A Survey and Morphological Studies of Members of the Family Moraceae in Selected Areas of Benue State, Nigeria

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Abstract: A study was carried out to determine the taxonomic spread of the family Moraceae in selected areas of Benue State between May, 2012 and December, 2014. The selected areas are namely: Agan forest Reserve in Makurdi Local Government Area, Ikwe wildlife Resort in Gwer-east Local Government Area, and Leke Forest Reserve in Konshisha Local Government Area. Also, the morphological characters of the members of the family found were recorded. A total of eight (8) plant species belonging to two tribes of the Family Moraceae were recorded in the study areas (Ficeae and Artocarpae). Of the eight (8) plant species of the Moraceae recorded, seven(7) belonged to the Tribe Ficeae. These were: *Ficus exasperata*, *Ficus ingens*, *Ficus platyphylla*, *Ficus polita*, *Ficus sur*, *Ficus thonningii*, *Ficus trichopoda*, and only one species belonged to the Tribe Artocarpae. This was *Artocarpus heterophyllus*. The density of specific species of Moraceae varied. *Ficus sur* was the most dominant species in all the three sites with the highest number of thirty (30) stands at Agan Forest Reserve, followed by 25 stands at Leke Forest Reserve and 24 stands at Ikwe Wildlife Resort. *Ficus thonningii* was second to *Ficus sur* with Ikwe Wildlife Resort having the highest number (30 stands), followed by those found at Agan Forest Reserve (28 stands), and lastly those found at Leke Forest Reserve (26 stands). *Artocarpus heterophyllus* had the least number of 7 stands at Ikwe Wildlife Resort only. There was no significant difference between the density of specific species in the three study areas at p= 0.05

Keywords: Distichous, globose, obovoid, stipitate, monoecious, Moraceae, morphological.

1. INTRODUCTION

The Moraceae, often called the mulberry family or fig family, is a family of flowering plants comprising of monoecious or dioecious trees, shrubs, lianas, or rarely herbs which comprise of 40 genera and 1,000 species, nearly all with milky sap (Gill, 1988). The leaves are simple and alternate or rarely opposite. The stipules are small and lateral or sometimes they form a cap over the bud and leave a cylindrical scar. The flowers are unisexual and minute, and are usually densely aggregated. These aggregations frequently take the form of pendulous aments or catkins. Usually, the perianth consists of 4 or 5 undifferentiated sepals, but sometimes fewer or no perianth segments are present. A typical male flower has four stamens, one opposite each perianth segment. The female flowers have a bicarpellate pistil, generally with two styles, although one may be suppressed. The ovary is superior or inferior and contains a single pendulous ovule in a solitary locule. Fruit types include drupes and achenes that are often coalesced or otherwise aggregated into a multiple accessory fruit (Gill, 1988). Most are widespread in the tropical and sub-tropical regions, less so in temperate climates. In West Africa, it is represented by 12 genera and 110 species (Zerega *et al*., 2005). In Benue State, Nigeria, the Moraceae family is reported as the second largest family after Caesalpinioideae (Akesa, 2010 and Anyam *et al*., 2010).

A large number of these plants provide edible fruits. These include *Artocarpus heterophyllus, Ficus carica, Ficus glomerata, Morus alba,* and *Treculia africana.* Others are of medicinal importance. These include, *Ficus sycamorus, Ficus polita* and *Ficus ingens* (Gill, 1988). The bark of *Antiaria toxicaria* is used for making garments and sacks. Many species yield good timber. *Morus australis* is grown for its leaves which are fed to silkworms. Many Ficus species are grown as shade trees. The bark of *Ficus nekbudu* serves as source of inutshu cloth (Gill, 1988). The wood of *Maclura aurantiaca* is suitable for making bows (Gill, 1988).

In Benue State, Nigeria, comprehensive information on the distribution of members of the Family Moraceae including the morphological characteristics are lacking at present. The objective of this study is to survey, identify and describe the distribution of members of the Family Moraceae growing naturally in different areas of Benue State, Nigeria, including their morphological characteristics.

2. MATERIALS AND METHODS

Survey of members of the Family Moraceae: A floristic survey of the study sites was made and sample plant species belonging to the Family Moraceae were collected. The field assessments of the taxa were based on their

general morphology. This was in line with the methods used by Cronquist (1988), Hutchinson (1926; 1959; and 1973), and Keay *et al*. (1989), who also used diagnostic keys which do offer description of the plants concerned, and state the essential diagnostic characters by means of which the taxa could be identified. They used the most conspicuous and clear-cut characters, without special regards to those considered taxonomically the most important. Both plants that were identified conclusively on the field and those not identifiedbut suspected of belonging to the Family Moraceae were conveyed to the Botany laboratory of Benue State University, Makurdi, for identification and authentication. Mr. J.I. Waya of the Department of Biological Sciences, Benue State University, Makurdi, helped with the conclusive identification and authentication of the plant samples using taxonomic books such as FWTA, Trees of Nigeria by Keay *et al*.1989. Field photographs of the plant species studied showing their growth habits and some other taxonomic characters were taken using a Sunny-digital Camera model S 250

3. RESULTS AND DISCUSSION

Table1 illustrates the different species of the Family Moraceae found in the study areas, with their common and local names. A total of eight (8) species belonging to two tribes of the Family Moraceae were recorded in the study areas. The two tribes were Ficeae and Artocarpae. Of the eight (8) plant species of the Moraceae recorded, seven(7) belonged to the Tribe Ficeae. These were: *Ficus exasperata, Ficus ingens, Ficus platyphylla, Ficus polita, Ficus sur, Ficus thonningii, Ficus trichopoda,* and only one species belonged to the Tribe Artocarpae. This was *Artocarpus heterophyllus*. Out of the eight species found in the study areas, four of them were found in the wild including *Ficus exasperata, Ficus ingens, Ficus sur,* and *Ficus trichopoda,* while the other four were found in the homesteads including *Ficus platyphylla, Ficus polita, Ficus thonningii* and *Artocarpus heterophyllus.* The density of specific species of Moraceae varied. For instance, *Ficus sur,* which was the most dominant species in all the three sites, had the highest number of thirty(30) stands in Agan Forest Reserve, followed by 25 stands in Leke Forest Reserve and 24 stands in Ikwe Wildlife Resort. *Ficus thonningii* was second to *Ficus sur* but were not found in the wild, they were found in the homesteads close to the study sites. Those found close to Ikwe Wildlife Resort were higher in number (30 stands), followed by those found in Agan Forest Reserve (28 stands), and lastly those found close to Leke Forest Reserve (26 stands). Some of these species were reported before by several workers. In Plateau State, Nigeria, Offiah *et al*.(2011) reported *Ficus exasperata, Ficus trichopoda* and *Ficus platyphylla.* Also, Okafor (2015) in southern Nigeria reported two species, *Ficus exasperata* and *Ficus platyphylla.* Kadiri *et al*. (2008) in An Ethnobotanical Survey of Herbal Markets and Medicinal Plants in Lagos State recorded *Ficus sur, Ficus thonningii, Ficus trichopoda.* Our result are in agreement with those found by Aworinde *et al*. (2013) in Odeda area Southwestern Nigeria who reported plants grown and maintained in home gardens to include *Ficus platyphylla, Ficus polita, Ficus thonningii* and *Artocarpus heterophyllus.* In Taraba State of Nigeria, Chapman & Chapman (2001) reported several other species including *Ficus syncamorus, Ficus benjamina* and *Ficus rosa.* Mbuya (1994) identified useful trees and shrubs for Tanzania which include *Ficus sur, Ficus thonningii, Ficus trichopoda Ficus exasperata* and *Ficus platyphylla.*

Table 1: Species of the Family Moraceae found in the study areas, with their common and local names.

Tribe	**Species**	**Common *name***	**Local *names***

Ficeae	*Ficus exasperata* Vahl	Sandpaper fig/Toothbrush fig	Hitur (Tiv),Uli/Ikpi (Idoma), Adundu okulokulo (Etulo),Uhuo/Uho (Igede).
	Ficus ingens (Miq.) Miq	Homestead fig	Hon-tur (Tiv), Adundu (Etulo), Kawuri (Hausa).
	Ficus platyphylla Del	Gutta-percha tree	Ikondo-tor (Tiv), Ogo (Idoma),Ugu ese/Afe mnii (Etulo), Gamji (Hausa).
	Ficus polita Vahl	Homestead fig	Kondam/Mua (Tiv),Oda (Idoma), Mku-ozi/Afaya (Etulo),Durumi (Hausa).
	Ficus sur Forssk	Cape fig/ Broom cluster fig/Bush fig/wild fig	Tur (Tiv),Okoklodu (Idoma), Andundu (Etulo), Obwo (Igede),Dullu/Fabrinbaure (Hausa).
	Ficus trichopoda Baker	Stilt-root fig	Po (Tiv),Ugu (Etulo), Bauren kiyashi (Hausa).
	Ficus thonningii Blume	Dome-crowned fig	Akinde (Tiv),Oda (Idoma),Mku-ozi ulo),Uvo (Igede), Shiriya/Guluba/Chediya (Hausa).
Artocarpae	*Artocarpus Heterophyllus* Lam	Jackfruit	Ahi-uke (Tiv).

The data presented in Table 2 illustrates the distribution and frequency of occurrence of species of the Family Moraceae found in the study areas.

Table 2: Frequency of occurrence of different species of Moraceae at the study areas.

Species	**Number of plants**						**Total**
	Agan Forest Reserve		**Ikwe Wildlife Resort**		**Leke Forest Reserve**		
	O	**E**	**O**	**E**	**O**	**E**	
Ficus exasperata	30	(26)	24	(26)	25	(27)	79

Ficus ingens	08	(06)	04	(06)	06	(06)	18
Ficus platyphylla	07	(09)	09	(09)	11	(09)	27
Ficus polita	17	(17)	17	(17)	17	(17)	51
Ficus sur	30	(29)	26	(28)	30	(29)	86
Ficus thonningii	28	(28)	30	(28)	26	(28)	84
Ficus trichopoda	18	(21)	20	(21)	25	(21)	63
Artocarpus heterophyllus	00	(02)	07	(02)	00	(02)	07
Total	138		137		140		415

O = Observed

E = Expected

χ^2 cal (χ^2 calculated) = 20.93 χ^2 tab (χ^2 tabulated) = 23.68 df (degree of freedom) = 23 p = 0.05 NS (Not significant)

Description of different species of Moraceae at the study areas: Plates I – VIII represent all the identified species of Moraceae at the study areas. Their descriptions are presented in Table 3

Table 3: Species of the family Moraceae and their morphological description

Species	**Morphological description**
Ficus exasperata Vahl	Tree up to 20 m tall with smooth grey bark. Leaves distichous and alternate, ovate to elliptic, apex shortly acuminate, base acute to obtuse, upper surface scabrous . Leaves have a very rough surface, giving sand paper-like characteristics.. Sap is sticky, not milky.Figs are solitary or in pairs in the leaf axils, rarely on older wood,
Ficus ingens (Miq.) Miq	Tree ,10-12m high, the bole usually short, with dense, spreading crown. Bark is rough or somewhat scaly, grey-brown, with pink slash, exuding white latex. Stems are relatively thick densely pubescent to glabrous, grey brown. Leaves are alternate, spirally-arranged. Figs are solitary or in pairs in the axil of a leaf
Ficus platyphylla Del	Tree of 18m high, 6m in girth, with large widely spreading branches and

	broad crown. The bark is rusty red, flaking off in scattered patches and grey beneath. Branchlets very stout; twigs, stipules and young foliage finely velvety. Leaves are mostly broadly elliptic, round or blunt at the apex.
Ficus polita Vahl	Tree up to 15 m. tall, hemi-epiphytic, leafy twigs. Leaves spirally arranged; Figs 1 -4 together on spurs up to 3 cm. long on the older wood. Receptacle globose to obovoid often shortly stipitate, at least when dry, 2–4 cm. in diam. when fresh, 1.5–4 cm. in diam. when dry,
Ficus sur Forssk	Medium-sized tree up to 30m tall, with white latex present in all aerial parts; bole up to 150 cm in diameter, sometimes with buttresses; outer bark brownish to grey or whitish, Leaves arranged spirally, simple, shiny red when young. Figs are borne on leafless branchlets up to 50–70cm long on the trunk or older branches, Flowers unisexual, sessile; male flowers with 3-lobed perianth and 2–3 stamens; female flowers with 2–4 sepals, 1-celled ovary and short or long style
Ficus trichopoda Baker	Tree, 5-15m high, with short bole, up to 2m in diameter, often with stilt roots hanging from the trunk and branches, and dense and rounded crown, with horizontal or slightly drooping branches. Bark is smooth, pale to dark grey, with white striped-red slash, exuding little white latex. Leaves are alternate, spirally-arranged. Figs are solitary or in bunches of 2-4, beneath or in the axil of a young leaf,
Ficus thonningii Blume	Tree, or epiphytic or strangler tree, 8-10m high, with a short bole, more or less cylindrical, branching down ,with dense rounded crown and aerial roots frequently hanging from the trunk and branches. Bark is smooth, pale grey to brown , with a pink slash, exuding abundant latex. Leaves are alternate, spirally arranged, Figs are solitary or in pairs, beneath or in

	the axil of a young leaf, and sometimes on old branches,
Artocarpus Heterophyllus Lam	The tree is handsome and stately, 9-21 m tall, with evergreen, alternate, glossy, somewhat leathery leaves, oval on mature wood, sometimes oblong or deeply lobed on young shoots. All parts contain a sticky, white latex. Short, stout flowering twigs emerge from the trunk and large branches, or even from the soil-covered base of very old trees. The tree is monoecious: tiny male flowers are borne in oblong clusters 5-10 cm in length; the female flower clusters are elliptic or rounded.

PLATE 1: *Ficus exasperata* Vahl

PLATE 2: *Ficus ingens* (Miq.) Miq.

PLATE 3: *Ficus platyphylla* Del.

PLATE 4: *Ficus polita Vahl*

PLATE 5: *Ficus trichopoda* Baker.

PLATE 6: *Ficus thonningii* Blume.

PLATE 7: *Ficus sur* Forssk

PLATE 8: *Artocarpus heterophyllus* Lam

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