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RESEARCH ARTICLE

FLORISTIC COMPOSITION OF FOUR MEADOWS IN DINDER NATIONAL PARK, 2018-2019

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ABSTRACT

Background: Dinder National Park (DNP) is characterized by three ecological systems and these are meadows, riverine and dahara. These variations in habitat have resulted in wide distribution and high diversity of fauna and flora (1). ***Objective:*** The objective of the present study is to document the diversity of flora of the Dinder National Park in 2018 and 2019 in 4 meadows. ***Method:*** Standard collection and identification methods were used for plants. ***Results:*** During the study period, a total of 29 plant species, representing from 15 families, in 11 orders were recorded. The dominant families were Fabaceae and Poaceae. The phenology of flora revealed 71% of herbs, perennial herb and shrub forming 7% each. The annual weeds, grass, perennial grass, sub-shrub and trees represented 3% for each. ***Conclusion:*** There was a great diversity in species composition and families. It showed variations in species and families within the same medow among the years. Also, there were variations in species and families between the meadows.

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INTRODUCTION

DNP is located in the Blue Nile State bordering Ethiopia country and it is surrounded by three Sudanese States (Sinnar, Gadarif and Blue Nile). It covered an area of about 10,291km2 and it lies between latitudes 11° 45 E 12° 50 N and longitude 34° 30 E 36° 00 N at the south eastern part of Sudan against the Ethiopian's boundaries and about 550 Km South East far from Khartoum State (2). According to (Harrison, 1958) Dinder National Park (DNP) is characterized by three ecological systems and these are meadows, riverine and dahara. These variations in habitat have resulted in wide distribution and high diversity of fauna and flora. In the past DNP contained varieties of wildlife species, some were endangered or vulnerable while the rest are classified as least concern. The general classification of vegetation in Dinder national park are *Acacia seyal* and *Balanites aegyptiaca* Savanna alternating with grass area zone, and also *Anogeissus leocarpus* and *Combretum hartmannianum* Savanna woodland zone (Harrison, 1958).

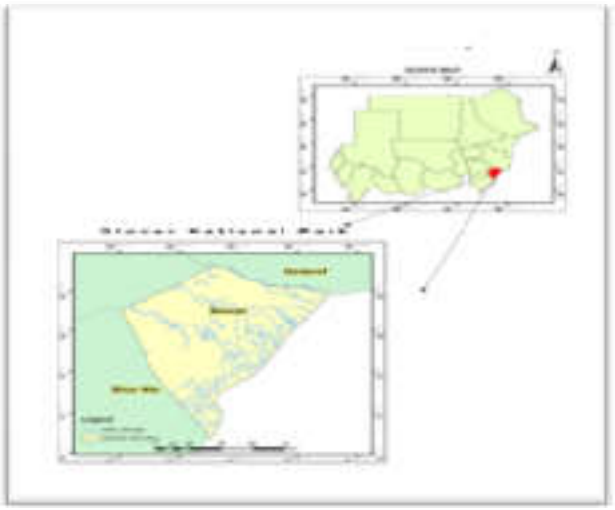
MATERIALS AND METHODS

Study area: DNP is the most important biosphere reserve in the Northern Sudan, it was declared as national park in 1935 following the London convention of 1933 and in 1979 it had been designated as Biosphere Reserve under UNESCO Man and the Biosphere program, in which the involvement of people in biodiversity conservation to enhance linking of ecology with economics, sociology and politics

DNP is located in the Blue Nile State bordering the Ethiopia country and it is surrounded by three States (Sinnar, Gadarif and Blue Nile) (map 1). It covered an area of about 10,291 km2 and it lies between latitudes 11° 45 E 12° 50 N and longitude 34° 30 E 36° 00 N at the south eastern part of Sudan against the Ethiopian's boundaries and about 550 Km South East far from Khartoum State (HCENR/WCGA/UNDP, 2004). The vegetation assessment conducted in four meadows namely (Abdelgani N 12.61037 E 35.02751, Ein-al-shamis N 12.64413 E 35.00760, Ras-Amir N 12.61553 E 35.08929, and Beit-alwahash N12.50576 E 35.03881)

Vegetation (herbaceous) cover: A quadrate one square meters (1*1 m) were placed from the starting point of the meadows reaching 1000m North-South and East-West. The line transects was divided to 50 m and quadrate place systematically and randomly every 10 m at the right and left side of the line transect. A total 20 of quadrate were implemented along the line in which every vegetation cover were counted and identified to estimate the density, abundance, frequency, relative density, relative frequency, relative abundance and the important value index of it. The species are classified to families, orders, genus and species. The list of families covered in this study was arranged according to the Angiosperm System of Classification of Flowering Plants (APG, 2009) and the Linear Angiosperm Phylogeny Group (LAPG) III (Haston, 2009), while subfamilies, genera, and species were arranged alphabetically within the families. Digital camera (Nikon d3400) was used to photograph the whole plants and diagnostic morphological parts. Note book was used to record data in the field. Available taxonomic references were used to

verify the species: (Andrews, 1952; Andrews, 1956; Braun, 1991) Herbarium catalogue, Royal Botanic Garden, Kew (http://apps. kew. org/herbact/navigator.ed) were used for identifications.



Map 1. Location of DNP

Updating of plants names was taken into account according to recent literature and (The Plant List, 2013). The vegetation parameters were calculated using the formulae of (Dangol, 2001) and (Chaudhry, 2016).

RESULTS

During the study period, a total of 29 plant species, representing from 15 families, in 11 orders were recorded (Table 1). The phenology of the plants was calculated, 71% were herbs, perennial herbs and shrubs forming 7% for each. The annual weeds, grass, perennial grass, sub-shrubs and trees represented 3% (Figure 1).

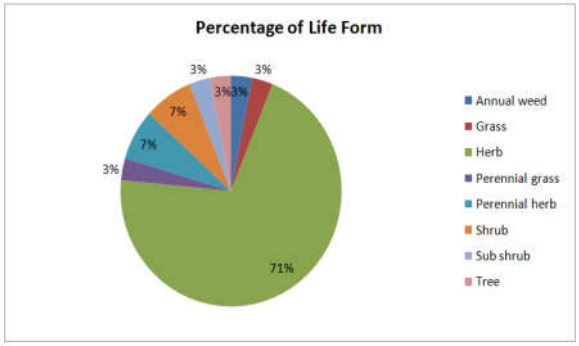


Figure 1. Percentage of life form

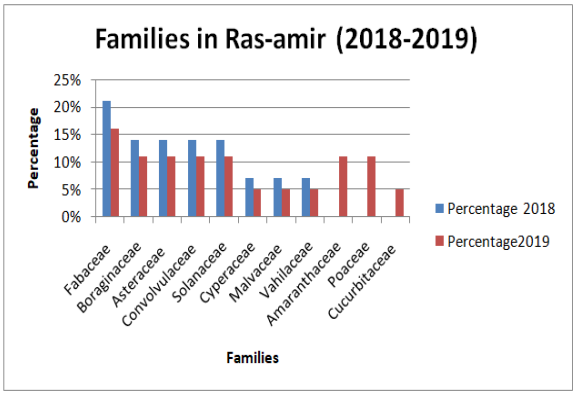


Figure 2. Families recorded in Ras-amir meadow

Vegetation cover in Rasamir in 2018 and 2019: In 2018, 14 species belonging to 8 families were observed in Ras-amir, Fabaceae (21%) was found to be the largest family represented by 3 species; followed by Boraginaceae (14.5%), Asteraceae (14.5%), Convolvulaceae (14.5%) and Solanaceae (14.5%) represented by 2 species for all, while Cyperaceae, Malvaceae and Vahilaceae were monophyletic representing 7% for each. In 2019, nineteen plants species were recorded in Ras-Amir meadows falling within 12 families. Fabaceae was found to be the largest family represented by 3 species (16%). Amaranthaceae, Solanaceae, Poaceae, Boraginaceae, Asteraceae and Convolvulaceae represented by 2 species forming 11% for each. Malvaceae, Cyperaceae. Cucurbitaceae and Vahliaceae are monophyletic represent 4.5% for each.

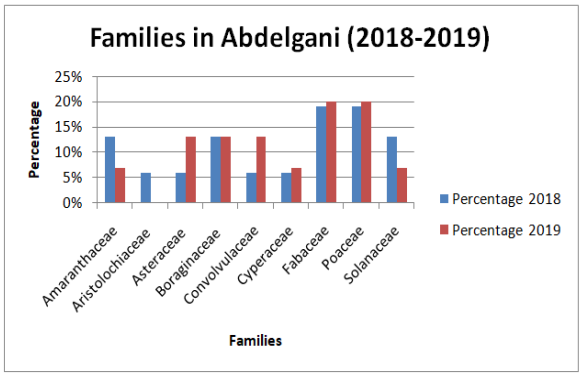


Figure 3. Families recorded in Abdelgani meadow in 2018 and 2019

Vegetation cover in Abdelgani (2018 and 2019): In 2018 Fabaceae and Poaceae were found to be the largest family represented by 3 species forming 19%; followed by Boraginaceae (13%), Asteraceae (13%) and Solanaceae (13%) two species for all. Convolvulaceae, Cyperaceae, Amaranthaceae and Aristolochiaceae are monophyletic representing 5.75% for each. In 2019 Fabaceae and poaceae was found to be the largest family represented by 3 species comprising 20% for each; followed by Boraginaceae (13%), Convolvulaceae (13%) and Asteraceae (13%) with two species for each. Solanaceae, Cyperaceae and Amaranthaceae are monophyletic representing 7% for each.

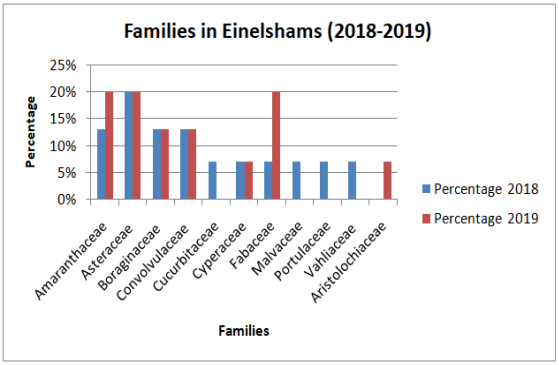


Figure 4. Families recorded in Abdelgani meadow in 2018 and 2019

Vegetation cover in Einalshams in 2018 and 2019: In 2018, Asteraceae was found to be the largest family represented by 3 species (19% for each); followed by Boraginaceae, Convolvulaceae and Amaranthaceae two species for all (13% each). The other families Cyperaceae, Fabaceae, Cucurbitaceae, Malvaceae, Vahliaceae and Portulaceae are monophyletic forming 7% of families. In 2019 Fabaceae, Asteraceae, Amaranthaceae was found to be the largest family represented by 3 species (20%); followed by Boraginaceae, Convolvulaceae two species for all (13%). Cyperaceae, and Aristolochiaceae are monophyletic forming 7%.

Table 1. Floral Composition of the 4 meadows in Dinder National Park, Sudan

No	Species	Family	Order	Phenology
1	*Acacia nilotica*	Fabaceae	Fabales	Tree
2	*Achyranthes aspera*	Amaranthaceae	Fabales	Annual weed
3	*Ageratum conzoides*	Asteraceae	Caryophyllales	Herb, weed
4	*Amaranthus gracizans*	Amaranthaceae	Asterales	Herb
5	*Amaranthus spinosus*	Amaranthaceae	Caryophyllales	Herb
6	*Aristolochia bracteolata*	Aristolochiaceae	Caryophyllales	Perennials herb
7	*Corchorus tridens*	Malvaceae	Piperales	Herb
8	*Cymbopogon sp.*	Poaceae	Palvales	Herb
9	*Cyperus sp.*	Cyperaceae	Poales	Herb
10	*Heliotropium sp.*	Boraginaceae	Boraginales	Herb
11	*Heliotropium supinum*	Boraginaceae	Boraginales	Herb
12	*Indigofera hochstetteri*	Fabaceae	Fabales	Herb
13	*Ipomea aquatica*	Convolvulaceae	Solanales	Herb
14	*Ipomea sp.*	Convolvulaceae	Solanales	Herb
15	*Luffa aegyptiaca*	Cucurbitaceae	Cucurbitales	Herb
16	*Luffa echinata*	Cucurbitaceae	Cucurbitales	Herb
17	*Mimosa pigra*	Fabaceae	Fabales	Shrub
18	*Panicum repens*	Poaceae	Poales	Perennial grass
19	*Physalis angulata*	Solanaceae	Solanales	Herb
20	*Portulaca oleracea*	Portulaceae	Caryophyllales	Herb
21	*Pulicaria crispa*	Asteraceae	Asterales	Sub-shrub
22	*Pulicaria undulata*	Asteraceae	Asterales	Herb
23	*Rhynchosia minima (L.)*	Fabaceae	Fabales	Perennial herb
24	*Ricinus communis*	Euphorbiaceae	Malpighiales	Shrub
25	*Senna obtusifolia*	Fabaceae	Fabales	Herb
26	*Solanum nigrum*	Solanaceae	Solanales	Herb
27	*Sorghum arundinaceum*	Poaceae	Poales	Herb
28	*Vahlia digyna*	Vahliaceae	Vahliales	Grass
29	*Xanthium strumarium*	Asteraceae	Asterales	Herb

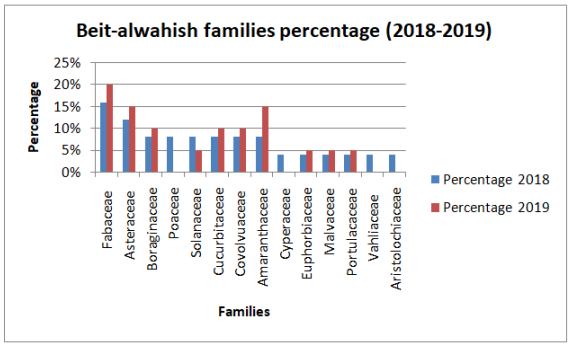


Figure 5. Families recorded in Beit-alwahish meadow 2018-2019

Vegetation cover in Beit-alwahish 2018: 2018 Fabaceae was found to be the largest family represented by 4 species (16%); followed by Asteraceae 3 species (12%). All of Boraginaceae, Poaceae, Solanaceae, Cucurbitaceae, Covolvuaceae and Amaranthaceae represent by 2 species (8%). The other families Cyperaceae, Euphorbiaceae, Malvaceae, Portulacaceae, Vahliaceae and Aristolochiaceae are monophyletic forming 4% of all family. In 2019 Fabaceae was found to be the largest family represented by 4 species (20%); followed by Asteraceae and Amaranthaceae 3 species for both forming 15%. All of Cucurbitaceae, Boraginaceae and Convolvulaceae represent by 2 species (10% for all). The other families Malvaceae, Portulacaceae, Solanaceae and Euphorbiaceae are monophyletic are 5%.

DISCUSSION

Fabaceae family represented the largest family in Rasamir, Abdelgani and Beit-alwahish during both years: 2018 and 2019. In Einalshams in 2018 the largest family was Asteraceae, while in 2019 was the Fabaceae. This result is compatible with the Poaceae and Fabaceae families which are usually widely distributed in any floristic study.

Occurrence of Poaceae can be attributed to their wide ecological range of tolerance and to their efficient seed dispersal capability (Collentte, 1999) and (Good, 1974). Also, the wide distribution of the Poaceae family is referring to that it is the one of the largest families of flowering plants. It consists of 620 genera and 8000 species. It is widely distributed in all the regions of the world. It is divided into number of subfamilies eg. Festucoideae, Panicoideae, Eragrostoideae, Bambusoideae, Oryzoideae and Arundinoideae (Mabberley, 2008). (Elizabeth, 2015) mentioned that Poaceae are widely distributed globally, and are distributed in various ecological environments. According to (Judd, 2002) and (Stevens, 2006) Fabaceae or Leguminosae commonly known as the legume, pea, or bean family, are a large and economically important family of flowering plants. It includes trees, shrubs and herbaceous plants perennials or annuals, which are easily recognized by their fruits (legume) and their compound, stipulated leaves. The group is widely distributed and is the third-largest land plant family in terms of number of species, behind only the Orchidaceae and Asteraceae, with 730 genera and over 19,400 species.

CONCLUSION

The study reveals that there were lots of variations in the number of species and families between the meadows and two years of the study. The most spread families in all meadows were the Fabaceae and Poaceae. The most life form of the flora was herbs forming 71% of all other life forms. In Ras-amir during 2018, 14 species falling in 8 families was recorded, while in 2019 the plant species recorded were 19 falling in 12 families. In Abdelgani during 2018, 13 species falling in 9 families, while in 2019 12 species falling in 8 families were recorded. In Einalshams 15 species falling in 10 families were recorded, while in 2019 also 15 species falling in 7 families were recorded. In Beit-alwahish 25 species falling in 14 families were recorded while in 2019 the species recorded were 20 species falling in 10 families. There was a great diversity in species composition and families. The results revealed that there was a variation in species and families among the years. Also there were variations in species and families between the meadows and this may probably have a great influence on the life of wild animals. Accordingly, this study suggests

Recommendation

Further studies of the floristic composition in all meadows of Dinder National Park is recommended.

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REFERENCES

Harrison, M.N. & Jackson, J.K. (1958). Ecological Classification of the Vegetation of the Sudan. Forest Department, Khartoum, Sudan: Forests Bulletin (New Series) No. 2, 22 pp.

HCENR/WCGA/UNDP (2004). Management Plan for Dinder National Park.

APG III. (2009).An update of the Angiosperm phylogeny Group (APG) Classification for the orders and Families of Flowering Plants: APG III. Bot. J. of linn. Soc. 161: 105-121.

Haston, E., Richardson, J.E., Stevens, P.F., Chase, M.W. and Harris, D.J. (2009). The Linear Angiosperm Phylogeny Group (LAPG) III: a linear sequence of the families in APG III.Botanical Journal of the Linnaean Society 161: 128–131.

http://apps.kew.org/herbact/navigator.ed. Kew Herbarium Catalog.

Andrews, F.W. (1952). The flowering plants of the Angl-Egyptian Sudan Vol. 2. The Burncle of Co., Ltd, Arbroath.

Andrews, F.W. (1956). The flowering plants of the Sudan, Vol. 3.The Burncle of Co., Ltd, Arbroath.

Bebawi, F. F., and Neugebohrn, L. (1991). A review of plants of Northern Sudan, with special reference to their uses.GTZ. Eschborn.

Braun, M., Burgstaller H., Hamdoun, A. M. and Walter, H. (1991). Common weeds of Central Sudan. GTZ. Eschborn.

The Plant List. (2013). Version 1.1. Accessed at http://www.theplantlist.org

Dangol, D.R., Shivakoti, G.P. (2001). Species composition and dominance of plant communities in western Chitwan, Nepal. Nepal Journal of Science and Technology. 2001b; 3:69-78.

Chaudhry, B., Wang, J., Wu, S., Maglione, M., Mojica, W., Roth, E., Morton, S.C. and Shekelle, P.G. (2006). Systematic review: impact of health information technology on quality, efficiency and cost of medical care. Annuals of Internal Mediine 144: 742-753.

Collentte, S. (1999). Wild Flowers of Saudi Arabia. National Commission for Wildlife Conservation and Development, Riyadh.

Good, R. (1974).The Geography of the Flowering Plants. Fourth Edition. London: Longman Group Limited.

Mabberley, D.I. 2008. The Plant Book Cambridge. Univ. Press,Cambridge, New York.

Elizabeth A. K. In: Flowering Plants Monocots. In: Kubitzki K. editor. The families and genera of vascular plants. Springer-Verlag, Berlin Heidelberg. 2015. pp. 1–56

Judd, W.S., Campbell, C.S., Kellog, E.A., Stevens, P.F., Donoghue, M.J. Plant Systematics: a phylogenetic approach, Sinauer Axxoc, 287-292, ISBN 0-87893-403-0. 2002.

Stevens, P.F (2006). Fabaceae. Angiosperm Phylogeny Website. Verson 7 May 2006. Retrived 28 April 2008.

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