



**A New Record to the flora of Sudan; *Macroptilium lathyroides* (L.) Urb.,
Fabaceae**

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Abstract: The main work covering the flora of Sudan is done by Andrews, more than five decades have passed since then; hence the possibility of finding a new species is high. *Macroptilium lathyroides* (L.) Urb. for first time to be recorded to the flora of Sudan. The *M.lathyroides* is observed at first in Tutti Island. The digital photos of the plant in its natural habitat were taken and a Garmin GPS map 62s was used for the geographic coordinates of the collecting sites, a detailed morphological description of the plant was given to provide a clear picture for identification of plant. *M. lathyroides* has been used as a forage species in some areas. It is also a known nitrogen fixer and thus has been useful for soil amendment.

Keywords: *Macroptilium lathyroides*, Flora, Tutti island, GPS and forage.

1. Introduction:

Sudan exhibits a wide range of variation in the topography, climate, soil and hydrology; these resulted in different vegetation zones, consequently rich flora (Elsafori *et al.*, 2012); addition to that, Sudan possess many ecological zones that ranging from the desert and semi desert in the north to the low rainfall woodland savannah in the south country, the thing that made Sudan rich in plant diversity. The first descriptive flora of

the plants of the Sudan based on catalogue of Sudan plants compiled by Broun and Massey (1929) and published in 1929, also Aylmer (1937) concentrated on trees and shrubs of the Sudan. the great compilation of the Sudanese flora was achieved by Andrews (1950; 1952;1956) who inventoried the Sudanese flora in three volumes, these excellent volumes are serving a very useful purpose in available short description of the known plants of the Sudan, and now it is considered the primary references for the identification of plant species in the Sudanese herbaria. After a long time then El Amin (1990) inventoried the trees and shrubs of Sudan. After that just a spatial flora had been carried out by many authors for different parts of Sudan. Recently, a great work has been done by Darbyshire *et al.*, (2015) that 4000 species and more of plants species have been reported for Sudan and South Sudan according to the joint research project conducted between the Herbarium of the Royal Botanic Gardens, Kew and the Herbarium of the Department of Botany at University of Khartoum.

Seeds and pollen grains can be easily transferred from country to another due to living creatures like human, animal, birds.... etc., or by other factors like water and wind; accordingly, sharing the flora components between countries is possible and recording a new species to the flora in such a country is certain.

Macropitilium lathyroides (Phasey bean) originated from tropical America (Central America, the Caribbean Islands, and South America) and is naturalized in the tropics and subtropics. It was introduced into India, Australia, Africa and the southern USA. It grows from 23°N to 30°S and from sea level up to an altitude of 1800-2000 m. It is mainly found in wet places along roadsides, on waste lands, in open fields, pastures, and in open situations along streams and rivers (Cook *et al.*, 2005). Phasey bean grows better in warm conditions (optimum temperature being 25-30°C. It can grow where annual rainfall ranges from 450 mm to 3000 mm. In drier places. *M. lathyroides* is tolerant to water logging and flooding as its nodulated roots can benefit from water excess (Whiteman, 1983; 1984) It does well on a wide range of soils from well to poorly drained and deep-sandy to heavy-clayey soils (Ibrahim and Davies,1991; Odeyinka,2004),.

1.1. The Study Area:

1.1.1. Location:

Tutti Island is situated approximately between 15.37 latitude and 32.29 longitude, with an area of less than 8 sq. Km. Tutti is completely surrounded by water(Fig.1 ,2) as the Blue Nile flows on the Eastside and the White Nile on the South and West to the island (Obeid and Mahmoud, 1969).

1.1.2. Climate:

The climate of Tutti Island is generally arid, with low rainfall and high evaporation potential [Wail and Elgazali, 2007]. 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 – 24.6, C).

1.1.3. 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.

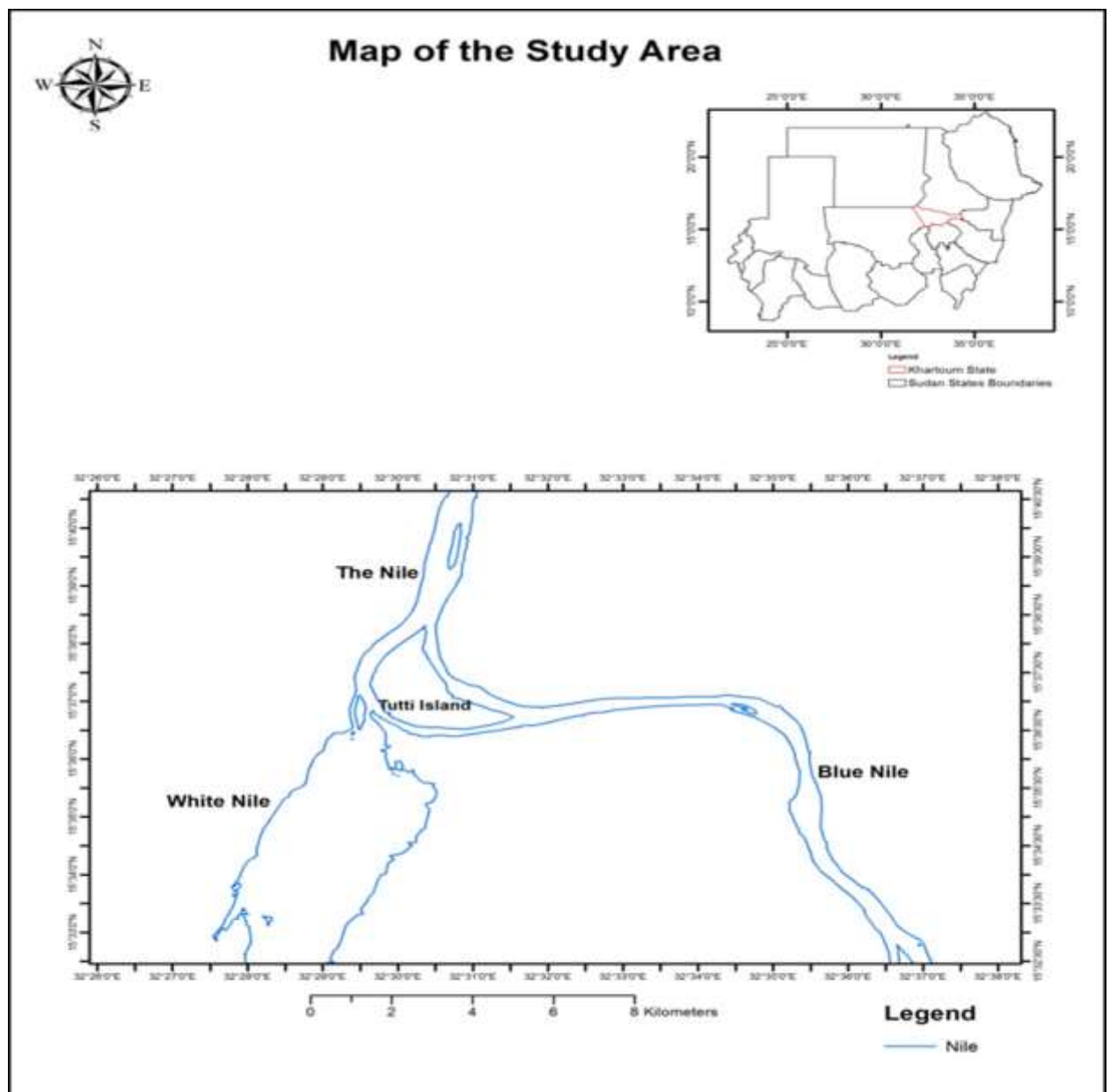


Figure 1: Map revealed the position of the studied area.

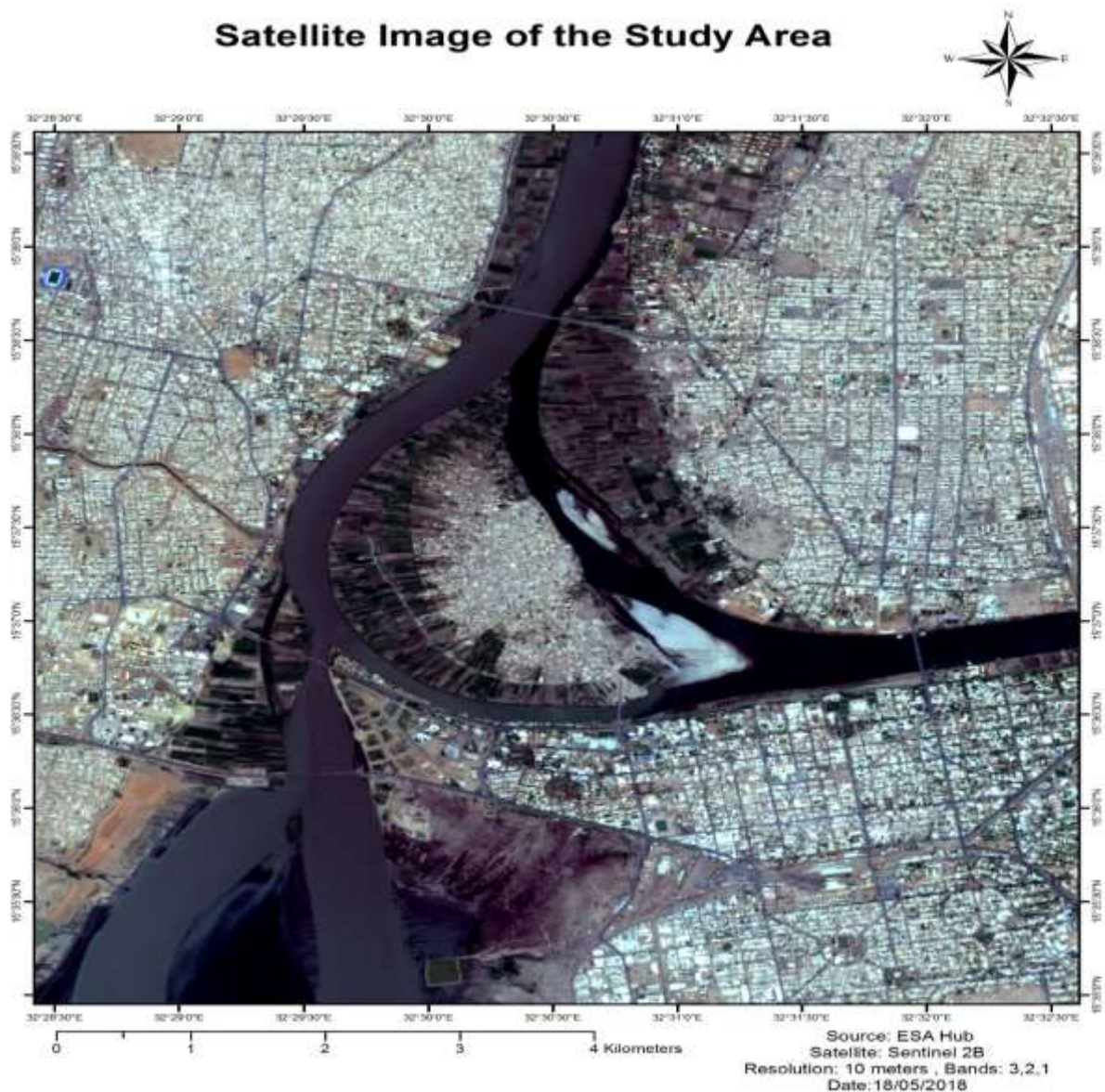


Figure 2: Satellite image revealed the study area.

2. Material and Method:

During a field survey conducted by authors to inventory the Flora of Tutti Island, Khartoum state-Sudan, from July 2017 to July 2018, *Macropitilium lathyroides* was collected. The digital photos of the plant in its natural habitat were taken and a Garmin GPS map 62s was used for the geographic coordinates of the collecting site. The authors consulted different regional floras to confirm the record. A detailed morphological description of the plant was given to provide a clear picture for identification the plant. The specimens of the plant were deposited in the Herbarium of Botany Department, Khartoum University and Herbarium of Medicinal and Aromatic Plants Institute Research.

3. Result:

3.1. The Systematic Position of *Macroptilium lathyroides*.

Kingdom: Plantae – Plants

Subkingdom: Tracheobionta – Vascular plants

Superdivision: Spermatophyta – Seed plants

Division: Magnoliophyta – Flowering plants

Class: Magnoliopsida – Dicotyledons

Subclass: Rosidae

Order: Fabales

Family: Fabaceae – Pea family

Genus: *Macroptilium* (Benth.) Urb. – bushbean

Species: *Macroptilium lathyroides* (L.) Urb. – wild bush bean

3.2. Synonyms:

Macroptilium lathyroides (L.) Urb. var. *lathyroides*

Macroptilium lathyroides (L.) Urb. var. *semierectum* (L.) Urb.

Phaseolus crotalarioides Mart. ex Benth.

Phaseolus lathyroides L.

Phaseolus semierectus L.

Phaseolus semierectus L. var. *angustifolius* Benth.

3.3. The Common Names:

Phasey Bean

Wild Bushbean

Wild Pea Bean

Cow Pea

Cowpea

Wild Bush Bean

3.4. Plant Description:

M.lathyroides is an erect branching legume, Annual or biennial subshrub up to 0.6-1 m high (Fig. 3), in shaded conditions, it may trail or twin, with vines reaching 1.2 m long (Fig.4). **Stems** sparsely to densely appressed pubescent, green, rounded and solid. **Stipules** lanceolate, 5–10 mm; **petiole** 0.5–5 cm. **Leaves** trifoliate (Fig 11) alternate spiral, pinnately veined, **Leaflets** mostly entire, ovate to lanceolate, or narrowly elliptic,

3-8 cm long; 1-3.5 cm wide, base cuneate, apex acute, upper surface glabrous, lower surface appressed hairy, sometimes slightly lobed towards the base. **Flowers (Fig.6,7)** papilionate on very short pedicels; bisexual, solitary or grouped together in a terminal or axillary raceme. **Inflorescences** spicate raceme, about 15 cm long borne on axillary peduncles to about 30 cm long., the **calyx** 4-6 mm long, has 5 fused sepals that are greenish and form a short tube; **corolla** has 5 dark pink to purple red petals that are fused at their base. 2 petals forming a keel and a single large petal that is the standard. There are 10 **stamens** with 9 of them fused forming a partial tube around the ovary. The **ovary** is superior with a single locule. Around the base of the ovary is a short nectary. **Pods** linear, sub-cylindrical, 5.5-10 cm long, 2.5-3 mm wide, straight or slightly curved, glabrous or pubescent (Fig. 8) , when mature, the valves becoming strongly twisted on dehiscence (Fig.12) (pods shatter readily on maturity), each pod containing up to 20 (-30) seeds. **Seeds** obliquely oblong, slightly compressed, about 3 mm long, mottled light and dark grey-brown or black (Fig.9).



Figure 3: *M. lathyroides*; the whole plant.



Figure 4: *M.lathyroides* rolled around an object.



Figure 5: *M. lathyroides* at seedling stage



Figure 6: *M. lathyroides* flower;



Figure 7: *M.lathyroides* Flower; the dorsal side
the ventral side.

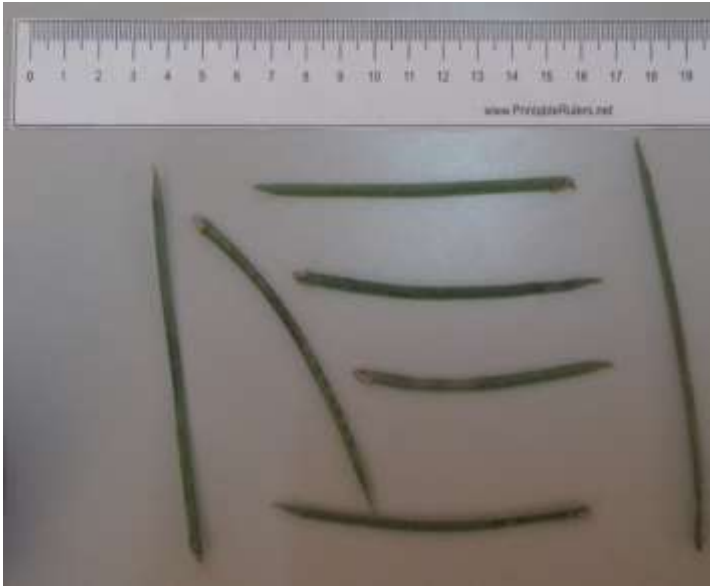


Figure 8: *M.lathyroides*'s pods



Figure 9: *M.lathyroides*'s seeds



Figure 10: *M.lathyroides*'s mature



Figure 11: *M.lathyroides*'s trifoliate leaves And immature pods.



Figure 12: *M. lathyroides* ; The pod strongly twisted on dehiscence.

Table 1: Coordinates of the recorded sites of *M. lathyroides* at Tutti Island, Khartoum, Sudan .

Site	Date	Time	Latitude	Longitude
1	16/5/2018	3:00 pm	N 15° 37' 08.1"	E 032° 29' 47."1
2	26/6/2018	11.00am	N 15° 37'07.035"	E 032°29' 46.697"
3	26/6/2018	11:15am	15° 37'0 8.271"	032° 29'47.709"
4	26/6/218	10:00am	15° 36' 39.674"	032° 30'02.60"
5	26/6/2018	10:10am	15° 36' 40.067"	032° 30'01717"

4. Discussion:

The main work covering the flora of Sudan is that of Andrews (1950; 1952;1956). More than five decades have passed since then; hence the possibility of finding a new species or otherwise missing others is great (Mack and Lonsdale, 2001).

Plant dispersal plays the most important role in the colonization of new habitats, including the spread of alien species and the maintenance of diversity with implications

for succession, regeneration and conservation. Humans have surpassed natural forces as the principal global disperser of vascular plants (Nash, 1995). Some of the means of dispersal are accidental: Seeds and other plant disseminules and vegetative propagules are transported inadvertently in clothing; cling to or are ingested by our domesticated animals; and are found within and attached to all manner of commerce, particularly as contaminants in seed lots.

The annual flood of the Blue Nile in Tutti island definitely carries reproductive parts (seeds, pollen grains...etc.), accordingly the possibility of recording or adding a new species to the flora of Sudan is certain, that because the Blue Nile passes through many neighboring East African countries.

M. lathyroides originated from tropical America (Central America, the Caribbean Islands, and South America) and is naturalized in the tropics and subtropics and it is the first time to be recorded to the flora of Sudan.

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.

5- Conclusion:

The description of Sudanese flora had began earlier by travelers, explores and colonizer. The systematic studies of the flora have begun by the end of the 19th century. The first descriptive flora of the plants of the Sudan was written by Brounand Massey (1929) then followed by tremendous work done by Andrews (1950;1952;1956) who inventoried Sudanese flora in three volumes, since then up to now just a spatial Floras have been carried out by many authors for different parts of Sudan. So more than five decades have passed since then; hence the possibility of finding a new species is high. Accordingly, this study is strongly recommends updating of Sudanese flora.

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