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ECOLOGICAL AND ECOPHYSIOLOGICAL STUDIES ON SOME PLANTS FROM WADI EL-HAWASHIYA, THE EASTERN DESERT, EGYPT.

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ABSTRACT

Wadi El-Hawashiya is one of the most important wadis of the Eastern Desert of Egypt that occupies a specific position in the Gulf of Suez area. Annually, it receives 10 mm rainfall adding to annual storms creating flash floods that put the wadi on attention focus for sustainable development. The present investigation aims at recognition, identification of floristic components and evaluation of the nutritive value of vegetation as an ecophysiological adaptation towards the accident environmental stresses, through clarifying the chemical composition of the dominant species during different successive seasons. Phytosociologically, the results indicated that the co-dominant *Zilla spinosa-Zgophyllum coccineum* community type dominated the upstream portion of the wadi bed, while *Artemisia herba-alba* and *Zilla spinosa* communities dominated two different sites at the midstream portion. The surveyed plants were classified according to their palatability into three groups; high palatable, low palatable and unpalatable. Also, the results showed that the variations in edaphic factors, especially soil texture, salinity, moisture contents and sharp-ct sloping at the wadi bed, play important roles in the distribution and growth of plants and in accumulation of osmotically active constituents inside the plant tissues. Ultimately, results of the present work indicated that there is an intimate relationship between accumulation of K^+ ions and the formation and account anion of carbohydrates.
Keywords: Ecophysiology, phytosociologically and environmental stresses.

INTRODUCTION

Wadi El-Hawashiya, the Eastern Desert, occupies position relative to other Egyptian deserts. It is located at km 29 to the northwest of Ras Gharib city. It lies between longitudes 32˚ 13 30 and 32˚ 57 00 E and latitudes 28˚ 00 40 & 28˚ 29 00 N, covering an area of about 917.08 km^2, Fig. (1). Climatologically, the area of the basin is characterized by an arid climate, where it receives, annually, 10 mm rainfall adding to the annual storms which attack the area during autumn and spring and creating flash floods. The basin has an elongated shape with maximum length of about 66 km cutting through the Red Sea mountainous terrain and draining towards the Gulf of Suez. The up-stream portion of drains the eastern scarp of the plateau. It consists of varicolored cyclical sequences of fine to coarse grained, fluvial to deltaic stone, shallow marine sandstone and mudstone. The middle stream portion consists of white, fine to coarse grained, mature, cross-bedded sandstone with some conglomerate beds. The delta and the wadi floors are covered with sand and gravels representing the weathering products of the country rocks of the basin (e.f Agour and Shabana, 2002). Extensive investigations have been done by several authors, on germination, growth and attribution of natural vegetation, e.g Kassas (1952), Kassas and Girgis (1964), Batanouny (1979), Ahmed and El-Dawi (1996) and Moussa (2001), but the chemical composition of the plant materials and its ecological bearing as a function of

physiological responses of natural vegetation towards the drastic environmental factors of the study area hasn't been carried out.

The present investigation is an attempt to recognize, identify the main floristic component of the natural vegetation of Wadi El-Hawashiya and to evaluate the nutritional value of that vegetation as an ecological adaptation through clarifying the chemical components of the dominant species during two different successive seasons.

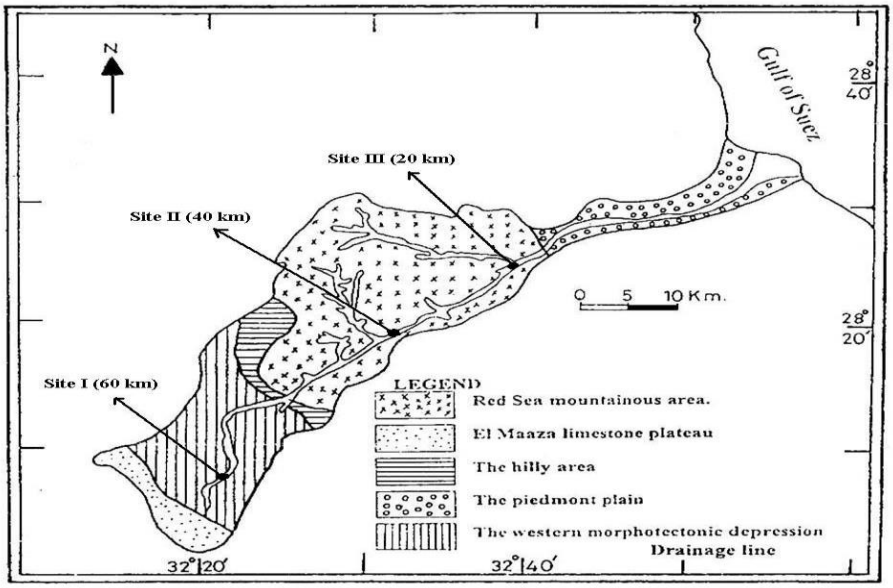

Fig.(1): The main geomorphologic units, Wadi El Hawashiya area.

MATERIALS AD METHODS

I- Vegetation study:-

At the main channel of the wadi three distinct sites were selected to carry out the present investigation, one site at the up-stream portion, while the other two sites at the middle-stream portion. The down-stream portion didn't surveyed due to the presence of the Arab Oil Company camp. In each site thirty list quadrates of an area 10×10 m^2 were randomly set up. The plants were listed and identified according to Boulos (1995). Cover, frequency, density and their relative values were determined according to Muller-Dombois and Elenberg (1974). The relatives were summed to give the importance value for each species according to Ludwige and Reynolds (1988). The wadi bed is surveyed by GPS through stop and go techniques to determine the land steepness, Table (1).

II- Soil analysis:-

In each previous site, ten representative soil profiles of depth 0-50 cm were taken and mixed together to give one composite sample for each site. Soil samples were air-dried and subjected to determine the particle size

distribution (Wild *et al*., 1979), $CaCO_3$, Organic matter, the measure of electrical conductivity (EC) and PH values, Table (2).

III- Chemical analysis of plant materials:-

The plant materials of the dominant species were seasonally collected during wet and dry seasons, oven-dried at 60 c° for a constant weight and were subjected to determine crude protein and crude fibers according to A.O.A.C. (1990), total carbohydrate according to Chaplin and Kennedy (1994) and two cations Na^+ and K^+ according to Jackson (1967). Digestible crude protein (DCP) and total digestible nitrogen (TDN) were estimated by using the equation:-

DCP = 0.93 CP – 3.52 (Le Houérou, 1980)

TDN = 65.14 + 0.45 CP – 0.38 (Adams *et al*., 1964)

Nutritional values (N.V) were expressed as percentages of crude protein (CP), crude fibers (CF), Total carbohydrates (TC), Na^+ and K^+, Table (3).

RESULTS AND DISCUSSION

I- Soil:-

The relevant data of soil properties of Wadi El-Hawashiya are presented in table (1). Physically, soil of the wadi is characterized by coarse textured class where the coarse fractions are highly represented; 69.72 %, 66.65 and 67.37 % in site I, site II and site III, respectively. In corresponding, the field capacity (FC), the capacity of soil to hold water, is very low where it ranged from 3.06 % to 7.6 % at the depth of 0-50 cm. data of GPS, table (1) showed that there is an apparent horizontal steepness along the wadi bed from the west to the east towards the Gulf of Suez. This gradient varied in height from 343 m above the sea level at site I, 270 m at site II to 241 m at site III, respectively.

Chemically, soil reaction was very alkaliscent where the PH value fluctuated within a narrow range; 7.37, 7.72 and 7.74 in site I, II and III, respectively. The electrical conductivity measured 0.17, 0.14 and 0.19 dsm^{-1} at site I, II and III; respectively. Calcium carbonate $CaCO_3$ reached the highest level of 14.5 % in site I and gradually declined to 9.2 % in site III while it recorded 13.1 % in site II. The organic matter (OM) amounted to 0.09 %, 0.24 % and 0.28 % in site I, II and III; respectively. The variations in the edaphic factors of the study area, especially $CaCO_3$ and organic matter (OM), may be due to the difference in the geomorphological unites, fig (1) and the apparent gradient of the main channel of the wadi bed, table (1). It could be concluded that, besides sharp-cut sloping of the wadi bed, soil texture, salinity (EC) and moisture percentage play an important role in plant distribution and growth and accumulation of osmotically active constitutes in plant cells. Results of the present investigation were in accordance with those of Abd El-Rahman *et al.* (1983), Abd El-Razik *et al* (1984), Moussa (2001) and Ebad *et al*. (2006).

II- Vegetation:-

Results of vegetation analysis of the main channel of wadi El-Hawshiya are presented in table (2). These results can be summarized as follows:-

Site I (up-stream portion of the wadi):-

This site represents the highest elevated area of the wadi bed (343 m above sea level). It is dominated by the co-dominant *Zilla spinosa-Zygohyllum coccineum* community type. The perennial associations arranged in a descending order according to their importance value (IV) are*: Zilla spinosa* (66.78), *Zygophyllum coccineum* (64.73), *Artemisia herba-alba* (58.22), *Ochradenus baccatus* (45.29), *Leptadenia pyrotechnica* (31.99), *Cleome droserifolia* (11.42), *Ephedra alata* (9.76), *Aerva javanica* (7.98) and *Fagonia arabica* (4.03).

Site II:-

It represents one of the two stands setup at the mid-stream portion that elevates 270 m above sea level. The *Artemisia herba-alba* community type dominates this site. The associations wee as the same such as the proceedings site few exceptions such as the three perennials *Acacia tortilis*, *Pulicaria crispa*, *Heliotropium arabinense* and the only annual species *Polycarpon succulents*.

Site III:-

This site represents the lowest elevation (241 m above sea level) and the lowest number of species (7 species) of the surveyed area. *Zilla spinosa* community type dominates this site. It comprised the following associations: *Zilla spinosa*, Acacia tortilis ssp. raddiana, *Ephedra alata*, *Artemisia herba-alba*, *Leptadenia pyrotechnica*, *Ochradenus baccatus* and *Achillea fragrentissma*. They are descendingly arranged according to their importance values.

It is, clearly, evident from the forgoing results that the vegetation of Wadi El-Hawashiya is represented by fourteen species that belong to twelve plant families. Each family is represented by only one species with the exception of family Zygophyllaceae which is presented by two species and family Asterceae by tree species. From ecological point of view, Wadi El-Hawashiya is high phyto-diversity, the phyto-diversity may be due to the unique geomorhological structure and topographic features of the wadi those obtained by Chamberlain (1975) and Zaghloul and Moussa (2005) where they concluded that communities are bitter indicators for habitat conditions than individual species. The ecological conditions; characters of subsurface sediments and substratum, land relief and local microclimate are the main factors that limit the type and the extent of the plant cover in an ecosystem.

III. Physiological studies:

The plant species of Wadi El-Hawashiya are classified according to their nutritive value (NV) into three categories namely: 1- Highly palatable (HP), 2- Low palatable (LP) and 3- Unpalatable (UP). All individual species of the three groups are randomly distributed long the main channel of the wadi. The nutritive value in the present investigation is considered as a function of physiological environmental conditions.

1- Highly palatable group (HP):-

This group comprises Artemisia *herba-alba, Heliotropium arabinense, Acacia tortilis ssp. raddiana, Acacia tortilis* and *Ochradenus baccatus* which they are descendingly arranged according to the total nutritional value of each species, Table (3). They represent about 35.7 % of the total species of the wadi.

During winter, it is found that these plants provide a total average NV of 63.5 % the two species *Artemisia herba-alba* and *Heliotropium arabinense* exhibited the highest total NV., 76.6 % and 75.6 %, respectively. The nutritional criteria (CP, CF, TC, Na^+ and K^+) are distinctly varied between all representative plants of this group. The highest Cp (14.2 %) was obtained by *Acacia tortilis ssp. raddiana* followed by *Acacia tortilis* (13.1 %), while the lowest value (6.7 %) was obtained by *Artemisia herba-alba*. The maximum CF (28.5 %) was obtained by *Artemisia herba-alba* followed by *Heliotropium arabinense* (23.3 %), while the lowest CF percentage (17.1 %) was recorded by *Acacia tortilis*. Concerning the total carbohydrates percentage (TC), *Heliotropium arabinense* recorded the highest value (41.3 %), followed by *Artemisia herba-alba* (39.6 %) and *Acacia tortilis ssp. raddiana* (30.6 %). Total carbohydrates contents was approximately the same (20.2 & 20.4 %) for *Ochradenus baccatus* and *Acacia tortilis*, respectively. Results of the present work were in harmony with those of El-Halwany *et al*. (2002) where they demonstrated that total carbohydrates contents were higher in all studied plants compared with other studies.

In respect to K^+ and Na^+ ions as nutritional criteria, it is noticed that K^+ ions percentage was markedly higher than that of Na^+ ions in all plants of this group, Table (3). The highest K^+ contents (1.78 %) was obtained by *Heliotropium arabinense* followed by *Artemisia herba-alba* (1.54 %) and *Acacia tortilis ssp. raddiana* (1.42 %), while the lowest percentage (1.2 & 1.3 %) was obtained by *Ochradenus baccatus* and *Acacia tortilis*, respectively. Concerning Na^+ ions, the minimum contents (0.11 %) was obtained by *Heliotropium arabinense*, while the maximum contents (0.71 & 0.78 %) attained the two *Acacia* species. Potassium is an essential element in all cell metabolic processes and translocation of carbohydrates (Fath and Turk, 1972). Results of the present investigation were in agreement with those of El-Halwany *et al.* (2002) and Nahid and Fatma (2004), they concluded that K^+ percentage was relatively higher in all studied plants than that of Na^+ percentage.

2- Low palatable group (LP):-

This group was represented by three plants only; *Zilla spinosa*, *Leptadenia pyrotechnica* and *Fagonia arabica*. These plants provide a total average 48.9 % nutritional value (N.V). The highest total nutritional criterion (56 %) was obtained by *Zilla spinosa*, while *Leptadenia pyrotechnica* and *Fagonia arabica* plants recorded more or less the same level (45.9 & 44.8 %) of nutritional value. In comparison, it is noticed that the nutritional values, electrolytes and non electrolytes for each individual of this group were lesser than those of the first group concerning mineral ions percentage (Na & K), they were more or less the same within the three species. 0.22 % for (Na and K) was obtained by *Zilla spinosa*. The other value criteria were markedly

differed in between the three plants with the exceptional total carbohydrates contents was approximately more or less the same.

3- Un-palatable group (UP):-

This group comprise the largest number (6 species) of plants mostly they are aromatic, such as *Achillea fragrentissma*, *Pulicaria arabica*, *Ephedra alata*, *Cleome droserifolia* and *Aerva javanica*, beside the xerophytic species *Zygophyllum coccineum*. In despite of its high total average N.V. (50.9 %), all members of this group are unpalatable for livestock herbivory. Some plants showed higher nutritional criteria than those members of the second group, for example total carbohydrates (TC) percentage amounted 33.8 and 27.8 % for *Achillea* and *Pulicaria* plants, respectively. Concerning the cations are differed with and between all members of this group but, apparently, Na^+ percentages were higher than those of K^+ in all plants. In comparison, Na^+ percentages were remarkably higher in plants of this group than those of the two proceedings. The total average crude protein attained the lowest level (7 %) compared to the two other groups.

In general, physiologically, un-palatability may be due to offensive scent, aromatic smell resulting from the presence of volatile oil and finally the high Na^+ percentages in the plant tissues. The previous elements may be accumulated or execrated inside the ant tissue due to an accident environmental stress. So, plants of the third group deserve the priority of further studies on their secondary metabolite fractions, especially, volatile oils, tannins or other palatability retardant compounds.

On thee other hand, during summer, all plants in the three groups tend to physiologically adjust their osmotic potential through increment of the osmotically active constitutes which in turn affect the rate of water required for survival in dry seasons. The osmotically active constitutes include mineral ions and some organic compounds such as carbohydrates and proteins.

Generally, the present investigation proved that all individual plants in the three groups tended to increase their osmotically active constituents, either electrolytes or non-electrolytes, during the dry season. Table (3) shows the increment of the total average NVs during summer where they amounted 67.7 %, 51.9 % and 55.3 % for highly, low and un-palatable groups, respectively. However, during the two seasons of study, it is noticeable that the pronounced increment of K^+ than that of Na^+ in all plants of group I (highly palatable). The two ions were more or less the same in plants of low palatable group, while in these of un-palatable one, Na^+ apparently increased than that of K^+ with exceptions. These results are in agreement with these of Moussa and Ahmed (2010).

The most interesting point in the present investigation is the correlative relationship between the correspondence increments of K^+ and carbohydrates percentage either in palatable or in un-palatable plants even during the two seasons of study, Fig. (2a, b). For example, the highly palatable *Heliotropeum arabinense* and the Un-palatable *Achillia fragrentessma* recorded their peaks of K^+ and total carbohydrates during the two seasons of study. All plants of the three groups showed the same patterns Table (3). In this respect, Evans and Wildes (1972) and Wyn Jone *et al*. (1979) stated that K^+ ions have an important role in protein and starch

synthesis. Potassium ions have indirect effects on photosynthesis and promotes the translocation of assimilates from leaves (Neals and Incoll, 1968). Under favourable conditions carbohydrates are utilized by plants for maintenance and for development of new shoot and root growth (Abd El-Rahman *et al*., 1983 and El-Halawany *et al*., 2002). Potassium promotes certain enzyme reactions and acts with Na^+ to maintain normal PH level and responsible for the balance between fluids inside and outside the cell (Lust, 1974). So, it is note that the higher percentage of potassium percentage the higher the fresh yield of leaves and stem and their total nutritive value, but the un-palatability may be due to the inhibitory effects of palatability retarded compounds.

Concerning digestible crude protein (DCP) and total digestible nitrogen (TDN), there is correlation between them and different nutritional value criteria (N.V), especially crude protein (CP) and crude fibers (CF), during the two seasons of study.

Table (1): Soil characteristic of Wadi El-Hawashiya, Eastern Desert.

Items / Site and Depth	GPS Data	Physical characters					Chemical characters			
		C.S%	F.S%	Silt + Clay%	Texture	F.C %	PH	EC dsm^{-1}	$CaCO_3$ %	O.M%
SI (0-50 cm) 60 km from the mouth of the wadi	28º 24' 59" N 32º 37' 45" E 343 m ASL	69.72	20.14	10.14	Coarse sand	3.06	7.73	0.17	14.5	0.09
SII (0-50 cm) 45 km from the mouth of the wadi	28º 25' 43" N 32º 41' 41" E 270 m ASL	66.65	26.35	7.0	Coarse sand	5.14	7.72	0.14	13.1	0.24
SIII (0-50 cm) 20 km from the mouth of the wadi	28º 27' 51" N 32º 46' 55" E 241 m ASL	67.37	23.36	9.27	Coarse sand	7.6	7.74	0.19	9.2	0.28

Whereas: - C.S= Coarse sand, F.S= Fine sand, O.M= Organic matter, F.C= Field capacity and ASL= above sea level.

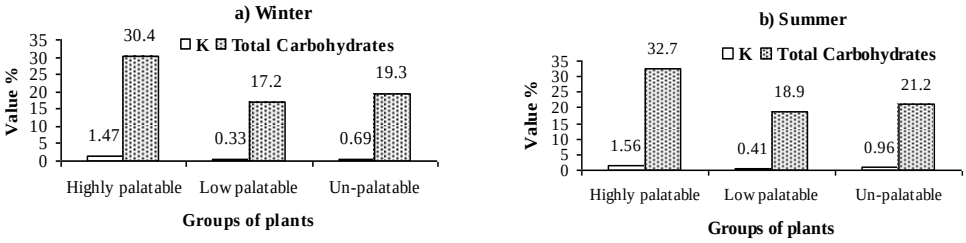

Figure (2a, b): Seasonal relationship between absorption of Potassium and accumulation of Carbohydrates.

Table (2): Importance values of plant species dominated Wadi El-Hawashiya, Eastern Desert.

Species	Family	IV
(SI) 60 km inside the wadi		
Zilla spinosa (L.) Prantl	Brassicaceae	66.78
Zygophyllum coccineum (L.)	Zygophyllaceae	64.73
Artemisia herba-alba (Asso.)	Asteraceae	58.22
Ochradenus baccatus (Del.)	Resedaceae	45.29
Leptadenia pyrotechnica (Forssk.) Decne.	Asclepiadaceae	31.99
Cleome droserifolia (Forssk.) Del.	Cleomaceae	11.42
Ephedra alata (Decne.)	Ephedraceae	9.76
Aerva javanica (Burm.f.) Spreng.	Amaranthaceae	7.98
Fagonia arabica (L.)	Zygophyllaceae	4.03
(SII) 45 km inside the wadi		
Artemisia herba-alba (Asso.)	Asteraceae	79.894
Ephedra alata (Decne.)	Ephedraceae	67.428
Zilla spinosa (L.) Prantl	Brassicaceae	64.779
Leptadenia pyrotechnica (Forssk.) Decne.	Asclepiadaceae	33.34
Ochradenus baccatus (Del.)	Resedaceae	17.577
Acacia tortilis (Hayne.)	Fabaceae	11.552
Zygophyllum coccineum (L.)	Zygophyllaceae	5.755
Cleome droserifolia (Forssk.) Del.	Cleomaceae	5.657
Pulicaria crispa (Forssk.) Oliv.	Asteraceae	5.637
Heliotropium arabinense (Fresen.)	Boraginaceae	4.174
Polycarpon succulentum (J. Gay)	Caryophyllaceae	4.202
(SIII) 20 km inside the wadi		
Zilla spinosa (L.) Prantl	Brassicaceae	104.856
Acacia tortilis (Forssk.)	Fabaceae	74.253
Ephedra alata (Decne.)	Ephedraceae	39.011
Artemisia herba-alba (Asso.)	Asteraceae	34.598
Leptadenia pyrotechnica (Forssk.) Decne.	Asclepiadaceae	19.467
Ochradenus baccatus (Del.)	Resedaceae	14.168
Achillea fragrantisimma (Forssk.) Sch. Bip.	Asteraceae	13.640

Table (3): Nutritional value of different plant species dominate the wadi bed of Wadi El-Hawashiya, Eastern Desert during two successive seasons.

Items / Species	Winter								Summer							
	CP%	CF%	TC%	Na^+	K^+	DCP %	TDN %	Total NV%	CP%	CF%	TC%	Na^+	K^+	DCP %	TDN %	Total NV%
I- Highly palatable group																
Artemisia herba alaba	6.7	28.5	39.6	0.31	1.54	2.7	67.8	76.6	8.4	28.7	41.2	0.45	1.62	4.3	68.5	50.3
Ochradenus baccatus	7.8	18.3	20.4	0.12	1.2	3.7	68.5	47.8	8.9	18.2	22.8	0.23	1.34	4.8	68.8	50.9
Acacia tortilis	13.1	17.1	20.2	0.71	1.3	8.6	70.7	52.4	13.3	17.3	22.5	1.34	1.35	8.9	70.8	55.8
Acacia tortilis ssp. raddiana	14.2	18.6	30.6	0.78	1.42	9.7	71.2	65.7	14.3	18.4	33.4	0.89	1.64	9.8	71.2	68.6
Heliotropium arabinense	9.1	23.3	41.3	0.11	1.78	1.9	68.9	75. 6	10.3	23.1	44.1	1.75	1.93	6.1	69.4	81.2
Total average	10.2	21.2	30.4	0.41	1.47	-	-	63.5	11.4	21.1	32.7	0. 93	1.56	-	-	67.7
II- Low palatable group																
Zilla spinosa	11.6	27.3	16.1	0.22	0.22	7.3	70.0	56.0	13.3	27.2	18.3	0.31	0.35	8.3	70.8	59.5
Leptradenia pyrotechnica	3.9	22.2	18.9	0.4	0.48	1.5	67.2	45.9	4.1	22.1	20.5	0.55	0.51	0.3	66.6	47.8
Fagonia arabiaca	10.8	17.3	16.7	0.31	0.30	6.6	69.7	44.8	12.8	17.1	17.9	0.42	0.33	8.4	70.5	48.6
Total average	8.8	22.3	17.2	0.31	0.33	-	-	48.9	10.1	22.1	18.9	0.43	0.41	-	-	51.9
III- Unpalatable group																
Zygophyllum coccineum	5.7	27.9	14.1	1.3	0.11	1.8	67.5	49.1	6.4	28.1	15.3	2.1	0.3	2.4	67.6	52.3
Cleome dresrofolia	8.8	32.8	17.5	0.55	0.44	4.7	68.7	60.1	10.9	32.9	19.2	1.2	0.61	6.6	69.7	64.8
Ephedra alata	10.3	24.8	9.9	0.21	0.13	6.1	69.4	45.1	13.6	24.2	11.8	0.33	0.91	9.1	70.9	50.1
Aerva javanica	4.5	21.2	12.7	1.55	0.18	0.67	66.4	40.1	4.9	21.6	14.1	1.75	0.27	1.1	66.9	42.6
Pulicaria arabica	6.1	15.8	27.8	1.1	1.3	2.2	66.8	50.9	6.3	16.2	30.2	1.55	1.9	2.3	67.6	56.2
Achillea fragrantisimma	6.8	16.5	33.8	1.0	1.9	2.8	67.8	60.4	7.2	17.8	36.3	1.66	2.5	3.2	68.0	65.5
Total average	7.0	23.2	19.3	1.0	0.69	-	-	50.9	8.2	23.5	21.2	1.43	0.96	-	-	55.3

CONCLUSION

Phytosociologicaly, the present investigation concluded that Wadi El-Hawashiya is characterized by its high phyto-diversity. From ecological point of view, this phyto-diversity may be due to the unique geomorphological structure and topographic features of the wadi bed. There are three communities are distinguished, the co-dominant species *Zilla spinosa* - *Zygophyllum coccineum*, *Artemisia herba-alba* and *Zilla spinosa* communities. Communities are better indicator for habitat conditions than the individual species.

Physiologically, chemical constitutes, especially nutritive values of the plant materials has an ecological bearing as a function of environmental acclimation. Of fourteen surveyed species, there are eight palatable ones; 57.1 % of the total species. Owing to the large number of palatable plants and the annual flash floods attack the area, delta of Wadi El-Hawashiya must be put in the first priorities of governmental attentions for sustainable development. It is note worth to note, from the foregoing results, that there is an intimate relationship between accumulation of potassium ions and the increment of carbohydrates synthesis rates. It is known that potassium element improves yield quality.

Recommendation

Beside the annual 10 mm/year rainfalls, the wadi receives some annual rained storms creating flash floods drain into the delta of the wadi bearing fine disintegrated materials resulting from weathering of the country rocks. So the delta reveals the presence of shallow basin filled with moderate deep and fine textured soil suitable for several purposes of sustainable development. These floods cause confusedness and/or serious damages for settlers and constructions of the Arab Petroleum Company. Thus, for the previous reasons, the present investigation suggest a rapid performance for delineation of catchment's area and drainage basin based on recent and advanced programs depending by using Remote Sensing and Geographical Information System (GIS) technique in order to protect and exploit the natural resources of this promising area.

A part from this approach, more lights must be thrown on the un-palatable plants through further studies on palatability retracted compounds.

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دراسات بيئية وبيئية فسيولوجية على بعض النباتات بوادى الحواشية، الصحراء الشرقية، مصر

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يعتبر وادى الحواشية احد اهم اودية الصحراء الشرقية لمصر حيث يشغل مكانة خاصة بمنطقة خليج السويس. يستقبل الوادى سنويا حوالى ١٠ مم من الامطار الى جانب العواصف السنوية المطيرة والتى تخلف وراءها فياضانات محدودة النطاق والتى تضع هذا الوادى فى بؤرة الاهتمام هدف التنمية المستدامة.

تهدف الدراسة الحالية الى تحديد وتعريف عناصر الغطاء النباتى لمجرى الوادى وكذلك تقييم القيم الغذائية، كأحد عوامل الانضباط الايكوفيسيولوجى تجاه الظروف البيئية المناوئة، وذلك من خلال التعرف على التركيب الكيميائى للنباتات السائدة بالوادى على مدار موسمين مختلفين ومتتابعين.

اوضحت دراسة المجتمع النباتى ان العشيرة المزدوجة لنباتى السلة والرطريط قد تسيدتا منبع الوادى، بينما سادت عشيرتا الشيح الابيض والسلة موقعين مختلفين فى القطاع الاوسط للوادى. تم تقسيم النباتات طبقا لاستساغتها الى ثلاثة مجموعات عالية الاستساغة، مجموعة منخفضة الاستساغة ومجموعة غير مستساغة. كما أوضحت النتائج ان اختلافات العوامل الارضية مثل قوام التربة، الملوحة، محتوى التربة من الرطوبة والتضاريس، تلعب دورا هاما فى توزيع ونمو الغطاء النباتى وكذلك فى تراكم المواد النشطة اسموزيا داخل انسجة النبات. واخيرا اوضحت الدراسة ايضا من خلال التحليل الكيميائى للنباتات ان هناك علاقة وطيدة بين تراكم أيونات البوتاسيوم وتكوين وتراكم الكربوهيدرات.

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