FEATURES AND UTILITY INDICES OF COMMON SHRUBS OF ANAMBRA STATE, NIGERIA

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ABSTRACT
Shrubs are woody plants that are found mostly in exposed surfaces in Savannah and other Ecological systems. Most do not grow beyond 8m; they are multi-branching and unlike trees, commence branching from the base. A 'roll call' of some important shrubs of Anambra State, Nigeria was undertaken between the rainy and dry periods of 2018-2019. The design employed was the descriptive survey method. Extensive physical examination and visual observation/ recordings were carried on backed up by a questionnaire –aimed principally at ascertaining the utility indices of the encountered species. One hundred and eighty questionnaires were distributed among staff and students residing in the three senatorial zones of the State-Awka, Nnewi, Onitsha and Ekwulobia. 125 questionnaires were recovered. The questionnaire was face-validated and reliability established using the *test-retest* method. The 56 shrubs encountered belong to the families *Fabaceae, Euphorbiaceae, Malvaceae, Apocynaceae, Rubiaceae, Asteraceae, Annonaceae* and *Verbenaceae.* Flower colour was dominated by yellow, white and multi-coloration. Most shrubs found in south-eastern Nigeria are relevant in erosion control, habitat for small animals, major source of fuel wood, food, medicinals, ornamentals, animal fodder, purification of the atmosphere and phytoremediation. Unrelenting deforestation prevalent in this clime has not spared the shrubs but their hardiness has ensured sustainability.
Keywords: Shrub families, flower colour, Deforestation, Utility indices.

1.1. Introduction

Plants have coevolved with man and animals from the origin of life. Without the flora, it is obvious that survival and existence of the fauna would have been impossible. In times past, trees generally were accessible mostly to hunters, aerial organisms, climbers, the youth and the male folk. Herbs (grasses and forbs) were relatively accessible to both male and female folk, but the shrubs are the traditional rallying point of the female folk. One can stand on her feet and access shrubs without much stress. This is of critical importance to the female folk especially in this part of the World because of their principal role of housekeeping and on a daily basis, they access shrubs for food, shelter, clothing, fuel, shade, medicines, ornamentals, industrial raw materials to mention just a few.

Gill (1988) defined shrub as a woody plant with several main stems from the base. As Tropical biodiversity continues to be obliterated in terms of quality and quantity, through the agencies of deforestation, desertification, soil degradation, environmental pollution, erosion and flooding, mineral prospecting, livestock grazing, soil mining and land use conflicts, shrubs (plants) which unlike animals are immobile, offer little or no resistance and are mowed away into extinction. Deforestation is the removal of forest cover naturally or by human activities. It may occur abruptly when the forests is cleared for Agricultural production or more

gradually as a result of unsustainable logging practices (Houghton, 1995). It does not only include felling of trees but also removal of shrubs, lanes, grasses and other plants from the forest (Otebeye and Onyeanusi, 2008). Over 70% of Nigerians live in the rural areas and almost all the rural dwellers use fuel wood energy for their domestic needs. Fuel wood gathering is non-selective and almost all woody species can be exploited for the supply of fuel energy (Otegbeye and Otegbeye, 2002).

People are relatively familiar with trees, herbs, climbers etc but there is an elusiveness associated with shrubs which makes it to be often confused with trees. There is need to clear this confusion and reluctance in the appreciation of shrubs so that shrubs can as well take their exalted place amongst important plant growth forms and that is part of what this work is set to achieve. Shrubs are encountered in significant quantities in most Biomes of the earth except probably in extremely cold or hot areas. They are found in forests, grasslands, aquatic habitats, and even in deserts providing those multifarious purposes (survival) that are indispensable to man and animals inhabiting the diverse biogeographical regions of the Earth. If shrubs are allowed to be driven into extinction because of mainly unsustainable and non-environmentally friendly anthropogenic influences, their economic relevance will be irretrievably lost.

There is need therefore, to sustainably manage and enhance the development and protection of shrubs in particular and plants in general so that man's stress-filled life on earth will at least retain that plant mitigating factor that is recognized by all and sundry. Reforestation, establishment of wildlife refuges, wilderness areas, world heritage sites, botanical/zoological gardens, national parks, game and forest reserves – all these will go a long way in sustainably preserving our plant heritage in shrubs. Most woody species provide herbal medicine (Olapade and Bakare, 1992; Kafaru, 1994 and Otegbeye and Otegbeye, 2002). They are used singly or in combination for the treatment of different ailments in humans and livestock. Okeke et al. (2008) listed about fifteen shrubs in their work titled: Igbo Traditional Ford System: Documentation, Uses and Research Needs. This study aims to identify the common shrubs in Anambra State, identify their botanical attributes and establish their utility indices.

2.1. Literature Review

Lahaye *et.al.* (2005) contributed as follows: Shrubs are small to medium sized woody plants. It is distinguished from a tree by its multiple stems and shorter heights, usually less than 6m (20ft) tall. Plants of many species may grow into shrubs or trees, depending on their growing conditions. Small, low shrubs, generally less than 2m (6.6ft) tall, such as lavender, periwinkle and most small garden varieties of roses, are often termed subshrubs or bushes. An area of cultivated shrubs in a park or a garden is known as a shrubbery. When clipped

as topiary, suitable species or varieties of shrubs develop dense foliage and many small leafy branches growing close together.

Many shrubs respond well to renewal pruning, in which hard cutting back to a 'stool' result in long new stems known as 'canes'. Other shrubs respond better to selective pruning to reveal their structure and character. Shrubs could be deciduous or evergreen. In botany and ecology, a shrub is more specifically used to describe the particular physical structural or plant life form of woody plants which are less than 8 metres (26ft) high and usually have many stems arising at or near the base. For example, a descriptive system widely adopted in Australia is based on structural characteristics based on life-form, plus the height and amount of foliage cover of the tallest layer or dominant species. For shrubs 2-8 metres (6.6-26.2ft) high, the following structural forms are categorized:

- Dense foliage cover (70-100%) - Closed scrub
- Mid-dense foliage cover (30-70%) - Open scrub
- Sparse foliage cover (10-30%) - Tall shrub land
- Very sparse foliage cover (<10%) - Tall open shrub land

For shrubs less than 2 metres (6.6ft) high, the following structural forms are categorized:

- Dense foliage cover (70-100%) – Closed heath or closed low shrub land – (North America).
- Mid-dense foliage cover (30-70%) – Open heath or mid-dense low shrub land – (North America).
- Sparse foliage cover (10-30%) – Low shrub land
- Very sparse foliage cover (<10%) - Low open shrub land.

According to Irbijaro, M.F.A (2008), the five major causes of human-induced desertification are deforestation especially of upland watersheds; overgrazing by animals of fragile rangelands; excessive cutting of fuel wood in dry lands; over cultivation of poor soils; and inappropriate irrigation practices resulting in salinization and alkalization of agricultural land. The major threat to biodiversity in Nigeria is habitat destruction and overharvesting of wildlife, fisheries and plant species. Of the 1.4million species of plants and animals identified in Nigeria, insects, comprising approximately 751,000 species, account for 50 percent. Higher plants comprising 220,000 species account for 15.7 percent, fishes 19,000 species (1.3 percent), and mammals 4,000 species (0.028 percent) (FEPA, 1992).

In tropical and subtropical areas, shrubs are mostly found in the savannah regions, on the forest fringes, on cleared Agricultural areas, on roadsides (exposed surfaces), water banks and in homesteads. They prefer exposed surfaces because they are often shaded out in closed forested areas. They provide habitat for smaller animals and birds. Their woody habit imbues them with a measure of resilience; they are often very luxuriant in

the rainy season, while most shed their leaves in the dry (unfavorable) season. Their major relevance in this part of the world is in such areas as erosion control, fuel wood supply and livestock fodder

3.1. Materials and Methods

3.1.1. The Study Area: Anambra State lies within the derived Savannah vegetation zone which accommodates mostly grass and shrubs. The State has, though not equitably distributed; vast forested, derived savannah; swamp and marshy vegetation, especially along the numerous water courses and watersheds. Shrubs are occur throughout the State especially on forest fringes, interspersing grasses, along water courses, in exposed surfaces and in inhabited areas. The secret of their persistence is because they are very hardy plant species, have lower nutrient and biomass requirement than trees, and also have lower economic relevance than trees. They are usually very closely situated on the ground, so the effects of environmental influences on them are less severe. Constant warmth (Sunlight) and moisture (rainfall) that is experienced for more than eight months (March-October), each year is also indispensable to shrubbery development and survival. The shrubs with their close proximity to the ground surface play important role in check-making erosion menace in Anambra State. **Study Design:** The research design utilized in this work was the type. Well structured questionnaire were used to obtain field data from some staff and students of Anambra State.

Physical Examination and Visual Observation: The major part of the materials and methods involved physical examination and visual observation. Shrub identification was enhanced by using Gill's 'Taxonomy of Flowering Plants' (1988). According to Lahaye (2005), shrubs do not always grow beyond 8 metres, so every plant that was less than 10 metres was thoroughly scrutinized. Plants that were considered as shrubs in this work also had the following characteristics: (1) they were all woody species, (2) they lacked a single straight bole, (3) they were all multi-branching from the base or very close to the base (4) they could be easily accessed and their yield (leaves, flowers, fruits, wood) harvested on the ground. Species identified as shrubs were recorded. To determine the utility indices and value of the shrubs, questionnaire was used as a backup to the physical examination.

Study population and instrument for data collection: The instrument for data collection was a well-structured questionnaire. Each area had fifty questionnaires administered to them. Forty questionnaires were distributed to staff and students residing in the in the study areas. Twenty were randomly distributed at both the Uli and Igbariam Campuses of the COOU. Selection of respondents was randomized to ensure sound statistics and complete elimination of bias. At the end of the exercise, only one hundred and twenty-five (125) were recovered for analysis.

Validity and reliability of Instrument: The instrument was face-validated by the Departmental team of lecturers, who looked out for clarity of instructions, consistency in structure and organization. Reliability of the instrument was ascertained using the test-retest method by the repetition of the same questions on the same group of respondents after an interval of two weeks.

Methods of data collection and analysis: Respondents were instructed to tick Yes or No in some instances and in a few other instances requested to give information based on ethno- botanical knowledge. Data analysis was done using tables and bar chart.

4. RESULTS

One hundred (100) respondents mentioned at least fifty (50) of the highlighted shrubs as being in existence in Anambra State. A total of 56 Shrub species from 26 families were identified in this work. Preponderant shrub families encountered in Anambra State has Fabaceae and Euphorbiaceae topping the list (Table 1, Fig. 1). All the shrubs are perennial and very few (such as *Manihot esculentum*) are biennial species. The dominant flower colour includes white, yellow and multi-coloration. Red, brown and pink are less common (Table 1).

Table 1: Checklist of common shrubs found in Anambra State, Nigeria

S/N	Botanical name	Family	Habit	Flower colour	Value
1.	*Agave sisalana*	Agavaceae	Perennial	Yellowish green	Industrial raw material/income
2.	*Annona senegalensis*	Annonaceae	Perennial	Creamy/Xanthate	Fodder
3.	*Uvaria chamae*	Annonaceae	Perennial	Reddish	Fruit
4.	*Plumeria species*	Apocynaceae	Perennial	Multicoloured petals	Ornamental
5.	*Allamanda cathartica*	Apocynaceae	Perennial	Yellow	Ornamental
6.	*Thevetia neriifolia*	Apocynaceae	Perennial	Yellow, generally	Ornamental
7.	*Rauvolfia vomitoria*	Apocynaceae	Perennial	Dull white	Medicinal
8.	*Calotropis procera*	Asclepiadaceae	Perennial	Whitish purple	Food
9.	*Vernonia amygdalina*	Asteraceae	Perennial	Dull white	Food
10.	*Chromolaena odoratum*	Asterceae	Perennial	White	Medicinal
11.	*Tithonia diversifolia*	Asteraceae	Perennial	Deep yellow flowers	Ornamental
12.	*Tecoma stans*	Bignoniaceae	Perennial	Multicoloured petals	Ornamental
13.	*Ananas comosus*	Bromeliaceae	Perennial	Violet	Food
14.	*Chrysobalanus icaco*	Chrysobalanaceae	Perennial	White /Greenish white	Income
15.	*Combretum hispidum*	Combretaceae	Perennial	Bright pink	Medicinal
16.	*Gnestis ferruginea*	Connaraceae	Perennial	White	Erosion control
17.	*Byroscarpus coccineus*	Connaraceae	Perennial	White	Erosion control
18.	*Bryophylum pinnatum*	Crassulaceae	Perennial	Dull yellow	Medicinal
19.	*Thuja occidentalis*	Cuppressaceae	Perennial	Yellow	Ornamental
20.	*Manihot esculentum*	Euphorbiaceae	Biennial	Shrub	Manioc food
21.	*Securinega virosa*	Euphorbiaceae	Perennial	Dull white	Erosion control
22.	*Alchornea laxifora*	Euphorbiaceae	Perennial	Brown	Erosion control
23.	*Alchornea chordifolia*	Euphorbiaceae	Perennial	Greenish white	Fodder sps.
24.	*Breynia nivosa*	Euphorbiaceae	Perennial	White	Ornamental/medicinal
25.	*Jatropha gosipiifolia*	Euphorbiaceae	Perennial	Dark red	Medicinal
26.	*Ricinus communis*	Euphorbiaceae	Perennial	Red	Food medicinal
27.	*Acalypha wilkesiana*	Euphorbiaceae	Perennial	Red	Ornamental
28.	*Baphia species*	Fabaceae	Perennial	White	Erosion control
29.	*Mimosa invisa*	Fabaceae	Perennial	Pink	Erosion control
30.	*Clausena anisata*	Fabaceae	Perennial	Cream/yellowish white	Ornamental
31.	*Cassia occidentalis*	Fabaceae	Perennial	Yellow	Ornamental
32.	*Piliostigma thonningii*	Fabaceae	Perennial	White	Erosion control

Table 1: (Continued) Checklist of common shrubs found in Anambra State, Nigeria

33.	*Senna hirsuta*	Fabaceae	Perennial	Orange yellow	Medicinal
34.	*Dichrostachys cinerea*	Fabaceae	Perennial	Pink	Ornamental
35.	*Cajanus cajan*	Fabaceae	Perennial	Brown	Food
36.	*Icacina trichantha*	Icacinaceae	Perennial	Creamy white	Erosion control
37.	*Rosmarinus officinalis*	Labiatae	Perennial	Multicoloured	Ornamental
38.	*Napoleana vogelii*	Lecythidaceae	Perennial	Creamy	Stakes (Agriculture)
39.	*Henna podocarpa*	Leguminosae	Perennial	multicoloured	Medicinal
40.	*Hibiscus rosa-sinenses*	Malvaceae	Perennial	Multicoloured	Ornamental
41.	*Abutilon mauritianum*	Malvaceae	Perennial	Yellow	Erosion control
42.	*Urena lobata*	Malvaceae	Perennial	Pink	Erosion control
43.	*Sida garckeana*	Malvaceae	Perennial	Yellow	Industrial raw material
44.	*Sida acuta*	Malvaceae	Perennial	Yellow	Industrial raw material
45.	*Bougainvillea glabra*	Nyctaginaceae	Perennial	Multicoloured	Ornamental
46.	*Olax viridis*	Olacaceae	Perennial		Chewing stick
47.	*Syringia vulgaris*	Oleaceae	Perennial	Lilac	Ornamental
48.	*Gardenia nitida*	Rubiaceae	Perennial	White /Yellow	Ornamental
49.	*Ixora coccinea*	Rubiaceae	Perennial	Red	Ornamental
50.	*Mussaenda species*	Rubiaceae	Perennial	Pink	Ornamental
51.	*Datura stramonium*	Solanaceae	Perennial	Multicoloured	Income
52.	*Solanum melongena*	Solanaceae	Perennial	Blue – Purple	Food
53.	*Dactyledenia barteri*	Sterculiaceae	Perennial	Greenish white	Income
54.	*Cola hispida*	Sterculiaceae	Perennial	Creamy	Income
55.	*Duranta repens*	Verbenaceae	Perennial	Purple	Ornamental
56.	*Lantana camara*	Verbenaceae	Perennial	Multicoloured petals	Ornamental

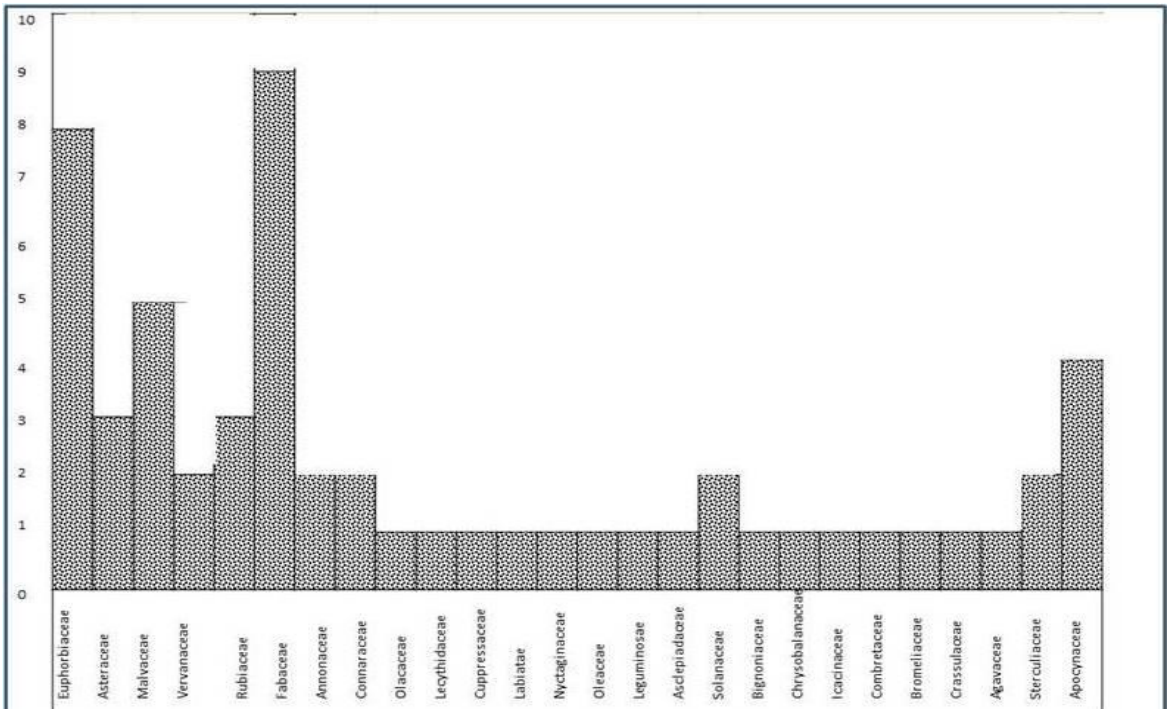

Fig.1. Bar Chart depicting preponderance of shrub families encountered in the study area.

Most of the shrubs are very relevant, especially in erosion prevention (soil protection), as fuel wood and as ornamental plants. A few are important sources of medicine, edible food and

Animal fodder species (Table 1). Plates 1-10 shows some of the shrub species encountered in the study area

Plate 1: Clausena anisata

Plate 2: Ananas comosus

Plate 3: Annona senegalensis

Plate 4: Mimosa invisa

Plate 5: Ocimum gratissimum

Plate 6: Dactyledenia barteri

Plate 7: Ricinus communis

Plate 8: Manihot esculentum

Plate 9: Olax viridis

4.1. DISCUSSION

The results indicate that almost all encountered shrubs are perennial species. This is supported by the fact that they are all woody species and woody species are hardy and long lasting. For the fact that encountered families were 26 encompassing 56 species indicates also that there is quite a substantial diversity of shrubs in Anambra State. Encountered shrubs have diverse roles as fuel wood, in erosion prevention and as medicinal and ornamental species. Some are also useful as sources of food, fodder and income. Almost all colors of the rainbow are encountered among shrub flower coloration. Multi-coloured petals are common both separately and in combination, but apart from multi-coloration, dominant flower colour of shrubs include: white, yellow, and pink, red and purple coloration to a lesser extent.

4.2. CONCLUSION

Finally man must have had a hand in the superior prevalence of these shrub families because, of all families encountered, *Euphorbiaceae* and elements of F*abaceae*, *Malvaceae*, *Solanaceae*, *Asteraceae* serve man and his livestock as edible food, medicinal plants and industrial raw materials; *Asteraceae*, *Euphorbiaceae*, *Annonaceae* and *Fabaceae* form the bulk of his medicinal shrubs; while *Apocynaceae*, *Rubiaceae*, *Verbenaceae*, *Fabaceae* and

Malvaceae fulfill his aesthetic needs. So it is not by accident that the more useful shrub (species) families are preponderant in Anambra State.

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