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Full Length Research Paper

A morphometric analysis of the genus *Ficus* Linn. (moraceae)

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Foliar parameters of *Ficus* in Nigeria were subjected to quantitative analysis. The morphometric analysis is based on ten quantitative parameters of the leaves of species. Principal compound analysis produced six groups whose characters are described. Highly significant positive correlation exists between leaf length and leaf width, leaf length and lamina length, leaf length and petiole length, lamina length and lamina width. Negative correlation was observed between leaf width and leaf length/width ratio, petiole length and fruit length/petiole length ratio. The groups that emerged compared well with existing traditional classification with some sub-sectional discrepancies.

Key words: *Ficus*, morphometric analysis, numerical classification.

INTRODUCTION

The methods of numerical taxonomy have been used in classifying many plants as well as interpreting results of taxonomic studies (Gomez-Campo et al., 2001; Chiapella, 2000, Sneath and Sokal, 1973). Cluster analysis and principal component analysis (PCA) are two techniques commonly used in numerical classifications. Cluster analysis produces a hierarchical classification of entities (taxa) based on the similarity matrix, while PCA is a second method used for reducing the dimensions of the original data. It determines the line through the cloud of points that accounts for the greatest amount of variation. The position of the points relative to each other is an indication of their taxonomic relationship. The PCA allows visual interpretation of the relationship.

The genus *Ficus* Linn. is made up of close to 1000 species throughout tropical and warm temperate regions with greatest diversity in SE Asia, Malesia and tropical South America, 42 species in Australia. Berg (1989) has reported about 105 in the African floristic region with some five dozens in West Africa (Burkill, 1997) and at least 44 species are in Nigeria (Keay, 1989). The genus *Ficus* is readily distinguished by the highly characteristic fruits and has often been recognized by the milky juice, the prominent stipule that leaves a scar on falling and the minute unisexual flowers often arranged on variously shaped receptacles (Hutchinson and Dalziel, 1958). *Ficus* includes a large number of indoor ornamental plants and garden and roadside trees such as *F. elastica* Roxb. ex Hornem., *F. religiosa* L., and *F. microcarpa* L. The genus has followed several curious lines of evolution. The taxonomy of this group is still puzzling, because of the extreme morphological variability and ambiguous boundaries between taxa. Corner (1960a, b, 1961, 1962, 1965) recognized four subgenera, 14 sections, 14 subsections, 54 series and 38 subseries. Most of these infrageneric groupings have been done using the figs pollinators (1977). The present study deals with the analysis of morphological variation in relation to taxon boundaries and to evaluate characters that have been used for delimitation between species.

MATERIALS AND METHODS

In accordance with classical taxonomic practice, herbarium material has been utilized with individual specimens forming the units of study. Data have largely

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Table 1. The classification and distribution of *Ficus* Linn.

Subgenus	Section	No. of species	Distribution
Ficus	*Adenosperma* Corner	23	Indo - Australia
	Ficus	60	Indo - Australia, Asia, Africa
	Kalosyce (Miq.) Corner	20	Indo - Australia and Asia
	Neomorphe King	6	Indo - Australia and Asia
	Rhizocladus Endl.	55	Indo - Australia and Asia
	Sinosycidium Corner	1	Asia
	Sycocarpus Miq.	75	Indo - Australia and Asia
	Sycidium Miq.	105	Indo - Australia, Asia, Africa
Pharmacosycea Corner	*Oreosycea* (Miq.) Corner	50	Indo - Australia and Africa
	Pharmacosycea	20	America
Sycomorus (Gasp.) Miq.	*Sycomorus*	13	Africa and Indo - Australia
Urostigma (Gasp.) Miq.	*Americana*	120	America
	Conosycea (Miq.) Corner	65	Indo - Australia, Asia, Africa
	Galoglychia (Gasp.) Endl.	75	Africa
	Leucogyne Corner	2	Asia
	Malvanthera Corner	20	Indo - Australia
	Stilpnophyllum Endl.	1	Asia
	Urostigma	20	Indo - Australia, Asia, Africa

Adapted from Weiblen, 2000.

been derived from inherent morphological characters. Selection of the morphological characters to be scored followed a literature review of former taxonomic studies on the species of the section and a preliminary examination of herbarium materials. Certain characters were discarded as research progressed because they proved constant throughout the group, were difficult to assess accurately or were unsuitable for rapid and accurate scoring. Measurements were taken for the lengths and widths of leaves, lamina, fruits (when present) with a line ruler. The morphological measurements were compiled on recording sheets using as many numbers of taxa as were available for each operational taxonomic unit (OTU). Mean figures were entered into a Microsoft Excel spreadsheet and the raw data then coded to allow analysis using Unistat 4.0 for Windows. For analysis the ratios of these figures were calculated. Analysis of variance (ANOVA) was carried out for 10 selected quantitative measurements: leaf length, leaf width, leaf length/width ratio, lamina length, petiole length, lamina/petiole length, fruit length, fruit width, fruit length/width ratio, and fruit stalk length. The level of significance was recorded for each measurement. Cluster Analysis was performed for these parameters. The quantitative characters considered most helpful for specific distinction were combined into pictorial scatter diagrams and a reduced sample was subjected to PCA ordination.

Enumeration of representative herbarium specimens used

Sonibare & Others FHI 106054 *F. asperifolia*, Punt & Daramola FHI 78407 *F. capreifolia*, Sonibare & Others FHI 106046 *F. exaperata*, Latilo FHI 38017 *F. variifolia*, Okeke FHI 24695 *F. mucuso*, Sonibare & Others UIH 22256 *F. sur*, Wit & Daramola FHI 79243 *F. vallis-choudae*, Eimunjeze & Others 66417 *F. ingens*, Sonibare & Others UIH 22254 *F. lutea*, Lowe FHI 81966 *F. cyathistipula* subsp. *cyathistipula*, Okoye FHI 59147 *F. saussureana*, Onochie FHI 35928 *F. abutilifolia*, Ibhrmesabbor 94649 *F. glumosa*, Gbile & Others FHI 65405 *F. platyphylla*, Geerling FHI 43440 *F. trichopoda*, Jackson FHI 20942 *F. natalensis* subsp. *natalensis*, Sonibare & Others UIH 22247 subsp. *leprieurii*, Sonibare & Odewo UIH 22253 *F. thonningii*, Daramola FHI 29096 *F. aldofi-friderici*, Sonibare & Others FHI 106051 *F. elasticoides*, Daramola & Binuyo FHI 95988 *F. barteri*, Jones FHI 14523 *F. lyrata*, Sonibare & Others FHI 106056 *F. sagittifolia*, Brenan FHI 39370 *F. artocarpoides*, Sonibare & Others FHI 106053 *F. polita,* Hoechii FHI 103963 *F. ottoniifolia*, Domen FHI 32431 *F. ovata*, Keay FHI 37245 *F. sansibarica* subsp. *macrosperma*, Sonibare & Others FHI 106050 *F. umbellata*, Sonibare & Others FHI 106047 *F. elastica*, Jackson FHI 17836 *F. pumila*.

RESULTS

Differences in leaf and fruit morphology between the three hundred and eighty-four individuals belonging to the thirty-one species of *Ficus* were examined for ten quantitative characters (leaf length, leaf width, leaf length/width ratio, fruit length, fruit width, fruit length / width ratio, fruit stalk length). Table 1 shows the classification and distribution of *Ficus* adapted from Weiblen (2000). The specimens examined are shown in Table 2, classification according to Corner (1965).

Table 2. Specimens examined (classification according to Corner 1965) summarized by Berg (1990).

Subgenus	Section	Subsection	Species
Ficus	*Sycidium* Miq.	-	*Ficus asperifolia*
	,,		*Ficus capreifolia*
	,,		*Ficus exasperata*
Pharmacosycea	*Oreosycea* (Miq.) Corner	-	*Ficus variifolia*
Sycomorus	*Sycomorus* (Gasp.) Miq.	-	*Ficus mucuso*
	,,		*Ficus sur*
	,,		*Ficus vallis-choudae*
Urostigma	*Urostigma* (Gasp.) Miq.	-	*Ficus ingens*
	Galoglychia (Gasp.) Endl.	*Galoglychia*	*Ficus lutea*
	,,	,,	*Ficus saussureana*
	,,	*Platyphyllae*	*Ficus abutilifolia*
	,,	,,	*Ficus glumosa*
	,,	,,	*Ficus platyphylla*
	,,	,,	*Ficus trichopoda*
	,,	*Chlamydorae*	*Ficus natalensis*
	,,	,,	*subsp. natalensis*
	,,	,,	*subsp. leprieurii*
	,,	,,	*Ficus thonningii*
	,,	*Crassicostae*	*Ficus aldofi-friderici*
	,,	,,	*Ficus elasticoides*
	,,	*Cyathistipulae*	*Ficus barteri*
	,,	,,	*Ficus cyathistipula*
	,,	,,	*subsp. cyathistipula*
	,,	,,	*Ficus lyrata*
	,,	,,	*Ficus sagittifolia*
	,,	*Caulocarpae*	*Ficus artocarpoides*
	,,	,,	*Ficus polita*
	,,	,,	*Ficus ottoniifolia*
	,,	,,	*Ficus ovata*
	,,	,,	*Ficus sansibarica*
	,,	,,	*subsp. macrosperma*
	,,	,,	*Ficus umbellata*
	,,	*Stilphnophyllum*	*Ficus elastica*
Others	-	-	*Ficus pumila*

Means and standard deviations are shown as Table 3. Analysis of variance (ANOVA) was performed to test the differences between taxa. The results indicate that the differences are highly significant when we consider all the species (Table 4). The values of the ten quantitative parameters that characterize each of the thirty-one species subjected to principal component analysis (PCA) are the same as the ones used for the ANOVA. According the PCA 82.00% of the variance is expressed by three factors (lineal combinations of parameters). For each factor, parameter with maximum discriminating power and the percent of variance they account for are expressed as indicated in Table 5. Figure 1 represents the component plot on rotated axes for the ten quantitative parameters, while Table 6 represents the factor loading of the parameters. This shows that leaf length, lamina width, petiole length and lamina length are contributing most to the separation. Figure 2 represents the position of different species with respect to the above axes or factors using axes one and two. It permits a visualization of the degree of affinity among them.

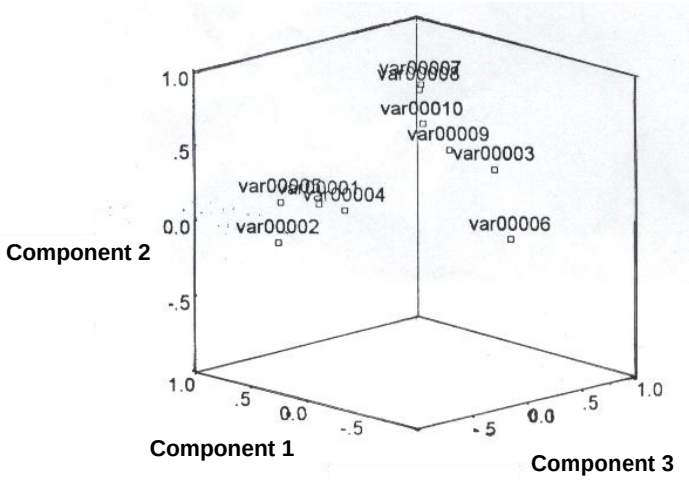

Figure 1. Component plot in rotated space for the ten quantitative parameters.

Table 3. Means ± standard deviations of 10 quantitative parameters of *Ficus*.

Taxa	L.Length	L.Width	L/W	B.Length	P.Length	B/P	F.Length	F. Width	Fl/W	S.Length
F. asperifolia	12.41±4.55	4.76±1.88	2.66±0.36	11.31±3.99	1.09±0.66	12.4±4.09	15.38±6.48	9.13±5.87	1.86±0.45	6±2.2
F. capreifolia	8.44±0.83	2.29±0.41	3.83±0.77	7.35±0.6	1.09±0.33	7.42±2.61	5±0.76	5±0.93	1.04±0.28	10±1.51
F. exasperata	13.58±4.76	5.39±1.54	2.36±0.57	10.24±3.1	1.9±1.16	6.05±1.42	9.75±5.39	7.5±4.99	1.15±0.20	6.25±5.52
F. variifolia	16.26±4.45	7.04±1.19	2.35±0.72	14.09±4.35	2.17±0.97	6.78±4.19	12.5±1.6	15.38±1.6	0.82±0.07	5.25±1.83
F. mucuso	17.73±7.05	10.45±3.14	1.66±0.26	11.55±3.5	6.18±3.9	2.6±1.48	20.25±2.87	16.25±2.05	1.25±0.11	12.62±6.99
F. sur	15.13±5.28	6.56±2.47	2.32±0.45	11.13±3.68	4±2.33	3.47±2.02	18.5±13.06	13.5±8.64	1.35±0.43	11.25±3.85
F. vallis-choudae	17.98±3.12	9.29±3.6	1.75±0.18	13.71±2.64	4.26±0.66	3.23±0.46	32.25±7.91	21.75±3.45	1.5±0.37	0
F. ingens	13.94±2.09	6.5±0.93	2.14±0.07	11.24±1.97	2.95±0.81	4.34±1.7	5±1.07	4.5±0.76	1.11±0.18	5.63±1.92
F. lutea	30.11±7.34	10.55±1.65	2.85±0.43	23.85±4.23	6.48±3.44	4.35±1.72	14.5±6.55	12.5±6.74	1.22±0.24	6.88±1.25
F. cyathistipula subsp. *cya.*	16.3±2.41	5.18±0.21	3.14±0.39	14.35±2.37	1.95±0.91	8.49±3.18	34±1.51	30±1.51	1.14±0.1	15±2.51
F. saussureana	22.3±1.3	5.94±0.41	3.77±0.28	20.84±1.38	1.46±0.54	16.46±7.31	17.88±8.59	24.75±6.8	0.7±0.19	0
F. abutilifolia	16.66±5.48	11.25±3.23	1.47±0.23	10.15±2.85	6.78±2.82	1.66±0.53	22.88±4.82	12.12±2.7	1.94±0.47	10.13±3.52
F. glumosa	12.45±4.09	6.59±4.53	2.33±0.27	10.05±3.5	2.53±0.92	4.15±1.36	6.88±5.36	6.88±5.38	1.02±0.21	8.75±2.82
F. platyphylla	23.83±8.88	12.81±3.91	1.86±0.27	17.02±5.75	6.79±3.32	2.67±0.61	6.88±1.55	4.63±1.19	1.55±0.44	9.75±1.98
F. trichopoda	16.44±4.01	9.44±3.04	1.71±0.34	13.19±3.03	3.25±1.25	4.43±1.29	8.63±3.38	6.63±2.39	1.32±0.32	15±5.35
F. natalensis subsp. *nat.*	7.54±1.62	2.31±0.96	3.74±1.67	6.96±1.34	0.35±0.12	22.57±10	3.5±0.93	3.25±1.04	1.17±0.56	3.5±1.07
F. natalensis subsp. *lep.*	7.55±2.3	4.71±1.25	1.62±0.19	6.44±1.62	1.11±0.85	11.52±11.09	3.75±0.71	3.5±0.53	1.09±0.25	7.75±2.49
F. thonningii	11.38±5.19	4.11±1.25	2.71±0.81	9.11±3.69	2.26±1.55	5.7±3.1	8.25±3.69	6.5±3.85	1.35±0.44	4.13±1.25
F. aldofi-friderici	14.44±4.45	5.46±1.85	2.7±0.42	11.8±3.69	2.17±0.85	5.64±1.48	4.88±0.35	4.75±0.46	1.01±0.12	0
F. elasticoides	32.91±3.07	16.08±0.88	2.05±0.17	26.63±1.25	6.23±2.1	4.85±2.12	15.75±1.39	15.75±1.39	1	10.5±1.77
F. barteri	22.95±2.9	3.93±0.26	5.85±0.62	20.89±3.21	2.06±0.94	12.01±5.36	26.38±3.07	14±1.6	1.91±0.36	10±1.51
F. lyrata	29.8±0.74	17.15±0.78	1.74±0.11	26.15±0.74	3.65±0.66	7.39±1.41	0	0	0	0
F. sagittifolia	45.33±0.97	11.99±1.29	3.82±0.44	42.86±0.54	2.46±0.87	19.8±8.13	0	0	0	0
F. artocarpoides	14±0.35	5.64±0.42	2.5±0.18	11.48±0.38	2.39±0.43	4.97±1.05	29.75±2.25	24±1.51	1.24±0.04	19.25±1.83
F. polita	16.61±7.09	7.24±3.12	2.38±0.67	10.53±4.27	6.1±3.32	1.86±0.45	15.75±2.49	14.25±2.6	1.11±0.05	0
F. ottoniifolia	18.64±3.55	6.94±0.26	2.8±0.58	14.81±1.56	3.83±2.14	6.02±4.84	13.38±2.07	10.88±0.99	1.27±0.22	10.5±1.77
F. ovata	25.94±7.4	9.19±2.71	2.85±0.38	19.62±5.55	6.38±2.01	3.12±0.39	27.5±4.63	28.75±9.91	1.03±0.33	10±1.51
F. sansibarica subsp. *macr.*	11.93±2.48	4±0.53	2.98±0.53	9.44±2.08	2.45±0.87	4.4±1.27	32.38±2.07	28.5±3.51	1.15±0.17	26.88±6.51
F. umbellata	24.16±4.4	16.24±3.27	1.51±0.22	19.41±2.24	7.9±1.85	3±0.81	0	0	0	0
F. elastica	8.61±0.73	3.78±0.26	2.28±0.15	7.37±0.64	1.24±0.4	6.54±2.33	10±1.51	10±1.51	1	0
F. pumila	7.88±2.38	3.85±0.97	2.03±0.35	6.35±1.94	1.49±0.57	4.58±1.17	55±9.5	25.63±4.47	2.17±0.42	15.62±4.14

L.Length = Leaf length; L.Width = Leaf width; L/W = Leaf length/Width ratio; B.Length = Lamina length; P.Lenght = Petiole length; B/P = Lamina length/Petiole length; F.Lenght = Fruit length; F.Width = Fruit width; Fl/W = Fruit length/Width; S.Lenght = Stalk length

Table 4. Analysis of variance (ANOVA) result based the 10 quantitative parameters of some *Ficus* species.

Parameters	Mean square effect	Mean square error	F (df 30, 217)	Level of significance
L.length	17290.4269	576.3476	30.7040	***
L.Width	3910.9060	130.3635	29.8155	***
L/W	201.7226	6.7241	25.0434	***
B.length	14318.3431	477.2781	53.0211	***
P. length	1098.2818	36.6094	12.1027	***
B/P	6231.6738	207.7225	13.0573	***
F.length	37496.1210	1249.8707	58.5571	***
F. Width	19433.4355	647.7812	44.1345	***
FL/W	60.7116	2.0237	25.7091	***
S.Lenght	10165.3387	338.8446	41.7395	***

***Results highly significant at p ≤ 1%

L.Length = Leaf length; L.Width = Leaf width; L/W = Leaf length/Width ratio; B.Length = Lamina length; P.Lenght = Petiole length; B/P = Lamina length/Petiole length; F.Lenght = Fruit length; F.Width = Fruit width; Fl/W = Fruit length/Width; S.Lenght = Stalk length

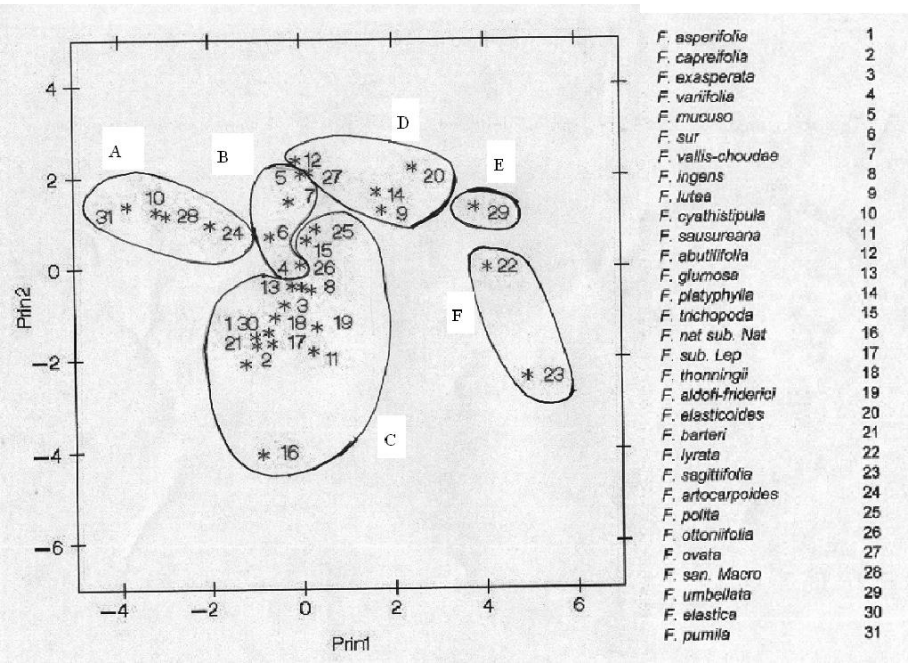

Figure 2. Scatter plot of *Ficus* species based on ten morphological parameters after the first and second principal component analyses.

Table 5: Factor loading of 10 quantitative characters in principal component analysis.

Char/axes	PRIN 1	PRIN 2	PRIN 3
1	0.978	-0.091	0.089
2	0.797	-0.216	-0.454
3	0.125	0.171	0.828
4	0.921	0.155	0.267
5	0.654	0.11	-0.58
6	0.03	0.263	0.818
7	-0.045	0.937	-0.004
8	0.045	0.87	0.069
9	-0.396	0.575	-0.103
10	-0.141	0.697	-0.086

The characters are represented by the following numbers:(1) leaf length, (2) leaf width, (3) length/width ratio, (4) lamina length, (5) petiole length, (6) lamina/petiole, (7) fruit length, (8) fruit width, (9) fruit length/width, (10) stalk length.

Table 6. Cumulative pincipal component analysis (PCA).

Char	Eigenvalue	Difference	Proportion	Cumulative
1	3.70	1.08	0.37	0.37
2	2.62	0.75	0.26	0.63
3	1.87	1.28	0.19	0.82
4	0.59	0.08	0.06	0.88
5	0.51	0.14	0.05	0.93
6	0.37	0.20	0.04	0.97
7	0.17	0.05	0.07	0.98
8	0.12	0.07	0.01	1.00
9	0.05	0.05	0.01	1.00
10	0.00	0.00	0.00	1.00

The characters are represented by the following numbers:(1) leaf length, (2) leaf width, (3) length/width ratio, (4) lamina length, (5) petiole length, (6) lamina/petiole, (7) fruit length, (8) fruit width, (9) fruit length/width, (10) stalk length.

Tentatively the following groups and ascriptions seem reasonable:

1. *F. pumila, F. cyathistipula* subsp*. cyathistipula, F. sansibarica subsp. macrosperma, and F. artocarpoides.*
2. *F. variifolia, F. sur, F. mucuso, F. vallis-choudae.*
3. *F. asperifolia, F. capreifolia, F. exasperata, F. ingens, F. saussureana, F. glumosa, F. trichopoda, F. natalensis* subsp. *natalensis, F. natalensis* subsp*. leprieurii, F. thonningii, F. aldofi-friderici, F. barteri, F. polita,* and *F. ottoniifolia.*
4. *F. abutilifolia, F. platyphylla, F. lutea, F. elasticoides and F. ovata.*
5. *F. umbellata*
6. *F. lyrata, F. sagittifolia*

Table 7 shows the correlation coefficients of the ten quantitative parameters. It is observed that there is highly significant positive correlation between: leaf length and leaf width, leaf length and lamina length, leaf length and petiole length, lamina length and lamina width, leaf width and petiole length, leaf length/width ratio and fruit

Table 7. Similarity matrix based on correlation coefficient of *Ficus* species.

Parameter	L.Length	L.Width	L/W	L.Length	P.Length	B/P	F.Length	F.Width	Fl/W	S.Length
L.length	1.00	0.75	0.13	0.98	0.50	0.12	- 0.19	- 0.10	- 0.35	- 0.25
	n.s	***	n.s	***	*	n.s	n.s	n.s	n.s	n.s
L.Width	0.75	1.00	- 0.46	0.65	0.76	- 0.28	- 0.25	- 0.22	- 0.35	- 0.21
	***	n.s	*	***	***	n.s	n.s	n.s	n.s	n.s
L/W	0.13	- 0.46	1.00	0.24	- 0.43	0.60	0.07	0.15	0.16	0.01
	n.s	*	n.s	n.s	*	***	n.s	n.s	n.s	n.s
B.Length	0.98	0.65	0.24	1.00	0.31	0.29	- 0.23	- 0.14	- 0.38	- 0.29
	***	***	n.s	n.s	n.s	n.s	n.s	n.s	*	*
P.Length	0.50	0.76	- 0.43	0.31	1.00	- 0.61	0.03	0.06	- 0.07	- 0.00
	*	***	*	n.s	n.s	***	n.s	n.s	n.s	n.s
B/P	0.12	- 0.28	0.60	0.29	- 0.61	1.00	- 0.27	- 0.22	- 0.12	- 0.30
	n.s	n.s	***	n.s	***	n.s	n.s	n.s	n.s	n.s
F.Length	- 0.19	- 0.25	0.07	- 0.23	0.03	- 0.27	1.00	0.87	0.57	0.56
	n.s	n.s	n.s	n.s	n.s	n.s	n.s	***	***	*
F.Width	- 0.10	- 0.22	0.15	- 0.14	0.06	- 0.22	0.87	1.00	0.52	0.51
	n.s	n.s	n.s	n.s	n.s	***	***	n.s	*	*
Fl/W	- 0.35	- 0.35	0.16	- 0.38	- 0.07	- 0.12	0.57	0.52	1.00	0.41
	n.s	n.s	n.s	*	n.s	n.s	***	*	n.s	*
S.Length	- 0.25	- 0.21	0.01	- 0.29	- 0.00	- 0.30	0.56	0.51	0.41	1.00
	n.s	n.s	n.s	n.s	n.s	n.s	*	*	*	n.s

L.Length = Leaf length; L.Width = Leaf width; L/W = Leaf length/Width ratio; B.Length = Lamina length; P.Lenght = Petiole length; B/P = Lamina length/Petiole length; F.Lenght = Fruit length; F.Width = Fruit width; Fl/W = Fruit length/Width; S.Lenght = Stalk length ***Results highly significant at p ≤ 1%
n.s: not significant

length/petiole length ratio, fruit length and fruit width, fruit length / width ratio and fruit length, fruit length / width ratio and fruit width, fruit stalk length and fruit length, fruit stalk length and fruit width. The results show negative correlation between: leaf width and leaf length / width ratio, petiole length and fruit length / petiole length ratio. The latter is highly significant.

DISCUSSION

The groupings observed as a result of the principal component analysis provide some strength for the existing classification by Berg, (1989); Corner, (1965); and Ramirez (1977). For instance group A made up *F. cyathistipula subsp. cyathistipula, F. pumila, F. sansibarica subsp. macrosperma and F. artocarpoides* all fit into the subsection *Caulocarpe, section Galoglychia* (Gasp.) Endl. with the exclusion of *F. cyathistipula* subsp. *cyathistipula* and *F. pumila*. Group B comprising of *F. variifolia, F. mucuso, F. sur* and *F. vallis-choudae* is a perfect group in agreement with the classification by Miquel (1847) in the Section *Sycomorus* if *F. variifolia* is excluded. It is should however be noted that *F. variifolia* should be in the Section *Oreosycea*. Members of the Section Galoglychia in the existing classification largely constitute group C although comprising of different subsections. However, *F. asperifolia, F. capreifolia* and *F. exasperata* should be in the Section *Sycidium* and their inclusion in this group is puzzling and needs some further appraisal. *F. abutilifolia* and *F. platyphylla* in group B are members of the subsection Platyphyllae. *F. umbellata* constitute a group on its own, while group F. is another cluster group supporting the existing classification in which these two species are members of the subsection Cyathistipulae. The genus *Ficus* has been divided by previous authors into four subgenera – *Ficus, Pharmacosycea, Sycomorus and Urostigma*. Our study has supported these subgeneric delimitation with some subsectional discrepancies.

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