

Assesement of plants used in traditional management of animals diseases in ekiti state north senatorial district of nigeria.

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mary kehinde olanipekun kehinde
Ekiti State University

✉ mary.olanipekun@eksu.edu.ng *Corresponding Author*
ORCID: <https://orcid.org/0000-0003-1080-0864>

patrick Olugbenga Tedela
Ekiti State University

Joshua O Kayode
Ekiti State University

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Translational Medicine

KEYWORDS

Semi-structured, livestock, diseases, management, indigenous knowledge

Abstract

Background

The traditional use of plant as medicine for the management of man and animal health has been from time immemorial to alleviate sicknesses in both local and urban communities. Animal has been a medium of provision of proteins and for the normal growth of organisms, however there are a lot of diseases that are detritions' to the normal health of animals, hence reduced the effectiveness of such an animal. There is therefore a need for ethnobotanical documentation of the medicinal plants as well as associated knowledge and practices.

Method

Ethnobotanical surveys were conducted in Ekiti South senatorial district between 2017 and 2018 to document plants used in treating animal diseases in the study area. Semi structured questionnaire and the guided field-walk methods was used to interview the respondents who supplied information on plants used in treating the identified animal diseases. Different ethnobotanical indices were used to evaluate the relevance of the documented plants to the management of animal diseased prevailing in the study area.

Results

A total of 63 plant species from 38 families were documented for the management of ruminant and birds animals. The plants were reported using to treat six categories of ailments. The part of the plants mostly used are the leaves (50.7%) followed by the bark (40.8%), the seed (35.2%) and root (18.3%). The plants are prepared and applied either singly or in combination with other plants and are used either in the wet or dried forms. Rationales for the choice of these plants were also identified. The decoctions and infusions are the most frequent methods of preparation. The traditional healers in the study area possess rich ethno-pharmacological knowledge and depend largely on naturally growing plant species. The documented medicinal plants can serve as a basis for further and future phytochemical and pharmacological studies.

Conclusion

The study areas are rich in biodiversity because of the favorable climatic conditions. However, the

indiscriminate exploitation of the farming land is detrimental to the availability of some of the naturally occurred and indigenous plants, thus extinction of the plants cannot be underestimated. Therefore the documentation of the information will significantly contribute to the evaluation and preservation of the traditional knowledge before it is finally eroded.

Key words: Semi-structured, livestock, diseases, management, indigenous knowledge

Introduction

The rearing of livestock plays important role in supporting the livelihood of poor farmers, consumers, traders and laborers in developing countries [1]. Livestock such as cattle, goats, sheep and poultry are mostly reared to provide income, meat, security, employment amongst others to its inhabitants. Therefore, enhancement of livestock production system is designed to produce a great impact and to alleviate poverty among the poor. However [1] reported that animal diseases are crucial constraints in enhancing livestock productivity and production. The high cost of managing animal health, absence or unsuitability of production and resistance to synthetic drugs predispose the animals to diseases. Also, livestock farmers are located in the rural areas where the provision of information on veterinary and improved management services are few or not available and when they are available the option is expensive to the rural farmers. Livestock farmers therefore resort to using indigenous methods to curb animal diseases. The use of herbs to manage animal diseases is among the various indigenous methods adopted by farmers. The knowledge based on the use of herbs differs not only from region to region but also within communities and have developed through trial and error and deliberate experimentation [2, 3]. Studies carried out in Africa, Asia, Europe, Latin America and North America revealed that plants are routinely used as remedy for animal diseases [4, 5, 6]. In Nigeria, [7, 2, 8, 9, 10] reported that farmers especially in the rural areas are known to treating animal diseases with herbs and other traditional medical practices before the advent of orthodox medicine and most of the plants used in the management of these animal diseases are readily available, more effective and less toxic. In this study, however, it was observed that there has been little documentations of the traditional knowledge of resource poor livestock farmers in the management of animal diseases, though, there has been transmission of information across generations by oral traditions and

therefore is in danger of extinction [11]. This study therefore aimed at providing useful information on medicinal plants used by livestock farmers for the management of animal diseases in the Northern Senatorial District of Ekiti-State. This will help veterinarians and other scientists in harnessing the information towards solving livestock problems in their area.

Materials And Methods

Study area:

Ekiti State is situated entirely within the tropics. It is located between latitude 7.667° N and longitudes 5.250° East. Ekiti State has three senatorial districts namely, Ekiti North, Ekiti South and Ekiti Central Senatorial Districts. The survey was carried out in three Local Government Areas in Ekiti North Senatorial District. The Local Government Areas are Ido/Osi, Moba and Ilejemeje. The area has a total land mass of 837 square kilometers and population of 908,017 people (2006 National Census). The major occupation of the people is farming. From each of the sample LGAs, five communities each making a total of fifteen villages that are far from urban influence were selected.

Field visits for this study were carried out in 2018 and 2019. Information was obtained from rural dwellers, traditional healers, livestock rearers, veterinary doctors, hawkers of medicinal plant preparations and herbalists with the aid of a semi-structured questionnaire and the guided field-walk methods as described by [12]. Ten respondents each were selected from the fifteen villages to make a total of 150 respondents who have maintained domicile in the community for a period of not less than 20 years. The questionnaire was used to interview these individuals while the guided field-walk involved contacting and interviewing individuals recommended by other community members for their knowledge. The questionnaires were administered to find out the various medicinal plants, the plant parts used, the ailments category for which the plants are used, method of preparation and mode of administration. Similarly, ethnobotanical indices were applied for quantitative analysis. The plants identified were collected, scientifically identified and the voucher specimens were deposited at the Herbarium unit of Plant Science and Biotechnology Department of Ekiti-State University. The data were spread on the Excel Sheet and encoded using descriptive statistics to analyze the data obtained. Further, scientific identification of the plants and their uses in these communities were reaffirmed

from the literature sources containing medicinal plants [13,14]

Ethnobotanical indices

For quantitative analysis, various quantitative indices were applied as follows:

Relative frequency citation

The frequency of citation (FC) was used to identify the most used plant species by the local inhabitants of the study area. It was calculated based on the assertion of [15], using the following fomular:

$$RFC = \frac{FC}{N}$$

where FC is respondents citing the use of specific species and N are the total respondents.

Use value

The relative importance of particular plant species cited by all informants in a given area is quantitatively measured in terms of the use value. It was calculated according to [16] using the following formula:

$$UV = \frac{U_i}{N}$$

where U_i is the number of citations or used reports by each respondent for a particular plant species and N is the total respondents.

Informant consensus factor

The consensus between respondents and particular plant species used for each diseased category was tested by using informant consensus factor. It was figured out by following [15], using given formula:

$$A: ICF = \frac{Nur - Nt}{Nt - 1}$$

where 'Nur' represents the total number of used reports in each group of diseases, and 'Nt' represents the total species cited by all the informants for that group of ailments.

Relative importance

Relative importance (RI) was figured out by following [17, 18]

. using the given formula.

$$RI = \frac{(Rel\ PH + Rel\ BS) \times 100}{2}$$

$Rel\ PH = \frac{PH\ of\ a\ given\ plant}{Maximum\ PH\ of\ all\ reported\ plant\ species}$

Maximum PH of all reported plant species

where PH is the pharmacological attribute of the selected plants and Rel PH is the relative number of pharmacological properties attributed to individual plant species.

$Rel\ BS = \frac{BS\ of\ a\ given\ plant}{Maximum\ BS\ of\ all\ reported\ plant\ species}$

Maximum BS of all reported plant species

BS is the number of body systems healed up by using single species and Rel BS is the relative number of body systems healed up by using a single species.

Fidelity level

The fidelity level (FL) index was used to determine the most preferred species used to cure a particular disease as to treat the same ailment category with more than one plant species is also used. It was figured out after Friedman *et. al.*, using the given formula:

$$FL = \frac{Np}{N} \times 100$$

Where Np is the number of respondents citing the use of species for a particular ailment and N is the total number of respondents citing the plants for any illness.

Intellectual property agreement statement

Prior to the interviews, the informants were duly informed about the objectives of the research with verbal agreement that the information gather during the research shall not be used for commercial purposes but to enlighten and document medicinal plants used for the treatment of ruminant and birds diseases, thus, the interview was granted.

Results And Discussion

A total of 64 plant species from 38 families were identified as botanicals used in the management of the various ailments affecting animals in the study areas (Tables 1). The families of the identified plants are arranged in alphabetical order. The Asteraceae family has the highest number of plants represented by seven plants, followed by Euphorbiaceae and Solanaceae (four plants each) families respectively. The families Asclepiadaceae and Caesalpinaceae are made up of three plants each while other families one species each) were found to be used medicinally by the local communities. The dominance of Asteraceae might be due to suitable habitat, favorable environmental conditions for the growth of the species and more interactions of local communities that have been from generation to generations in the study area. Therefore the traditional use of the plants have been established and well recognized by the local inhabitants. The diseases/symptoms that have been treated by extracts from the identified plants ranges from Diarrhea, dysentery, retained placenta, ectoparasites/mange, cough, Common cold, Gastroenteritis, wounds for ruminants while Newcastle diseases, Fowl plague, Infected wounds, Chronic respiratory diseases, Coccidiosis, among others were found peculiar to birds in the study area. The plant parts used depend on the plant under consideration and severity of ailments. However, the results also showed that the leaves of the plants are the most frequently used (79.5%), followed by the seeds (16.3%) and the stem bark (4.11%). The reason why the leaves are the most frequently used might be because it contains more bioactive ingredients such as secondary metabolites, essential oils and phytochemicals, this contributes to the high effectiveness leaves have over other parts of the plants (kayode et al 2018 [19]; Amjad et al., 2015;[20] Furthermore, it could also be due to the convenience in harvesting for the preparation of herbal medicine [3, 21, 22, 9]. The use of roots and stems were observed to be annihilative, destructive and detrimental to the survival of plants as observed by various researchers [9, 22, 23, 24]. Moreover, it is not easy to collect the roots of wood and deep rooted plants [25].

Herbal preparation and administration

The methods of preparing these medicinal plants vary between decoction (38%), infusion, extract, powdered, and juice 23%, 17%, 8% respectively. They are highly reputed and valued by traditional healers in the study area for its curative and palliative effects in the treatments of diseases generally

(Umair et al., 2017 [26]; Tugume et al., 2016 [27]; Hutchings, 1996) [28]. Decoction is a very simple and it is an easy way of preparation of herbal medicine with more health benefit [28]. In decoction, the efficacy of herbal remedies increases due to the maximum extraction of health-beneficial secondary metabolites and other bioactive ingredients which accelerated on heating [30]. Also, previous researchers asserted the presence of the varieties of secondary metabolites, pharmacological and organoleptic properties in plants [26, 27, 31, 26, 32]. The majority of the botanicals implicated in the treatment of the ailments are used in combination with other parts of different plants (Table 2). This has been corroborated with the findings of [33, 3, 34, 35] that plants have synergy when combined during preparation, thereby making them more effective as mixtures. The taste of herbal medicine can be discouraging, however, it can be adjusted by adding honey or sugar to make it more pleasant [36, 37]. Additionally, Poultice, rubbing and paste were other common methods as reported in previous studies [26, 17, 4]. In oral mode of administration, plant materials were mainly ingested as decoction or in powdered form with water, milk or honey. Oral intake of herbal medicine is usually effective for the treatment of internal diseases while for external diseases such as skin infections, joint dislocation, cage fatigue, hemorrhoid and various pains were treated by topical application of the drugs [38]. Contrarily, the conventional system of medicine, according to [39] and [40], was observed that they lack standardization and quality control in the administration of traditional medicine.

However, without scientific proofs from the traditional healers and local people, the rationales for the choice of some of these plants have been attributed to some inherent properties, potential and effectiveness of these plants. These plants have been used traditionally over a period of times, they have been tested and proved and been considered being purgative, anti-dysenteric, anodyne, anti-inflammatory, carminative, demulcent, diaphoretic, emollient, styptic or astringent, refrigerant, stomachic, tonic and vasodilator in folk use. For instance plants used in treating wounds could be due to the presence of tannin content that imparting astringent activity which helps to recuperate diseases such as diarrhea, dysentery, gastroenteritis, wounds etc in animals. Plants containing tannins are astringent, able to draw together or constrict body tissues and are effective in stopping

the flow of blood or other secretions. Tannins strengthen veins by repairing the connective tissues surrounding veins and decrease capillary fragility [41]. The anti-inflammatory activities and various other healing properties exerted by plants may also be due to the presence of alkaloids, flavonoids and saponins present in these plants [42, 43, 44, 45, 46]

Relative frequency of citation (RFC)

Relative frequency of citation (RFC) indicates the traditional importance of each of the plant species with respect to informant who reported the uses of the species as asserted by [15, 4]. The RFC value of the reported species ranged between 0.06 for *Parkia biglobosa* and 0.97 for *Ficus exasperata* (Table 3). The highest RFC was calculated for *Ficus thoningii* (0.97), *Momordica charantia* (0.94), *Ficus exasperata* (0.93), *Allium cepa* (0.90), *Flugea virosa* (0.91), *Aframomum melagueta* (0.80) and *Chromolaena odorata* (0.73) respectively. The high value revealed that the inhabitants of the study area have a close association with the plants species and they are frequently using them to treat various diseases. The high RFC of *Ficus thoningii* indicates that this species is commonly utilized by local communities to treat various health disorders. This could lead to overexploitation of this species in the study area. The high exploitation may lead to threat and extinction if not conserved and adequately managed immediately. Therefore the understanding of RFC data contributes significantly to the importance of plant species within an area, the conservation of the species with maximum RFC and for biological, pharmacological and phytochemical screening of such species is imperative.

Use Value

The use value (UV) index was used to measure the ethnomedicinal uses associated with documented medicinal plant species and is ranged from 0.09 for *Zingiber officinale* and 0.01 *Lantana camara* (Table 3). The highest UV was reported for *Zingiber officinale* (0.95), followed by *Momordica charantia* (0.89), *Thitornia diversifolia* (0.89), *Ficus exasperata* (0.87), *Allium cepa* (0.87). The high usage of the reported species indicates a strong association and dependence of local communities on surround flora, especially for the treatment of various diseases and as food and livelihoods [47, 48] Moreover, the plant species which are used excessively are assumed to be biologically more active; therefore these should be subjected to phytochemical and pharmacological screening to increase sustainable

utilization and conservation of plant resources [49, 4].

Fidelity level (FL)

FL identifies the most preferred plant species used by traditional healers to cure various diseases and also indicates the proportion of informants reporting the use of specific plant species. The FL level of the reported species was ranged from *Flugea virosa* (97.33), *Allium cepa* (90), *Ficus thonigii* (97), *Ficus exasperate* (93), *Flugea virosa* (91), *Aframomum meleguata* (80), *Nicotiana tabacum* (76), *Chromolaena odorata* (73), *Jathropha multifida* (69) respectively. However, the lowest fidelity level of the plant species ranged from *Lantana camara* having the lowest fidelity level (0.4%), to *Parkia biglobosa* (6%), *Vitelaxia paradosa* (7%), *Senna occidentale* (9.3), *Psidium guajava* and *Pergularia daemia* (10%) each while *Calotropis procera* (11%) respectively. Plant species having high FL values are extensively believed to be most preferred ones and they are mostly used in the area compare to those with less FL values as earlier reported by [4]). These species are used to cure different ailments since ancient times in combination with other plants or ingredients and could be considered as a model plants for pharmacological screening. Despite the fact that modern health facilities are accessible, effective though expensive in the study area, local communities are still rely on medicinal plants and they possessed significant traditional knowledge on plant resources utilization.

Informant consensus factor (ICF)

The various diseases reported from the study areas were classified into 6 categories to develop the consensus of informants on medicinal plants following WHO' s international categorization of ailment [50]. It was observed that, informant consensus factor (ICF) values ranged from 0.34 to 0.90 where the highest level of 0.90 and 0.88 are for gastrointestinal disorder and skin infection diseases (Table 4). Prevalence of these diseases are mainly caused by poor hygiene conditions, inadequate care and supply of drinking water and consumption of contaminated food [4, 51]. *Aframomum meleguata*, *Allium cepa*, *Allium sativum*, *Aspila Africana*, *Boerhavia difusa*, *Carrica papaya*, *Caccia occidentale*, *Gossypium arboretum*, *Momordica charantia* and *Zingiber officinale* were among the most frequently utilized plant species to treat digestive system while *Adansonia digitata*, *Agerantum conizoides*, *Amaranthus spinosus*, *Annona senegalensis*, *Aspilia Africana*, *Azadiracter indica*,

Chromolaena odorata, *Datura stramonium*, *Ficus exasperate*, *Sida corymbosa*, *Vitex doniana* and *Vitelaxia paradosa* were used to treat skin infections. These diseases were observed prevalence in the study area; this could be because it was rural areas where extensive and free range methods of animal keeping are dominant. This may lead to outbreak of pathogenic attacks that may lead to chronic skin diseases and infection [52]. Many of the plants identified have been reportedly found growing in the study area. This observation tends to explain the reasons why plants medicine had been describe to be readily available, economical and effective with little or no side effects [23, 41]. The earlier assertion that the preference for plant medicine by the indigenous tribal groups in Nigeria are further enhanced by the extremely poor modern medical infrastructures in the rural areas, urban slums and current economic recession in the country that made the cost of modern medicine soar beyond the reach of most citizens. Similarly, the availability of phytochemicals such as flavonoids, vitamins, essential oil, alkaloids, saponins and phenols supported the effectiveness of plant based medicines [53, 54, 55, 25, 56, 24]. Additionally, inhabitants of the study areas have traditional knowledge which they have built over a long period of time due to their interaction with these plants species [57, 58, 59].

Some of the plants identified to manage respiratory tract infections varied from *Aframomum meleguata*, *Allium cepa*, *Allium sativum*, *Calotropic procera*, *Capscicum frutesence*, *Chromolaena odorata*, *Citrus aurantifolia*, *Lagenaria siceraria*, *Musa parasidiaca* among others. Respiratory tract and throat diseases ranked third highest ICF value and it was found to be 0.6. Various factors such as changes in climatic conditions, poor hygiene conditions, a high proportion of cold, moistures, germs, may cause abnormalities to respiratory tracts [60, 4]

Conclusion The use of plants in treating ailment is prevalent in the study area because of its less cost and effectiveness. The mode of administration and the variation in dosages suggested the scientifically importance of concentration of herbal treatment in treating diseases. The preparation of the herbs as decoction and infusion suggested the adequate extraction of the active ingredients from the plants, thus make it effective. However, the scientific validation of the dosage and the concentration of the herbal medicine are imperative to justify its usage scientifically.

Table:1. List of plants used in treating animal diseases in Ekiti State Northern Senatorial District of Nigeria.

S/N	Name of plants	Family name	Part used	Disease treated
1.	1. <i>Adansonia digitata</i> (Linn.)	Bombaceae	Leaves/fruits	Wounds/fowlpox
2	2. <i>Aframomum meleguata</i>	Zingiberaceae	seeds	Gastroenteritis, cold and CRD
3	3. <i>Ageratum conyzoides</i> (L.)	Asteraceae	Leaves	Wounds
4	4. <i>Allium cepa</i> (L.)	Alliaceae	Leaves/bulbs	Worm, CRD and CRD
5	5. <i>Allium sativum</i> (L.)	Alliaceae	Leaves	Cold, gastroenteritis and CRD
6.	6. <i>Alstonia boonei</i> (Pers)	Apocynaceae	Leaves and stem bark	Fever
7	7. <i>Amaranthus spinosus</i> (L)	Amarantheceae	Leaves/bulbs	Coccidiosis, Diarrhea, ectoparasites/Mange
8	8. <i>Anacardium occidentale</i> (L.)	Anacardiaceae	Leaves and stem	Diarrhea
9.	9. <i>Anona senegalensis</i> (L.)	Annonaceae	Leaves	Wounds, Fever
10.	10. <i>Aspilia africana</i> (Pers.)	Asteraceae	Leaves	Wounds, Gastroenterites
11	11. <i>Azardirecta indica</i> (A.Juss.)	Meliaceae	Leaves/fruits/ stem	Fever, wounds, Fowlpox, Coccidiosis
12.	12. <i>Boerhavia difusa</i>	Nyctaginaceae	Leaves	Worms, gastroenteritis
13	13. <i>Bridelia ferruginea</i> (L.)	Euphorbiaceae	Leaves/stem/bark	Diarrhea/fever
14.	14. <i>Calotropis procera</i> (R.Br.)	Asclepiadaceae	Leaves	Cough, cold
15	15. <i>Capsicum frutescens</i> (L.)	Solanaceae	Fruit	Cold/fever
16	16. <i>Caccia occidentale</i> (L.)	Caesalpinaceae	Leaves	Worms, Gastroenterites
17	17. <i>Chromolaena odorata</i> (L.)	Asteraceae	Leaves	Wounds, Fever, Coccidiosis
18	18. <i>Cissampelos owariensis</i> (P.Beav.)	Menispermaceae	Leaves	Diarrhea/Worms/Wounds
19.	19. <i>Citrus aurantifolia</i> (Christm)	Rutaceae	Leaves/fruits	Cough/CRD
20.	20. <i>Datura stramonium</i> (L.)	Solanaceae	Leaves/fruits	Gastroenterites/Wounds
21.	21. <i>Elaeis guinensis</i> (Jacq)	Arecaceae	Leaves/fruits	Wounds/poison/Fowlpox
22.	22. <i>Ficus exasperate</i> (L.)	Moraceae	Leaves/latex	Ectoparasites/Mange/Fever
23	23. <i>Ficus thoningii</i> (L.)	Moraceae	Leaves	Retention of placenta
24.	24. <i>Flugea virosa</i> (L.)	Euphorbiaceae	Leaves	Retention of placenta
25.	25. <i>Gliricidia sepium</i> (Jacq)	Fabaceae	Leaves	Gastroenterites
26.	26. <i>Gossypium arboretum</i> (Jacq)	Malvaceae	Leaves and seeds	Gastroenterites
27.	27. <i>Guiera senegalensis</i> (L.)	Combretaceae	Leaves	Retention of placenta
28.	28. <i>Helitricum indicum</i> (L.)	Boraginaceae	Leaves and stem	Retention of placenta
29	29. <i>Hymenocadia acida</i> (L.)	Hymenocardiaceae	Leaves	Retention of placenta
30.	30. <i>Jatropha gossypifolia</i> (L.)	Euphorbiaceae	Leaves/latex	Wounds/Fowlpox

31.	31. Jatropha multifida (L.)	Euphorbiaceae	Leaves	Cough
32.	32. Khaya senegalensis (Desr)	Meliaceae	Leaves	Ectoparasites/Mange/Fever
33	33. Lagenaria siceraria (Molina)	Cucurbitaceae	Leaves	Worms/Newcastle
34.	34. Lantana camera (L.)	Verbenaceae	Leaves	Fever/Fowlpox
35.	35. Momordica charantia (L.)	Cucurbitaceae	Leaves	Gastroenterites/Fowlpox
36	36. Moringa oleifera (Lam)	Rubaceae	Leaves	Newcastle/ Worms
37	37. Musa parasidiaca (L.)	Musaceae	Leaves/stem	Cough/ CRD
38	38. Nicotiana tabacum (L.)	Solanaceae	Leaves	Fever/ Ectoparasite/Mange
39	39. Ocimum basilicum (Sims)	Lamiaceae	Leaves	Worm/ Diarrhea
40	40. Parkia biglobosa (Auberville)	Mimosaceae	Leaves/stem	Wounds/Fowlpox/ Weakness
41	41. Pergularia daemia (Forsk)	Asclepiadaceae	Leaves	Newcastle/ Gastroenterites/CRD
42	42. Parquetina nigrens (Afz)	Asclepiadaceae	Leaves	Coccidiosis/ Diarrhea
43	43. Psidium guajava(L.)	Myraceae	Leaves	fever
44	44. Rauwolfia occidentalis (Afz)	Apocynaceae	Leaves	Fever
45	45. Lantana camera (L.)	Verbenaceae	Leaves	Fever
46	47. Senna alata(L.)	Ceasalpinaceae	Leaves	Diarrhea
47				
48	48. Senna occidentalis (L.)	Ceasalpinaceae	Leaves	Wounds
49	49. Sida corymbosa(L.)	Malvaceae	Leaves	Wounds
50	50. Solanum nodiflorum (Jacq)	Solanaceae	Leaves/fruits	Diarrhea, Worms
51	51. Spondia mombin(L.)	Asteraceae	Leaves	Coccidiosis Worms
52	52. Talinum triangulare (Jacq)	Portulacaceae	Leaves	Fever
53	53. Tephrosia vogeli (Hook)	Portulacaceae	Leaves	Newcastle/ Cough
54	54. Terminalia schimperiana (L.)	Combretaceae	Leaves	Coccidiosis Wounds
55	55. Thitornia diversifolia(L.)	Asteraceae	Leaves	Weakness/Fever
56	56. Tridax procumbens(L.)	Asteraceae	Leaves	Wounds, Anaemia
57	57. Triumfetta cordifolia(A. Rich)	Tiliaceae	Leaves	Fever/weakness
58	58. Venonia amygdalina (Del)	Asteraceae	Leaves	Fever/Diarrhea
59	59. Vitex doniana (Sweet)	Verbenaceae	Leaves	Cough/Wounds/
60	60. Vitelaxia paradosa	Sapotaceae	Leaves	Wounds/Fowlpox/Coccidiosis
61	61. Zea mays (L.)	Poaceae	Seeds	Fever/Fowlpox
62	62. Zingiber officinale (Rosc)	Zingiberaceae	Seeds	Gastroenterites/Bloat
	63. Carica papaya	Caricaceae	Seeds/Fruits/Leaves	Fever, Gastroenterites

Table 2

List of plants identified use for the treatment of Animal diseases in the study areas

S/N	Family	Scientific	Local	Habit	Part Used	Preparation	Application	Disease
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	Name	Name	Name					treated
1	Alliaceae	Allium cepa, (L)	Alubasana	H	LF	EX	Internal Internal	Worm CRD
		Allium sativum (L)	Ayu	H	B	EX	Internal Internal Internal	Cold, Gastroent eritis CRD
2	Apocynaceae	Alstonia boonei (Pers)	Igi Ahun	T	LF; SB	EX DE	Internal	Fever
		Rawolfia occidentalis (Afz)	Asofeyeje	T	LF	PD	Internal	Fever
3	Arecaceae	Elaeis guinensis (Jacq)	Igi ope	T	F	PA	Internal Internal External	Worm, Poison, Fowl pox
4	Amaranthaceae	Amaranthus spinosus (L)	Tete elegun	H	LF SD	PA PA	Internal Internal Internal	Coccidiosis, Diarrhea, Gastroent eritis, Mange
5	Anacardiaceae	Anacardium occidentale (L)	Kaju	S	FR AP	JU DE	Internal Internal	Diarrhea; Fever
6	Annonaceae	Annona senegalensis (L)	Igi Abo	T	LF, SD	EX EX	External Internal	Wounds, Fever
7	Asclepiadaceae	Calotropis procera (R.Br)	Bomubomu	H	LF; SD	EX DE	Internal	Cough Cold
8	Asteraceae	Agerantum conizoides (L),	Imi esu	H	LF	VG	External	Wounds
		Aspilula Africana (Pers),	yunrinyun	H	LF	EX	External Internal	Wounds, Gastroent eritis
		Chromolaena odorata	Igi Akintola	H	LF	EX DE DE	External Internal Internal	Wounds, Fever, Coccidiosis
		Spondia mombin (L);	Igi Ekikan	T	LF	EX DE CH	Internal Internal Internal	Worms, Coccidiosis, Retained placenta
		Thitonia diversifolia (L);	Ewe ododo	H	LF	EX	Internal Internal	Weakness Fever
		Tridax procumbens (L)	Ewe Igbalode	H	LF	IN TE	External Internal	Wounds, Anaemia
		Venonia amygdalina	Igi Ewuro	T	LF AP	EX JU	Internal Internal	Fever Diarrhea
9	Bombacaceae	Adansonia digitata (L)		T	LF	DE	External Internal	Wounds Fowlpox
10	Boraginaceae	Helitricum indicum (L)	Ewe Aparigun	H	LF	CH VG	Internal	Retained placenta
11	Caecalpinaceae	Cassia occidentalis (L);	Igi Kassia	T	LF	EX	Internal Internal	Worms Gastroent eritis
		Senna alata (L);		S	LF	DE	Internal	Diarrhea
		Senna occidentalis (L)		S	LF	DE	External	Wounds
12	Caricaceae	Carica	Igi ibepe	T	LF,	EX	Internal	Gastroent

	e	papaya (L)			SD	PA		erites, Fever
13	Combretaceae	Guiera senegalensis (L);	Gedu	T	LF	EX	Internal	Gastroenterites, Weakness of body
		Terminalia schimperiana (L)		T	LF	EX	Internal External	Gastroenterites, Weakness of body
14	Cucurbitaceae	Lantana camara (L)	Ewon Adele	T	LF	EX	Internal External	Gastroenterites, Weakness of body
		Momordica charantia (L)	Igi ejinrinwe	H	LF; WP	PQ DE	Internal Internal	Gastroenterites, Diahorea
15	Euphorbiaceae	Bridelia feruginea (L)	Igi ira	T	LF, SD	EX DE	Internal Internal	Weakness of body, Diahorea
		Flugea virosa (L)	Isawewe ameranbabo	T	LF	CH	Internal Internal	Female sex delivery, Diahorea
		Jatropha gossypifolia	Igi lapalapa	H	FL; AP	HR EX	Internal Internal	Pile, Diahorea
		Jatropha multifida (L)	Ogege	H	FL; AP	DE IN	Internal	Pile, Diahorea
16	Fabaceae	Gliricidia sepium (Jack.)	Agunmaniye	T	LF, AP	DE IN	Internal	Gastroenterites
17	Hymenocardiaceae	Hymenocardia acida (L)	Orupa	H	LF	DE	Internal	Retained placenta
18	Lamiaceae	Ocimum basilicum (Sims.)	Igi Efiri	H	LF	EX	Internal Internal	Pile, diahorea
19	Malvaceae	Gossypium arboreum (Jacq)	Igi owu	S	LF, SD	EX EX	Internal	Gastroenterites
		Sida corymbosa (L)	Iseketu	H	LF	EX	External	Wounds
20	Meliaceae	Azadiracta indica (A.Juss) Khaya senegalensis (Desr.)	Igi dongoyaro	T	LF, AP	DE IN	Internal External External External	Fever, Wounds, Fowlpox, Coccidiosis
21	Menispermaceae	Cissampelos owariense (P.Beav.)	Ewe joojoje	H	LF	EX	Internal External	Diahorea, Worms Wounds
22	Mimocaceae	Parkia biglobosa (Auberville)	Igi iru	T	LF, SD	EX PA	Internal External External	Weakness, wounds Fowlpox
23	Moraceae	Ficus exasperata (L)	Igi sawn paper	T	LF; AP	DE IN	Internal External External	Ectoparasites, Mange, Fever
		Ficus thoningii (L)	Igi odan	T	LF	DE	External External External	Ectoparasites, Mange, Retained placenta
24	Musaceae	Musa parasidiaca (L)	Ogede	H	LF, FR	HR CH	Internal Internal External	Cough, CRD

25	Myraceae	Psidium guajava (L)	Gurofa	T	FR; LF	EX PD	Internal	Fever
26	Nyctaginaceae	Boerhavia diffusa (L)			LF	EX	Internal Internal	Worms, Gastroenterites
27	Poaceae	Saccharum officinarum (L)	Igi ireke		LF	JU	Internal	Gastroenterites
		Zea mays (L)	Agbado		SD	CH	Internal External	Fever, Fowlpox
28	Portulacaceae	Tephrosia vogeli (Hook)	Orobeja		LF	EX	Internal Internal	Cough, Newcastle disease
29	Rubaceae	Moringa oleifera (Lam)			LF, SD	EX DE	Internal Internal	Newcastle disease; Worms
30	Rutaceae	Citrus aurantifolia (Christm)	Osan wewe		LF, SD	JU	Internal External	Cough, CRD
31	Sapotaceae	Vitellaxia paradoxa	Emimi		LF	EX	Internal Internal	Wounds; Fowlpox; Coccidiosis
32	Solanaceae	Capsicum frutescens	Igi ata		SD	IN	Internal External	Cold, Fever
		Datura stramonium (L)	Adodomode		LF SD	EX PA	External Internal	Wounds; Gastroenterites
		Nicotiana glauca (L)	Igi taba		LF; SD	IN	Internal External Internal	Ectoparasite, Mange, Fever
		Solanum nodiflorum (Jacq.)	Ewe Odu		LF	IN	Internal Internal Internal	Diarrheas, Worms, Coccidiosis
33	Steculiaceae	Walteria indica	Ewe eje		LF	HR	Internal	Coccidiosis
34	Tiliaceae	Triumfetta cordifolia (A. Rich)			LF	EX	Internal External	Fever Body weakness
35	Verbenaceae	Lantana camara (L)	Ewon Adele		LF	EX	Internal External	Fever, Fowlpox
		Vitex doniana (Sweet)	Oriri		LF	DE	Internal External	Wounds, Cough, Fowlpox
36	Zingiberaceae	Aframomum meleguata (L)	Atare		SD	PA	Internal Internal Internal	Gastroenterites, Cold, CRD

Keys: Habit: H, herbs, S shrubs, T trees, C climber; 2. Part(s) used: LE leaf, FR fruit, RT Root, ST stem, AP aerial Parts, WP whole Plant, FD fronds, SD Seed, FL flower, BA bark, BL bulb, RH rhizome, TW twig, SH shoot, LX latex, LB leaf bud, FP floral parts, 3. Method of preparation: PD powder, DE decoction, EX extract, PA paste, JU juice, PO poultice, IN infusion, HR hot rubbing, CH chewed, VG vegetable, TE tea, ET eaten, CK cooked, HB hot beverage.

Table 3

Quantitative Analysis of the data of the plants identified in the study areas

S/N	Botanical Name	Rel.PH	Rel. BS	RI	FC	RFC	UV	FL (%)
1	Adansonia digitata (L)	0.50	0.54	52.0	30	0.20	0.07	20
2	Aframomum meleguata	0.83	0.98	90.5	120	0.80	0.78	80
4	Allium cepa	0.86	0.91	85.5	135	0.90	0.87	90

5	(L.) Allium sativum (L.)	0.67	0.78	72.2	98	0.65	0.60	65
6	Alstonia boonei (Pers)	0.64	0.64	64	84	0.56	0.48	56
7	Amaranthus spinosus (L)	0.58	0.56	57	64	0.43	0.23	43
8	Anacardium occidentale (L.)	0.58	0.51	55	64	0.43	0.40	43
9	Anon senegalensis (L.)	0.58	0.54	56	64	0.43	0.28	43
10	Aspilia africana (Pers.)	0.61	0.78	69.5	72	0.48	0.33	48
11	Azadiracta indica (A.Juss.)	0.58	0.54	56	84	0.56	0.52	56
12	Boerhavia difusa	0.12	0.18	15	9	0.06	0.02	06
13	Bridelia ferruginea (L.)	0.58	0.54	56	84	0.56	0.53	56
14	Calotropis procera (R.Br.)	0.23	0.35	29.0	16	0.11	0.07	11
15	Capsicum frutescens (L.)	0.69	0.79	74	98	0.65	0.61	65
16	Carrica papaya (L)	0.69	0.64	66.5	98	0.65	0.61	65
17	Caccia occidentale (L.)	0.50	0.47	48.5	30	0.20	0.12	20
18	Chromolaena odorata (L.)	0.78	0.89	83.5	110	0.73	0.53	73.30
19	Cissampelos owariensis (P.Beav.)	0.70	0.81	75.5	99	0.67	0.19	66.00
20	Citrus aurantifolia (Christm)	0.49	0.48	48.5	28	0.19	0.15	18.70
21	Datura stramonium (L.)	0.66	0.59	62.5	89	0.59	0.23	59.33
22	Elaeis guinensis (Jacq)	0.62	0.78	70	78	0.52	0.47	52.00
23	Ficus exasperate (L.)	0.91	0.86	88.5	140	0.93	0.87	93.33
24	Ficus thoningii (L.)	0.93	0.82	87.5	146	0.97	0.92	97.33
25	Flugea virosa(L.)	0.86	0.92	89	136	0.91	0.67	91.33
26	Gliricidia sepium(Jacq)	0.78	0.79	78.5	110	0.73	0.61	73.33
27	Gossypium arboretum(Jacq)	0.58	0.58	58	64	0.43	0.23	42.66
28	Guieria senegalensis (L.)	0.53	0.54	53.5	34	0.23	0.15	22.70

29	Helitricum indicum(L.)	0.58	0.54	56	67	0.45	0.32	44.66
30	Hymenocadia acida(L.)	0.61	0.71	66	73	0.49	0.19	48.66
31	Jatropha gossypifolia (L.)	0.69	0.88	78.5	91	0.61	0.43	60.66
32	Jatropha multifida (L.)	0.71	0.92	81.5	103	0.69	0.52	68.66
33	Khaya senegalensis (Desr)	0.55	0.43	49	62	0.41	0.33	41.33
34	Lagenaria siceraria (Molina)	0.62	0.67	64.5	74	0.49	0.19	49.33
35	Lantana camera (L.)	0.10	0.11	10.5	6	0.04	0.01	4.00
36	Momordica charantia (L.)	0.65	0.78	71.5	92	0.94	0.89	61.33
37	Moringa oleifera (Lam)	0.67	0.71	69	94	0.63	0.57	62.66
38	Musa parasidiaca (L)	0.56	0.54	1.15	39	0.26	0.29	26.00
39	Nicotiana tabacum (L.)	0.79	0.92	85.5	114	0.76	0.59	76.00
40	Ocimum basilicum (Sims)	0.55	0.45	50	62	0.41	0.80	41.33
41	Parkia biglobosa (Aubereville)	0.12	0.09	10.5	9	0.06	0.43	6.00
42	Pergularia daemia (Forsk)	0.17	0.08	12.5	15	0.10	0.27	10.00
43	Parquetina nigrens (Afz)	0.53	0.54	53.5	60	0.40	0.25	40.00
44	Psidium guajava(L.)	0.17	0.13	15	15	0.10	0.10	10.00
45	Rauwolfia occidentale(Afz)	0.54	0.29	41.5	39	0.26	0.06	26.00
46	Lantana camera (L.)	0.62	0.78	70	43	0.29	0.11	28.67
47	Saccharium officinarium (L.)	0.62	0.71	66.5	43	0.29	0.29	28.67
48	Senna alata(L.)	0.48	0.34	41	28	0.19	0.21	18.67
49	Senna occidentals (L.)	0.16	0.13	14.5	14	0.09	0.19	9.33
50	Sida corymbosa(L.)	0.64	0.65	64.5	48	0.32	0.29	32
51	Solanum nodiflorum (Jacq)	0.18	0.14	16	16	0.11	0.33	11
52	Spondia mombin(L.)	0.67	0.78	72.5	94	0.63	0.57	63
53	Talinum triangulare (Jacq)	0.60	0.78	69	60	0.40	0.25	40

54	Tephrosia vogeli (Hook)	0.48	0.26	37	28	0.19	0.45	19
55	Terminalia schimperiana (L.)	0.51	0.34	42.5	32	0.21	0.27	21
56	Thitornia diversifolia (L.)	0.68	0.57	62.5	95	0.63	0.89	63
57	Tridax procumbens (L.)	0.52	0.54	53	34	0.23	0.23	23
58	Triumfetta cordifolia (A. Rich)	0.48	0.36	42	28	0.19	0.27	19
59	Venonia amygdalina (Del)	0.60	0.78	69	80	0.55	0.66	55
60	Vitex doniana (Sweet)	0.11	0.09	10	10	0.67	0.19	67
61	Vitelaxia paradoxa	0.11	0.08	9.5	11	0.07	0.21	7
62	Walteria indica	0.48	0.55	51.5	28	0.19	0.27	19
63	Zea mays (L.)	0.60	0.78	39	80	0.55	0.45	55
64	Zingiber officinale (Rosc)	0.61	0.88	74.5	82	0.55	0.95	55

Rel. PH relative number of pharmacological properties attributed to a single plant, Rel. BS relative number of body systems treated by a single species, RI relative importance, FC frequency of citation, RFC relative frequency of citation, UV use value, FL fidelity level

Table 4
Informant Consensus factors of the Respondents in the study area

S/N	Group of Diseases	Name of the associated diseases	Informant Consensus Factors
1	Skin diseases/ Mange	Ectoparasites, Mange, Wounds	0.90
2	Digestive system diseases	Diahoera, Dysentary,	0.80
3	Respiratory diseases	Cough, throat	0.60
4	Circulatory/ Reproductive diseases	Urinary diseases, Retained placenta	0.50
5	Fevea	Weakness and Pain	0.45
6	Muscular/Joint diseases	Dislocation of joints, weakness of legs or cage fatigue	0.34

Conclusion

The present study evaluated indigenous knowledge, the importance and the medicinal use of plants as remedies for ruminant and birds diseases in Ekiti state north senatorial district of Nigeria. The plants had proved to be very effective in the study area. The plants are relatively available, effective, diseases resistance and less toxic as determined by the ethnobotanical indices. The most used part of the species is the leaves followed by the seeds and bark respectively. However, there is a need to determine the chemical constituents embedded in the plants to validate their efficacies scientifically for safety use.

Declarations

Ethics approval and consent to participate

Authors received approval from the leadership, the kings and the traditional practitioners before receiving and documenting information from the respondents on the use of plants for treating animal diseases in the Ekiti North Senatorial district, Ekiti State, Nigeria.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated during and/or analysed during the current study are not publicly available due to the compromising of the authors' privacies, however, the data are available from the corresponding author on reasonable request.

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Competing interests

The authors declared no Competing of interest in the designing of the work, the collection, analysis, interpretation of data, writing of the manuscript and in the decision to publish the results.

Authors Contribution

OMK, TPO and KJ participated in designing the protocol of the survey. OMK carried out the research; TPO, OMK and KJ participated in data analysis and writing the manuscript. All authors participated in reviewing the manuscript. All authors read and approved the final manuscript.

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