



ABUNDANCE AND ETHNOMEDICINAL USE OF TREE AND SHRUB SPECIES IN AZAZA AND MOKLA FORESTS IN THE BLUE NILE STATE, SUDAN

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Article DOI: <https://doi.org/10.36713/epra7634>

DOI No: 10.36713/epra7634

ABSTRACT

Documentation of medicinal plants utilization as an important non-timber forest resources are essential for their restoration and preservation. The present research aims to study the abundance of trees and shrubs in Azaza and Mokla forest in the Blue Nile state and to document their traditional use by two communities of Falata tribe living in the same locality. Field surveys were conducted during the period July-November in 2016 and 2017 following timed-meander survey method. Abundant, frequent, occasional, infrequent, and rare species were estimated. Ethnomedicinal data were collected using semi-structured questionnaires. Documentation was taken from a total of 43 informants. 23 informants from Flata Willa in Amara Seraifa village which is located about 30 Km north of Roseires dam and 20 informants from Falata Odda who are displaced by the dam lake and now resettled in City3 which located south east of the dam lake. A total of 28 medicinal trees and shrubs were identified in the studied forests. The most utilized plant families were leguminosae followed by Malvaceae Apocynaceae, and Zygophyllaceae. The highest proportion of the medicinal plants are trees (68%) and the common treated diseases are stomach pain, respiratory inflammation, haemorrhoid, heart pain, uteritis, anemia, kidney disease, and dysentery. The study recommended further pharmacological and phytochemical research to study the efficiency of these plants to cure the diseases as well as sustainable management approach and proper conservation strategy to be integrated into forest management planning and activities for protection of the studied forests.

KEYWORDS: *Ethnomedicine; plants; forest; Blue Nile; Sudan*

1. INTRODUCTION

Non-timber forest products play a significant and critical role in improving livelihoods to a large part of the world's population (Belcher, 2005; Heubes et al, 2012). These products have long formed a vital component of people's everyday needs such as energy, food, raw materials for building, and medicines (Campbell and Luckert, 2002). Medicinal plants are one of the important non-timber forest resources that entering world market every year (Iqbal, 1993). 70–80% of people worldwide rely mainly on traditional herbal medicine to meet their primary healthcare needs (Shengji, 2001) The exploration, utilization and conservation of these resources are essential for restoration and preservation of traditional and

indigenous knowledge (Reddy, 2012). In Sudan, although extensive areas of woodland and forest have been converted to agricultural use since the early 1900s (Harrison and Jackson, 1958), Still most of the natural forest products considered as an important source of income especially in the Blue Nile state (El Mamoun and El Zein, 2012). Modern health care systems in this area are not sufficient. The main source of their remedies is mainly plants. The present study aims to document the abundance of trees and shrubs in Azaza and Mokla forest in Al Roseires locality of the Blue Nile state and to explore and document their traditional use by two communities of Falata tribe living in the same locality



2. MATERIALS AND METHODS

This study was conducted in the Blue Nile state which is a regional state located in the southern part of Sudan. The total area of the State is approximately 45,844 km² and an estimated population of 1,193,293. This study is confined to Azaza (N:11 49 894 E:34 30 331) and Mokla (N:11 34 659 E:34 50 827) forests in Al Roseires area, which is the largest locality of the Blue Nile state. (Figure1). According to the vegetation cover map of Sudan, Blue Nile state is in the zone of low rainfall woodland savanna (Harison and Jackson, 1958). Its economic activity is based on agriculture and livestock. Collections of trees and shrubs in studied forest were conducted during the period July-November in 2016 and 2017 following timed-meander survey method adopted by Cropper (1993). Specimens were identified consulting relevant floras and publications of Andrews (1950; 1952; 1956) and El Amin (1990). Names are updated according to Plant List (2021). Families were arranged according to the Linear Angiosperm Phylogeny Group (APG III) (Haston et al. 2009). Vernacular names were reported

from local people and available literature (Andrews 1953, 1957). Species abundance in the studied forest was conducted according to the scale proposed by Palmer et al. (1995). Abundant, frequent, occasional, infrequent, and rare species were estimated. Ethnobotanical surveys were carried out during July 2017 using semi-structured questionnaires. Documentation was taken from a total of 43 informants belonging to two different branches of the Flata tribe. 23 informants from Flata Willa in Amara seraifa village which is located about 30 Km north of Roseires dam and 20 informants from Falata Odda who are displaced by the dam lake and now resettled in City3 which located south east of the dam lake. Conversations were held at informants' homes with the assistance of well-known local people and in focus group discussions in different sites in the studied areas. Ages of the informants ranged from 39 to 83 years with a mean of 60 years. Informants were asked about the plants and the harvested parts they use to cure the prevalent diseases, methods of preparing the herbal remedy, and administrative details.

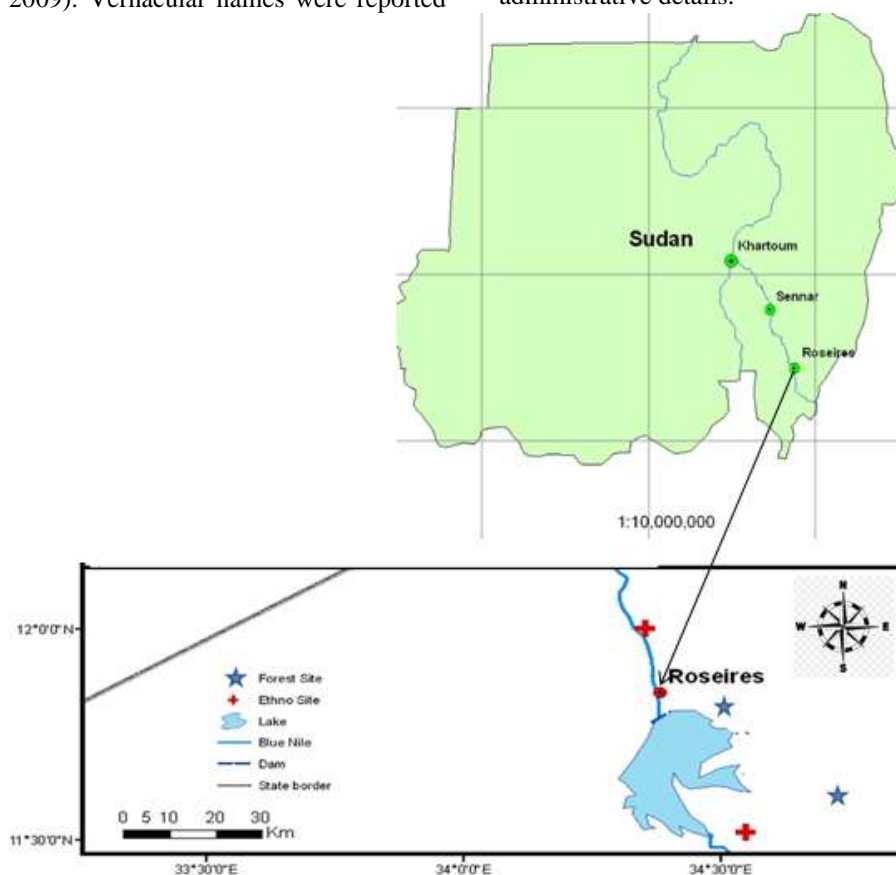


Figure1. Location of the study area



3. RESULTS AND DISCUSSION

In this study, a total of 28 naturally growing tree and shrub species of medicinal values were identified and documented in Azaza and Mokla forests (Figure 2) shows the proportions of trees and shrubs in the studied forests. Species abundance in the two forests is presented in table 1. *Acacia senegal*, *Sterculia Africana*, *Terminalia laxiflora*, and *Combretum glutinosum* are the dominant species in Azaza forest while *Anogeissus leiocarpus*, *Combretum glutinosum*,

Dalbergia melanoxylon, *Dichrostachys cinerea*, *Sterculia Africana*, *Ziziphus abyssinica*, and *Ziziphus spina-christi* are the most dominant species in Mokla forest.

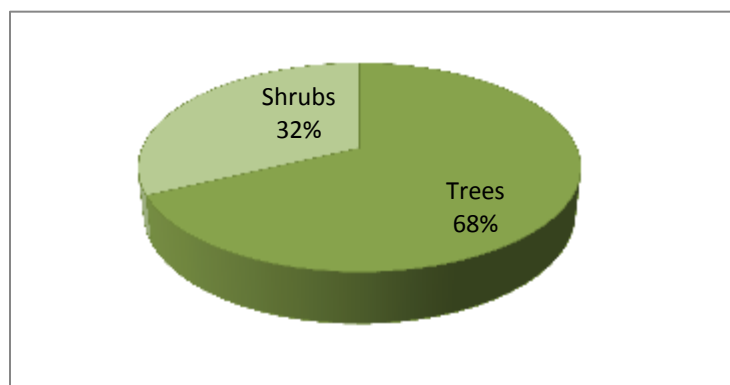


Figure2. Proportions of Ethnomedicinal trees and shrubs in the studied forests

Leaves, stem, bark, flowers, roots, seeds, and gum are the plants parts used by Falata Wila and Falata Odda tribal communities for remedies of diseases like stomach pain, respiratory inflammation, haemorrhoid, heart pain, uteritis, anemia, and kidney disease (Table 2). Leaves, bark, and roots are the most used parts of the plants. Figure 2 shows the proportions of the plant parts used. The most utilized plant families were

leguminosae (12 species) followed by Malvaceae, Apocynaceae, Zygophyllaceae (three species), and Combretaceae (two species) and one species from the families Burseraceae, Arecaceae, Papaveraceae, Meliaceae, and Lamiaceae. Figure 3. Interviews revealed that methods of preparation and application of the remedies were transmitted, most of the young generations are now using these traditional medicine.



Species	Local name	Abundance	
		Azaza forest (N:11 49 894 E:34 30 331)	Mokla forest (N:11 34 659 E:34 50 827)
<i>Acacia foetida</i> (Jacq.) Kunth	Lawot	+++	+
<i>Acacia polycantha</i> Willd.	Kakmoot	++++	+++
<i>Acacia senegal</i> (L.) Willd.	Hashab	+++++	+++
<i>Adansonia digitata</i> L.	Tbaldi	+++++	++++
<i>Anogeissus leiocarpus</i> (DC.) Guill. & Perr.	Silk	+++	+++++
<i>Argemone mexicana</i> L.	Khashkhash	+	+
<i>Azadirachta indica</i> A. Juss	Neem	++	++
<i>Balanites aegyptiaca</i> (L.) Delile	Laloub	+++	++++
<i>Boscia senegalensis</i> Lam.	Mokheet	+++	++
<i>Boswellia papyrifera</i> (Caill. ex Delile) Hochst	Trag trag	++	++
<i>Calotropis procera</i> (Aiton) Dryand.	Oshar	+++	++
<i>Capparis decidua</i> (Forssk.) Edgew	Tundob	+	+
<i>Cassia arereh</i> Del	Gaga	+	++
<i>Combretum glutinosum</i> Perr. ex DC.	Habeel	++++	+++++
<i>Dalbergia melanoxylon</i> Guill	Babanose	++++	+++++
<i>Dichrostachys cinerea</i> (L.) White & Arn.	Kadad	+++	+++++
<i>Grewia mollis</i> Juss.	Godam	+++	++++
<i>Hyphaene thebaica</i> (L.) Mart.	Dom	+	+
<i>Ocimum basilicum</i> L.	Rehan	++	++
<i>Pterocarpus lucens</i> Guill. & Perr.	Taraya	++	++++
<i>Senna alexandrina</i> Mill.	Sana sana	+++	+++
<i>Senna tora</i> (L.) Roxb.	pargahi	+++	+++
<i>Sterculia africana</i> Fiori.	Tartr	+++++	+++++
<i>Stereospermum kunthianum</i> Cham .	Khash khash	+++	+++
<i>Tamarindus indica</i> L.	Aradeeb	+++	+++
<i>Terminalia laxiflora</i> Engl.	Sobag	+++++	++++
<i>Ziziphus abyssinica</i> Hochst. ex A.Rich.	Seder feel	++	+++++
<i>Ziziphus spina-christi</i> (L.) Desf.	Seder	++	+++++

Table1. Trees and shrubs abundance in the studied forests

Key: (Abundance is according to scale proposed by Palmer et al. (1995): Abundant+++++; frequent +++++;

Occasional +++; Infrequent ++; Rare +)



Species	Local name	Habit	Part used	preparation	Medicinal use
<i>Acacia foetida (Jacq.) Kunth</i>	Lawot	Tree	Leaf	paste	Tonsillitis
<i>Acacia polyacantha Willd.</i>	Kakmoot	Tree	Bark & root	Decoction	Stomach pain
<i>Acacia senegal (L.) Willd.</i>	Hashab	Tree	Gum	Raw or maceration	Kidney pain
<i>Adansonia digitata L.</i>	Tbaldi	Tree	Fruit	Maceration	Dysentery
<i>Anogeissus leiocarpus (DC.) Guill. & Perr.</i>	Silk	Tree	Bark	decoction	Inflammation/ back pain
<i>Argemone mexicana L.</i>	Khashkhash	Shrub	Bark	Maceration	Ant venom
<i>Azadirachta indica A. Juss</i>	Neem	Tree	Leaf	Decoction	Malaria
<i>Balanites aegyptiaca (L.) Delile</i>	Laloub	Tree	Fruit	Maceration	Stomach pain/ haemorrhoid
<i>Boscia senegalensis Lam.</i>	Mokheet	Tree	Flower+ bark	Decoction	Respiratory inflammation
<i>Boswellia papyrifera (Caill. ex Delile) Hochst</i>	Trag trag	Shrub	Leaf	Paste	Haemorrhoid
<i>Calotropis procera (Aiton) Dryand.</i>	Oshar	Shrub	Root	Decoction	Diarrhea
<i>Capparis decidua (Forssk.) Edgew</i>	Tundob	Tree	Leaf & stem	Maceration	Vomiting
<i>Cassia arereh Del</i>	Gaga	Shrub	Root	Maceration	Stomach pain/ dysentery/ scorpion and ant venom
<i>Combretum glutinosum Perr. ex DC.</i>	Habeel	Tree	Bark	Decoction	Inflammation
				Paste	Hemorrhoid
<i>Dalbergia melanoxylon Guill.</i>	Babanose	Tree	Root	Raw	Sexual catalytic
<i>Dichrostachys cinerea (L.) White & Arn.</i>	Kadad	Tree	Leaf	Raw	Heart pain
<i>Grewia mollis Juss.</i>	Godam	Tree	Fruit	Infusion	Anemia
<i>Hyphaene thebaica (L.) Mart.</i>	Dom	Tree	Fruit	Maceration	Hypertension/ typhoid
<i>Ocimum basilicum L.</i>	Rehan	Shrub	Leaf	Decoction	Headache
<i>Pterocarpus lucens Guill. & Perr.</i>	Taraya	Shrub	Bark	Maceration	Kidney disease
<i>Senna alexandrina Mill.</i>	Sana sana	Shrub	Leaf & seed	Decoction	Stomach pain
<i>Senna tora (L.) Roxb.</i>	pargahi	Shrub	Bark	Decoction	Uteritis
<i>Sterculia africana Fiori.</i>	Tartr	Tree	Bark	Burnt	Uteritis
				Maceration	Coldness
<i>Stereospermum kunthianum Cham.</i>	Khash khash	Shrub	Bark	Decoction	Uterine bleeding
<i>Tamarindus indica L.</i>	Aradeeb	Tree	Fruit	Maceration	Stomach pain/ Diarrhea
<i>Terminalia laxiflora Engl.</i>	Sobag	Tree	Bark	Decoction	Respiratory inflammation
<i>Ziziphus abyssinica Hochst. ex A.Rich.</i>	Seder feel	Tree	Leaf	Paste	Abscess
<i>Ziziphus spina-christi (L.) Desf.</i>	Seder	Tree	Fruit & leaf	Maceration	Stomach pain

Table 2. List of Medicinal plants used by two communities of Falata tribe in the studied area

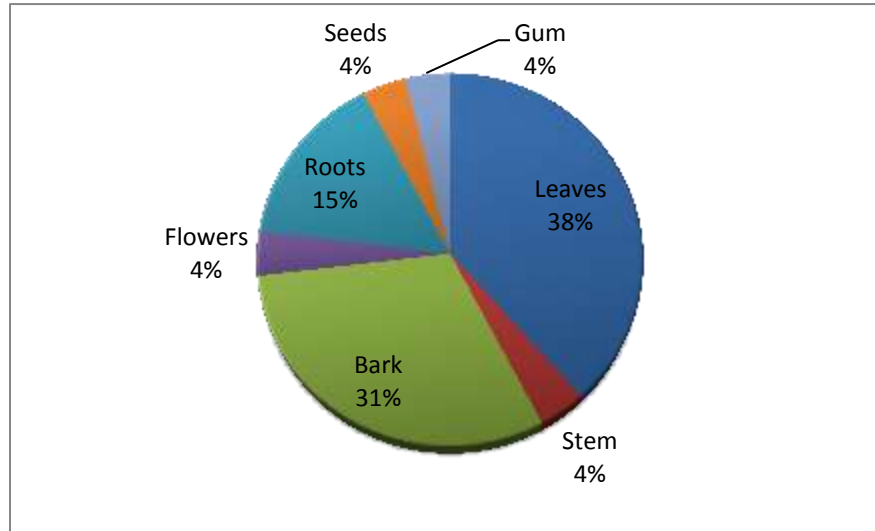


Figure 2. Ethno medicinal plants: Different plant parts used in the study area

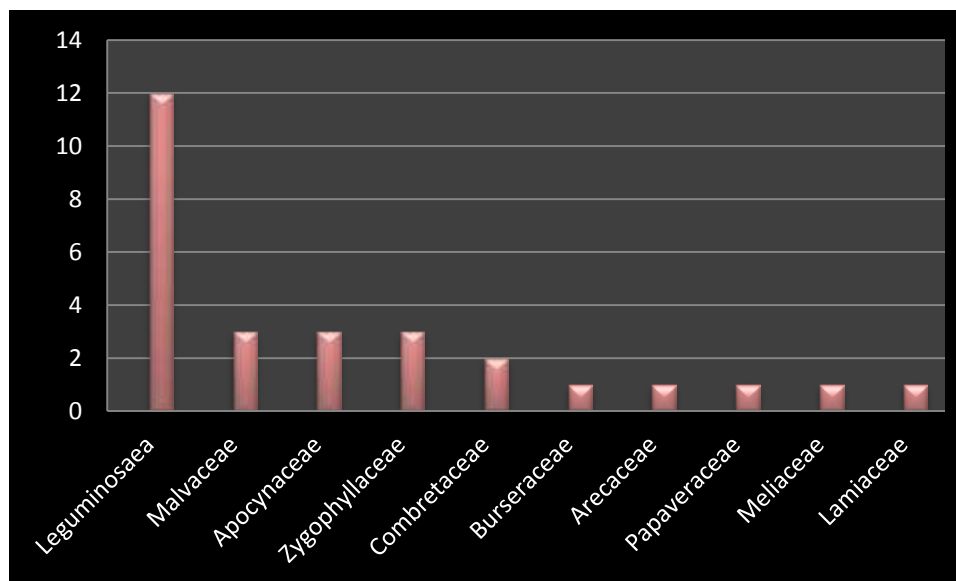


Figure 3. Ethno medicinal plants: the proportions of the plants used by families

It is observed that the use of leaves of *Ziziphus spina-christi* as an effective remedies to treat stomach pain was also documented for the Barti tribe in Sennar state (Ahmed et al, 2020). The use of leaves of *Hyphaene thebaica* by Kababish tribe in the northern Sudan for the treatment of hypertension were reported by Ahmed et al (2014) People from the different tribes Barti, Kababish and Falata agree to use *acacia seyal* stem for the treatment of rheumatic pain.

ACKNOWLEDGEMENT

Authors gratefully acknowledge the funding of this work by the Ministry of higher Education and Scientific Research, Sudan and would also like to express appreciation for the support of the Sudanese Electricity Distribution Company Ltd. and the valuable help and cooperation of the informants and locals in Amara Seriafa, Azaza, and Mokla areas .



CONCLUSION

This research documented the species diversity and abundance of trees and shrubs of Azaza and Mokla forest in the Blue Nile State and contributes on documentation of medicinally important species. The study revealed that Falata Willa and Falata Odda tribes, which lives in the vicinity of the studied forest used 28 plants to treat various ailments. The most utilized plant families were leguminosae followed by Malvaceae Apocynaceae, and Zygophyllaceae. The highest proportion of the medicinal plants are the trees (68%) and the common treated diseases are stomach pain, respiratory inflammation, haemorrhoid, heart pain, uteritis, anemia, kidney disease, and dysentery. The study recommended further pharmacological and phytochemical research to study the efficiency of these plants to cure the diseases as well as sustainable management approach and proper conservation strategy to be integrated into forest management planning and activities for protection of this non-timber forest products.

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