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Medicobotanical Studies in Relation to Veterinary Medicine in Ekiti State, Nigeria: Conservation of Botanical Species Used for the Treatment of Poultry Diseases

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ABSTRACT

The rare veterinary botanicals in Ekiti State were identified using semi-structured questionnaire matrix. The traditional ecological knowledge defined by the respondents was used to identify the relevant conservation strategies that could guaranteed the continuous supply of the species in the study area.

INTRODUCTION

In Nigeria, recent initiatives had continued to enumerate the importance of botanicals in the livelihood of her citizenry. Apart from the income and essential products derivable from the botanicals, their roles in health maintenance is now widely recognized. Kayode *et al.* (2009) had stressed the importance of botanicals in the maintenance of the health of livestock in Ekiti State, Nigeria.

The rapid and massive deforestation that characterized the Nigerian vegetation has now became a permanent feature of the local environment of Ekiti State, Nigeria Attempts to reduce or perhaps eliminate bush burning, the major culprit of deforestation in the state, had failed woefully. The on-going extensive road construction activities further complicates the threat to the environment.

It is pertinent therefore to examine the abundance of the veterinary botanicals, identify the rare species among them and propose sustainable conservation strategies that would enhance their availability to the present and future generations. These constitute the objectives of the study being reported here.

MATERIALS AND METHODS

The detail description of the methods used in the enumeration had been provided by Kayode *et al* (2009). The major source(s) of the species was/were determined. The availability and the relative abundance of the species in the study area were determined using the ease at which any of the species

could be found when such is required for use.

Secondary information was obtained from interviews conducted with botanical vendors in the major market centres in each of the zones of the study area and other key informants stated in Kayode *et al.* (2009).

RESULTS AND DISCUSSION

A total of 38 species were identified as being used for the treatment of pests and diseases in the study area. Kayode *et al* (2009) had given the description and occurrence of these species, The species (Table 1) could be grouped into two categories: the cultivated and not cultivated species (Table 2). The cultivated species could further be classified into two sub groups, the widely and sparsely cultivated species. The widely cultivated species were those species with edible fruits and species whose leaves were valued for their medicinal usage. These species were also valued as important sources of income most especially during the off-farm seasons. They include *C. frutescens, C. papaya, C. aurantifolia, M. paradisiacal* and *Z.mays,* all valued for their fruits, *N. tobacum, O. bascilicum* and *V. amygdalina,* valued for their medicinal leaves, as well as *S. officinarum* valued for its edible stem. The sparsely cultivated species were *A.arabica, A. digitata, A. indica, S, alata* and *S. occidentale* valued primarily for the provision of shade and *J. gossypifolia* used primarily for erosion control and for boundary demarcation. The fact that these species were cultivated in the study area constituted a favourable incentive for the cultivation of these species in large quantities. The production of the edible fruits in large quantities may alleviate the existing poverty as this would constitute a viable source of income especially during the off-farm season. Recently the Ekiti State Government in partnership with some private investors is putting up a multimillion dollar biofuel production plants that would be making use *Jatropha* species. This could further boost the cultivation of *Jatropha* in the study area.

Most of the species that were not cultivated have their wildlings preserved in the study area. The preservation of their seedlings that grow in the wild was borne out of the realization for their usefulness as sources of important products that ranged from medicine (human medicine), shade, boundary demarcation, erosion control and fuel wood. These species include *A.melegueta, B. ferruginea, F. exasperate, L. siceraria, P. biglobosa, S. americanum, T. triangulare, T. schionperiana, T. vogelii, V. paradoxa* and *V. doniana. S. americanum* and *T. triangulare* were herbaceous vegetables that grow abundantly in the study area. The fruits and seeds of *P. biglobosa* are important delicacy in the study area. It could therefore constitutes an important source of income if cultivated in large quantity in the study area hence they readily availability of market for its seeds could serve as incentive for the large scale cultivation of the species. Previous study by Kayode (2004) had revealed that the lack of silvicultural knowledge of indigenous species had constituted an important disincentive to their cultivation. The dormancy of the seeds of this species had also hindered its adoption for cultivation, by

the rural farmers. Field observation during this study also revealed that the respondents lacked the requisite knowledge on the silvicuture of *A.melegueta, B. ferruginea, F. exasperate, T. schionperiana, T. vogelii, V. paradoxa* and *V. doniana*. Considerable length of time is taken when sourcing for these species hence they constituted the scarce species among these veterinary species.

A. spinosus, B. diffusa, C. odorata, C. owariensis, D. stramonium, L. camera, M. charanta, P. nigrescens and *P. daemia* were also not cultivated in the study area. They grow naturally as wildlings and they were found abundantly in the study area while *A. cepa* and *A. sativum* that were equally not cultivated in commercial quantities in the study area were easily found available for purchase from the retailers who sourced them from the northern parts of Nigeria, about 200 to 1000km from the study area. Thus *A.melegueta, B. ferruginea, F. exasperate, L. siceraria, P. biglobosa, S. americanum, T. schionperiana, T. vogelii, V. paradoxa* and *V. doniana* could be regarded as the rare species amongst the identified veterinary botanicals. At present, *S. americanum* is not rare but may be included because of its similar features with the other rare species. Field observations revealed that most of the residents possessed considerable indigenous knowledge on the identified rare species (Tables 3-12) which could serve as enabling strategies toward the conservation of the rare species. These include the knowledge on their utilities, elementary reproduction methods, time of flowering and fruiting, type of soil and growth characteristics of some of the species.

In conclusion, with the increasing conversion of the existing vegetation in the study area into monoculture plantation of exotic species and agriculture, there is the likelihood of continuous erosion of botanical species in the study area. Thus there is the need for public enlightenment campaign on the danger inherent in biodiversity loss; the relative regrowth capabilities of the rare veterinary species should be defined, sustainable harvesting methods should be derived for the species. While the harvesting of seeds and leaves were not supposed to be predatory and annihilative, the harvesting of seeds and leaves in species that were not cultivated could be so described. There is also the need for detailed studies on the biology of these species. Kayode and Ogunleye (2008), Kayode and Omotoyinbo (2008), Omotoyinbo and Kayode (2008) had advocated these positions recently. Botanical gardens, where identified endangered species could be cultivated, should also be established in each zones of the state. *Ex situ* devices, where important rare species are cultivated and later re-introduced into their natural environment, should also be utilized. All these will guarantee the survival of the identified rare species and make them available with relative ease when required.

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Table 1.Identified botanicals used in the cure of veterinary pests and diseases in Ekiti State, Nigeria.

S/N	Botanical Species	Major Source(s)*			Availability and abundance in the study area
		1	2	3	
1.	*Acacia arabica*	CA	HA	FR	Cultivated for the control of wind erosion, frequently available
2.	*Adansonia digitata*	FR	CA	HA	Cultivated for its edible fruit, occasionally available
3.	*Aframomum melagueta*	HF	FR	CA	Not cultivated but wildlings are preserved, abundantly available
4.	*Allium cepa*	PH	-	-	Not cultivated but readily available and in abundant,
5.	*Allium sativum*	PH	HF	-	Not cultivated but readily available and in abundant,
6.	*Amarantus spinosus*	HF	CA	HA	Not cultivated, grow as weed, abundantly available
7.	*Azadirachta indica*	CA	HA	-	Cultivated for control of wind, provision of shade, frequently available
8.	*Boerhavia diffusa*	HF	CA	HA	Not cultivated, grow as weed, abundantly available
9.	*Bridelia ferruginea*	FR	HF	CA	Not cultivated but widely preserved because of its medicinal values, frequently available

10. *Capsicum frutescens*	HF	PH	-	Cultivated for its edible fruits, abundantly available
11. *Carica papaya*	HF	HA	PH	Cultivated for its fruits, abundantly available
12. *Chromoleana odorata*	HA	CA	HF	Not cultivated, grow as weed, abundantly available
13. *Cissampelos owariensis*	HF	FR	HA	Not cultivated, grow as weed, abundantly available
14. *Citrus aurantifolia*	HF	HA	PH	Cultivated for its edible fruits, abundantly available
15. *Datura stramonium*	CA	FR	HF	Not cultivated, grow as weed, abundantly available
16. *Elaeis guineensis*	HF	PH	HA	Cultivated for its edible fruits and other economic products, abundantly available
17. *Ficus exasperate*	FR	CA	HF	Not cultivated, wildling preserved, occasionally available
18. *Jatropha gossypifolia*	HA	CA	-	Cultivated for erosion control, hedge plant, boundary demarcation, frequently available
19. *Lagenaria siceraria*	HA	HF	CA	Often cultivated for the control of erosion and for the demarcation of boundary, occasionally available
20. *Lantana camera*	CA	FR	HF	Not cultivated, frequently available
21. *Momordica charantia*	CA	HF	FR	Not cultivated, frequently available
22. *Musa paradisiaca*	HF	HA	PH	Cultivated for its edible fruits, abundantly available
23. *Nicotiana tobacum*	HF	HA	PH	Cultivated for its leaves, abundantly available
24. *Ocimum bascilicum*	HF	HA	-	Often not cultivated, sometimes cultivated, abundantly available
25. *Parkia biglobosa*	HF	CA	-	Not cultivated but wildling preserved, frequently available
26. *Pergularia daemia*	FR	CA	HA	Often not cultivated but wildling preserved, sometimes cultivated especially in the HA, occasionally available
27. *Perquetina nigrescens*	FR	CA	HA	Not cultivated, occasionally available

28. *Saccharum officinarum*	HF	PH	HA	Cultivated for its edible stem, frequently available
29. *Senna alata*	CA	HA	-	Cultivated for shade provision, occasionally available
30. *Senna occidentalis*	CA	HA	-	Cultivated for provision of shade, occasionally available
31. *Solanum americanum*	HF	PH	-	Not cultivated but wildlings preserved, abundantly available
32. *Talinium trangulare*	HF	HA	CA	Not cultivated, grow as wildlings that are preserved, abundantly available
33. *Tephrosia vogelii*	FR	CA	-	Not cultivated, occasionally available
34. *Terminalia schimperiana*	FR	CA	-	Not cultivated, wildlings preserved, occasionally available
35. *Vernonia amygdalina*	HF	HA	CA	Often not cultivated, sometimes cultivated for its medicinal leaves abundantly available
36. *Vitex doniana*	FR	CA	-	Not cultivated, occasionally available
37. *Vitellaria paradoxa*	FR	CA	-	Not cultivated, occasionally available
38. *Zea mays*	HF	PH	-	Cultivated, abundantly available

* 1 = Primary source, 2 =Secondary source, 3 =Tertiary source

CA = Common area, FR = Forest, HA = Household area, HF = Household farm, PH = Purchased

Table 2. Status of the identified botanicals used for the cure of veterinary pests and diseases in Ekiti State, Nigeria.

Status	Botanical Species

(a) Cultivated Species

(i) Widely cultivated species: *C. frutescens, C. papaya, C. aurantifolia, M. paradisiaca, N. tobacum, O. bascilicum, S. officinarum* and *V. amygdalina,* and *Z.mays.*

(ii) Sparsely cultivated species: *A.arabica, A. digitata, A. indica, J. gossypifolia, S, alata* and *S. occidentale.*

(b) Uncultivated Species

(ii) Preserved wildling species: *A.melegueta, B. ferruginea, F. exasperate, L. siceraria, P. biglobosa, S. americanum, T. triangulare, T. schionperiana, T. vogelii, V. paradoxa* and *V. doniana*

(ii) Weed species: *A. spinosus, B. diffusa, C. odorata, C. owariensis, D. stramonium, L. camera, M. charanta, P. nigrescens* and *P. daemia*

(iii) Purchased species: *A. cepa* and *A. sativum*

Table 3. The potentials of the respondents' indigenous ecological knowledge on the conservation of *A. meleguata.*

Respondents' indigenous ecological knowledge	Conservation conjecture
Its fruits, seeds and leaves are used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
Its seeds are important ingredients of many traditional products medicine	Ready market available for its
It is a perennial plant	Its derivable benefits could last for more than a year
It can be cultivated in home garden	This could enhance its domestication

Table 4. The potentials of the respondents' indigenous ecological knowledge on the conservation of *B. ferruginea.*

Respondents' indigenous ecological knowledge	Conservation conjecture
Its stem barks, roots and leaves are used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow on varieties of soil ecological	It could be cultivated in all the zones of the state
It has short and twisted bole with more or less open canopy	These ideotypic characters could enhance its incorporation with agricultural crops
It is fire resistance and	Suitable in the study area where slash burn is the major agricultural system practiced
Its barks is used in curing numerous human diseases	Ready market available for its products
Its barks are available in the market for sold	It could constitutes source of additional income

Table 5. The potentials of the respondents' indigenous ecological knowledge on the conservation of *F. exasperata.*

Respondents' indigenous ecological knowledge	Conservation conjecture

Its stem barks, roots and seeds are used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow on well drained soil	It could be cultivated in all the ecological zones of the state
It grow well in fringing forest areas	It could thrive well in most parts of the state
It fruits in the dry season	Its seeds could be available for planting at the onset of the rains

Table 6. The potentials of the respondents' indigenous ecological knowledge on the conservation of *L. siceraria.*

Respondents' indigenous ecological knowledge	Conservation conjecture
The whole parts of the plant is used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow on well drained light soil	It could be cultivated in all the ecological zones of the state
It is easy to grow, could be sown directly or in pots garden and later transplanted	These make it suitable for home and cultivation in commercial quantities
It requires 3 to 4 months to mature	This ensures early returns from its cultivation
The wild type (present in the state) is perennial	Its derivable benefits could last for more than a year

Calabash, a product of this species is of cultural value	This attributes could be used to convince indigenes to cultivate the species and perhaps domesticate it
Its seeds is now known to be reach in oil	This tend to indicate that large scale cultivation of the species would be a viable source of income

Table 7. The potentials of the respondents' indigenous ecological knowledge on the conservation of *P. biglobosa.*

Respondents' indigenous ecological knowledge	Conservatione conjecture
Its stem barks, leaves and fruit pulp are used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow on loamy and sandy soil	It could be cultivated in all the ecological zones of the state
It grow well in derived savanna areas	It could thrive well in most parts of the state
It fruits in the dry season	Its seeds could be available for planting at the onset of the rains
Its seeds is a source of local soup ingredient this called 'I*ru*'	Ready market available for seeds from species

Table 8. The potentials of the respondents' indigenous ecological knowledge on the conservation of *S. americanum.*

Respondents' indigenous ecological knowledge	Conservation conjecture

The whole parts of the plant is used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow in humid areas with various soil types or near water source in semi arid areas	It could be cultivated in all the ecological zones of the state
It grow naturally in disturbed localities, and open or lightly shaded areas	It is suitable for home garden domestication
It could be sown directly or in pots and later transplanted or by stem cutting	These make it suitable for home garden and cultivation in commercial quantities
It requires 3 to 4 months to mature	This ensures early returns from its Cultivation

Table 9. The potentials of the respondents' indigenous ecological knowledge on the conservation of *T. schionperiana.*

Respondents' indigenous ecological knowledge	Conservation conjecture
Its stem barks and roots used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow well in fringing forest and derived savanna	It could be cultivated in all the ecological zones of the state
It fruits in the dry season	Its seeds could be available for planting at the onset of the rains

Table 10. The potentials of the respondents' indigenous ecological knowledge on the conservation of *T. vogelii.*

Respondents' indigenous ecological knowledge	Conservation conjecture
Its leaves and seeds are used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow well in derived savanna zone	It could be cultivated in the savanna of the state
It is fire resistance and	Suitable in the study area where slash burn is the major agricultural system practiced
It fruits in the dry season	Its seeds could be available for planting at the onset of the rains
It could be cultivated as ornamental or wind brake	Suitable for domestication
It could be planted as cover crop existing	Suitable for incorporation into the agricultural methods
It is now known to have insecticidal properties	Suitable for cultivation in commercial proportion

Table11. The potentials of the respondents' indigenous ecological knowledge on the conservation of *V. doniana.*

Respondents' indigenous ecological knowledge	Conservation conjecture

Its stem bark, roots and leaves are used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow well in well drained soil	It could be cultivated in most parts of the state
It could be cultivated as fruit tree	Suitable for domestication and large scale (commercial) proportion
Its roots and bark is now known to produce dye	Suitable for cultivation in commercial proportion and as a major source of income

Table 12. The potentials of the respondents' indigenous ecological knowledge on the conservation of *V. paradoxa.*

Respondents' indigenous ecological knowledge	Conservation conjecture
Its seeds and roots are used in the study area	This could enhance willingness to be involved in its cultivation
Harvesting methods are annihilative	This stressed the need for its conservation
It grow on many types of soil	It could be cultivated in all the ecological zones of the state
It fruits in the dry season	Its seeds could be available for planting at the onset of the rains
Its fruits is a source of local ointment called '*Ori*'	Ready market available for the fruit of this species