

Prevalence of *Erythrophleum suaveolens* (Brenan Plant) Usage in the Federal Capital Territory (FCT), Abuja – Nigeria

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ABSTRACT

Erythrophleum suaveolens is locally described as a poisonous plant, but still been used in the control of pest of cereals. It exhibits antifungal, medicinal properties and the seeds have essential oil. The aim of this study is to investigate the prevalence, and usage of this plant in the Federal Capital Territory (FCT), Abuja, Nigeria. Questionnaires were used in gathering information to study the plant with respect to its uses, parts used, preparation and prevalence. Regional survey studies show an abundance of plants in parts of Abuja. The study also shows that the leave part of the plant is largely used for pesticidal purpose. The correlation between the perceptions of the respondents on the use of the plant were statistically significant, (χ^2 [2; n = 100] = 25.93; $p < 0.05$), with a strong strength of association (Phi=0.509, Cramer's V=0.509, $p < 0.05$). The correlation of the perceptions of the respondents on the plant prevalence were also found to be statistically significant, (χ^2 [2; n = 100] = 44.444; $p < 0.05$), and the strength of relationship between the variables were strong (Phi=0.667, Cramer's V=0.667, $p < 0.05$). This study conclusively shows the plants prevalence in FCT as a plant for pest management

Keywords: Abuja, *Erythrophleum suaveolens*, Pesticidal, Plants usage, Prevalence

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INTRODUCTION

The use of plant products can be said to be one option of biological control (Tiilikkala *et al.*, 2011). According to Tiilikkala *et al.*, (2011), many plant species has been used in the technologies of botanical pesticides production. Some plant-based pesticides have already become established in plant protection (Isman, 2006). Pest management practices are based on the availability of effective and inexpensive reagents (El-Wakeil, 2013). The practice of using plant derivatives in agriculture dates back to ancient Greece, India, China and Egypt (Thacker 2002). Plant pesticides are naturally occurring chemicals used as an alternative to synthetic chemical formulations which may not be less toxic to humans (El-Wakeil, 2013). Some plant *species* exhibit chemical components that can kill or incapacitate insects and deter other pests in agricultural fields. Deng *et al.* (2009) had reported that there are many factors used in determining the botanical pesticides for pest control. Attention has been drawn to the development of environmentally friendly biocides with patent of sustainability and affordability in process of valuable substances (Emerhi *et al.*, 2017). Indigenous knowledge is an archive used in selecting and formulating the much needed environmentally friendly biocides to reduce wood degradation effects on antimicrobial and insect repellent activities of plants (Emerhi *et al.*, 2017).

Erythrophleum has 10 species belonging to the family Caesalpiniaceae that are distributed in Africa, from Kenya in the east, Senegal and Sudan in the west, and from Zimbabwe and Mozambique in the South. The *Erythrophleum suaveolens* plant has been introduced as an ornamental in tropical Asia (Olorunishola and Akintunde, 2003). The leaves of *E. suaveolens* is widely considered to be toxic to cattle, horses and goats. Despite this, the leaves are used for pest control for its insect repellent properties. In Tanzania, the leaves are used as fish bait. A pulp derived from the leaves is thrown into bodies of fish bearing water by local fishermen. In some parts of Nigeria, the leaves are used as an anesthetic, purgative, poison for the purposes of capital punishment and as a disinfectant. The Jukuns, a tribe in Benue state, Nigeria uses it as a charm against witchcraft (Burkill, 1995 in Okhale *et al.*, 2018). It is an

herbaceous perennial plant that is prevalent in Mozambique identified with its characteristic odour (Akinpeh *et al.*, 2012).

The stem bark extract of *E. suaveolens* has been reported to have appreciable components in bioactive secondary metabolites (Adedeji *et al.*, 2013). *E. suaveolens* has excellent wood protection properties that are a deterrent to termites along with antifungal and antimicrobial characteristics. (Asamoah *et al.*, 2014; Antwi-Boasiako and Eshun 2013; Antwi-Boasiako and Baidoo 2010; Ogunsanwo and Adedeji 2010; Aiyegoro *et al.*, 2007).

The *E. suaveolens* seed oil from literature review is said to be rich in monoterpenes and triterpenes. The major components found in the oil is citral (62.37%) and squalene (20.07%). These are oxygenated compounds and its isomeric composition are 59.3% α -citral and 40.7% β -citral. The activity of the antimicrobial effect of the essential oil against *E. coli* was also reported which may be due to its high content of citral (Okhale *et al.*, 2018). This study aims to reveal the prevalence, and usage of the *Erythrophleum suaveolens* in the Federal Capital Territory (FCT), Abuja, Nigeria.

METHODOLOGY

Study Design

Questionnaires were distributed to 130 people. 76.9% agreed to be included in this study. One on one interviews were also conducted at various times of the day, during the week and on weekends. The survey used a questionnaire to collect information on the usage of the plant with respect to the part used, preparation, prevalence etc. In compilation of the information collected, the respondent's anonymity was maintained by ensuring that no names, addresses, or other details that might identify an individual.

Data Analysis

The data collected were analyzed using SPSS v.22, Chi-Square was used in evaluating the association between the perceptions of the respondents on plant purposes and the relationship between the perceptions of the respondents on prevalence of the plant at $P < 0.05$.

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a. Stem bark

b. Leaves

c. Fruit with seed

Fig.1: *E. suaveolens* plant parts

Source: Field survey (2019)

RESULTS AND DISCUSSION

In this study, the majority of the respondents were male (90%) while 10% of the respondents were female as

indicated in Table 1. Farmers among the made up 80% of the respondents.

Table 1: Socio-demographic groups in study sample

Gender	
Male	90(0.9)
Female	10(0.1)
Occupation	
Trader	10(0.1)
Fisherman	10(0.1)
Farmer	80(0.8)

It was reported by Mnguu *et al.*, (2015) that the *E. suaveolens* bark and roots have an insecticidal effect on bollworms on farms and also in the preservation of grains from beetles and weevils. The study has shown from Table 2 that 40% of the respondents agreed that they used the plant for pesticide purposes, while 30% used it as a medicinal and fishing respectively. For the medicinal aspect of *E. suaveolens*, the dried powdered bark is used as snuff to cure headache; diluted decoction of the roots is used as an anti-helminthic against tape worms; decoction of the roots and bark decoction sooth body pains when applied (Betti, 2002).

The majority (80%) of the respondents in this study from Table 2 used the leaf parts of the *E. suaveolens* for various purpose, and majority also prepare the parts of the plant in powdered form for their own usage, while 40% of the respondents make use of the bark for various purpose. In a study conducted by Aiyegoro *et al.*, (2007) the stem bark of *E. suaveolens* were used against some selected bacterial isolates. The *E. suaveolens* stem bark extract according to Adedeji *et al.* (2013) has the presence of appreciably high components of bioactive secondary metabolites that has significant and excellent protection properties against; fungi and termites in wood.



From Fig. 2, 10% of the female respondents in this study assert that they only used the *E. suaveolens* for medicinal

purposes and while 20% of the male respondents also claimed to do this.

Table 2: Usage of *E. suaveolens* plant

Purpose <i>E. suaveolens</i> is used for	
Medicine	30(0.3)
Fishing	30(0.3)
Pesticide	40(0.4)
Part of <i>Erythrophleum suaveolens</i>	
Leaf	80(0.8)
Seed	10(0.1)
Stem	0(0.0)
Root	0(0.0)
Bark	40(0.4)
Mode of preparation	
Powered	70(0.7)
Dry leaves	60(0.6)
Slurry	30(0.3)
Extract	10(0.1)

According to the findings in (Table 3), the correlation between the perceptions of the respondents on plant purposes as a medicinal, fishing bait and as a pesticide. The variables were statistically significant, ($\chi^2 [2; n = 100] = 25.93; p < 0.05$), and the strength of the variables were strong (Phi=0.509, Cramer's V=0.509, $p < 0.05$).

None of the respondents claimed to be ignorant of the existence of the *E. suaveolens* plant from the result obtained in this study (Table 4). Among the respondents, 50% of them assert that the plant abundantly exists and while 30% of them were of the opinion that the plant is widely abundant



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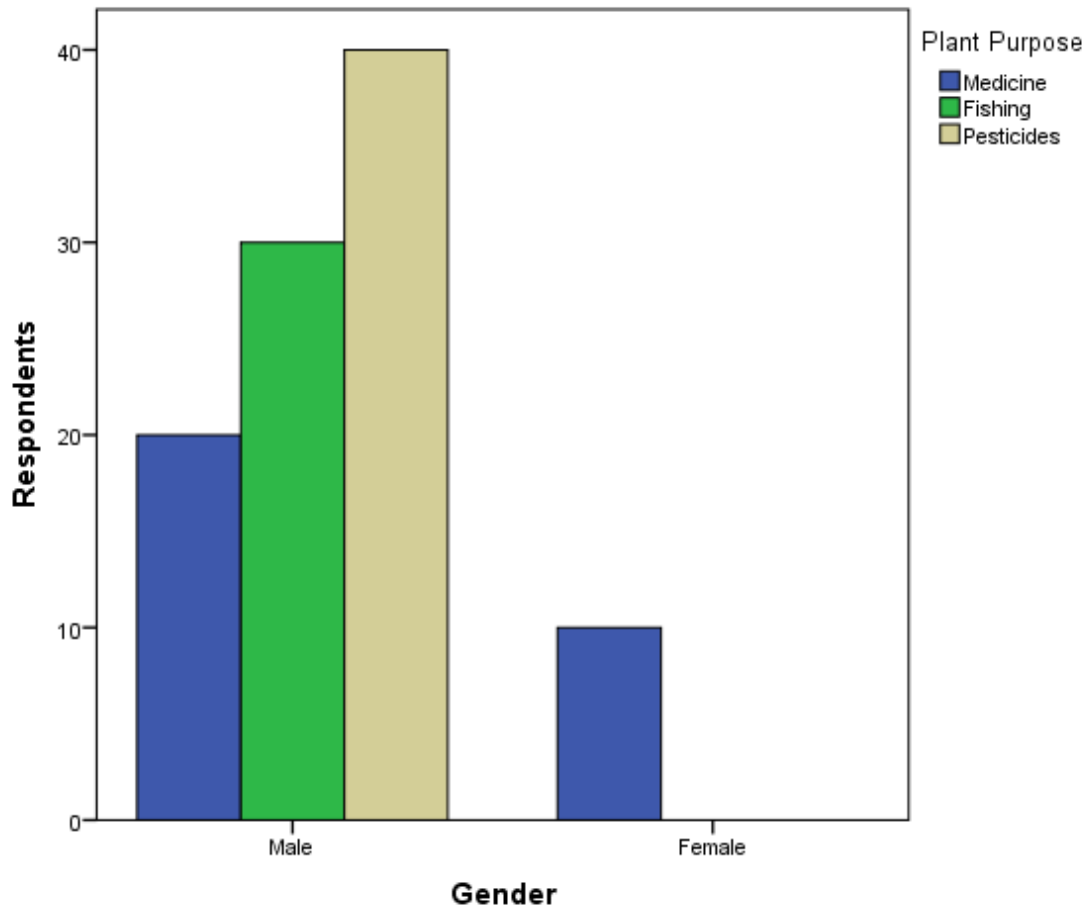


Fig.2: *E. suaveolens* plant usage purpose

Table 3: Chi-Square Tests showing the association between the perceptions of the respondents on plant purposes

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.926	2	.000
Likelihood Ratio	26.826	2	.000
Linear-by-Linear Association	15.000	1	.000
Phi	.509		.000
Cramer's V	.509		.000
N of Valid Cases	100		



Table 4: Prevalence of *E. suaveolens* plant among respondents

Prevalence of <i>E. suaveolens</i>	
Widely abundant	30(0.3)
Abundant	50(0.5)
Scanty	20(0.2)
Not present	-

Table 5: Chi-Square Tests showing the relationship between the perceptions of the respondents on prevalence of the plant

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	44.444	2	.000
Likelihood Ratio	37.291	2	.000
Linear-by-Linear Association	27.163	1	.000
Phi	.667		.000
Cramer's V	.667		.000
N of Valid Cases	100		

According to Ziba *et al.*, (2017), *E. suaveolens* is an endangered species which could become extinct due to its overuse as an herbal medicinal. In addition, anthropogenic activities such as forest clearing and illegal felling of trees for charcoal production highly pose a threat of extinction of the species as well as seed dormancy. Agriculture practices and urbanization continued to reduce the population of this plant (Ziba *et al.*, 2017). Contrary to the aforementioned, the majority of the respondents in this study claimed that the plant is quite prevalent in the Abuja region of Nigeria, and is usually found in the areas that are prone to gully erosion in a quantity that never threatens their existence. *E. suaveolens* is a leguminous plant that helps in enriching

the soil and serves as a protective against cattle destroying crops in the farming areas.

Findings from this study in (Table 5), show the correlation between the perceptions of the respondents on the prevalence of the plant. The relationship between these variables were statistically significant, (χ^2 [2; n = 100] = 44.444; $p < 0.05$), and the strength of relationship between the variables were strong (Phi=0.667, Cramer's V=0.667, $p < 0.05$).

All the female respondents in this study were of the opinion that the prevalence of the *E. suaveolens* is scanty, also 10% of the male respondents in this study also share this same opinion as indicated in Fig. 3



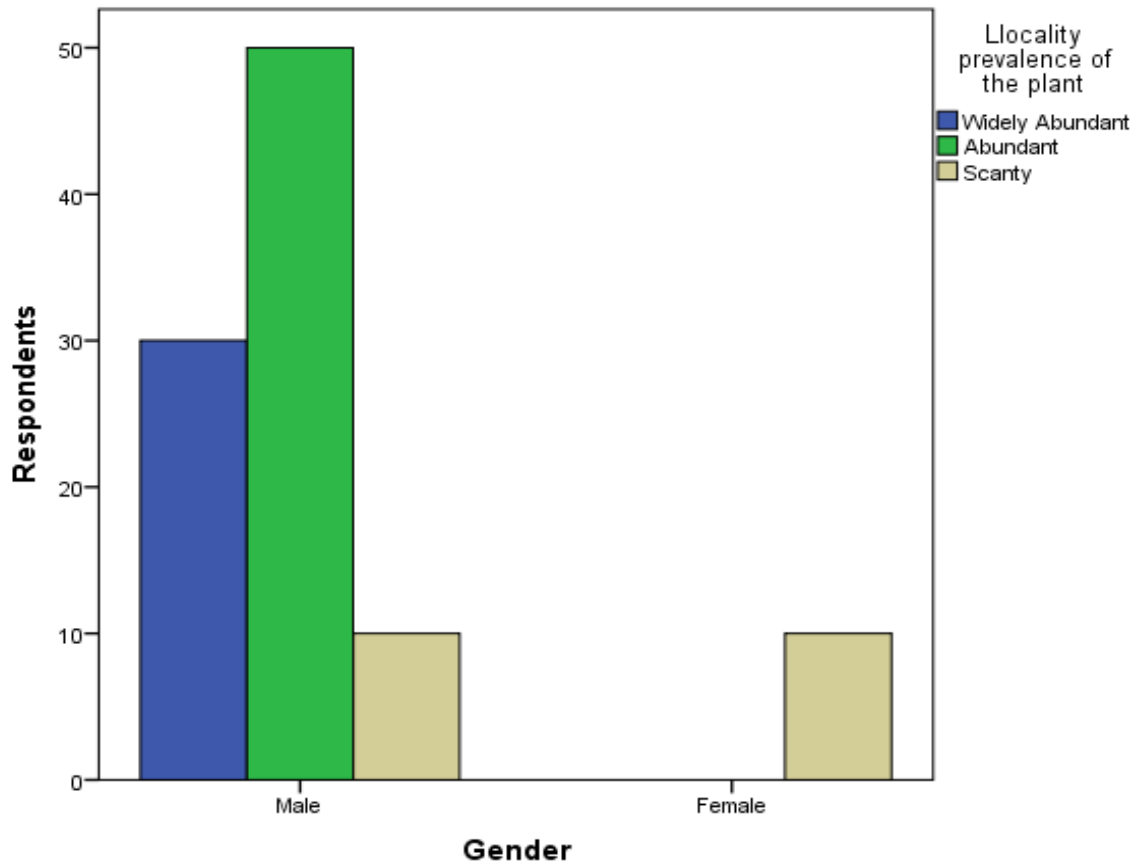


Fig.3: *E. suaveolens* plant Prevalence

CONCLUSION

E. suaveolens is a plant of which its numerous benefits have yet to be discovered. This study has shown that the plants exist in abundant quantity in some parts of Abuja, the Federal Capital of Nigeria. The study also shows that the plant leaf parts is largely used for its pesticidal properties. The association between the respondents and the purpose the plant is used for, and its prevalence were statistically significant.

Author’s Contribution:

YUSUF, Hajara. O: Carried out the experimental work, wrote and edited the submitted Manuscript

ANJORIN, Toba. S: Review the manuscript

OLU, Joshua: Edited the first draft of the manuscript and the data analysis

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