

Medicobotanical Studies in Relation to Veterinary Medicine in Ekiti State, Nigeria: (2) Conservation of Botanicals 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 become 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 silviculture 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 not cultivated also 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. | <i>Acacia arabica</i> | CA | HA | FR | Cultivated for the control of wind erosion, frequently available |
| 2. | <i>Adansonia digitata</i> | FR | CA | HA | Cultivated for its edible fruit, occasionally available |
| 3. | <i>Aframomum melagueta</i> | HF | FR | CA | Not cultivated but wildlings are preserved, abundantly available |
| 4. | <i>Allium cepa</i> | PH | - | - | Not cultivated but readily available and in abundant, |
| 5. | <i>Allium sativum</i> | PH | HF | - | Not cultivated but readily available and in abundant, |
| 6. | <i>Amarantus spinosus</i> | HF | CA | HA | Not cultivated, grow as weed, abundantly available |
| 7. | <i>Azadirachta indica</i> | CA | HA | - | Cultivated for control of wind, provision of shade, frequently available |
| 8. | <i>Boerhavia diffusa</i> | HF | CA | HA | Not cultivated, grow as weed, abundantly available |
| 9. | <i>Bridelia ferruginea</i> | FR | HF | CA | Not cultivated but widely preserved because of its medicinal values, frequently available |
| 10. | <i>Capsicum frutescens</i> | HF | PH | - | Cultivated for its edible fruits, abundantly available |
| 11. | <i>Carica papaya</i> | HF | HA | PH | Cultivated for its fruits, abundantly available |
| 12. | <i>Chromoleana odorata</i> | HA | CA | HF | Not cultivated, grow as weed, abundantly available |
| 13. | <i>Cissampelos owariensis</i> | HF | FR | HA | Not cultivated, grow as weed, abundantly available |

| | | | | |
|------------------------------------|----|----|----|--|
| 14. <i>Citrus aurantifolia</i> | HF | HA | PH | Cultivated for its edible fruits, abundantly available |
| 15. <i>Datura stramonium</i> | CA | FR | HF | Not cultivated, grow as weed, abundantly available |
| 16. <i>Elaeis guineensis</i> | HF | PH | HA | Cultivated for its edible fruits and other economic products, abundantly available |
| 17. <i>Ficus exasperate</i> | FR | CA | HF | Not cultivated, wildling preserved, occasionally available |
| 18. <i>Jatropha gossypifolia</i> | HA | CA | - | Cultivated for erosion control, hedge plant, boundary demarcation, frequently available |
| 19. <i>Lagenaria siceraria</i> | HA | HF | CA | Often cultivated for the control of erosion and for the demarcation of boundary, occasionally available |
| 20. <i>Lantana camera</i> | CA | FR | HF | Not cultivated, frequently available |
| 21. <i>Momordica charantia</i> | CA | HF | FR | Not cultivated, frequently available |
| 22. <i>Musa paradisiaca</i> | HF | HA | PH | Cultivated for its edible fruits, abundantly available |
| 23. <i>Nicotiana tobacum</i> | HF | HA | PH | Cultivated for its leaves, abundantly available |
| 24. <i>Ocimum bascilicum</i> | HF | HA | - | Often not cultivated, sometimes cultivated, abundantly available |
| 25. <i>Parkia biglobosa</i> | HF | CA | - | Not cultivated but wildling preserved, frequently available |
| 26. <i>Pergularia daemia</i> | FR | CA | HA | Often not cultivated but wildling preserved, sometimes cultivated especially in the HA, occasionally available |
| 27. <i>Perquetina nigrescens</i> | FR | CA | HA | Not cultivated, occasionally available |
| 28. <i>Saccharum officinarum</i> | HF | PH | HA | Cultivated for its edible stem, frequently available |
| 29. <i>Senna alata</i> | CA | HA | - | Cultivated for shade provision, occasionally available |
| 30. <i>Senna occidentalis</i> | CA | HA | - | Cultivated for provision of shade, occasionally available |
| 31. <i>Solanum americanum</i> | HF | PH | - | Not cultivated but wildlings preserved, abundantly available |
| 32. <i>Talinium triangulare</i> | HF | HA | CA | Not cultivated, grow as wildlings that are preserved, abundantly available |
| 33. <i>Tephrosia vogelii</i> | FR | CA | - | Not cultivated, occasionally available |
| 34. <i>Terminalia schimperiana</i> | FR | CA | - | Not cultivated, wildlings preserved, occasionally available |
| 35. <i>Vernonia amygdalina</i> | HF | HA | CA | Often not cultivated, sometimes cultivated for its medicinal leaves abundantly available |
| 36. <i>Vitex doniana</i> | FR | CA | - | Not cultivated, occasionally available |
| 37. <i>Vitellaria paradoxa</i> | FR | CA | - | Not cultivated, occasionally available |
| 38. <i>Zea mays</i> | 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: | <i>C. frutescens</i> , <i>C. papaya</i> , <i>C. aurantifolia</i> , <i>M. paradisiaca</i> , <i>N. tabacum</i> , <i>O. basilicum</i> , <i>S. officinarum</i> and <i>V. amygdalina</i> , and <i>Z.mays</i> . |
| (ii) Sparsely cultivated species: | <i>A.arabica</i> , <i>A. digitata</i> , <i>A. indica</i> , <i>J. gossypifolia</i> , <i>S. alata</i> and <i>S. occidentale</i> . |
| (b) Uncultivated Species | |
| (ii) Preserved wildling species: | <i>A.melegueta</i> , <i>B. ferruginea</i> , <i>F. exasperate</i> , <i>L. siceraria</i> , <i>P. biglobosa</i> , <i>S. americanum</i> , <i>T. triangulare</i> , <i>T. schionperiana</i> , <i>T. vogelii</i> , <i>V. paradoxa</i> and <i>V. doniana</i> |
| (ii) Weed species: | <i>A. spinosus</i> , <i>B. diffusa</i> , <i>C. odorata</i> , <i>C. owariensis</i> , <i>D. stramonium</i> , <i>L. camera</i> , <i>M. charanta</i> , <i>P. nigrescens</i> and <i>P. daemia</i> |
| (iii) Purchased species: | <i>A. cepa</i> and <i>A. sativum</i> |

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

| 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 medicine | Ready market available for its products |
| 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 | It could be cultivated in all the ecological 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 | Suitable in the study area where slash and 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. exasperate*.

| 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 and later transplanted | 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 |
| 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 | Conservation 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 called 'Iru' | Ready market available for seeds from this 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, open or lightly shaded areas | It is suitable for home garden and 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 | It could be cultivated in the savanna zone of the state |
| It is fire resistance | Suitable in the study area where slash and 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 | Suitable for incorporation into the existing 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