassan, Karidalya and Sorany cvs. recorded the lowest value of trunk diameter in comparison with all other studied cultivars.

These results are in agreement with the findings of Shahein *et al.*, (1982) who reported that trunk diameter showed some differences due to cultivars and seasons.

Concerning tree height, data in table (2) indicated that Chiperossino followed by Conservollia and Manzanillo cvs. had the highest value of tree height in comparison with all other studied cultivars in the two seasons. On the other hand, Aswad Lybia and Sorany cvs. recorded the lowest values of tree height in comparison with all other studied cultivars in the two seasons.

These results agreed with the findings of El-Desouki (1993) who found that tree height showed slight variation among cultivars.

Data in table (2) indicate that the ultimate shoot length of the studied cultivars was significantly different in the two seasons. However, in the first season, Coratina cv. recorded the highest shoot length while Nabali Saadeh cv. recorded the lowest one. On the other hand, in the second season Douaibly cv. recorded the highest value of shoot length, while Techernuola cv. recorded the lowest shoot length value. Other cultivars had intermediate values.

These results are in agreement with the findings of Shahein *et al.*, (1982) and El-Desouki *et al.*, (1992) who found that growth of all olive cultivars followed the same pattern of seasonal growth which started at the sunset beginning of spring and ended nearly in October with a regular increase in all growth parameters.

As for leaf area (Fig. 1) indicates that Techernuola, Coratina and Bella di Spagna cvs. had the largest leaf area than all other studied cultivars. Aswad Lybia, Sorany and Jabaa cvs. gave the smallest blade area. This was true in the two seasons.

These results are in agreement with results of Hussein, (1999 b) who found that Techernuola and Coratina cvs. had the largest leaf area than all other studied cultivars. While, Aswad Lybia,

Chiperssino and Picholine cvs. gave the smallest blade area.

In this regard, Shahein *et al.*, (1982) reported that the leaf area of Picholine and Itrana was significantly larger than that of Chiperssino and Coratina, which recorded the smallest leaf area in the two seasons.

Flowering

Regarding inflorescence emergence and blooming date, table (3) indicates that the time of inflorescence emergence varied due to cultivar and season. It occurred during the period from 10 to 24 March in 1999 and from 28 February to 15 March in 2000. In this respect, the earliest cultivars were Aswad Lybia followed by Coratina, Techernuola and Nabali Saadeh. While, the delayest cultivars were Itrana followed by Karidalya, Jabaa, Nabali Mohassan, Tanch, Manzanillo, Picholine, Jolit and Chiperssino. This was true in the two seasons. Dates

of beginning, full and end of blooming indicated that blooming duration started from 10 April to 5 May in 1999 and from 30 March to 27 April in 2000. Aswad Lybia cultivar followed by Coratina, Techernuola and Nabali Saadeh were the earliest cultivars while, Itrana followed by Karidalya, Jabaa, Nabali Mohassan, Tanch, Manzanillo, Picholine, Jolit and Chiperssino were the latest in this respect. In general, blooming dates occurred about 9-13 days earlier in the second season than in the first season.

These results are in agreement with those of Hassan (1996) and Hussein (1999 a) who found that inflorescence emergence occurred during the period from 10-15 March in 1997 and from 23-31 March 1998. Full bloom occurred from 5-18 April in 1997 season while it occurred from 18-27 April in 1998 one.

Table (2): Trunk diameter, tree height and shoot length of the studied olive cultivars under North Sinai conditions, Egypt (1999 and 2000 seasons)

Cultivar	Trunk diameter (cm)		Tree height (cm)		Shoot length (cm)	
	1999	2000	1999	2000	1999	2000
Manzanillo	5.20 e-g	7.80 g	234.3 c	271.7 c	8.4 hi	8.4 i
Aswad Lybia	4.4 h-j	6.4 l	153.32 j	198.3 j	9.8 d	7.4 k
Nabali Mohassan	3.90 j	6.07 l	162.3 i	199.3 hi	8.5 h	9.8 cd
Karidalya	4.30 ij	6.20 l	173.3 h	206.7 gh	9.1 fg	9.3 e
Itrana	9.30 a	11.1 a	230.0 cd	270.0 c	10.1 cd	8.2 j
Jabaa	4.75 hi	9.07 de	213.3 ef	270.0 c	8.9 g	8.5 hi
Coratina	7.39 b	9.30 d	193.3 g	230.0 ef	11.2 a	9.7 d
Jolit	4.90 gh	7.50 g	201.0 fg	233.3 ef	9.2 f	9.0 f
Conservollia	7.32 b	11.3 a	291.0 b	323.3 b	10.6 b	8.1 j
Bella di Spagna	5.45 ef	8.80 ef	160.7 hi	190.0 h-j	8.1 k	7.4 k
Techernuola	4.50 hi	8.50 f	218.3 de	260.0 cd	6.5 l	5.8 m
Nabali Saadeh	6.23 d	7.80 g	200.0 fg	235.3 ef	5.9 m	8.6 h
Chiperssino	7.50 b	10.4 b	315.0 a	365.3 a	8.9 g	9.9 c
Tanch	5.50 ef	8.80 ef	295.0 g	226.7 fg	10.6 b	8.8 g
Picholine	5.70 e	8.60 f	204.0 e-g	241.7 d-f	9.5 e	10.3 b
Sorany	4.30 ij	6.90 h	157.0 i	181.7 ij	6.4 lm	6.4 l
Kaissy	6.80 c	9.80 c	205.0 e-g	253.3 hi	8.3 g	8.5 hi
Douaibly	5.03 fg	8.40 f	171.7 hi	203.3 hi	10.2 e	11.0 a
Mawi Abou Shoka	7.60 b	11.3 a	198.3 fg	241.3 d-f	8.5 h	9.4 e

Means followed by the same letter(s) within each column are not significantly different at 5% level

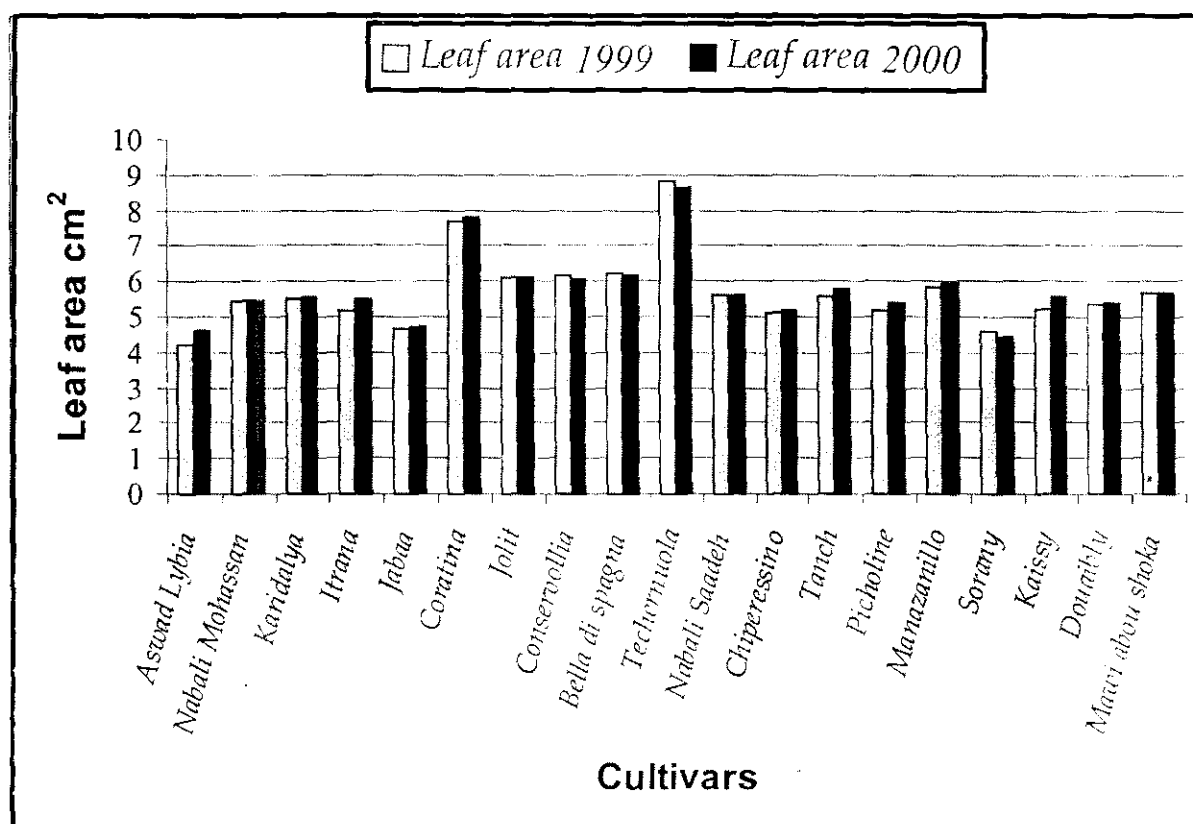


Fig. (1): Leaf area (cm²) of some olive cultivars under North Sinai conditions in 1999 and 2000 seasons.

Table (3): Inflorescence emergence and blooming dates for some olive cultivars under North Sinai conditions (1999 and 2000 season)

Cultivar	Inflorescence emergence date		Blooming dates					
			Beginning of bloom		Full bloom		End of bloom	
	1999	2000	1999	2000	1999	2000	1999	2000
Manzanillo	23/3	13/3	23/4	12/4	29/4	18/4	4/5	22/4
Aswad Lybia	10/3	28/2	10/4	30/3	15/4	4/4	19/4	10/4
Nabali Mohassan	23/3	13/3	24/4	14/4	30/4	19/4	3/5	23/4
Karidalya	23/3	15/3	24/4	13/4	30/4	19/4	5/5	24/4
Itrana	24/3	15/3	24/4	14/4	29/4	19/4	5/5	25/4
Jabaa	23/3	13/3	23/4	12/4	28/4	17/4	4/5	22/4
Coratina	10/3	1/3	11/4	4/4	16/4	10/4	19/4	15/4
Jolit	23/3	13/3	23/4	14/4	28/4	19/4	3/5	23/4
Conservollia	21/3	12/3	22/4	12/4	27/4	17/4	2/5	21/4
Bella di Spagna	23/3	13/3	22/4	12/4	27/4	17/4	3/5	22/4
Techernuola	18/3	5/3	19/4	6/4	22/4	10/4	27/4	15/4
Nabali Saadeh	18/3	6/3	18/4	7/4	22/4	12/4	27/4	16/4
Chiperssino	23/3	13/3	23/4	13/4	28/4	18/4	3/5	22/4
Tanch	24/3	14/3	22/4	13/4	28/4	18/4	4/5	23/4
Picholine	24/3	12/3	23/4	13/4	28/4	19/4	3/5	23/4
Sorany	22/3	12/3	21/4	11/4	27/4	17/4	2/5	21/4
Kaissy	21/3	11/3	22/4	10/4	27/4	16/4	2/5	21/4
Douaibly	-	14/3	-	14/4	-	20/4	-	26/4
Mawi Abou Shoka	-	15/3	-	14/4	-	21/4	-	27/4

Concerning blooming in relation to chilling hours data in table (4) indicated that the accumulated chilling hours from October–March was greatly higher in 1999-2000 season (94 hours) in comparison with the same period in 1998-1999 season (34 hours). These data clearly indicated that olive chilling requirements showed more favourable condition in 2000 season for floral initiation and formation than in 1999. The chilling requirement of olive is due to bud dormancy (Rallo and Martin, 1991).

Moreover, the cultivar differences in blooming dates may be attributed to difference in sufficiency of winter chilling requirements. In both seasons, blooming were occurred in all the studied cultivars except Mawi Abou Shoka and Douaibly in the first season. Winter chilling hours might be insufficient to release floral initiation in this season. These data also indicate that cultivars have different chilling sufficiency. In this respect, it seemed that Aswad Lybia, Coratina, Nabali Saadeh and Techemuola cultivars needed less chilling hours to release floral initiation than other studied cultivars.

These results are in agreement with those of Hartmann (1952); Hartmann and Whisler (1975) and Hussein (1999 a) who reported that the total chilling hours of North Sinai might be unfavorable for Mawi Abou Shoka and Douaibly cultivars.

Table (4) Chilling hours per month (< 7.2°C) under El-Sheikh Zuwayid conditions in 1999 and 2000 seasons.

Date	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
1998/1999	0	0	4	17	13	0	0	34
1999/2000	0	1	8	58	25	2	0	94

As for sex expression, table (5) indicates that higher percentage of sex expression ranging between 95.57 and 86% was recorded for six of the studied cultivars namely, Kaissy, Bella di spagna, Tanch, Picholine, Itrana and Nabali Saadeh. This was true in the two seasons. In the second season another two cultivars namely Douaibly and Mawi Abou Shoka recorded the same percentage of sex expression.

However, the lowest percentage of sex expression was recorded by Karidalya followed by Conservollia and Manzanillo. The variation in sex expression percentage of the different olive cultivars could be attributed to differences in the genetic factors (Uriu, 1959) cultivars and weather conditions (Brooks 1948; Fouad *et al.*, 1992 a), alternate bearing Spiegel - Roy (1965).

These results are in agreement with the findings of Hussein (1999a) who reported that percentage of sex expression ranging between 96% and 86% was recorded for nine of the studied cultivars namely Itrana, Aswad Lybia, Tanch, Chiperssino, Coratina, Bella di spagna, Nabali Saadeh, Nabali. Mohassan and Picholine. This was true in the two studied seasons. the lowest percentage of sex expression was recorded by Karidalya followed by Conservollia.

Data in table (5) show that the number of axes per inflorescence ranged between 4.53 and 11.37 for all studied cultivars. It is clear that Picholine cv. followed by Bella di Spagna and Jolit had the highest number of axes per inflorescence in the two seasons. While, Sorany cv. had the lowest number of axes in the two studied seasons.

Under North Sinai conditions, similar results were obtained by Hussein (1999 b) who reported that the number of axes per inflorescence ranged between 7 and 11 for all studied cultivars except Itrana which had the lowest number of axes (5) in the two seasons.

Regarding inflorescence length, table (5) shows that differences were slight among all the studied cultivars in inflorescence length. It is clear that Coratina and Conservollia followed by Bella di spagna, Tanch, Nabali Saadeh and Aswad Lybia had the longest inflorescences in comparison with all other studied cultivars while Itrana followed by Douaibly, Nabali Mohassan, Jabaa and Kaissy had the shortest inflorescence in the two seasons of investigation.

The present findings are in agreement with those of Sholokova and Domanskya (1971) who demonstrated a range of cultivars variation in panicle length of olive. In this regard, Fouad *et al.*, (1992 a) reported that the inflorescence length of

Coratina, Manzanillo, Bella di spagna and Conservollia under Giza conditions was 2.8, 2.9 and 2.8 cm in 1988 season and 2.8, 2.7, 2.2 and 2.6 cm in 1989 season respectively. Similar results were

obtained by Hussein (1999 a) under North Sinai conditions, who mentioned that Coratina, Conservollia, Tanch, Nabali Mohassan,

Table (5): Sex expression, number of axes per inflorescence and inflorescence length of some olive cultivars under North Sinai conditions (1999 and 2000 seasons)

Cultivars	1999					2000						
	Sex expression (%)		No. of axes per inflorescence	Inflorescence length (cm)		Sex expression (%)		No. of axes per inflorescence	Inflorescence length (cm)			
Manzanillo	64.30	f	6.63	f	3.33	d-f	64.23	e	6.47	Fg	3.30	d-f
Aswad Lybia	70.53	e	5.68	g	3.62	d	71.0	d	5.83	Gh	4.06	Bc
Nabali Mohassan	80.83	d	9.00	bc	3.63	d	78.73	c	9.1	Cd	2.80	gh
Karidalya	51.73	g	7.10	ef	3.47	d-f	52.47	g	6.97	Ef	3.27	d-f
Itrana	86.03	c	5.00	gh	2.70	g	88.10	b	5.13	Hi	2.99	f-h
Jabaa	71.17	e	9.27	b	3.12	f	70.60	d	9.00	Cd	3.10	e-g
Coratina	84.78	cd	9.43	b	4.53	a	80.83	c	6.47	Cd	4.63	a
Jolit	73.40	e	10.40	a	3.37	d-f	72.17	d	10.03	Bc	3.23	d-g
Conservollia	56.13	g	9.10	b	4.43	ab	58.70	f	9.33	Cd	4.70	a
Bella di Spagna	92.07	a	10.60	a	4.10	bc	95.57	a	10.9	Ab	4.17	b
Techernuola	72.40	c	9.470	b	3.40	d-f	70.37	d	9.37	Cd	3.40	d-f
Nabali Saadeh	86.20	bc	9.07	b	3.73	cd	86.17	b	9.40	Cd	3.40	d-f
Chiperssino	72.60	e	8.20	cd	3.33	d-f	70.90	d	8.70	D	3.67	cd
Tanch	91.13	ab	8.07	d	3.77	cd	90.13	b	7.60	E	3.50	de
Picholine	86.57	bc	10.53	a	3.57	de	88.73	b	11.37	A	3.63	cd
Sorany	69.03	e	4.53	h	3.57	de	68.17	d	4.57	I	3.60	d
Kaissy	93.90	a	7.83	de	3.17	ef	95.43	a	7.60	E	3.29	d-f
Douaibly	-	-	-	-	-	-	88.90	b	6.00	f-h	2.63	h
Mawi Abou Shoka	-	-	-	-	-	-	88.67	b	8.77	D	3.43	d-f

Means followed by the same letter(s) within each column are not significantly different at 5% level

Nabali Saadeh, Bella di spagna and Picholine cvs. produced longer inflorescences than the other studied cultivars. However, Itrana, Techernuola, Chiperssino and Manzanillo cvs. had the smallest panicle length in the two seasons.

Yield per tree and alternate bearing index

As for the yield/tree, table (6) indicates that Conservollia cultivar followed by Tanch and Coratina cultivars recorded the highest yield per tree in the two studied seasons. On the other hand, Sorany cultivar followed by Aswad Lybia and Jolit produced the lowest yield per tree, respectively in comparison with all other studied cultivars in the two studied seasons.

These results are in agreement with the findings of Shahein *et al.*, (1982) who found that the average olive crop increased from season to the next for most cultivars. Rosciolo and Coratina

cultivars recorded the highest yield per tree in the two studied seasons. On the other hand, Salonenque cultivars followed by Itrana gave the lowest yield per tree in comparison with all other studied cultivars in the two studied seasons.

Similar results were obtained by Abdel Aziz *et al.*, (1982) under Giza condition who found that Sorany cultivars recorded the lowest value of yield per tree in comparison with all other studied cultivars in the two studied seasons.

Concerning alternate bearing index, data in table (6) indicate that Techernuola, Conservollia and Nabali Mohassan cvs recorded the lowest values of alternate bearing index. While, Mawi Abou Shoka, Douaibly, Aswad Lybia and Sorany cvs. recorded the highest values in the two seasons. The other cultivars had intermediate values

Fruit quality

Concerning fruit weight, data in table (7) indicated that Itrana followed by Tanch and Jolit

cvs. significantly had the heaviest fruit in comparison with all other cultivars in both seasons. Bella di Spagna,

Table (6): Yield per tree of some olive cultivars under North Sinai conditions in 1999 and 2000 seasons.

Cultivars	Yield (Kg)		Alternate bearing index
	1999	2000	
Manzanillo	3.68 hi	8.79 h	40.95
Aswad Lybia	1.11 m	3.74 l	54.12
Nabali Mohassan	3.45 ij	7.54 i	37.18
Karidalya	2.83 k	6.70 j	40.57
Itrana	4.70 g	12.38 e	44.96
Jabaa	5.87 d	13.80 c	40.29
Coratina	8.87 c	20.57 b	39.74
Jolit	1.96 l	5.30 k	46.01
Conservollia	11.55 a	24.17 a	35.33
Bella di spagna	4.87 fg	12.10 e	42.58
Techernuola	3.81 h	7.74 j	34.00
Nabali Saadeh	5.13 ef	11.80 ef	39.37
Chiperssino	5.38 e	13.03 d	41.53
Tanch	10.12 b	23.67 a	40.09
Picholine	4.81 g	11.30 f	40.26
Sorany	0.63 n	1.83 m	48.78
Kaissy	3.27 j	7.33 i	38.30
Douaibly	-	5.63 k	100.00
Mawi abou shoka	-	9.75 g	100.00

Means followed by the same letter(s) within each column are not significantly different at 5% level

Coratina, Nabali Saadeh and Sorany gave the lightest fruit weight in the first season. This was in general true in the second season. The other studied cultivars were intermediate in this respect.

These observations are in accordance with those obtained by Hassan (1980) and Fouad *et al.*, (1992 b). In this regard, Hussein (1999 b) found that Itrana followed by Jolit and Tanch cvs. produced the heaviest fruit in comparison with the other studied cultivars. While, Nabali Saadeh and Nabali Mohassan followed by Techernuola gave the lightest fruits.

As for pit weight, data in table (7) indicate that fruit of Itrana followed by Tanch and Karidalya cvs. had significantly the heaviest pit weight in comparison with the other studied cultivars in the first season. While, these of Itrana followed by Douaibly and Tanch cvs. gave the heaviest pit weight in the second season. On the other hand, Nabali Saadeh, Manzanillo and Chiperssino cvs. recorded the lightest pit weight in comparison with the other studied cultivars in the first season. Similar results were obtained in the second season. Chiperssino followed by Manzanillo and Nabali

Saadeh cvs. Which recorded the lightest values of pit weight. The other cultivars had intermediate values.

The present data agreed with those found by Fouad *et al.*, (1992 b) and Hussein (1999 b) who reported that Itrana followed by Tanch cvs. had the heaviest pit weight in the two seasons. On the other hand, Nabali Mohassan and Nabali Saadeh followed by Manzanillo had the lightest pit weight in the two seasons.

Regarding flesh weight, data in table (7) indicate that Itrana followed by Tanch and Jolit cvs. had significantly the heaviest flesh weight as compared with the other studied cvs. in the first season. Results of the second season were almost similar to those obtained in the first season as Itrana followed by Jolit and Tanch cvs. had significantly the heaviest flesh weight in comparison with all other studied cultivars. On the other hand, Bella di spagna followed by Coratina and Techernuola cvs. had significantly the lightest flesh weight in comparison with all other studied cultivars in both seasons.

Table (7): Fruit weight, pit weight, flesh weight, flesh/pit ratio and flesh/fruit ratio of the olive cultivars under North Sinai conditions in 1999 and 2000 seasons.

Cultivar	1999					2000				
	Fruit weigh (g)	Pit weight (g)	Flesh weight (g)	Flesh/ fruit ratio	Oil content (%)	Fruit weigh (g)	Pit weight (g)	Flesh weight (g)	Flesh/ fruit ratio	Oil content (%)
Manzanillo	4.73 g	0.64 f	4.09 f	0.86	57.5 c	4.17 i	0.57 h-i	3.60 ef	0.86	59.8 a
Aswad Lybia	5.39 g	0.94 c	4.45 g	0.79	52.2 e	5.83 f	0.90 ef	4.93 d	0.85	51.9 c
Nabali Mohassan	7.20 e	1.30 cd	5.90 d	0.82	45.3 gh	7.32 d	1.21 d	6.11 c	0.83	44.4 ef
Karidalya	4.84 g	1.40 c	3.44 g	0.71	62.2 ab	4.66 h	1.51 c	3.15 fg	0.68	62.3 a
Itrana	11.64a	2.27 a	9.37 a	0.80	56.3 cd	11.54 a	2.20 a	9.34 a	0.81	56.4 b
Jabaa	6.45 f	1.62 b	4.83 e	0.71	48.0 f	6.62 e	1.65 bc	4.97 d	0.75	48.9 cd
Coratina	2.80 ij	0.93 e	1.87 i	0.67	62.3 a	2.96 k	0.97 e	1.99 ij	0.67	62.9 a
Jolit	9.51 c	1.15 d	8.36 b	0.88	41.5 i	10.21 b	1.22 b	8.99 a	0.88	43.1 fg
Conservollia	8.65 d	1.15 d	7.50 c	0.87	51.3 e	8.43 c	1.17 d	7.26 b	0.86	50.2 c
Bella di spagna	2.44 j	0.87 e	1.57 i	0.64	60.0 b	2.52 k	0.86 f	1.66 j	0.66	60.3 a
Techernuola	3.58 h	1.15 d	2.43 h	0.68	40.9 ij	3.67 j	1.26 d	2.41 hi	0.64	40.7 gh
Nabali Saadeh	3.25 hi	0.60 f	2.65 h	0.82	39.1 j	3.84 ij	0.68 g-i	3.16 fg	0.82	39.2 h
Chiperssino	6.67 f	0.68 f	5.99 d	0.90	60.3 ab	6.68 e	0.54 i	6.14 c	0.92	60.6 a
Tanch	10.73 b	1.70 b	9.03 a	0.84	61.0 ab	10.65 b	1.72 b	8.93 a	0.84	61.9 a
Picholine	3.50 h	0.68 f	2.82 h	0.81	55.0 d	3.82 ij	0.73 f-h	3.09 fg	0.81	55.0 b
Sorany	3.55 h	0.90 e	2.65 h	0.69	42.4 i	3.59 j	0.84 e-g	2.75 gh	0.77	42.9 fg
Kaissy	6.53 f	1.71 b	4.82 e	0.74	46.9 fg	6.54 e	1.67 b	4.87 d	0.74	46.9 de
Douaibly	-	-	-	-	-	5.30 g	1.82 b	3.48 ef	0.66	49.7 cd
Mawi abou shoka	-	-	-	-	-	5.12 g	1.30 d	3.82 e	0.75	45.6 de

Means followed by the same letter(s) within each column are not significantly different at 5% level

The present results are in agreement with the findings of Hussein (1999b) who found that Itrana, Jolit and Tanch cvs. had the highest flesh weight while, Karidalya, Techernuola and Nabali Mohassan recorded the lowest flesh weight.

Referring to flesh / Fruit ratio, data in table (7) indicated that Chiperssino followed by Jolit, Manzanillo and Conservollia cvs. recorded the highest value of flesh / fruit weight ratio in the two seasons. While Bella di spagna, Coratina and Techernuola cvs. had the lowest ratio in comparison with all other studied cultivars in the first season. Similar results were obtained in the second season. Techernuola followed by Bella di spagna and Coratina cvs. recorded the lowest ratio in comparison with all other studied cultivars.

The present results agreed with the findings of Fouad *et al.*, (1992 b) and Hussein (1999 b) who reported that Jolit, Manzanillo, Chiperssino and Conservollia cvs. recorded the highest value of flesh / fruit ratio. While Coratina and Nabali Mohassan cvs. recorded the lowest ratio.

As for fruit oil content results in table (7) indicated that Coratina followed by Karidalya and Tanch cvs. had significantly the highest oil content

(on dry weight basis) in comparison with all other studied cultivars in the two seasons. While, Nabali Saadeh followed by Techernuola and Sorany significantly had the lowest oil content in the two seasons. The other cultivars had intermediate values.

These findings are in accordance with those of Nour *et al.*, (1976) under Mariut conditions who found that Tanch followed by Bella di spagna, Coratina and Itrana cvs. gave the highest oil content values. While, Picholine cv. gave the lowest oil content values (46.34%) (on dry weigh basis). Shahein *et al.*, (1982) reported that oil content on dry weight basis varied due to cultivar and season.

6- Final evaluation.

Data in table (8) indicate that Tanch, Conservollia, and Chiperssino cvs. had the highest total points followed by Itrana, Manzanillo, Joilt, Picholine and Nobli Mohassan cultivars.

From the previous observations and from the tables of final evaluation it can be concluded that Tanch cv. followed by Conservollia, Chiperssino, Itrana, and Manzanillo are the most promising olive cultivars under North Sinai conditions.

Table (8): Final evaluation of some olive cultivars under North Sinai conditions in the two studied seasons.

Cultivar	Yield	Regular	Fruit	Flesh /	Oil	Total	Rank
	kg	bearing	weight	fruit	content	points	
Point	20	10	(g)	%	%	100	
Manzanillo	6.03	8.95	4.30	24.22	16.42	59.92	5
Aswad Lybia	1.45	6.95	6.85	19.62	10.86	45.73	10
Nabali Mohassan	5.14	9.52	10.47	20.20	4.80	50.13	8
Karidalya	4.26	9.00	4.99	5.20	19.46	42.91	12
Itrana	8.79	8.34	19.95	17.30	14.48	68.86	4
Jabaa	10.36	9.05	8.88	9.24	7.84	45.37	11
Coratina	16.23	9.13	0.88	2.30	20.00	48.54	9
Jolit	2.89	8.18	16.16	26.54	2.22	56.43	6
Conservollia	20.00	9.80	13.27	24.80	9.76	77.63	2
Bella di spagna	8.73	8.70	0.00	0.00	17.68	35.11	15
Techernuola	5.47	10.00	2.51	1.16	1.38	2.52	18
Nabali Saadeh	8.71	9.19	2.34	19.60	0.00	39.84	14
Chiperssino	9.60	8.86	0.20	30.00	17.94	75.60	3
Tanch	18.85	9.08	17.98	21.92	18.78	86.61	1
Picholine	8.22	9.05	2.58	18.46	13.34	51.65	7
Sorany	0.00	7.76	2.38	9.24	2.94	22.32	17
Kaissy	4.90	9.35	8.88	10.38	6.52	40.03	13
Douaibly	1.91	0.00	6.17	1.14	8.88	18.10	19
Mawi abou shoka	4.39	0.00	5.79	11.54	6.28	28.00	16

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تقييم بعض أصناف الزيتون المستوردة النامية بشمال سيناء (ب) اصناف بمنطقة الشيخ زويد

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أجريت هذه الدراسة خلال موسمي ١٩٩٩، ٢٠٠٠ في مزرعة المجمع الوراثي الحقلى بمركز بحوث الصحراء بمنطقة الشيخ زويد بشمال سيناء وعلى تسعة عشر من أصناف الزيتون المستوردة هي مانزانيللو أسود ليبيا، بينالى محسن، كاريداليا، اترانا، جبع، كوراتينا، جلط، كونسرفوليا، بلادى اسبانيا، نشرنويلا، نبالى سعادة، تشبيرسينو، تانش، بيشولين، صورانى، قيس، دعبيلى، ماوى أبو شوكة، يبلغ عمرها ٧ سنوات ومنزوعة بأرض رملية على مسافات ٦ × ٦ م وتروى بالتنقيط بمياه الأبار ملوحتها ١٥٠٠ جزء في المليون.

تم دراسة الصفات المورفولوجية للأشجار والتزهير والعقد وصفات جودة الثمار وقيمت هذه الأصناف على أساس المحصول وتبادل الحمل وبعض الصفات الثمرية.

أظهرت النتائج أن الأصناف محل الدراسة اختلفت معنويا بالنسبة للنمو الخضرى والازهار والاثمار وأيضا اختلفت معنويا من سنة الى أخرى حيث تميزت بعض الأصناف بطول الفرخ كما فى الصنف كوراتينا ودعبيلى وأخرى بزيادة قطر الجذع كما فى صنف اترانا وتشبيرسينو وكونسرفوليا فحين تميز الصنف كونسرفوليا وتشبيرسينو بارتفاع الشجرة. بالنسبة لمساحة الورقة فقد تفوق الصنف تشبيرنيولا وكوراتينا على بعض الأصناف وعموما سجل الصنف أسود ليبيا أقل قيما فى تلك العلاقات، أما من حيث النسبة الجنسية فقد أظهرت الأصناف قيس وبلادى اسبانيا وتانش أعلى نسبة جنسية للزهار الكاملة بالنسبة للزهار الكلية، بينما كانت الأصناف بيشولين، بلادى إسبانيا، أعلى عددا للمحاور على النورة بينما لصفة طول النورة فكانت الأصناف كوراتينا وكونسرفوليا وبلادى إسبانيا هي الأكثر طولاً.

من حيث الصفات الطبيعية للثمار من وزن الثمرة ووزن اللحم ووزن النواة فأظهرت الأصناف اترانا وتانش تفوقا فى هذا الصدد. أما من جهة المحصول فقد تفوقت فى ذلك أصناف كونسرفوليا وتانش وكوراتينا بها ومن حيث نسبة الزيت فأظهرت الأصناف كوراتينا وكاريداليا وتانش تفوقا معنويا على باقى الأصناف المذكورة.

توصى الدراسة من خلال التقييم النهائى بأن الأصناف تانش، كونسرفوليا، تشبيرسينو، اترانا، مانزانيللو هي الأكثر ملائمة وتوقا والأجدر بالاهتمام تحت ظروف منطقة الشيخ زويد بشمال سيناء.