Checklist of the Flora of Tutti Island, Khartoum Province, Sudan

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Authors’ contributions
This work was carried out in collaboration among all authors. Author MSH designed analyzed and interpreted and prepared the manuscript. Author FSMA designed the map and prepared the satellite image. Author SAAM wrote the protocol and wrote the first draft of the manuscript. Author MAK interpreted and prepared the manuscript. All authors read and approved the final manuscript.

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ABSTRACT
The current study was aimed to inventory and document the flora of Tutti Island (the study area) during a field survey conducted between August 2016 to December 2018. A total of 155 species belong to 120 genera and 41 families were inventoried. A number of 135 species were Dicotyledonous belong to 115 genera and 37 families. However, 20 species were monocotyledonous belong to 17 genera and 4 families. The most representative families were Fabaceae (23 species), Poaceae (14 species), Amaranthaceae (13 species), Asteraceae (10 species), Malvaceae (9 species) and Euphorbiaceae (8 species) respectively. Herbs comprise the predominant type of growth habit (52.34%) followed by shrubs (30.87%), vines (10.06%) and trees (6.71%) respectively. Botanical names of species and families were updated. The study resulted in a number of species not previously recorded in the flora of the study area. The inventory led to a new generic record to the flora of Sudan; that is Macroptilium lathyroides (L.)

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Urb. Despite flora of the study area is rich, the study noticed that, there are some negative impact factors can affect this richness over time, these factors represented in human activities including overgrazing, agriculture and population expansion that beside to the annual flood.

Keywords: Dicotyledonous; flora; new generic; Macroptilium lathyroides (L.) Urb.; Monocotyledonous; Tutti Island.

1. INTRODUCTION

Flora is all the plant life present in a particular region or time, generally the naturally occurring native plants. Sudan exhibits a wide range of variation in the topography, climate, soil and hydrology. This resulted in different vegetation zones and consequently rich flora [1] also Sudan possesses many ecological zones that range from the desert and semi desert in the north to the low rainfall woodland savannah in the south.

The first descriptive flora of the plants of the Sudan was found on catalogue compiled by [2] and published in 1929. The greatest compilation of the flora of Sudan was achieved by [3,4,5] who inventoried the flora in three volumes which now they are considered as the primary references for identification of plants species. Long time after that [6] inventoried the trees and shrubs of Sudan. After that just regional floras were carried out by many authors on different parts of Sudan; the flowering plants of Northern and Central Sudan by [7], the flora of Erkawit, Eastern Sudan by [8], the flora of central Sudan by [9], important trees of Northern Sudan by [10], also [11] studied the flora of the area around Wadi Halfa submerged by the Aswan Dam. also the flora of Jebel Marra in Western Sudan was studied by [12]. Common weeds of Central Sudan were checked by [13]. There is a huge work done in regional floras by [14-18] who has inventoried the medicinal plants in many areas in Sudan.

Tutti Island is one of Sudan islands which located in the joint point of the White and Blue Nile in Khartoum state at N15.37° E32.29. Although Tutti Island is isolated by the three rivers (Blue Nile, White Nile and Nile rivers), the climate conditions are described as arid with low rainfall and high evaporation. Accordingly, some changes have occurred in it. Tutti Island was under sever changes due to climate change, desertification, flood disasters and human impact. From 1972 to 2018 the island witnessed several environmental changes and shifts [19]. Accordingly, this study aims to inventory and document the flora composition of the Tutti Island in order to provide reliable data that reflecting the plant composition and help in implementing planning approach to conserve the unique plant diversity in the study area.

2. MATERIALS AND METHODS

2.1. The Study Area

2.1.1 Location

Tutti Island is situated approximately between 15°36’30”N- 15°38’30”N and 32°29’30”E– 32°31’30”E (Fig. 2) with an area of less than 8 sq. Km. Tutti is completely surrounded by water (Fig. 1) as the Blue Nile flows on the Eastside and the White Nile on the South and West to the island.

2.1.2 Climate

The climate of Tutti Island is generally arid with low rainfall and high evaporation potential [9]. The Nile shows a well-known cooling effect on the island, reducing the air temperature and increasing the relative humidity values and thus modifying the generally arid habitat. The monthly and yearly rainfall is greatly variable, however, the monthly mean maximum about (59.4 mm) is usually reached in August while the monthly mean temperature values are relatively low 23.3°C – 24.6°C.

2.1.3 The soil

Soil of Tutti Island is very fertile that because the Blue Nile dropping its yearly silty load on its banks. The soil in the island can be divided into the three types: Sandy soil, Clay soil and river mud.

2.2 Data Sampling and Analysis

The data compilation for the Angiosperms of the Tutti Island was carried out from August 2016 to December 2018. The whole plant was collected for in case of herbs and twigs with leaves and flowers and /or fruits in case of shrubs and trees. The specimens were stretched to dry between newspapers and firmly pressed inside a herbarium press. Newspaper was continuously
changed during the drying to avoid rotting of material. Subsequently, the specimens were mounted and labeled. The vouchers were checked at the Herbarium of the Medicinal and Aromatic Plants Research Institute (MAPRI), National Centre for Research (NCR) to confirm or complement its taxonomic determination. Preliminary species identification was carried out using a set of keys [3,4,5,13]. The identified species were compared with already identified herbarium specimens in the herbarium of the (HMAPRI). The species names have been revised and updated according to the database obtained from the websites: www.theplantlist.org and https://www.ipni.org. The vernacular names of the collected species were recorded from local inhabitants within the study area and also extracted from [2,12].

Fig. 1. Map illustrates the location of the Tutti island (the study area)
3. RESULTS AND DISCUSSION

3.1 Results

The study inventoried 155 species belonging to 120 genera and 41 families. The most representative families are: Fabaceae, Amaranthaceae, Poaceae, Malvaceae, Euphorbiaceae and Asteraceae respectively (Fig. 4). Herbs represent the most representative type of growth habit followed by shrubs, vines and trees respectively (Fig. 3).

The study inventoried a total number of 135 species belong to Dicotyledonous which belong to 115 genus and 37 families whereas 20 species are monocotyledonous belong to 17 genus and 4 families (Table 2).
Table 1. List of the plant species in the study area

| Family       | Botanical name                        | Vernacular name  | Growth habit |
|--------------|---------------------------------------|------------------|--------------|
| Acanthaceae  | *Nelsonia canescens* (Lam.) Spreng.   | -                | Herb         |
|              | *Ruellia tuberosa* L.                  | Tataq            | Herb         |
| Aizoaceae    | *Glinus lotoides* L.                   | Tarba            | Herb         |
|              | *Trianthema portulacastrum* L.         | Danab el naga    | Herb         |
|              | *Zaleya pentandra* (L.) C.Jeffrey      | El rabaa'        | Herb         |
| Amaranthaceae| *Achyrantes aspera* L.                 | KashmAlnasseba   | Shrub        |
|              | *Aerva javanica* (Burm. f.) Juss. exSchult. | Ras Al Shayeb  | Herb         |
|              | *Alternanthera nodiflora* R. Br.       | Abu tamra        |              |
|              | *Alternanthera pungens* Kunth.         | SimElfar         |              |
|              | *Alternanthera sessilis* (L.) R.Br. ex DC. | Amatera          |              |
|              | *Amaranthus graecizans* L.             | Lissan el TairSaghir | Herb       |
|              | *Amaranthus spinosus* L.               | Lisanelteir      | Herb         |
|              | *Amaranthus viridis* L.                | Lisan el TairKabeir | Herb       |
|              | *Amaranthus hybridus* L.               | Danab Al Kadees  | Herb         |
|              | *Chenopodium album* L.                 | FissElkalib      | Herb         |
|              | *Chenopodium murale* L.                | Efain            | Herb         |
|              | *Digera muricata* (L.) Mart.           | Lablab ahmer     | Herb         |
|              | *Gomphrena celosioides* Mart.         | -                | Herb         |
| Apocynaceae  | *Calotropis procera* (Aiton) Dryand.   | Ushar            | Shrub        |
|              | *Leptadenia arborea* (Forssk.) Schweinf. | Lewais/ Sho'bait | Vine         |
|              | *Oxystelma esculentum* (L. f.) Sm.    | Lewis            | Vine         |
| Areceaceae   | *Phoenix dactylifera* L.               | Nakheil          | Tree         |
| Aristoiochiaceae| *Aristolochia bracteolata* Lam.      | Umm Glagel      | Herb         |
| Asteraceae   | *Ageratum coryzoides* (L.) L.         | RehanElguroof   | Herb         |
|              | *Ambrosia crithmifolia* DC.            | Damsissa         | Herb         |
|              | *Blumea viscosa* (Mill.) V.M.Badillo   | Rihan            | Herb         |
|              | *Eclipta prostrata* (L.) L.            | Tamr El Ghanam  | Herb         |
|              | *Euthalia coryzoides* L. f.            | Hashish El Farras | Herb   |
|              | *Pulicaria crispa* Sch.Bip.            | Rihan el Gadawil | Shrub       |
|              | *Sonchus oleraceus* L.                 | Raboul           | Herb         |
|              |                                       | Moleita          | Herb         |
| Family       | Botanical name                                | Vernacular name | Growth habit |
|--------------|-----------------------------------------------|-----------------|--------------|
| Brassicaceae | Tridax procumbens (L.) L.                     | -               | Herb         |
|              | Xanthium strumarium subsp. brasilicum (Vell.) O. Bolös & Vigo | Ramtouk         | Herb         |
|              | Brassica nigra (L.) K. Koch                   | KhardelAswad    | Herb         |
|              | Lepidium niloticum (Delile) Sieber            | El Heweira      | Vine         |
|              | Rorippa indica (L.) Hiern                     | El zar          | Herb         |
|              | Morettia philaeana DC.                         | Sagggar         | Herb         |
| Boraginaceae | Heliotropium bacciferum Forssk.               | Danab El Agrab / Rhimta | Herb         |
|              | Heliotropium indicum L.                       | Danab El Agrab   | Herb         |
|              | Heliotropium ovalifolium Forssk.              | Danab El Agrab   | Herb         |
|              | Heliotropium sp.                              | Danab El Agrab   | Herb         |
|              | Heliotropium supinum L.                       | Danab El Agrab   | Herb         |
|              | Cordia sinensis Lam.                          | Andorab         | Tree         |
|              | Echium longifolium Delile                     | Shouk El Gimal  | Shrub        |
| Capparaceae  | Capparis decidua (Forssk.) Edgew.            | Tundub          | Shrub        |
|              | Dipterygium glaucum Decne.                    | Safeira         | Herb         |
|              | Maerua oblongifolia (Forssk.) A. Rich.        | Irg El Mahaba   | Shrub        |
| Cleomaceae   | Cleome gynandra L.                            | Tamalaika       | Herb         |
| Convolvulaceae | Convolvulus arvensis L.                   | Al ulliq        | Vine         |
|              | Convolvulus microphyllum Sieber ex Spreng.   | Chubeyra        | Herb         |
|              | Cuscuta hyalina Roth                          | Hamool          | Vine         |
|              | Ipomoea aquatica Forssk.                     | El-Arkala       | Herb         |
|              | Ipomoea cairica (L.) Sweet                    | Sit Al Hush     | Vine         |
|              | Ipomoea carnea Jacq.                          | El-Aweer        | Shrub        |
| Cucurbitaceae | Cucumis melo L.                              | Hummeid         | Vine         |
|              | Cucumis prophetarum L.                        | Fagos El Hameer | Vine         |
|              | Citrullus colocynthis (L.) Schrad.            | Hundal          | Herb         |
|              | Citrullus lanatus var. lanatus (Thunb.) Matsumura & Nakai. | BattikhAlkhala | Herb         |
|              | Coccinia grandis (L.) Voigt                   | IrgElDem        | Vine         |
|              | Luffa cylindrica (L.) M. Roem.                | Leef            | Vine         |
|              | Mukia maderaspatana (L.) M. Roem.             | Tbish El-Far    | Vine         |
| Cyperaceae   | Cyperus alopecuroides Rottb.                  | Seid            | Herb         |
|              | Cyperus rotundus L.                           | Sida            | Herb         |
|              | Cyperus squarrosum L.                         | Said            | Herb         |
| Family        | Botanical name                                      | Vernacular name | Growth habit |
|--------------|-----------------------------------------------------|-----------------|--------------|
| Elatinaceae  | *Fimbristylis falcata* (Vahl) Kunth               | Dign El Tais    | Herb         |
|              | *Bergia suffruticosa* (Delile) Fenzl              | Rimit           | Herb         |
| Euphorbiaceae| *Chrozophora plicata* (Vahl) A. Juss. Ex Spreng.  | Al gho'bera     | Shrub        |
|              | *Euphorbia aegyptiaca* Bois.                     | Umm lebaina     | Herb         |
|              | *Euphorbia heterophylla* L.                      | Um laban al Kabir| Herb       |
|              | *Euphorbia hirta* L.                             | Umm lebaina     | Herb         |
|              | *Euphorbia indica* Lam.                          | Malben          | Herb         |
|              | *Euphorbia granulata* Forssk.                    | Libbeyn         | Herb         |
|              | *Phyllanthus fraternus* G. L. Webster            | Sorebsagir      | Herb         |
|              | *Ricinus communis* L.                            | Kihuwi          | Shrub        |
| Fabaceae     | *Acacia nilotica* (L.) Del.                      | Sunt / Garad    | Tree         |
|              | *Acacia seyal* Del.                              | El taelh        | Tree         |
|              | *Alhagi maurorum* Medik.                         | Al agol         | Herb         |
|              | *Alysicarpus monilifer* (L.) DC.                 | Fraish          | Herb         |
|              | *Clitoria ternatea* L.                           | Erg Elagrab     | Vine         |
|              | *Faidherbia albida* (Del.) A. Chev.              | El-Haraz        | Tree         |
|              | *Indigofera oblongifolia* Forssk.                | Dahassir        | Shrub        |
|              | *Indigofera tinctoria* L.                        | Henat el groud  | Shrub        |
|              | *Lotus arabicus* L.                              | Barsim El bahar | Herb         |
|              | *Macroptilium lathyroides* (L.) Urb.             | -               | Shrub        |
|              | *Mimosa pigra* L.                                | Al sit -El Mustahia | Shrub     |
|              | *Parkinsonia aculeata* L.                        | Sesaban Abu shouk| Tree      |
|              | *Pithecellobium dulce* (Roxb.) Benth.            | Tamr Hindi      | Tree         |
|              | *Prosopis glandulosa* Torr.                      | Mesquite        | Shrub        |
|              | *Rhynchosia minima* (L.) DC.                     | Adan El Far     | Shrub        |
|              | *Senna alata* (L.) Roxb.                         | Nawama          | Shrub        |
|              | *Senna alexandrina* Mill.                        | SennaMekka      | Shrub        |
|              | *Senna. italic* Mill.                            | Sennasenna      | Shrub        |
|              | *Sesbania sesban* (L.) Merr.                     | Sesabann        | Shrub        |
|              | *Tamarindus indica* L.                           | Ara'daeb        | Tree         |
|              | *Tephrosia apollinea* (Delile) Link.             | Amayoga         | Shrub        |
|              | *Trigonella spruneriana subsp. hierosolymitana* (Boiss.) Ponert. | Handagoga |       |
|              | *Vignaun guiculata* (L.) Walp.                   | Lobia hello     | Herb         |
| Family          | Botanical name                                      | Vernacular name | Growth habit |
|-----------------|-----------------------------------------------------|-----------------|--------------|
| Lamiaceae       | Ocimum basilicum L.                                 | Rihan           | Shrub        |
|                 | Basilicum polystachyon (L.) Moench.                | -               | Herb         |
| Lythraceae      | Ammmania baccifera L.                               | Tamar El Far    | Herb         |
| Malvaee         | Abutilon pannosum (G.Forst.) Schltdl.               | Gargadan        | Shrub        |
|                 | Abutilon pannosum var. figarianum (Webb) Verdc.    | Hambuk/ Gargadan| Shrub        |
|                 | Corchorus depressus (L.) Stocks                     | Suteihia        | Herb         |
|                 | Corchorus fascicularis Lam.                         | Molokhia /Himaira| Herb        |
|                 | Corchorus tridens L.                                | Molokhia        | Herb         |
|                 | GossypiumhirsutumL.                                 | GutfArabi       | Shrub        |
|                 | Hibiscus trionum L                                  | Karkauba        | Herb         |
|                 | Sida spinosa L.                                     | Shadaida        | Herb         |
|                 | Sida ovata Forssk.                                  | Um migasheisha  | Herb         |
| Meliaceae       | Azadirachta indica Adr. Juss.                      | Neem            | Tree         |
| Menispermaceae  | Cocculus pendulus Diels.                           | Zighghain       | Vine         |
| Moraceae        | Ficus sycomorus L.                                 | Gameiz          | Tree         |
| Nyctaginaceae   | Boerhavia erecta L.                                | Terba           | Herb         |
|                 | Boerhaviarepensvar diffusa (L.)Heimerl ex JD Hooker| Terba           | Herb         |
|                 | Boerhavia repens L.                                | Shukal el kheil | Herb        |
| Onagraceae      | Ludwigia leptocarpa (Nutt.) H.Hara                  | Arkala          | Shrub        |
|                 | Ludwigia sp.                                        | Arkala          | Shrub        |
| Orobanachaceae  | Orobanche ramosa L.                                | Haluk           | Herb         |
|                 | Striga hermonthica (Delile) Benth.                  | EL.Boda         | Herb         |
| Oxalidaceae     | Oxalis corniculata L.                              | Hamd            | Herb         |
| Papaveraceae    | Argemone mexicana L.                               | Khashkhashmexicki| Shrub    |
| Poaceae         | Aristida adscensionis L.                           | Humeira         | Herb         |
|                 | Brachiaria eruciformis (Sm.) Griseb.                | Defera          | Herb         |
|                 | Cynodon dactylon (L.) Pers.                         | Nagil           | Herb         |
|                 | Dactyloctenium aegyptium (L.) Willd.               | Abu Asaba       | Herb         |
|                 | Dichanthium annulatum (Forssk.) Stapf.             | Meshra el Zaraf | Herb        |
|                 | Digitaria ciliaris (Retz.) Koeler                   | Um Farow        | Herb         |
|                 | Dinebra retroflexa (Vahl) Panz.                    | El Mileiha      | Herb         |
|                 | Echinocloa colonum (L.) Link                        | Defera          | Herb         |
|                 | Echinocloa stagnina (Retz.) P. Beauv.              | Berdi           | Herb         |
| Family            | Botanical name                          | Vernacular name   | Growth habit |
|-------------------|-----------------------------------------|-------------------|--------------|
| Eragrostis ciliaris (L.) R. Br. | Danab El Asad                           | Herb              |
| Phragmites australis (Cav.) Trin. ex Steud | Boss                                   | Herb              |
| Sorghum virgatum (Hack.) Stapf | Adaar                                   | Herb              |
| Urochloa trichopus (Hochst.) Stapf | Um Furaw                                | Herb              |
| Urochloa mosambicensis (Hack.) Dandy | -                                      | Herb              |
| Polygnaceae       | Persicaria glabra (Willd.) M.Gómez     | Al-Tomsahia       | Herb         |
| Portulacaceae     | Portulaca oleracea L.                   | Reglla            | Herb         |
|                   | Portulaca quadrifida L.                 | Lagab el Humara   | Herb         |
| Phragmites australis (Cav.) Trin. ex Steud | -                                      | Herb              |
| Polygnaceae       | Persicaria glabra (Willd.) M.Gómez     | Al-Tomsahia       | Herb         |
| Portulacaceae     | Portulaca oleracea L.                   | Reglla            | Herb         |
| Portulacaceae     | Portulaca quadrifida L.                 | Lagab el Humara   | Herb         |
| Rhamnaceae        | Ziziphusspina-christi (L.) Desf.        | Sidir             | Tree         |
| Rosaceae          | Potentilla supine L.                    | Sifairt el Bahr   | Herb         |
| Salicaceae        | Salix mucronata Thub.                   | Safsaf            | Shrub        |
| Sapindaceae       | Cardiospermum halicacabum L.            | Hanbook           | Vine         |
| Solanaceae        | Datura innoxia Mill.                    | Sakran            | Shrub        |
|                   | Datura stramonium L.                    | Sakran            | Shrub        |
|                   | Physalis angulata L.                    | Fruta             | Herb         |
|                   | Solanum nigrum L.                       | Sakran            | Shrub        |
|                   | Tamarix aphylla (L.) H.Karst.           | Tarfa             | Shrub        |
|                   | Tamarix nilotica (Ehrenb.) Bunge        | Tarfa             | Shrub        |
| Tamaricaceae      | Tamarix aphylla (L.) H.Karst.           | Tarfa             | Shrub        |
|                   | Tamarix nilotica (Ehrenb.) Bunge        | Tarfa             | Shrub        |
| Typhaceae         | Typha domingensis Pers.                | Um Brim'bita      | Herb         |
| Vahliaeeae        | Vahlia digyna (Retz.) Kuntze            | Sefairt El Bahr   | Herb         |
| Verbenaceae       | Phyla nodiflora (L.) Greene             | Libbia            | Herb         |
| Zygophylaceae     | Fagonia indica Burm. f.                 | Um-shweeka        | Herb         |
|                   | Tribulus terrestris L.                  | El- Derissa       | Herb         |
Fig. 3. Chart illustrates the most representative types of growth habit of the Study area

Table 2. Total number of various taxa covered in flora of the study area.

| Taxa      | Dicotyledonous | Monocotyledonous | Total |
|-----------|----------------|------------------|-------|
| Families  | 37             | 4                | 41    |
| Genera    | 115            | 17               | 132   |
| Species   | 135            | 20               | 155   |

Fig. 4. Chart illustrates the most representative plant families in the study area

Also the study inventoried number of species that are not previously listed in flora of the study area (Table 3).

Names of species, Genus and families constituting the flora of the study area were revised and updated according to the latest versions of the Angiosperm Phylogenic Group (APG) as shown in Tables 4 and 5.

The inventory of the flora of the study area led to a new generic record to the flora of Sudan; that is *Macroptiliumlathyroides* (L.) Urb.
Table 3. List of the plant species not previously recorded in flora of the study area.

| Family          | Botanical name                                      | Vernacular Name | Growth Habit |
|-----------------|-----------------------------------------------------|-----------------|--------------|
| Acanthaceae     | *Nelsonia canescens* (Lam.) Spreng.                | Abu tamra       | Herb         |
| Amaranthaceae   | *Alternanthera nodiflora* R. Br.                    | SimElfar        | Herb         |
|                 | *A. pungens* Kunth.                                 |                 |              |
|                 | *Amaranthus hybridus* L.                            | Danab Al Kadees | Small shrub  |
|                 | *Chenopodium album* L.                              | FissElkalib     | Herb         |
| Asteraceae      | *Pluchea dioscoridis* (L.) DC.                      | Rihan el Gadawil| Shrub        |
| Brassicaceae    | *Coronopus niloticus* (Del.) Spreng.                | El Heweira      | Herb         |
| Boraginaceae    | *Cordia sinensis* Lam.                              | Andorab         | Tree         |
|                 | *Echium longifolium* Del.                           | Shouk El Gimal  | Small shrub  |
| Capparaceae     | *Dipterygium glaucum* Decne.                        | Safeira         | Small shrub  |
| Convolvulaceae  | *Ipomoea cairica* (L.) Sweet                        | Sit Al Husn     | Vine         |
|                 | *I. carnea* Jacq.                                   | El-Aweer        | Shrub        |
| Cucurbitaceae   | *Citrullus lanatus* (Thunb.) Matsumura & Nakai      | BattikhAlkhala | Vine         |
|                 | *Coccinia grandis* (L.) Voigt.                      | Fagus           | Vine         |
|                 | *Mukia maderaspatana* (L.) M. Roem.                 | Tbish El-Far    | Vine         |
| Euphorbiaceae   | *Euphorbia granulata* Forssk.                       | Libbeyn         | Herb         |
|                 | *Phyllanthus fraterinus* G. L. Webster              | Sorebsagir      | Herb         |
| Fabaceae        | *Acacia seyal* Del.                                 | El talh         | Tree         |
|                 | *Alysicarpus monilifer* (L.) DC                     | Fraish          | Herb         |
|                 | *Indigofera tinctoria* L.                           | Henat el groud  | Small shrub  |
|                 | *Lotus arabicus* L.                                 | Barsim El bahar | Herb         |
|                 | *Macroptilium lathyroides* (L.) Urb.                 | Nawama          |              |
|                 | *Sennaalata* (L.) Roxb.                             |                 |              |
|                 | *Tamarindus indica* L.                              | Ara'daeb        | Tree         |
|                 | *Trigonella spruneri ana subsp. hierosolymitana* (Boiss.) Ponert. | Handagoga      | Herb         |
|                 | *Vigna un guiculata* (L.) Walp.                     | Lobia hello     | Herb         |
| Malvaceae       | *Corchorus depressus* L.                            | Suteilha        | Herb         |
| Menispermaceae  | *Cocculus pendulatus* Diels.                        | Zighghain       | Vine         |
| Moraceae        | *Ficus sycomorus* L.                                | Gameiz          | Tree         |
| Family                      | Botanical name                        | Vernacular Name | Growth Habit |
|----------------------------|---------------------------------------|-----------------|--------------|
| Nyctaginaceae              | *Boerhavia repens* L.                | Shukal el kheil | Herb         |
|                            | *B. repens var. diffusa* (L.) Heimerl ex JD Hooker | Terba           | Herb         |
| Onagraceae                 | *Ludwigia leptocarpa* (Nutt.) H. Hara | Arkala          | Herb         |
| Oxalidaceae                | *Oxalis comiculata* L.               | Hamd            | Herb         |
| Solanaceae                 | *Datura stramonium* L.               | Sakaran         | Small Shrub  |
| Tamaricaceae               | *Tamarix aphylla* (L.) Karst.         | Tarfa           | Shrub        |

**Table 4. List of plant species having recent names**

| Past name                          | Updated name                                                                 |
|------------------------------------|-------------------------------------------------------------------------------|
| *Ambrosia maritima* L.             | *Ambrosia crithmifolia* DC.                                                  |
| *Blumea aurita* (L.f.) DC.         | *Blumea visciosa* (Mill.) V.M.Badillo                                         |
| *Coronopus niloticus* (Del.) Spreng.| *Lepidium niloticum* (Delile) Sieber                                         |
| *Luffa aegyptiaca* Mill.           | *Luffa cylindrica* (L.) M.Roem.                                              |
| *Sida alba* L.                     | *Sida spinosa* L.                                                            |
| *Jussiaea aiuligera* Miq.          | *Ludwigia leptocarpa* (Nutt.) H. Hara                                        |
| *Polygonum glabrum* Wild.          | *Persicaria glabra* (Willd.) M. Gomez                                         |
| *Xanthium brasilicum* Vell.        | *Xanthium strumarium* subsp. *braslicium* (Vell.)O.Bolòs & Vigo              |
3.2 Discussion

As the island surrounded by two rivers, Blue Nile and White Nile (Fig. 1), this situation provides an ideal environmental factors for species diversity. these factors are represented in: 1) Increases the relative humidity, 2) The new seeds that brought by the Nile yearly during the flood seasons, 3) The good soil-moisture content, and 4) annual renewing of the soil due to the Blue Nile the Blue Nile dropping its yearly silty load on its banks. Consequently, the floristic list found in the study area showed a great species richness (Table 1). It worth noting that the number of species and families inventoried in this study was greater than that previously inventoried before by [20] who had studied the flora of the Tutti island (Table 3). However, the vegetation coverage of the study area is threatened by several human activities including overgrazing and agriculture, annual flood and increasing in population [19, 21]. These threats might affect the diversity and distribution of the plant species and even can cause disappearing of some species in the near future.

The annual flood of the Blue Nile which floods in the vast lands of the study area, definitely carriers reproductive parts (seeds, pollen grains,…etc.), accordingly, the possibility of recording or adding a new species to the flora of Sudan is certain because the Blue Nile passes through many neighboring East African countries and therefore, this study led to a new generic record to the flora of Sudan which is *Macroptilium lathyroides* (L.)Urb. *M. lathyroides* is used as a forage species in some areas. It is also a known nitrogen fixer and thus has been useful for soil amendment.

### 4. CONCLUSION

This study has shed light on the flora composition of the Tutti Island. The study showed the richness of the island in plant composition. The study revealed that the study area is still has a satisfying plant composition, but there are several threats can affect these composition in the near future.

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### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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