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FLORISTIC FEATURES OF THREE *PLANTAGO* SPECIES COMMUNITIES IN THE NILE DELTA, EGYPT

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ABSTRACT

The present study demonstrates a floristic characterization of three selected wild communities of Plantago species within the Nile delta region of Egypt. The benefits of weeds in agricultural situations, that they may increase crop growth under certain circumstances. Also, the specific site conditions and species involved must be considered before drawing conclusions about the value of a particular plant. Several Plantago species are common weeds in populated areas. After regular visits to the different sites of the study area, 60 stands (2 x 5 m each according to the minimal area) were selected for sampling the vegetation types. The stands representing Plantago lagopus L. community were sampled in El-Behira Governorate. The stands of Plantago major L. community were represented in El-Dakahlia Governorate and El-Sharkia Governorate. The sampled stands of Plantago squarrosa Murray community were designed in El-Behira Governorate, El-Dakahlia Governorate and Kafr El-Sheikh Governorate. The total number of plant species in the present study was 105 species, about 66 annual species (62.85%), three biennial species (2.86 %) and 36 perennial species (34.29%). The total number of the recorded plant species were belonging to 87 genera and related to 28 families. The major families were Poaceae, Asteraceae, Fabaceae, Brassicaceae and Polygonaceae which contributed collectively, about 60% of the total recorded plant species. The other recorded families were represented by relatively low number of species ranged between 1-4 plant species. The majority of the recorded species were therophytes (65.71%), followed by geophytes (16.19%), then hemicryptophytes (11.43%), chamaephytes (3.81%), helophytes (1.90%) and nanophanerophytes (0.95%). The floristic analysis in the present investigation revealed that, 64 species (60.95%) of the total recorded species were Mediterranean taxa, consequently the study area is mainly belonging to Mediterranean Toritory.

Keywords: *Plantago, Nile delta, flora, life form, chorotype.*

INTRODUCTION

Rapid population growth and high levels of food insecurity in the Nile basin mean that increasing agricultural production is an urgent imperative for the region (Johnston, 2012). Also, low productivity and high levels of risk due to variable climate should be considered in the future studies. Weeds were recognized as a plant to be considered a weed (a problem plant), its abundance must be above a specific level interferes with the activities and welfare of humans (Crawley, 1997). This refines the definition somewhat because it suggests that a plant is only a weed if it is present above a specific abundance. Areas of study range from basic

biological and ecological investigations to the design of practical methods of managing weeds in the environment. The overall goal of weed management is to design the most appropriate methods in a variety of situations that ensure a sustainable ecosystem and a minimum influence of nuisance weeds of Plantaginaceae, as generally circumscribed, is a cosmopolitan family (Monaco *et al.,* 2002). The genus *Plantago* has a wide geographical distribution all over the world. (Heywood, 1978; Cronquist, 1981; Mabberley, 1997). It is represented in Egypt by 22 species according to Boulos (2009). It has been widely used in folk medicine for various purposes, including wound healing and acted as an anti-inflammatory, antimicrobial and antitumor agent (Samuelsen, 2000). The present study provides an investigation of the floristic features, including list of plant species, life-span, life-form spectra and floristic analysis of the plant life associated with three *Plantago* species communities in the Nile delta namely, *Plantago lagopus, P. major* and *P. Squarrosa* of family Plantaginaceae.

STUDY AREA

The study area is located in the Nile delta region. It covers a total area of 2.25 million hectares and it is characterized by alluvial soils (clay to loamy). The Nile is the main source of water for irrigation, while the new land is located mainly on both the east and west sides of the Nile delta and scattered over various areas in the country. The sampled stands were distributed in many localities of the study area as shown in Figure (1) in the three main sectors as follows:

1. Eastern Nile delta including a Governorate namely:
- El-Sharkia Governorate represented by El-Salhia (old desert).
2. Central Nile delta including two Governorates namely:
   a) El-Dakahlia Governorate represented by Bilqas, Mansoura, Talkha and Qalabshu districts.
   b) Kafr El-Sheikh Governorate represented by Baltim district.
3. Western Nile delta including two Governorates namely:
- El-Beheira Governorate represented by Rosetta and Idko districts.

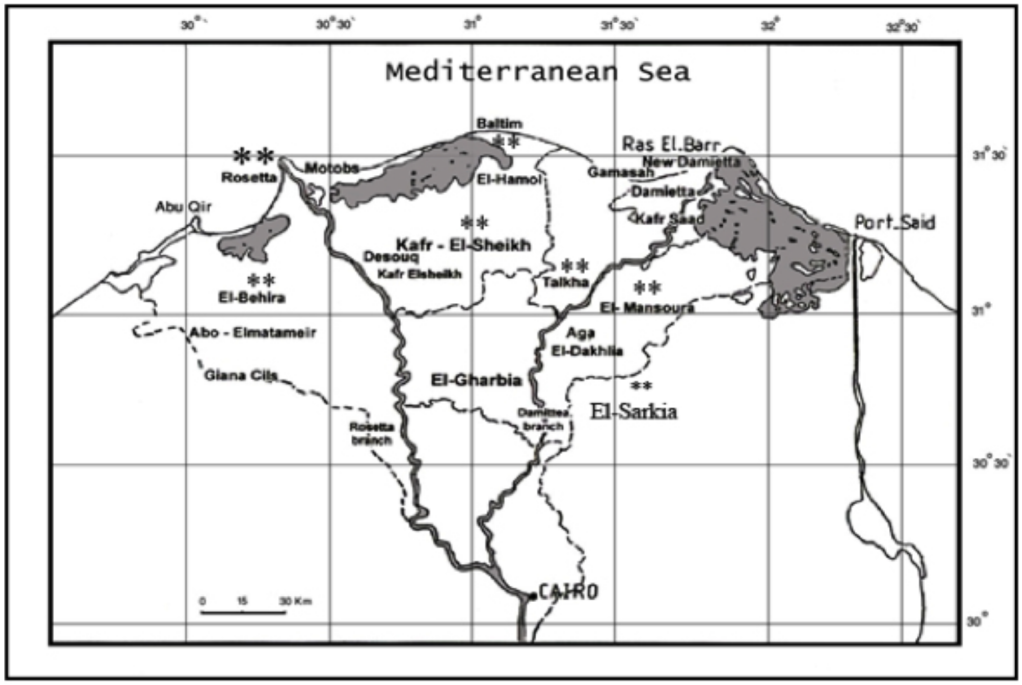


Figure (1) : Map of the Nile delta of Egypt showing the different locations of the sampled sites indicated by (*) in the study area.

MATERIALS AND METHODS

After regular visits to the different sites of the study area from January 2012 to December 2013, 60 stands (2 x 5 m each according to the minimal area) were selected for sampling the vegetation types in the different habitats of the study area. The chosen stands were distributed in the study area to cover all local physiographic variations within each habitat type and to ensure sampling of a wide range of vegetation variations. In delimiting each stand a reasonable degree of visual physiographic and physiognomic homogeneity and a minimum degree of disturbance were ensured.

The description and classification of life-forms in the present study were according to Raunkiaer (1934). The classification, identification and floristic categories were according to Tutin *et al.* (1964 -1968), Davis (1965 – 1985), Zohary (1966 & 1972), Tackholm (1974), Meikle (1977 & 1985), Feinbrun-Dothan (1978 & 1986) and Boulos (1999-2005).

RESULTS

Plant species in the study area are presented in Table (1). It showed that, the total number of plant species in the present study was 105 species. These species were classified as shown in Figure (2 a) into three major groups according to their life-span: 66 annual species (62.85%), three biennial species (2.86%) and 36 perennial species (34.29%).

According to the description and classification of life-form of Raunkiaer (1934), the life-form of the plant species recorded in the present study were grouped under six types

as follows: therophytes, chamaephytes, hemicryptophytes, geophytes, helophytes and nanophanerophyes (Table 1 & Figure 2 b). The majority of the recorded species were therophytes (65.71%), followed by geophytes (16.19 %), then hemicryptophytes (11.43%), chamaephytes (3.81%) and helophytes (1.9%). The lowest value of life-forms was recorded as nanophanerophytes which attained value of 0.95%.

The total number of the recorded plant species surveyed in the present study was 105 species belonging to 87 genera and related to 28 families (Table 2). The major recorded families were Poaceae (22 species), Asteraceae (19 species), Fabaceae (9 species), Brassicaceae (7 species) and Polygonaceae (6 species) which contributing collectively about 60% of the total recorded plant species. The other families include Fumariaceae, Geraniaceae, Lamiaceae, Lythraceae, Malvaceae, Oxalidaceae, Plantaginaceae, Primulaceae, Ranunculaceae, Scrophulariaceae, Solanaceae, Urticaceae and Verbenaceae were represented by relatively low number of plant species ranged from 1-4 species. *Symphyotrichum squamatum* was the only invasive species recorded in the present study according to Global Invasive Species Program Database Online, http://www.issg.org/database/welcome/.

Table (1) : Floristic composition of the plant life in the studied area.

No	Plant species	Family	Life form	Floristic category
A- Perennials :				
1	*Alhagi graecorum* Boiss.	Fabaceae	H	PAL
2	*Calligonum polygonoides* L.	Polygonaceae	Nph	SA-SI+IR-TR
3	*Convolvulus arvensis* L.	Convolvulaceae	H	COSM
4	*Cynodon dactylon* (L.) Pers.	Poaceae	G	PAN
5	*Cyperus alopecuroides* Rottb.	Cyperaceae	G	PAL
6	*Cyperus capitatus* Vand.	Cyperaceae	G	ME
7	*Cyperus rotundus* L.	Cyperaceae	G	PAN
8	*Echinochloa stagnina* (Retz.) P. Beauv.	Poaceae	G, He	PAL
9	*Echinops spinosus* L.	Asteraceae	H	ME+SA-SI
10	*Echium angustifolium* Mill.	Boraginaceae	Ch	ME
11	*Elymus farctus* (Viv.) Runemark ex Melderis	Poaceae	G	ME
12	*Euphorbia terracina* L.	Euphorbiaceae	H	ME
13	*Imperata cylindrica* (L.) Raeusch	Poaceae	G	ME+PAL
14	*Launaea fragilis* (Asso) Pau .	Asteraceae	H	ME+SA-SI
15	*Launaea mucronata* (Forssk.) Muschl.	Asteraceae	H	ME+SA-SI
16	*Lolium perenne* L.	Poaceae	H	ER-SR+ME+IR-TR
17	*Lotus creticus* L.	Fabaceae	H	ME

Table (1) : Continued.

18	*Lotus glaber* Mill.	Fabaceae	H	ER-SR+ME+IR-TR
19	*Mentha longfolia* L.Huds.	Lamiaceae	He	PAL
20	*Moltkiopsis ciliata* (Forssk.) I. M. Johnst.	Boraginaceae	Ch	SA-SI+ME+S-Z
21	*Oxalis corneculata* L.	Oxalidaceae	G	COSM
22	*Pancratium maritimum* L.	Amaryllidaceae	G	ME
23	*Pasplidium geminatum* (Forssk.) Stapf	Poaceae	G	PAL
24	*Pennisetum setaceum* (Forssk.) Chiov.	Poaceae	G	PAL+ME
25	*Persicaria salicifolia* (Willd.) Assenov	Polygonaceae	G	PAL
26	*Phragmites australis* (Cav.) Trin. Ex Steud.	Poaceae	G, He	COSM
27	*Phyla nodiflora* (L.) Greene	Verbenaceae	Ch	PAN
28	*Plantago major* L.	Plantaginaceae	H	COSM
29	*Polygonum equisetiforme* Sibthi & Sm.	Polygonaceae	G	ME+IR-TR
30	*Polypogon viridis* (Gouan) Breistr.	Poaceae	H	ME+IR-TR
31	*Schoenus nigricans* L.	Cyperaceae	G	COSM
32	*Silene succulenta* Forssk.	Caryophyllaceae	H	ME
33	*Symphyotrichum squamatum* (Spreng.) Nesom.	Asteraceae	Ch	NEO
34	*Sorghum virgatum* (Hack.) Stapf	Poaceae	G	SA-SI
35	*Stipagrostis lanata* (Forssk.) De Winter	Poaceae	G	SA-SI
36	*Veronica anagallis-aquatica* L.	Scrophulariaceae	He	COSM
B- Biennials :				
1	*Beta vulgaris* L.	Chenopodiaceae	Th	ME+IR-TR+ER-SR
2	*Rorippa palustris* (L.) Besser	Brassicaceae	Th	ME+IR-TR+ER-SR
3	*Sida alba* L.	Malvaceae	Th	PAN
C- Annuals :				
1	*Aegilops bicornis* (Forssk.) Jaub.& Spach	Poaceae	Th	SA-SI
2	*Amaranthus lividus* L.	Amaranthaceae	Th	PAL
3	*Ammannia baccifera* L.	Lythraceae	Th	PAL
4	*Anagallis arvensis* L.	Primulaceae	Th	ME+IR-TR+ER-SR
5	*Anchusa humilis* (Desf.) I .M. Johnst.	Boraginaceae	Th	SA-SI
6	*Avena fatua* L.	Poaceae	Th	PAL
7	*Bidens pilosa* L.	Asteraceae	Th	PAN
8	*Brassica tournefortii* Gouan	Brassicaceae	Th	ME+SA-SI
9	*Bromus catharticus* Vahl	Poaceae	Th	ER-SR+ME+IR-TR
10	*Bromus diandrus* Roth	Poaceae	Th	ME+IR-TR
11	*Cakile maritima* Scop.	Brassicaceae	Th	ME+ER-SR
12	*Calendula arvensis* L.	Asteraceae	Th	ME+IR-TR+SA-SI
13	*Carduus getulus* Pomel	Asteraceae	Th	SA-SI
14	*Carthamus tenuis* (Boiss. & Blanche) Bornm.	Asteraceae	Th	ME

Table (1) : Continued.

15	*Cenchrus biflorus* Roxb.	Poaceae	Th	S-Z+SA-SI
16	*Chenopodium album* L.	Chenopodiaceae	Th	COSM
17	*Chenopodium giganteum* D. Don	Chenopodiaceae	Th	PAL
18	*Chenopodium murale* L.	Chenopodiaceae	Th	COSM
19	*Conyza aegyptiaca* (L.) Dryand.	Asteraceae	Th	S-Z
20	*Conyza bonariensis* (L.) Cronquist	Asteraceae	Th	ME
21	*Coronopus didymus* (L.) Sm.	Brassicaceae	Th	COSM
22	*Coronopus squamatus* Forssk.	Brassicaceae	Th	ER-SR+IR-TR+ME
23	*Cutandia memphitica* (Spreng.) K. Richt.	Poaceae	Th	ME+IR-TR+SA-SI
24	*Daucus litoralis* Sm.	Apiaceae	Th	ME
25	*Eclipta prostrata* L.	Asteraceae	Th	PAL
26	*Emex spinosa* (L.) Campd.	Polygonaceae	Th	ME+SA-SI
27	*Erodium laciniatum* (Cav.) Willd.	Geraniaceae	Th	ME
28	*Euphorbia prostrata* Aiton.	Euphorbiaceae	Th	ME+SA-SI+IR-TR
29	*Euphorpia peplus* L.	Euphorbiaceae	Th	ER-SR+ME+IR-TR
30	*Fumaria bracteosa* Pomel	Fumariaceae	Th	ME+IR-TR+ER-SR
31	*Hordeum murinum* L.	Poaceae	Th	IR-TR+ME
32	*Ifloga spicata* (Forssk.) Sch. Bip.	Asteraceae	Th	ME+SA-SI
33	*Lactuca serriola* L.	Asteraceae	Th	ME+IR-TR+ER-SR+S-Z
34	*Lamium amplexicaule* L.	Lamiaceae	Th	ME+IR-TR+ER-SR
35	*Lolium multiflorum* Lam.	Poaceae	Th	ME+IR-TR+ER-SR
36	*Lotus halophilus* Boiss. & Spruner	Fabaceae	Th	ME+SA-SI
37	*Malva parviflora* L.	Malvaceae	Th	ME+IR-TR
38	*Medicago intertexta* (L.) Mill.	Fabaceae	Th	ME+ER-SR
39	*Medicago polymorpha* L.	Fabaceae	Th	ME+IR-TR+ER-SR
40	*Melilotus indicus* (L.) All.	Fabaceae	Th	ME+IR-TR+SA-SI
41	*Mesembryanthemum crystallinum* L.	Aizoaceae	Th	ME+ER-SR
42	*Ononis serrata* Forssk.	Fabaceae	Th	ME+SA-SI
43	*Paronychia arabica* (L.) DC.	Caryophyllaceae	Th	SA-SI+ME+S-Z
44	*Phalaris minor* Retz.	Poaceae	Th	ME+IR-TR
45	*Picris asplenioides* L.	Asteraceae	Th	SA-SI
46	*Plantago squarrosa* Murray	Plantaginaceae	Th	ME
47	*Plantago lagopus* L.	Plantaginaceae	Th	ME+IR-TR
48	*Poa annua* L.	Poaceae	Th	ME+IR-TR+ER-SR
49	*Polypogon monspeliensis* (L.) Desf.	Poaceae	Th	ME+IR-TR+SA-SI
50	*Pseudorlaya pumila* (L.) Grande	Apiaceae	Th	ME+SA-SI
51	*Ranunculus scleratus* L.	Ranunculaceae	Th	ME+IR-TR+ER-SR
52	*Raphanus raphanistrum* L.	Brassicaceae	Th	ME+ER-SR

Table (1) : Continued.

53	*Reicharadia tingitana* (L.) Roth	Asteraceae	Th	SA-SI+IR-TR
54	*Rumex dentatus* L.	Polygonaceae	Th	ME+IR-TR+ER-SR
55	*Rumex pictus* L.	Polygonaceae	Th	ME+SA-SI
56	*Senecio glaucus* L.	Asteraceae	Th	SA-SI+IR-TR
57	*Silene vivianii* Steud.	Caryophyllaceae	Th	SA-SI
58	*Sisymbrium irio* L.	Brassicaceae	Th	ME+IR-TR+ER-SR+SA-SI
59	*Solanum nigrum* L.	Solanaceae	Th	COSM
60	*Sonchus oleraceus* L.	Asteraceae	Th	COSM
61	*Stellaria pallida* (Dumort.) Murb.	Caryophyllaceae	Th	ME+ER-SR
62	*Torilis arvensis* (Huds.) Link	Apiaceae	Th	ME+IR-TR+ER-SR
63	*Urospermum picroides* (L.) F. W. Schmidt	Asteraceae	Th	ME+IR-TR
64	*Urtica urens* L.	Urticaceae	Th	ER-SR+ME+IR-TR
65	*Vicia sativa* L.	Fabaceae	Th	ME+IR-TR+ER-SR
66	*Xanthium strumarium* L.	Asteraceae	Th	COSM

Abbreviations:

Th : Therophytes
Ch : Chamephytes
Nph: Nanophanerophytes
H : Hemicryptophytes
He : Helophytes
G : Geophytes
COSM : Cosmopolitan
PAN : Pantropical
PAL : Palaeotropical
NEO : Neotropical
ME : Mediterranean
ER-SR: Euro-Siberian
SA-SI Saharo-Sindian
IR-TR: Irano-Turanina
S-Z : Sudano Zambezian

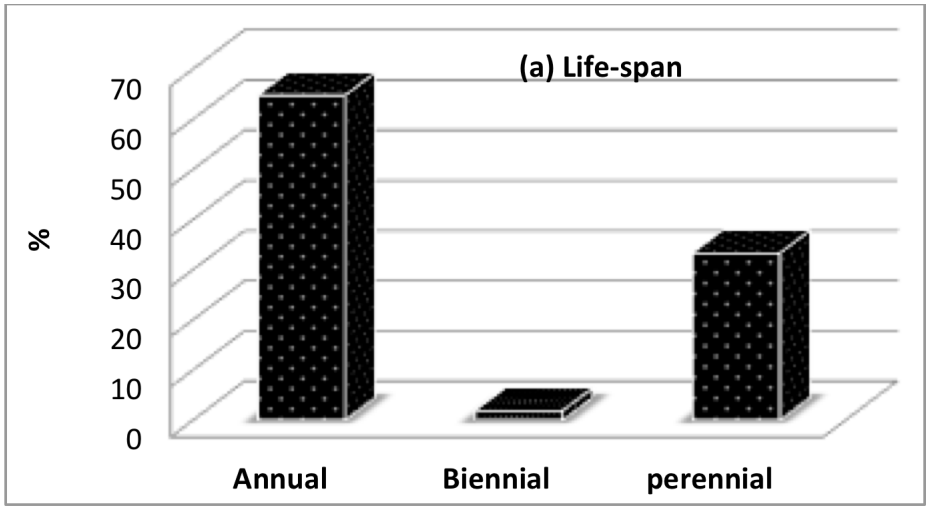
The floristic categories of the families in the study area are shown in Table (2). The floristic elements in the family Poaceae were 22 species including Biregional (7 species), Pluriregional (6 species), Palaeotropical, Saharo-Sindian (3 species, each), Mediterranean, Pantropical and Cosmopolitan elements were represented by one species, each. In Asteraceae (19 species), the chorotypes comprised Biregional (7 species), Pluriregional, Mediterranean, Saharo-Sindian and Cosmopolitan which were represented by two species each. While, Pantropical, Palaeotropical, Neotropical and Sudano-Zambezian elements were represented by one species each. In Fabaceae, (9 species) the chorotypes included Pluriregional (4 species), Biregional (3 species), as well as Mediterranean and Palaeotropical were represented by one species each. The floristic elements in family Brassicaceae (7 species) were Biregional and Pluriregional (3 species each), Cosmopolitan element was represented by one species. The floristic elements in Polygonaceae (6 species) were Biregional (4 species), Pluriregional and Palaeotropical (one species each).

The floristic analysis of the study area as shown in Table (3) revealed that 64 species (about 60.95 % of the total number of species) were Mediterranean taxa. These taxa were Pluriregional (27 species = 25.71%), Biregional (25 species = 23.81%) and Monoregional (12 species= 11.43%). It has been also, found that 29 species or about 27.62 % of the total number of recorded recorded species were Cosmopoliton (12 species =11.43%), Palaeotropical (11 species =10.48 %), Pantropical (5

species = 4.76 %) and Neotropical (1 species 0.95 %). On the other hand, the Saharo-Sindian elements were represented by 29 species (27.62%), which can be subdivided into: 14 species (13.33%) as Biregional, 8 species as Pluriregional elements (7.62%) and 7 species (6.67 %) as Monoregional. Other floristic categories were poorly represented, as they were represented by a little number of species. Generally as shown in Table (3), the Monoregional elements were represented by 49 species (46.67%), Biregional elements by 29 species (27.62%) and Pluriregional elements by 27 species (25.72%) of the total number of recorded species in the present study.

DISCUSSION

The total number of plant species in the present study was 105 species. These species were classified into three major groups according to their life-span: 66 annual species representing (62.85%), three biennial species (2.86%) and 36 perennial species (34.29%) which are mostly herbaceous either with woody base or with tuberous underground parts and few are shrubs. The dominance of annuals may be generally attributed to the fact that, annuals have higher reproductive capacity and ecological, morphological and genetic plasticity under high levels of disturbance (Harper, 1977) and agricultural practices (Grime, 1979). According to Shaltout and El Fahar (1991) the predominance of annuals (>70%) in the weed communities in the Nile Delta is related to the niche coincidence of both weeds and host crops. On the other hand, in the deltaic Mediterranean coastal habitat, the predominance of life-span is related to annuals species (>50%) where it in a harmony with other reports (El-Demerdash *et al.,* 1997; Mashaly, 2002; Shaltout *et al.,* 2005; Galal and Fawzy, 2007).



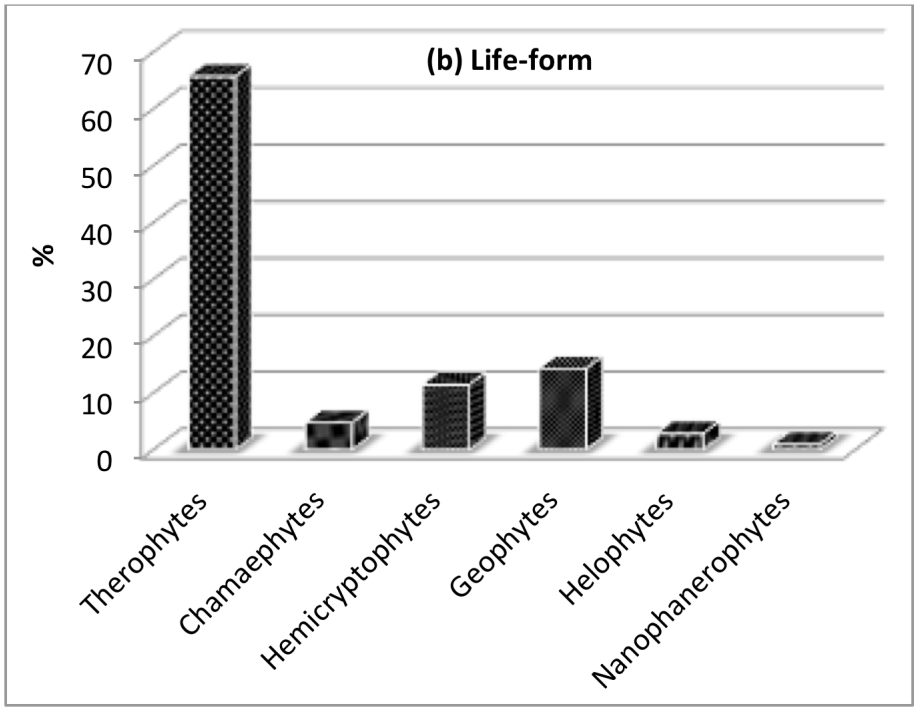


Figure (2) : Plant life-span (a)) and life-form (b) of the study area.

Table (2) : The principal floristic categories (Chorotypes) of the families recorded in the study area.

No.	Family	Genera	Species	COSM	PAN	PAL	NEO	ME	SA-SI	S-Z	Biregional	Pluriregional
1	Poaceae	19	22	1	1	3	-	1	3	-	7	6
2	Asteraceae	17	19	2	1	1	1	2	2	1	7	2
3	Fabaceae	6	9	-	-	1	-	1	-	-	3	4
4	Brassicaceae	6	7	1	-	-	-	-	-	-	3	3
5	Polygonaceae	5	6	-	-	1	-	-	-	-	4	1
6	Caryophyllaceae	4	4	-	-	-	-	1	1	-	1	1
7	Chenopodiaceae	2	4	2	-	1	-	-	-	-	-	1
8	Cyperaceae	2	4	1	1	1	-	1	-	-	-	-
9	Apiaceae	3	3	-	-	-	-	1	-	-	1	1
10	Boraginaceae	3	3	-	-	-	-	1	1	-	-	1
11	Euphorbiaceae	1	3	-	-	-	-	1	-	-	-	2
12	Plantaginaceae	1	3	1	-	-	-	1	-	-	1	-
13	Lamiaceae	2	2	-	-	1	-	-	-	-	-	1
14	Malvaceae	2	2	-	1	-	-	-	-	-	1	-
15	Aizoaceae	1	1	-	-	-	-	-	-	-	1	-
16	Amaranthaceae	1	1	-	-	1	-	-	-	-	-	-
17	Amaryllidaceae	1	1	-	-	-	-	1	-	-	-	-
18	Convolvulaceae	1	1	1	-	-	-	-	-	-	-	-
19	Fumariaceae	1	1	-	-	-	-	-	-	-	-	1
20	Geraniaceae	1	1	-	-	-	-	1	-	-	-	-
21	Lythraceae	1	1	-	-	1	-	-	-	-	-	-
22	Oxalidaceae	1	1	1	-	-	-	-	-	-	-	-
23	Primulaceae	1	1	-	-	-	-	-	-	-	-	1
24	Ranunculaceae	1	1	-	-	-	-	-	-	-	-	1
25	Scrophulariaceae	1	1	1	-	-	-	-	-	-	-	-
26	Solanaceae	1	1	1	-	-	-	-	-	-	-	-
27	Urticaceae	1	1	-	-	-	-	-	-	-	-	1
28	Verbenaceae	1	1	-	1	-	-	-	-	-	-	-
Sum		87	105	12	5	11	1	12	7	1	29	27
%				11.43	3.81	10.48	0.952	12.38	6.667	0.952	25.71	27.62

Abbreviations:

COSM : Cosmopolitan
PAN : Pantropical
PAL : Palaeotropical
NEO : Neotropical
ME : Mediterranean
SA-SI : Saharo-Sindian
S-Z : Sudano-Zambezian

According to the description and classification of life-form of Raunkiaer (1934), the life-form of the plant species recorded in the present study were grouped under six types as follows: therophytes, chamaephytes, hemicryptophytes, geophytes, helophytes and nanophanerophyes. The majority of the recorded species were therophytes (65.71%), followed by geophytes (16.19%), hemicryptophytes (11.43%), chamaephytes (3.81%), helophytes (1.9%) and nanophanerophytes (0.95%). The previous results agree with those of other reports (El-Demerdash *et al.,* 1990; Mashaly, 2001; Abu-Ziada *et al.,* 2008; El-Halawany *et al.,* 2010). The dominance of therophytes over the other life forms seems to be a response to their short life cycle that enable them to resist the instability of the cultivation system, topography variation and biotic influence (Heneidy and Bidak, 2001). Also, they had the ability to set seeds without the pollinators visit (Baker, 1974). The relatively high values of hemicryptophytes, cryptophytes and chamaephytes may be attributed to the ability of species to resist drought, salinity, sand accumulation and grazing (Danin and Orshan, 1990; Danin, 1996).

Results in the present investigation, showed that the study area is rich in its flora both at specific and generic levels. The total number of the recorded plant species surveyed in the present study was 105 species belonging to 87 genera and related to 28 families. The most recorded families were Poaceae, Asteraceae, Fabaceae, Brassicaceae and Polygonaceae contributing collectively about 60% of the total recorded plant species. The other families were represented by relatively low number of species. Symphyotrichum squamatum is the only invasive species recorded according to Global Invasive Species Program Database Online. This agrees more or less, with the findings of many authors: e.g.Quezel (1978) concerning the floristic structure of the Mediterranean Africa, Mashaly (1987) regarding the flora of Dakahlia-Damietta coastal district. Recently, El-Kady *et al.* (2000) on the vegetation of the north-west part of the Nile Delta, (Mashaly *et al.,* 2002) on the floristic features of Damietta area and El-Halawany (2003) on the vegetation changes in north Nile Delta, within two decades.

Egypt is the meeting point of the floristic elements belonging to at least four phytogeographical districts: the African Sudano-Zambesian, the Asiatic Irano-Turanian, the Afro-Asiatic Sahro-Sindian and the Euro-Afro-Asiatic Mediterranean (El-Hadidi, 1993). The floristic analysis of the study area revealed that 64 species of the total number of species were Mediterranean taxa. These taxa are either Pluriregional (27 species), Biregional (25 species) or Monoregional (12 species). It has been also, found that 29 species of the total number of recorded species include as Cosmopoliton (12 species), Palaeotropical (11 species), Pantropical (5 species) and Neotropical (one species). On the other hand, the Saharo-Sindian elements were represented by 29 species. Other floristic categories were poorly represented by a little number of species. Generally, the Monoregional elements were represented by 49 species, Biregional elements by 29 species and Pluriregional elements by 27 species of the total number of recorded species in the present study. Similar investigations have been described by many authors such as Serag (1999), Mashaly (2001,

2002 & 2003), Mashaly and Awad (2003), Mashaly and El-Ameir (2007), Abu-Ziada *et al.* (2008), Mashaly *et al.* (2008 & 2009) , Abd El-Aal (2013) and Abd El-Gawad *et al.* (2014).

It can be concluded that, the study area is mainly belonging to the Mediterranean Toritory and slightly extended to Euro- Siberian Toritory at north and to Saharo-Sindian at south.

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الملخص العربى

السمات الفلورية للمجتمعات النباتية المصاحبة لثلاثة أنواع من جنس البلانتاجو فى دلتا النيل بمصر

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تهدف هذه الدراسة إلى عمل مسح شامل للمجتمعات النباتية المصاحبة لثلاثة أنواع من جنس البلانتاجو في دلتا النيل بمصر وذلك للتعرف على السمات الفلورية والتوزيع الجغرافي وكذلك الطرز الحياتية والعناصر الفلورية للأنواع النباتية المختلفة بمنطقة الدراسة كما تهدف هذه الدراسة إلى التعرف على التركيب الفلوري لمنطقة الدراسة وذلك لإستخدامها في قياس التنوع النباتي وخطة الصون البيئي لمنطقة الدراسة في المستقبل.

فى هذة الدراسة قد تم تسجيل ١٠٥ نوعا من النباتات الزهرية التى تنتمى الى٨٧ جنسا و قد صنفت تحت ٢٨ فصيلة حيث اتضح ان الفصيلة النجيلية و المركبة و البقولية و الصليبية والحمضية هى الفصائل السائدة فى منطقة الدراسة. كما ان النباتات المسجلة بمنطقة الدراسة اشتملت على ٣٦ نوعا من النباتات المعمرة و٣ أنواع من النباتات ثنائية الحول و٦٦ نوعا من النباتات الحولية ,وقد تم تقسيم طرز الحياة النباتية الى ست مجموعات وهى : طراز الحوليات (therophytes) ويليها طرازالأرضيات (geophytes) ثم طراز شبه المختفيات (hemicryptophytes) وطراز النباتات الظاهرة (chamaephytes) وطرازنباتات البيئة الرطبة (helophytes) وكان أدنى قيمة لطرز الحياة هو طراز النباتات الزهرية الصغيرة (nanophanerophytes).

ولقد أوضح التحليل الفلورى أن هناك ٦٤ نوعا من النباتات المسجلة بنسبة (٥٩ , ٦٠٪) تتبع عنصر البحر المتوسط ,كما وجد أن العنصر العالمى يشمل ٤٣ , ١١٪ والعنصر الاستوائى ٤٨ , ١٠٪ والعنصر الاستوائى القديم ٧٦ , ٤٪ والعنصر الاستوائى الحديث ٩٥ , ٠٪ كما أتضح أن منطقة الدراسة تتبع أساسا أقليم البحر المتوسط وتمتد قليلا الى اقليم اليورو سيبري ناحية الشمال والى اقليم الصحارى – السندي ناحية الجنوب.

JOESE 5

FLORISTIC FEATURES OF THREE *PLANTAGO* SPECIES COMMUNITIES IN THE NILE DELTA, EGYPT

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