

**NSAP****47th Annual
Conference
(JOS 2022)****CONFERENCE
PROCEEDINGS**THEME
**SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES****DIVERSITY AND PROXIMATE COMPOSITION OF THE MOST PREFERRED
FODDER PLANTS AT ABOH-MBAISE, IMO STATE, NIGERIA**

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Abstract

Diversity and proximate composition of the most preferred fodder plants were studied at Aboh-Mbaise Local Government Area (LGA) of Imo State, South Eastern Zone of Nigeria. Ten ruminant farmers, selected through a multi-stage sampling technique were used to study the diversity of the fodder plants fed to small ruminants in the area. The seven of the most preferred fodder plants were thereafter selected and subjected to proximate analysis to determine their nutrient compositions. The farmers identified 18 fodder plants fed to their animals, with *Eleasia guineensis* recording the highest frequency of 10, *Dialium guineense* (8), *Persea americana* (5) and *Aspilia africana* (4) among others. The seven most preferred fodders were *Eleasis guinensis*, *Dialium guineense*, *Persea americana*, *Aspilia africana*, *Cactus after*, *Pennisetum purpureum* and *Veronica amygdaline*. Result proximate composition results showed a dry matter range of 85.29 - 89.35% while crude protein ranged from 5.96% for *E. guinensis* to 15.17% for *V. amygdaline* respectively. Crude fat ranged from 1.66-5.73% for *A. africana* and *V. amygdaline*, while crude fibre ranged from 6.94-22.28% for *V. amygdaline* and *P. purpureum*. Total Ash content also ranges from 9.04-14.37% with *A. africana* recording the highest in value. The nitrogen free extract values equally range from the 23% in *P. purpureum* to the 60.2% in *D. guineese*. It can be concluded that *V. amygdaline*, *A. africana*, and *D. guineese* were adjudged the best fodder plants for feeding ruminants at the study area. Information contained in this study can be used for the conservation of promising fodder plants for ruminant feeding in Southeastern Nigeria.

Keywords: Fodder, Diversity, Evergreen, Plants, Ruminant**Introduction**

In rural Southeastern region of Nigeria, evergreen plants are found in abundance throughout the year due to the favourable climatic condition, which is characterized by seven months of wet season and five months of dry season, with annual rainfall of up to 2500 mm, temperature range of 26.5 - 31°C and 70 - 90% (Agboola, 1979). Evergreen plants therefore constitute an abundant biomass on farm lands, bush fallows and forest in the humid tropical environment of Southeastern Nigeria and are commonly utilized in the wild as browse by small ruminants (Okoli *et al.*, 2003; Okoli *et al.*, 2014).

These browse plants are sources of essential nutrients such as proteins, carbohydrates, vitamins and minerals, which are frequently inadequate represented in tropical grass pastures (Esonu, 2015). Their abundance with evergreen foliage presents year-round forage resources in many marginal lands (Oji and Isilebo, 2000), this making it possible to produce livestock at such locations. Fodders found in the rural communities are thus important sources of nourishment for grazing ruminants, and as supplement to improve the productivity of herbivores fed on low quality feeds (Achonwa, 2017).

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In Southeastern Nigeria, however anthropogenic activities have been shown to specifically lead to the loss of plant diversity and abundance of the browse plants (Okoli *et al.*, 2014, Achonwa *et al.*, 2017). The increasing demand for livestock products as a result of rapid growth in the population of the world, and shrinking land area, the hope of feeding the millions of people in the future, and safe guarding the food security will depend on the better utilization of hitherto neglected animal feed resources. This reality has over the past few decades rekindled research interest in the use of indigenous tropical browse plants as sources of nutrients for livestock (Okoli *et al.*, 2003; Okoli *et al.*, 2014). The information on ruminant feeding values of the plants residing with the farmers which may have been gathered by personal experimentation need to be documented in order to preserve them (Wettasina *et al.*, 2008).

The overall objective of this study is to determine the nutrient values of the most preferred ruminant fodder plants at Aboh-Mbaise L.G.A., Imo State in order to advice the farmers on the best plants to feed their animals.

Materials and Methods

This study was carried out in Aboh-Mbaise Local Government Area (L.G.A.) in Imo State in the southeastern agro-ecological zone of Nigeria. Three communities in the L.G.A, namely, Amaohuru Nguru, Ogbor Nguru, and Ibeku Okwuato from which 10 ruminant farmers consisting of both male and female gender were selected purposefully for the study to generate representative data. The criteria for their selection were based on having some small ruminant in their compounds and willingness to participate in the study. Each farmer was visited once, for the purpose of plant selection, and identification.

The list of the preferred plants was generated by direct interview of the ruminant farmers, and field observation. Each farmer at the study location was asked to list, and identify any five most preferred fodder plants fed to small ruminants. The list of plant was thereafter compiled and their samples collected for Igbo and botanical name identifications. The leaves of the seven most preferred plants were collected, air dried until it became crispy to touch and then subjected to proximate analysis to determine their proximate compositions according to the methods of AOAC (1995).

The data generated were subjected to descriptive statistics such as frequency count, mean, standard deviation, range and coefficient of variation according to Stats Tester 4.0.1 (2020)

Results and Discussion

Table 1 shows the list of the fodder plants identified as small ruminant feed by farmers. The ruminant farmers depended on factors such as the availability of the fodder plants, ease of accessibility, they observed preferences of their animals, their assumed nutritional values, and medicinal values to make their selections. Altogether, 18 fodder plants were listed by the farmers. *Eleasia guineensis* recorded the highest frequency of 10, followed by *Dialium guineense* (8), *Persea americana* (5), and *Aspilia africana* (4), *Vernonia amygdalina*, *Pennisetum purpureum*, and *Cactus after* (3), *Urena lobate*, *Manihot esculanta*, *Chromlaena odorata*, and *Dacryodes edulis* (2) while others recorded frequencies between one. These fodder plants were made up of trees, shrubs, grasses and weeds, with some food bearing plants also being included. A few exotic plants such as Gmelina, Guava, and Avocado were also listed indicating that many of these plants serve other purposes in the rural farming environment. Okoli *et al.* (2014) and Udedibie, (2015) reported that plants used in ruminant feeding in Southeastern Nigeria also serve other purposes such as for food, firewood, medicine, shade, soil protection, and mulching among others.



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Some of the plants could not be identified botanically with their Igbo name provided by the farmers. These are Mpupu and Achara field, so, more studies are needed to identify them. Overall, the seven fodder plants that recorded frequencies of 3 to 10 were selected as the most preferred fodder plants and included *Eleasis guineensis*, *Dialium guineense*, *Persea americana*, *Aspilia africana*, *Cactus after*, *Pennisetum purpureum* and *Veronica amygdaline*.

Table 2 shows the proximate composition of the sampled fodders. The dry matter values ranged from 85.29 - 89.33% due to the low moisture content resulting from the method of drying which was air-drying. The standard moisture ranges of feedstuff according to Esonu, (2015) should be 10 - 12%. The crude protein (CP) ranged from 5.96 - 17% with *V. amygdaline* recording the highest value, and *E. guineensis* the least. This plant is stated by Okoli, (2003) to have high food and medicinal values. *A. africana* also recorded a relatively high crude protein (CP) value of 13.63% while the overall mean value of $10 \pm 3.17\%$ suggests that the fodder plants will be able to support microbial activities in the rumen of the ruminant (Esonu, 2015).

Table 1: List of fodder plants fed to small-ruminants at Aboh-Mbaise LGA

	English name	Igbo name	Botanical names	Frequency
1	African Rosewood	Oha	<i>Pteracarpus osum</i>	1
2	African velvet tamarind	Icheku	<i>Dialium guineense</i>	8
3	Avocado	Ube Bekee	<i>Persea americana</i>	5
4	Bitter leaf	Onugbu	<i>Vernonia amygdalina</i>	3
5	Wild cane	Opete	<i>Cactus after</i>	3
6	Caesar weed	Udo	<i>Urena lobate</i>	2
7	Cassava leave	Akpu	<i>Manihot esculanta</i>	2
8	Elephant grass	Achara nka	<i>Pennisetum purpureum</i>	3
9	Gmelina	Melina	<i>Gmelina aborea</i>	1
10	Guava	Gova	<i>Psidium guajava</i>	1
11	Seam weed	Awolowo	<i>Chromlaena odorata</i>	2
12	African Rosewood	Nturukpa	<i>Pteracarpus santalinoides</i>	1
13	Palm fronds	Igu Nkwu	<i>Eleasia guineensis</i>	10
14	Pear leaf	Ube	<i>Dacryodes edulis</i>	2
15	Plantain leaf	Abirica	<i>Musa paradisiaca</i>	1
16	-	Oranjila	<i>Aspilia africana</i>	4
17	-	Mpupu	-	1
18	-	Achara field	-	1

The crude fat (CF) values ranged from 1.66 - 5.73% with *A. africana* (5.73%) and *V. amygdaline* (4.96%) recording the highest values and *C. after* (1.66%) recording the least value. The CF values ranged from 6.94 - 22.28%. *P. purpureum* (22.28%), *P. americana* (20.74%) and *E. guineensis* (19.84%) recorded the highest values, while *V. amygdaline* (6.94%) recorded the lowest value. Total ash content, which represents the mineral values of the samples ranged from 9.04 - 14.37%, with *A. africana* ranking the highest (14.37%) followed by *E. guineensis* (11.14%) and *V. amygdaline* (10.35%) and *P. americana* (10.16%). The nitrogen free extract (NFE) which is an indication or reflection of the carbohydrates content of a feedstuff ranged from 43.23 - 60.02% with *P. purpureum* recording the highest and *D. guineense* the lowest values, indicating that the sampled plants may have high gross energy.

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Table 2: Proximate composition (%) of the most preferred fodder plants at Aboh-Mbaise L.G.A

Plant Species	MC	DM	CP	EE	CF	Ash	NFE
<i>E. guineensis</i>	14.71	85.29	5.96	2.18	19.84	11.64	45.67
<i>D. guineense</i>	10.65	89.35	9.04	1.85	8.66	9.42	60.02
<i>P. americana</i>	13.22	86.78	8.74	2.01	20.74	10.16	45.13
<i>A. africana</i>	12.76	87.24	13.63	5.73	10.74	14.37	47.77
<i>V. amygdalina</i>	12.53	87.47	15.17	4.96	6.94	10.35	50.05
<i>P. purpureum</i>	14.19	85.81	9.11	1.98	22.20	9.25	43.23
<i>C. after</i>	13.15	86.85	9.00	1.66	13.53	9.05	53.57
Mean $\pm$ S.D	13.03 $\pm$ 1.30	86.97 $\pm$ 1.30	10.09 $\pm$ 3.17	2.91 $\pm$ 1.68	14.67 $\pm$ 6.24	10.60 $\pm$ 1.88	49.34 $\pm$ 5.84
Range	10.65-14.71	85.29-89.35	5.96-15.17	1.66-5.73	6.94-22.28	9.05-14.37	43.23-60.02
C.V	9.26	1.38	29.12	53.62	39.40	16.44	10.92

MC = Moisture content; DM = Dry matter; CP = Crude protein; EE = Ether extract; CF = Crude fiber; NFE = Nitrogen free extract; CV = Coefficient of variation

Conclusion

It can be concluded that *Vernonia amygdaline*, *Aspilia africana*, and possibly *Dialium guineense* are the fodder plants of high nutrient values with rank of 3, 4 and 8 by the ruminant farmers, respectively.

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