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POTENTIALITY OF NATIVE RANGE PLANTS UNDER DIFFERENT LOCATIONS AT NORTH EASTERN COAST OF EGYPT

BY

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ABSTRACT

Effect of climatic and edaphic factors on potentiality of native range plants of seven locations i.e. S_1 (non- saline depression), S_2, S_3 (inland plateau), S_4, S_5 – (saline depression), S_6, S_7 – (coastal sand dunes) were investigated during the wet (spring) and dry (autumn) seasons of 2002 and 2003 years from El-Arish to El-Kantara district in the North- Eastern Coast of Egypt. The study aimed to evaluate the vegetation structure throughout 42-chart quadrate (m^2). The obtained results are:

* Twenty-six plant species belong to 14 families were recorded in seven locations. The highest contribution was presented by plant species belong to family *Chenopodiaceae* followed by *Compositae* and *Graminae* (6, 4 and 4).
* The highest values of plant cover % (75.3%) as well as the fresh and dry productivity 1.54,0.58 (ton/fed.) at wet season were at S_4 (Saline depression)
* S_1 (non-saline depression) showed superiority in plant density (plant/m^2) in the wet season while S_2 (inland platean) was the best during dry season.
* *Artemisia monosperma, Zygophyllum album, Atractylis Carduus, Ammophila arenaria* and *Avena sativa* were widely spread in the different studied of the seven locations.
* Fresh and dry yields were superior during dry season comparing to wet one.
* Twelve species (46.2%) and 14 species (53.8%) of the total plants were more palatable at wet and dry seasons respectively.

Keywords: Climatic and Edaphic factors, Abundance, Frequency, Plant covers, Productivity, Density, Botanical composition, Natural vegetation and Potentiality

INTRODUCTION

Sinai covers about 61000 km^2. The northern part is the promising area for agricultural utilization, where the winter precipitation is in maximum rates (about 100 mm). The vegetation survey of the area is of great importance for any type of agricultural development projects. Natural vegetation is differed in type, productivity and composition from site to another due to differences in the edaphic and climatic factors, (Abou- Deya 1984, Abou- Deya and Salem, 1990 a, b and Sarwatt *et al.*, 1989). Precipitation and temperature are the main environmental factors influencing plant growth under native conditions (Zahran *et*

al., 1990, El- Toukhy *et al.*, 2002 and Hendawy, 2002). Therefore, the present study was carried out to obtain more information about the relationship between the climatic and edaphic factors and the potentiality of range plants in the northern part of Sinai from El- Arish to El-Kantara.

MATERIALS AND METHODS

During wet (spring) and dry (autumn) seasons of the years 2002 and 2003, survey and distribution studies were conducted around the North Eastern coast of Egypt, started from El- Arish in the East (about 150 km) to El-Kantara in the West as indicated on Fig (1). Seven sites differe in climatic and edaphic factors were selected to this study, namely: S_1 17 km from El-Arish called (El-Gharaa) (N: 31° 11″ 70′-E: 34° 02″ 51′) non- saline depression dominated by *Atriplex* association with *Artemisia sp.* S_2 14 km from El-Arish called (Omir) (N: 31° 11″ 50′-E: 34° 01″ 17′) dominated by *Artemisia spp.*, S_3 at 21 km from El-Arish (N: 31° 14″ 36′ E: 34° 14″ 66′) dominated by *Artemisia sp.* and *Halocnemum strobilaceum,* (S_2, S_3) inland plateau, S_4 at 25 km from El-Arish (N: 31° 04″ 24′ –E: 33° 28″ 25′) dominated by *Zygophyllum* and *Artemisia sp.*, S_5 at 58 km from El- Kantara (N: 31° 02″ 35′ –E: 33° 10″ 60′) dominated by *Zygophyllum* and *Halocnemum sp.* (S_4, S_5) saline depression, S_6 at 48 km from El-Kantara called (Rommana) (N:30° 59″ 93′ –E:32° 42″ 20′)dominated by *Zygophyllum* and *Artemisia sp* then S_7 at 28 km from El- Kantara (N:31° 00″ 39′-E:32° 35″ 02′) dominated by *Ammophila arenaria* (S_6, S_7) sub coastal sand dunes using (Ground Position Station GPS).

Table (1) Average monthly meteorological data for El- Arish and El-Kantra during the study period.

Table (1): Mean values of Meteorological data at El-Arish and at El-Kantara during the experimental period (2002- 2003).

Month	El-Arish				El-Kantra			
	Mean T. C°	Rain Mm	R.H*. mm	E.V** mm/day	Mean T. C°	Rain mm	R.H.* mm	E.V** mm/day
January	13.9	52	71.5	1.6	14.4	7.92	58.2	1.8
February	14.8	10	71.0	1.9	15.4	14.04	55.5	2.1
March	17.0	0.0	62.5	3.0	18.9	14.76	52.45	3.5
April	19.1	0.0	72.0	4.5	21.4	3.0	45.2	4.0
May	21.7	0.0	72.0	5.0	25.5	0.0	49.87	6.1
June	23.8	0.0	76.0	6.0	27.87	0.0	50.59	6.3
July	25.8	0.0	73.0	6.4	29.3	0.0	49.0	7.4
August	26.4	0.0	72.0	5.7	29.5	0.0	50.0	6.2
September	25.0	0.0	70.0	5.0	27.3	0.0	52.0	5.3
October	23.2	0.0	67.0	3.5	24.2	4.32	54.0	4.2
November	15.8	0.0	67.0	2.6	20.2	3.0	59.0	3.3
December	19.8	38	67.0	2.4	15.8	9.0	63.0	4.2
Total	246.3	100	841	47.6	269.8	56.04	638.81	52.4
Mean	20.53	8.33	70.08	3.97	22.48	4.67	53.23	4.37

RH= Relative Humidity **E.V= Evaporation

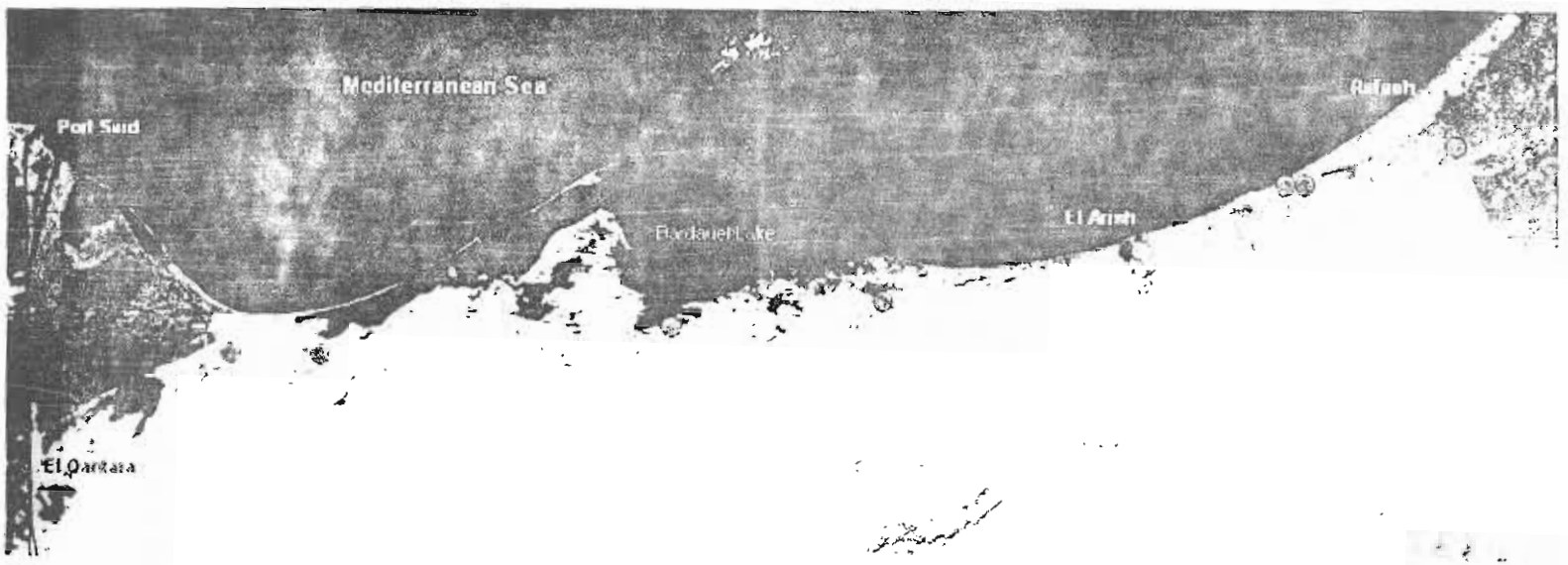

Fig.(1): Location Map of Natural Vegetation Samples in the North Sinai

Soil samples were taken from each site at different depths of (0-20), (20-40) and (40-60) cm to carry out the mechanical analysis using the international pipette method as described by Kilmer and Alexander, (1949) and the chemical analysis was conducted according to Jachson (1967), as shown in Table (2).

According to the reconnaissance method outlined by Hanson and Churchill (1965), quadrate method of one square meter was used in listing and counting the individuals of each species. The quadrate was randomly plotted six times within each site.

Table (2): Chemical and mechanical properties of soil in the different sites from El- Arish to El-Kantra area during 2002 – 2003 seasons.

Sites	Depth	pH	Ec mmhos/ cm	class	Soluble anions meg/ L				soluble cations meg/L			
					SO_4^{--}	CO_3^{-}	HCO_3^{-}	Cl^{-}	K^{+}	Na^{+}	Mg^{++}	Ca^{++}
S_1	0-20	8.23	0.3	Sandy loam	0.59	3.0	1.0	0.5	0.21	0.70	1.00	2.0
Non saline	20-40	7.91	1.4	Sandy loam	4.73	0.5	0.1	1.5	0.13	0.70	1.00	5.0
depression	40-60	7.95	0.3	loamy sand	1.06	1.0	0.5	0.5	0.28	0.78	1.00	1.0
S_2	0-20	8.13	3.0	sand	0.93	-	3.0	2.0	0.3	0.04	1.0	4.0
Inland	20-40	8.01	1.2	sand	6.53	-	6.0	0.5	0.3	-	4.0	9.0
plateau	40-60	7.86	2.5	loamy sand	1.57	-	0.5	1.5	0.3	0.04	5.0.	3.0
S_3	0-20	8.14	1.4	Sand	4.54	-	5.0	0.5	-	0.04	8.0	2.0
Inland	20-40	8.05	1.5	loamy sand	5.25	-	6.0	2.0	0.10	0.15	9.0	4.0
plateau	40-60	7.80	1.1	loamy sand	2.09	-	5.0	2.0	0.04	0.05	5.0	4.0
S_4	0-20	7.60	16.18	loamy sand	1.2	-	0.5	2.5	0.05	0.13	10.0	9.0
Saline	20-40	7.73	17.72	loamy sand	1.2	-	0.5	1.0	0.09	1.13	14.0	4.0
depression	40-60	7.75	21.25	loamy sand	1.5	0.5	0.5	1.0	0.09	0.17	19.0	4.0
S_5	0-20	7.75	12.4	sand	22.57	-	3.0	2.5	0.03	0.04	18.0	10.0
Saline	20-40	7.41	11.4	sand	21.07	-	6.0	2.0	0.03	0.04	17.0	12.0
depression	40-60	7.31	14.0	sand	17.03	-	5.0	2.0	0.3	1.0	13.0	11.0
S_6	0-20	8.32	0.6	sand	16.5	-	8.0	5.0	0.4	0.6	10.0	15.0
Sub	20-40	8.23	2.5	sand	22.75	-	1.0	2.0	0.05	0.70	21.0	4.00
coastal	40-60	8.02	2.2	sand	59.68	-	4.0	2.0	0.64	0.04	53.0	12.0
sand dunes												
S_7	0-20	8.03	0.2	sand	0.51	-	1.0	1.0	0.08	0.43	1.0	1.0
Sub coastal	20-40	7.88	1.5	sandy loam	6.91	-	-	1.0	0.08	0.83	4.0	3.0
sand dunes	40-60	7.83	0.2	sand	1.69	0.5	0.5	1.0	0.08	0.61	1.0	2.0

Data of the following variables were recorded and averaged over the six sampling units to get the mean value within each site of the studied:

1. The botential composition of the natural vegetation.
2. Cover percent: is the percent of ground, which covered by the canopy of the plant species.
3. Plant density: is the measure of number of individuals per unit area.
4. Frequency percentage: is the degree of uniformity of occurrence of individuals within an area, or the percent of number of samples containing a given species to the total number of samples.
5. Dominance: it means that the species are ecologically high successful in relation to the environment. It was evaluated as the species having high density and frequency.

6. Palatability: is the parameters of the preference or acceptability of a plant species as a fodder by the grazing animal.
7. Proper degree of utilization: it refers to the number of species that have been grazed compared to that of not grazed. It varied among seasons and places depending upon, drought season, kind and age of animals and the associated species.

Samples were taken from every plant species in each quadrate and oven dried at 100°C to determine the dry matter percentage and dry foliage yield for every species was used to calculate the production unit area.

RESULTS AND DISCUSSION

1. Botanical composition:

It is well noticed that the studied area is relatively small and badly depleted because of heavy grazing, mowing and shifting cultivation, however, many species were detected in this survey.

Results in Table (3) indicate the potentiality of the area to produce plant species and richness of the area in natural vegetation resources. During this vegetational survey, 14 families including 26 species (8 annuals and 18 perennials) were found in the whole area under 7 different locations.

The result showed that the *Chenopodiaceae* had greater number of species (6) whereas, *Compositae* and *Gramineae* contained (4) species fallowed by other families. It means that both families are widely distributed in such area.

The most common life forms were the shrubby species (57.7%) which have 42.3% with non-succulent leaves and 11.53% with succulent leaves. In addition, the contribution of herbs represented 42.3% of which (38.5%) non-succulent leaves, the contribution of geophytes was 3.85%. In this connection, Abou- Deya (1984) found that *Gramineae* family had the greater number of species followed by *Chenopodiaceae* then *Compositae* at El-Arish and El-Maghara road in the north eastern coast of Egypt.

2. Edaphic and climatic factors:

The annual rainfall at El-Arish region ranged from 52 mm in January to zero in July and the total amount around the year was recorded as 100 mm. The annual average temperature is 20.53°C. Relative humidity fluctuated slightly from month to another and ranged from 76.0% in June to 62.5% in March with an average of 70.08%, evaporation reached its maximum in July (6.4% mm/day) and its minimum (1.6% mm/ day) in January with annual average of 3.97 mm/ day. On the other hand for El- Kantara, region the annual rainfall ranged from 14.76 mm in March to Zero in July and the total amount around the year was 56.04 mm. The annual average temperature was 22.48°C, relative humidity fluctuated from 63.0% in December to 45.2% in April with an average of 53.23%, evaporation reached its high value in July (7.4 mm/ day) and its minimum in January (1.8 mm/day) with annual average of 4.37 mm/ day (Table, 1).

Table (3): Average Botanical composition during different growing seasons in different sites from El-Arish to El-Kantara (2002-2003).

N	Life form	Scientific name	Family name	P-Up/ An-pr	Wet season								Dry season							
					S1	S2	S3	S4	S5	S6	S7	T	S1	S2	S3	S4	S5	S6	S7	T
1	Herb	*Ammophila arenaria*	Graminae	Up/Pr						+		1		+		+			+	3
2	Herb	*Avena sativa*	Graminae	P/An	+							1		+						1
3	Herb	*Panicum turgidum*	Graminae	P/Pr								-				+				1
4	Ev.s	*Zilla spinosa*	Graminae	P/ Pr		+						1		+	+			+	+	4
5	Herb	*Achillea fragrantissima*	Compositae	P/An								-		+						1
6	Ev.s	*Artemisia monosperma*	Compositae	P/Pr	+	+	+		+	+	+	6	+	+	+	+	+	+	+	7
7	Ev.s	*Atractylis carduus*	Compositae	P/Pr	+	+	+				+	4	+	+						2
8	Herb	*Chrysanthemum coronarium*	Compositae	P/An	+	+	+					3								-
9	Ev.Ss	*Anabasis articulata*	Chenopodiaceae	P/Pr								-							+	1
10	Ev.Ss	*Atriplex halimus*	Chenopodiaceae	P/Pr	+							1	+							1
11	Herb	*Chenopodium murale*	Chenopodiaceae	Up/An		+						1								-
12	Ev.s	*Halocnemun strobilaceum*	Chenopodiaceae	Up/Pr				+	+			2	+							1
13	Ev.s	*Hammada elegans*	Chenopodiaceae	P/Pr							+	1								-
14	Ev.s	*Salsola kali*	Chenopodiaceae	P/Pr								-	+		+	+				3
15	Ev.s S.L.S	*Mesembryanthemum nodiflorum*	Aizoaceae	P/Pr			+					1								-
16	Herb	*Allium desertorum*	Alliaceae	P/Pr								-		+						1
17	Herb	*Silene succulenta*	Caryophyllaceae	P/An								-		+						1
18	Ev.s	*Frankenia revoluta*	Frankeniaceae	P/Pr		+						1								-
19	Herb	*Rumex vesicarius*	Frankeniaceae	Up/Pr		+						1								-
20	Herb	*Malva parviflora*	Malvaceae	P/An		+						1								-
21	Ev.s	*Nitraria retusa*	Nitrariaceae	P/Pr								-					+		+	2
22	Ev.s	*Salvia lanigera*	Polygonaceae	P/An		+						1								-
23	Herb	*Ruppia maritima*	Ruppiaceae	P/An								-			+					1
24	Ev.s	*Tamarix aphylla*	Tamaricaceae	Up/Pr								-		+	+			+	+	4
25	Ev.s	*Thymelaea hirsuta*	Thymelaeaceae	Up/Pr		+						1		+	+					2
26	Ev.L.S	*Zygophyllum album*	Zygophilaeae	P/Pr				+	+	+	+	4				+	+	+	+	4
T					5	10	4	2	3	3	4	31	5	10	6	5	3	4	7	40

P : Palatable Up: unpalatable **An** : Annual **Pr** : Perrnial

S : Shrubs Ss: Sub shrubs **Ev:** ever green **Ls:** Leafy succulent

T:Total

It appeared that differences of the soil between the sites were from sandy loam, loamy sand and sand with pH ranged between 8.32 at site (6) to 7.31 at site (5) and Ec from 0.2 mmhos/ cm at site (7) sub coastal sand dune to 21.25 mmhos/cm at site (4) saline depression so, the different appeared between the dominant plants according to the structure and the chemical analysis of the soil. (Table 2)

3. Coverage %:

Plant cover is one of the best criteria for measuring changes in vegetation around the year. Table (4) show that the cover % varied from site to another. It was also clear results in that the cover % was changed by season variation; it ranged from 29 to 75.3% with an average of 53.7 for the wet season and from 44.1 to 69.4% with an average of 54.8 for the dry one. Thus, differences between sites may be due to the variation between the individual plant canopies and also to the unequal intervals between the adjacent plants. These results are in accordance with that obtained by Abou- Deya (1984) who revealed that cover % varied from site to another and it ranged from 13.4 to 82.1% with an average a of 54.8% within the road from El-Arish to El-Maghara. Furthermore, results showed that the lowest cover % occurred at sites 2 and 3. This may be due to heavy grazing within these sites. Similar finding were obtained by Abou- Deya (1984), Ibrahim (1995), Hendawy (2002) and El-Toukhy (2002). On the other hand the highest cover value was recorded for site (4) at (saline depression) because it lied at the dried parts which characterized by salt marshes. As a result, plants in such site are undesirable for grazing animals; *Halocnemon strobilaceum* and *Thymelaea hirsuta* which occupied this site (salt tolerant plants) had a big and spread vegetative parts; it exceed cover % of other sites.

Table (4): Average cover percentage during different growing seasons in different sites from El-Arish to El-Kantara area (2002-2003).

Site	Cover %	
	Wet season	Dry season
1	59.6	59.5
2	36.2	44.1
3	29.0	46.6
4	75.3	50.8
5	61.4	58.5
6	61.1	69.4
7	53.4	54.6
average	53.7	54.8

4. Plant density (Plant/ m^2)

The abundance of plant species may be expressed by density. Results in Table (5) showed that plant density varied from 1.0 in sites 5 and 6 to 3.8 plant/m^2 in site (1) with an average of 1.86 plant/m^2 during the wet season, and from 1.0 in site (4) to 6.48 plant/m^2 in site (2) by an average of 2.07 plants/ m^2 during the dry season. All the species found in the different sites were grouped into annuals and perennials.

Annuals and perennials species constituted from 0.74 plant/m^2 (24.1%) and 1.1 plant/m^2 (75.9%) respectively during the wet season while, these ratio was

estimated to be 0.06 plant/m^2 (1.59%) and 2.01 plant/m^2 (98.4%) for annuals and perennials, respectively during the dry season. It means that the plant density, especially for annuals, was greater during the wet season than the dry season.

Plant density was positively associated with rainfall rate. As for example, plant density of eastern- north sites (1, 2, and 3) was higher in wet season, where the maximum rate of rains is 100 mm as compared with the other sites. Similar result were obtained by Shalaby *et al.* (1980 b), Abou- Deya (1984) and El- Toukhy (2002).

Average plant density overall sites around the year was estimated to be 1.97 plant/m^2 which contained 0.4 annuals (20.5%) and 1.56 perennials (79.5%). Perennials were found at all sites and its density exceeded at dry season while, annual plants exceeded the perennials in the two sites (1 and 3) at the wet season. It means that the development range can be made successfully in such sites by using artificial reseeding or fencing for such annuals that were adapted and palatable.

Table (5): Average plant density during different growing seasons in different sites from El-A rish to El-Kantara (2002-2003).

Site	Wet season				
	total density	Annuals		Perennials	
		P/m^2	%	P/m^2	%
1	3.8	2.5	65.8	1.3	34.2
2	2.2	0.7	31.8	1.5	68.2
3	2.8	2.0	71.4	0.8	28.6
4	1.1	-	-	1.1	100
5	1.0	-	-	1.0	100
6	1.0	-	-	1.0	100
7	1.1	-	-	1.1	100
average	**1.86**	**0.74**	**24.1**	**1.1**	**75.9**
Dry season					
1	1.33	-	-	1.33	100
2	6.48	2.9	4.48	6.19	95.52
3	1.5	0.1	6.67	1.40	93.3
4	1.0	-	-	1.0	100
5	1.57	-	-	1.57	100
6	1.20	-	-	1.2	100
7	1.4	-	-	1.4	100
average	**2.07**	**0.06**	**1.59**	**2.01**	**98.4**

Average all the year = 1.97 plant/m^2 Annuals = 0.4 (20.5%) Perennials = 1.57 (79.5%)

5. Frequency & Abundance:

Artemisia monsoperma, Zaygophyllum ablum, Atractylis carduus and *Halocnemum strobilaceum* were the dominant species during the wet season and their frequencies were estimated to be 27.1, 25.7, 10 and 10%, respectively. However, the other species had frequency percentage varied from 1.4 to 8.57%. The same dominant species are also recorded by Abou- Deya (1984) on El-Arish – to El- Maghara road under different sites. On the other hand, *Artemisia monosperma, Zygophyllum album, Atractylis carduus* and *Zilla spinosa* were the dominant species during the dry season. Their frequencies were estimated to be 39.3, 22.9, 10 and 8.57%, respectively.

In other words four species (15.4% of the recorded total species) were found at most sites (*Artemisia sp., Zygophyllum, sp., Atractylis sp.*, and *Zilla sp.*). Three species (11.5 % of the total species) (*Salsola kali, Ammophila arenaria* and *Tamarix aphylla*), were frequent distributed at three sites while three species (11.5% of the total species) were frequented at two site (*Nitraria retusa, Thymelaea hirsute* and *Halocnemum sp.*) and the other species (61.6% of the total species recorded) were presented at one site. It means that about 27% of the total species recorded had a wide distribution (Table 6).

It could be concluded that these species had the highest values in both spring and summer seasons and this may be due to the increase of relative humidity which the plant give more growth activity. In this concern Abou- Deya *et al.* (1996) revealed that the annuals were obtained in spring but perennials remained merely with systematic scattering in summer. Also, Abou- Deya (1984) found that 19% of the total species at El-Arish to El-Maghara road had a wide distribution and were found in 5 or more sites.

6. The dominance:

Species of higher density and frequency were considered to be dominant species. Results in Tables (5 & 6) showed that *Artemisia monosperma* and *Zygophyllum* album were the dominant species over all the studied area as they showed higher frequency and density. Similar results were obtained by Ahmed (1981), and Abou- Deya (1984) in that region.

Furthermore, some species could be considered as an indicator for the kind of the habitate such as *Ammophila arenaria,* which is found in sand dunes. *Halocnemum strobilaceum* was dominated in very saline soils and *Nitraria retusa* was oftenly found in saline soils.

These results are in harmony with those obtained by Dye and Walker (1980), wheeler (1980), Arabcenter (1982 b), Abou- Deya (1984) and El-Toukhy *et al.* (2002).

7. Palatability:

The importance of the plant is determined by its relative abundance, palatability and degree of utilization. Some forage plants are so highly palatable and productive, that they are selected by grazing animals. These results indicated that under wet season (Table 3) 12 species (46.2% of the total plants) were more palatable species, 5 species (19.2% of the total plants) were unpalatable. The palatable plants contained 4 annuals species (33%) and 8 perennials (87%). On the other hand, at dry season 14 species (53.8% of the total plants) were more palatable, contained 4 annuals (28.6%) and 10 perennials (71.4%).

It means that these species had high tolerance to salinity and widely spread. It appears from such results that the development of natural vegetation for this area is more available, especially within sites 2 and 3(inland plateau) where annuals and perennials are more than other sites.

Table (6): Average frequency percent of different species during different growing seasons in all sites from El-Arish to El-Kantara area (2002-2003).

Species	Wet season		
	Frequency %	Density p/m²	Sites
Artemisia monosperma	27.1	0.34	$S_1, S_2, S_3, S_5, S_6, S_7$
Zygophyllum album	25.7	0.31	S_4, S_5, S_6, S_7,
Atractylis carduus	10	0.11	S_1, S_2, S_3, S_7
Halocnemum strobilaceum	10	0.10	S_4, S_5
Chryanthemum coronarium	8.57	0.39	S_1, S_3
Ammophila arenaria	5.71	0.04	S_6
Atriplex halimus	5.71	0.07	S_1
Zilla spinosa	28.6	0.03	S_2
Mesembryanthemum nodiflorum	2.86	0.03	S_7
Thymelaea hirsuta	2.86	0.03	S_2
Avena sativa	1.43	0.29	S_2
Rumex vesicarius	1.43	0.01	S_2
Salvia lanigera	1.43	0.04	S_2
Malva parviflora	1.4	0.01	S_2
Frankenia revoluta	1.4	0.01	S_2
Chenopodium mural	1.43	0.01	S_2
Hammada elegans	1.43	-	S_7
	Dry season		
Artemisia monospera	39.3	0.84	$S_1, S_2, S_3, S_4, S_5, S_6, S_7$
Zygophyllum album	22.9	0.25	S_4, S_5, S_6, S_7,
Atractylis carduus	10	0.09	S_1, S_3,
Zilla spinosa	8.57	0.08	S_2, S_3, S_6, S_7
Salsola kali	8.09	0.09	S_1, S_2, S_5
Ammophila arenaria	6.67	0.34	S_2, S_4, S_7
Atriplex halimus	5.71	0.05	S_1
Tamrix aphylla	5.48	0.05	S_2, S_6, S_7
Nitraria retusa	4.29	0.04	S_5, S_7
Halocnemum strobilaceum	4.29	0.04	S_5
Panicum turgidum	2.86	0.03	S_4
Anabasis articulata	2.86	0.03	S_7
Thymelaea hirsuta	2.86	0.03	S_2, S_3
Achilea fragrantissima	1.43	0.01	S_2
Silene succulenta	1.43	0.01	S_2
Ruppia maritima	1.43	0.05	S_2
Avena fatua	1.19	0.01	S_2
Allium desertorum	1.19	0.04	S_2

Proper degree of utilization:

Proper degree of utilization is a measure of the quantity of forage yield that can be obtained from forage plants and used for animal feeding. It depends upon season of utilization, kind of plants, kind and age of animals and environmental conditions. Proper degree of utilization was evaluated as 12 species palatable compared with 5 unpalatable (6: 2.5) under wet season, while there was 14 palatable species compared with 4 unpalatable (7: 2) at dry season. In this respect, Abou- Deya (1984) found that proper degree of utilization at El-Arish to El- Maghara road was evaluated as 22 palatable species compared with 14 unpalatable or 11: 7.

Fresh and dry yields:

Data in Table (7) showed that fresh and dry yields of species at dry season exceeded that those in wet ones. Actually, rising dry matter percentage

Table (7): Average fresh and dry fodder productivity (Ton/ Fed.) of native plants grown during wet and dry seasons of 2002- 2003 in different sites

N	Scientific name	Fresh productivity															
		Wet season								Dry season							
		S1	S2	S3	S4	S5	S6	S7	T	S1	S2	S3	S4	S5	S6	S7	T
1	*Arnebia arenaria*	-	-	-	-	-	.12	-	.12	-	.02	-	.34	-	-	.21	.57
2	*Avena sativa*	.02	-	-	-	-	-	-	.02	-	.36	-	-	-	-	-	.36
3	*Panicum turgidum*	-	-	-	-	-	-	-	-	-	-	-	.13	-	-	-	.13
4	*Zilla spinosa*	-	.07	-	-	-	-	-	.07	-	.06	.26	-	-	.02	.03	.37
5	*Achillea fragrantissima*	-	-	-	-	-	-	-	-	-	.03	-	-	-	-	-	.03
6	*Artemisia monosperma*	.24	.08	.65	-	.03	.26	.63	1.89	.60	.34	.79	.34	.16	1.09	.25	3.57
7	*Atractylis cardus*	.04	.05	.07	-	-	-	.01	.17	.32	-	.09	-	-	-	-	.41
8	*Chrysanthemum coronarium*	.08	.02	.04	-	-	-	-	.14	-	-	-	-	-	-	-	-
9	*Anabasis articulata*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.21	.21
10	*Atriplex halimus*	.62	-	-	-	-	-	-	.62	1.62	-	-	-	-	-	-	1.62
11	*Chenopodium murale*	-	.25	-	-	-	-	-	.25	-	-	-	-	-	-	-	-
12	*Haloxeman strobilaceum*	-	-	-	.50	.81	-	-	1.31	-	-	-	-	.44	-	-	.44
13	*Lycium shawii*	-	-	-	-	-	-	.01	.01	-	-	-	-	-	-	-	-
14	*Noaea mucronata*	-	-	-	-	-	-	-	-	.03	.12	-	-	.13	-	-	.28
15	*Mesembryanthemum nodiflorum*	-	-	.63	-	-	-	-	.63	-	-	-	-	-	-	-	-
16	*Allium desertorum*	-	-	-	-	-	-	-	-	-	.02	-	-	-	-	-	.02
17	*Silene succulenta*	-	-	-	-	-	-	-	-	-	.02	-	-	-	-	-	.02
18	*Frankenia revoluta*	-	.13	-	-	-	-	-	.13	-	-	-	-	-	.03	-	.03
19	*Rumex vesicarius*	-	.63	-	-	-	-	-	.63	-	-	-	-	-	-	-	-
20	*Malva parviflora*	-	.04	-	-	-	-	-	.04	-	-	-	-	-	-	-	-
21	*Nitraria retusa*	-	-	-	-	-	-	-	-	-	-	-	-	.48	-	.21	.69
22	*Salvia lanigera*	-	.03	-	-	-	-	-	.03	-	-	-	-	-	.01	-	.01
23	*Ruppia maritima*	-	-	-	-	-	-	-	-	-	-	.01	-	-	-	-	.01
24	*Tamarix aphylla*	-	-	-	-	-	-	-	-	-	.50	.25	-	-	0.38	0.25	1.38
25	*Thymelaea hirsuta*	-	.11	-	-	0.01	-	-	.12	-	.11	.38	-	-	-	-	0.49
26	*Zygophyllum album*	-	-	-	1.04	.15	0.89	.81	2.89	-	-	-	1.18	.51	.31	.42	2.42
T		1	1.41	1.39	1.54	1	1.27	1.46	9.07	2.57	1.58	1.78	1.99	1.72	1.84	1.58	13.06

Table (7): Cont.

N	Scientific name	Dry Productivity															
		Wet season								Dry season							
		S1	S2	S3	S4	S5	S6	S7	T	S1	S2	S3	S4	S5	S6	S7	T
1	*Ammophila arenaria*	-	-	-	-	-	.08	-	.08	-	.01	-	.28	-	-	.16	.45
2	*Avena sativa*	.01	-	-	-	-	-	-	.01	-	.24	-	-	-	-	-	.24
3	*Panicum turgidum*	-	-	-	-	-	-	-	-	-	-	-	.08	-	-	-	.08
4	*Zilla spinosa*	-	.04	-	-	-	-	-	.04	-	.04	.23	-	-	.01	.02	0.30
5	*Achillea fragrantissima*	-	-	-	-	-	-	-	-	-	.02	-	-	-	-	-	.02
6	*Artemisia monosperma*	.09	.04	.45	-	.03	.11	.28	1.0	34	.2	.32	.22	.09	.67	.22	2.06
7	*Atractylis cardus*	.02	.01	.06	-	-	-	.01	.10	.22	-	.05	-	-	-	-	.27
8	*Chrysanthemum coronarium*	.02	.01	.01	-	-	-	-	.04	-	-	-	-	-	-	-	-
9	*Anabasis articulata*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.11	.11
10	*Atriplex halimus*	.22	-	-	-	-	-	-	.22	.88	-	-	-	-	-	-	.88
11	*Chenopodium murale*	-	.04	-	-	-	-	-	.04	-	-	-	-	-	.04	-	.04
12	*Halocemun strobilaceum*	-	-	-	.15	.37	-	-	.52	-	-	-	-	.18	-	-	.18
13	*Hammada elegans*	-	-	-	-	-	-	.01	.01	-	-	-	-	-	-	-	-
14	*Salsola kali*	-	-	-	-	-	-	-	-	.01	.06	-	-	.05	-	-	.012
15	*Mesembryanthemum nodiflorum*	-	-	.03	-	-	-	-	.03	-	-	-	-	-	-	-	-
16	*Allium desertorum*	-	-	-	-	-	-	-	-	-	.01	-	-	-	-	-	.01
17	*Silene succulenta*	-	-	-	-	-	-	-	-	-	.01	-	-	-	-	-	.01
18	*Frankenia revoluta*	-	.03	-	-	-	-	-	.03	-	-	-	-	-	.01	-	.01
19	*Rumex vesicarius*	-	.01	-	-	-	-	-	.01	-	-	-	-	-	.01	-	.01
20	*Malva parviflora*	-	.01	-	-	-	-	-	.01	-	-	-	-	-	-	-	-
21	*Nitraria retusa*	-	-	-	-	-	-	-	-	-	-	-	-	.02	-	.06	0.08
22	*Salvia lanigera*	-	.01	-	-	-	-	-	.01	-	-	-	-	-	.01	-	.01
23	*Ruppia maritima*	-	-	-	-	-	-	-	-	-	-	.004	-	-	-	-	.004
24	*Tamarix aphylla*	-	-	-	-	-	-	-	-	-	.16	.08	-	-	.21	.16	0.61
25	*Thymelaea hirsuta*	-	.05	-	-	.01	-	-	.06	-	.09	.19	-	-	-	-	.28
26	*Zygophyllum album*	-	-	-	.43	.05	.19	.18	.85	-	-	-	.38	.15	.1	.13	.76
T		.36	.25	.55	.58	.46	.38	.48	3.06	1.45	.84	.874	.96	.49	1.06	.86	6.534

and decreasing moisture content to the minimum in plant tissues may be behind such increase in dry season . Many plants were found only at dry season such as *Tamarix aphylla, Ruppia moritima, Nitraria retusa, Allium desertorum, Anabasis articulata, Achilea fragrantissina* and *Pancium turgidum*, while other plants were spread widely in different sites at dry season more than of the wet one such as *Ammophyila arenaria, Zilla spinosa, Artemisia monosperma* and *Zygophyllum album*. These results may be due to the relatively more favourable environmental conditions. The production of site 1(non-saline depression), site 4 (saline depression) were higher than those obtained form other sites. This may be attributed to the high precipitation and the relatively appropriate soil.

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الطاقة الانتاجية للنباتات الطبيعة فى مواقع مختلفة بالساحل الشمالي الشرقي لمصر

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يختلف تركيب وانتاجية الغطاء الخضرى الطبيعى من موقع إلى آخر باختلاف العوامل المناخية وخصائص التربة الطبيعة والكيميائية، لذلك اجرى هذا البحث في سبعة مواقع مختلفة ابتداء من العريش بالساحل الشمالي الشرقي لمصر حتى القنطرة وذلك فى موسمى الجفاف والامطار لعامى ٢٠٠٢ و ٢٠٠٣ لدراسة تركيب وانتاجية الغطاء الخضرى الطبيعى باستخدام طريقة الالواح ذات المربع (١م)^{2} .وكما تم دراسة صفات التربة الطبيعة والكيمائية . وقد تم تقسيم النباتات بعد تعريفها إلى نباتات مستساغة وغير مستساغة وحوليه ومعمرة وكذلك حساب قياسات المرعى (%التغطية ، الكثافة النباتية نبات/ م٢ ، الوفرة، التكرار ، السيادة) كذلك الحاصل الغض والجاف. ويمكن تلخيص أهم النتائج المتحصل عليها في الآتي:

- ظهور ٢٦ نوع نباتى تتبع ١٤ عائلة وتمثل العائلة الرمرامية يليها المركبة ثم النجيلية اكبر الاعداد النباتية.
- تفوق الموقع (٤)(السبخات الملحية) في التغطية (%) والحاصل الغض والجاف فى الموسم الرطب.
- تفوق الموقع (١)(بيئة غير ملحية) في الكثافة النباتية فى الموسم الرطب بينما تفوق الموقع (٢) (أرض منخفضة) في الموسم الجاف.
- أشارت النتائج أن النباتات (العادر- الرطريط ، شوكة الجمل، سويدة) لها مدى واسع فى الانتشار في موقع الدراسة
- تفوقت الإنتاجية الغضه والجافة في الموسم الجاف عن الرطب نظرا لوجود العديد من الشجيرات فى الموسم الجاف فقط.