

Taxonomic Studies of three Underutilized Edible Species of ficus l. in Ebonyi State of Nigeria

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ABSTRACT

Taxonomic studies were carried out on three species of underutilized edible *Ficus* in Ebonyi State of Nigeria. The aim of the studies was to determine how related the three edible *Ficus* were in their macromorphology and leaf epidermal features. The three species are *F. thonningii*, *F. capensis* and *F. umbellata*. The young leaves of the species are very delicious vegetables; they serve as food and medicine. The studies were carried-out using standard methods. The results of the studies showed that the leaf shape was elliptic in *F. thonningii* and *F. capensis* and ovate in *F. umbellata*. The leaf size showed considerable variations among the three species. The leaf length of *F. thonningii* ranged from 6.0 - 10.7cm with the mean 9.8, the leaf width ranged from 4.7 - 8.2cm with the mean 5.0. The leaf length of the *F. capensis* ranged from 7.0 - 11.0cm with the mean of 10.5, the width ranges from 4.9 - 9.0cm with the mean of 7.0. The length of the *F. umbellate* ranged from 5.6 - 9.4cm with the mean 7.0, the width ranged from 5.9 - 11.2cm with the mean 8.0. The abaxial and adaxial surfaces of the three species showed paracytic stomata and the stomata were more abundant on abaxial surfaces of the three species compare to their adaxial surfaces. *F. capensis* showed trichomes on the adaxial surface and was absent on the adaxial surface and also absent on both the abaxial surface and adaxial surfaces of *F. umbellata* and *F. thonningii*.

Keywords: *Ficus*, Macromorphology, Epidermal features, Vegetables, Nigeria

INTRODUCTION

Ficus is one of the largest genera in the family moraceae of more than 800 species in the tropics and subtropics of the world [1]. In African floristic region, 105 species of the genus were recorded by [2] while [3] in West Tropical Africa Flora recorded 44 species in Nigeria. The genus is valuable due to its high economic and nutritional values. It is a good source of food for fruit-eating animals and man in some parts of the tropics [4]. In Nigeria, and other parts of the world, the plants along with many others in this family are important in the traditional treatment of many diseases. The plant extracts have been reported in the treatment of diarrhea, dysentery, sexually transmitted disease causing microorganisms, chest ailments, tuberculosis, leprosy, convulsions, and pain, in anaemia and wound [5], [6] among many others. The relevance of this plant in traditional medicine is as a result of the secondary metabolites such as phytates, phenols, saponins, tannins, alkaloids, terpenoids and flavonoids

which they have been screened to contain.

The taxonomy of *Ficus* is still puzzling because of the extreme morphological similarities and ambiguous boundaries between taxa. [7] broadly grouped the species of *Ficus* they studied into two based on glabrous and pubescent nature of leaf surfaces. Among the pubescent group was *F. thonningii* Blume with hairs on the adaxial surfaces of the leaves. Stalked hairs with flat plates were observed on the abaxial surfaces of *F. ingens* and *F. sur*, and also on the adaxial surfaces of *F. ovata*, *F. polita*, *F. thonningii*, and *F. trichopoda*. [8] also reported that there were important leaf epidermal characters exhibited by some species of the genus which are taxonomically significant. According to [9] Anticlinal walls were repand in *F. capreifolia*, *F. exasperata*, *F. glumosa*, *F. ovata*, *F. sagittifolia*, *F. trichopoda*, *F. variifolia*, but straight to arch in all other species. Cell shape is irregular in *F. capreifolia*, *F. exasperata*, *F.*

glumosa, *F. mucoso*, *F. ovata*, *F. sagittifolia*, *F. trichopoda*, and *F. variifolia* while it is polygonal in other species, except in *F. saussureana*, in which both irregular and polygonal shapes are represented. Stomata were restricted to the abaxial surfaces of the leaves except in *F. vallis-choudae* in which leaves are amphistomatic, hydathodes were observed on the adaxial leaf surfaces of *F. lutea*, *F. sansibaricasubspmacrosperma*. [3] also reported that there was extensive similarities in the foliar epidermal

MATERIALS AND METHODS

Fresh specimens of *F. thonningii* Blume (Synonym: *Urostigmathonningii* (Blume) Miq.), *F. capensis* Thumb (synonym: *F. surForssk*) and *F. umbellata* Vahl were collected from Abakaliki metropolis and identified in Ebonyi State University Herbarium.

Macromorphological study:

Leaf length and width, were measured following the method of Nwankwo and Ayodele (2017). From each specimen, a total of 20 leaflets were randomly selected for measurement.

Foliar epidermal studies: Epidermal preparation methods also followed [5] The standard median portions of the leaves obtained by cutting with razor blade were soaked in concentrated trioxonitrate (v) acid for about 25 to 35 minutes depending on the nature of the leaves. The appearance of air bubbles on the surfaces of the leaves indicated their readiness for separation. They were transferred into some water in the Petri

characters of *F. ovata*, *F. umbellata*, *F. ottonifolia*, *F. polita* and *F. thonningii* they studied.

Less publications have been seen on the three species of interest which are *Ficusumbellata*, *Ficusthonningii* and *Ficuscapensis*. The young leaves and fruits of the species are very good vegetables in some parts of Ebonyi State. It is necessary to study the species based on their macromorphology and leaf epidermal features.

dish with a pair of forceps. Both epidermises were carefully separated by teasing them apart and pulling the epidermis back on itself using camel hair brush and dissecting needle. The camel hair brush was also used to remove the adhering tissue debris. The separated surfaces were rinsed in distilled water and then transferred into 50% ethanol for about two to three minutes to harden. They were rinsed again in distilled water and stained with safranin for about five minutes and excess stains were washed off in water. They were mounted in 25% glycerol on slides with the edge of the cover slips sealed with nail varnish to prevent dehydration. The slides were labelled appropriately and examined under the light microscope while photomicrograph of each slide was taken at a magnification (x400), using Canon digital camera fixed to light microscope and connected to personal computer

RESULTS

The three species had simple leaves. The leaf shape was ovate in *F. umbellata*, elliptic-obovate in *F. capensis* and elliptic in *F. thonningii*. The leaf surfaces of the three species were glabrous and *F. The leaf margin of F. umbellata* and *F. thonningii* were entire and *F. capensis* was serrate. The leaf apices of the three species were acute. The leaf base of *F. umbellata* was cordate, *F. capensis* and *F. thonningii* were acute. The leaf size showed the considerable variation among the three species. The leaf length of *F. thonningii* ranged from 6.0 - 10.7cm with the mean 9.8, the leaf width ranged from 4.7 - 8.2cm with the mean 5.0. The leaf length of the *F. capensis* ranged from 7.0 - 11.0cm with the mean of 10.5, the

width ranges from 4.9 - 9.0cm with the mean of 7.0. The length of the *F. umbellata* ranged from 5.6 - 9.4cm with the mean 7.0, the width ranged from 5.9 - 11.2cm with the mean 8.0. The macromorphological features were summarized in table 1 and 2 below.

Foliar epidermal features

The abaxial and adaxial surfaces of the three species showed paracytic stomata and the stomata were more abundant on abaxial surfaces of the three species compare to their adaxial surfaces. *F. capensis* showed trichomes on the adaxial surface and was absent on the adaxial surface and also absent on both the abaxial surface and adaxial surfaces of *F. umbellata* and *F. thonningii*.

Table 1. Qualitative macro-morphological species of *Ficus* species studied.

Character	Leaf shape	Leaf surface	Leaf margin	Leaf apex	Leaf base
<i>F. umbellata</i>	Ovate	Glabrous	Entire	Acute	Cordate
<i>F. capensis</i>	Elliptic-obovate	Glabrous	Serrate	Acute	Acute
<i>F. thonningii</i>	Elliptic	Glabrous	Entire	Acute	Acute

Table 2: Shows the summary of morphometric analysis of the three species of *Ficus* studied

Character	Length (cm)	Width (cm)
<i>F. thonningii</i>	6.0(9.8±0.3)10.7	4.7(5.0±0.4)8.2
<i>F. capensis</i>	7.0 (10.5±0.3)11.0	4.9(7.0±0.2)9.0
<i>F. umbellata</i>	5.6(7.0±0.4)9.4	5.9(8.0±0.3)11.2

All measurement are in centimeter (cm); minimum (mean ± standard error) maximum

DISCUSSION

The macro morphology and leaf epidermal features of the three species showed that *F. thonningii* and *F. capensis* are more related than *F. umbellata*. The leaf surfaces of the three species studied were all glabrous; this is contrary to the report of [7]. They reported that *F. thonningii* and *F. capensis* were pubescent on the adaxial surfaces of the leaves. The leaf epidermal features were more related among the species we studied and this is in line with the report of [3] [4] who reported that there was extensive similarities in the foliar epidermal

characters of *F. umbellata* and *F. thonningii* they studied.

The presence of stomata on the adaxial surface of *F. thonningii* and trichomes on the adaxial surface of *F. umbellata* are striking features which have not been reported early by other researchers. *Ficus. thonningii* and *F. umbellata* are domestic plants used for fencing while *F. capensis* is wild. It is noteworthy that the three species of *Ficus* reported here are very good vegetables which serve as food and medicine. Phytochemical, proximate and molecular data of the species are also needed to fully

ascertain the status of the species in the genus.

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