

Ethnoveterinary Plants as Food Plants of Indian Gaur in Eturnagaram Wildlife Sanctuary, Warangal, Telangana State, India

M. Bapu Rao¹, E. Narayana² and M. Vikram Reddy^{3*}

^{1,2}Applied Ecology Laboratory, Department of Zoology, Kakatiya University
Waranagl-506 009, Telangana State, India

³Salim Ali School of Ecology and Environmental Sciences, Pondicherry Central University, Kalapet,
Pondicherry-605 016, India

Email: bapu7masadi@gmail.com

ABSTRACT

An inventory of the food spectrum of Gaur at Eturnagaram wildlife sanctuary in Telangana State (India) was made through a three year study with an aim to explore the diet composition, preferable food plants and their ethnoveterinary potential to treat different ailments. The ethnomedicinal plants used by the ethnic koya tribes living in and around the Eturnararma wildlife sanctuary are documented. The study identified 44 medicinal plant taxa representing 35 genera of 26 families. Ceasalpinaceae, Combretaceae and Rhamnaceae are the predominant family with 3 species from each family. The ethnoveterinary information on the food plants of Gaur used for treating ailments of animals, it has been observed that stem bark (45.45%) is the most commonly used plant part followed by leaves (22.73%), roots (11.36%), whole plant parts (11.36%), flowers (04.54%) and fruits (04.45%). The enumerated plants are used to treat of several common ailments of livestock by the Koya people includes anthrax, babesiosis, cough, dysentery, ephemeral fever, epitaxis, horn cancer, impaction, inflammatory diseases, lack of milk secretion, maggot-infected sores, oestrus, opacity of cornea, panting, retained placenta, rheumatism, skin diseases, trypanosomiasis, tympany and yoke gall.

Keywords: Ethnoveterinary plants, Food plants, Indian Bison, Koyas, Eturnagaram Wildlife sanctuary

INTRODUCTION

The Gaur or Indian Bison (*Bosgaurusgaurus*) is one of the large wild ungulates of Asian jungles (Corbet and Hill, 1992). It is a dominant herbivore and considered as the largest bovid confined to the oriental biogeographic region of the world. Globally, Gaur is distributed in Bangladesh, Bhutan, Cambodia, China, India, Peninsular Malaysia, Burma, Nepal, Thailand and Vietnam. In India, IB is found in central, southwestern and northeastern regions (Choudhary, 2002). India is having the highest Gaur population than any other countries in the world accounting for approximately 85% of its current global population. The Gaur in India occur in 124 protected areas (PAs) which cover only 26% of actual global distribution area of IB. In recent years, the population trend of IB is declining in many PAs and there are records of local extinction in protected areas like Bandhabagarh National Park, M.P and KangarGhati Wildlife sanctuary, Chhattisgarh (Duckworth et al., 2008). One of the first steps towards conservation of Gaur is to identify the food and feeding habits. Knowledge and comprehension on diet composition of the species is essential to take management decisions for viable population maintenance in the wild.

Much information based on studies on food and feeding of wild ungulates including Indian Bison is available in different habitats by the number of researchers. Information on its current distribution status in India has been gained through a questionnaire survey and literature reports (Arrendran, 2000). Rodger (1987) described on the wild grazing ungulates of India. Habitat analysis of Indian Bison in BhagvanMahaveer Wildlife Sanctuary using remote sensing and GIS was carried out by Kittur (2002).

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The food habits of wild ungulates and their competition with livestock were vividly studied in Pench Wildlife Reserve (Shukla and Khare, 1998). Krishnan (1972)

conducted an ecological survey based on the habitat, activity patterns and food habits of the large mammals including Indian Bison in peninsular India. Vairavel (1998) studied ecology of *Bos gaurus* with special reference to habitat utilization in Parambikulam Wildlife Sanctuary, Kerala (Srivastava et al., 1996) carried out Micro Histological studies on the food of Sambar, Gaur and cattle in Periyar Tiger Reserve, Kerala. Pasha et al. (2002) reported debarking of Teak (*Tectonagrandis*) by IB during summer in Pench Tiger Reserve, BhagvanMahaveer Wildlife Sanctuary and Mollem National Park. Gad and Shyama (2009) reported the feeding habits of Gaur from Mudumalai wildlife sanctuary and National park. Nayak and Patra (2015) reported qualitative information on the aspects of food and feeding habits of Gaur in Kuldhia Wildlife Sanctuary (KWS), Odisha.

Enthnoveterinary medicine is a holistic interdisciplinary study of the local knowledge and the socio-cultural structures and environment associated with animal health care and husbandry (Jain, 1999; Tiwari and Pande, 2010). Hence, to keep animals healthy, traditional healing practices have been applied for centuries and have been passed down orally from generation to generation (Toynag et al., 2007; Phondani et al., 2010). Widespread interest in documenting and validating ethnoveterinary practices arose in the early 1980s. Since then, several studies have been carried out, many reports written, and numerous conferences and workshops held. These activities have saved ethnoveterinary knowledge from extinction because most knowledge resided with elderly community members and disappeared as they died (Toynag et al., 2007; Phondani et al., 2010). However, the effort is still quite insignificant when compared to the undocumented global ethnoveterinary plant lore.

Koyas are the major ethnic tribes in the Eturnagaram wildlife sanctuary. The available information on ethnoveterinary medicine is not only scanty but scattered for Telangana state (Ramana, 2008). A comprehensive attempt was made (Reddy & Raju, 2000) of plants used in veterinary practices by the tribes of Telangana. The crude drugs as phytocure for veterinary diseases in Warangal district include 77 species and 71 genera representing 42 families of Magnoleophyta (Reddy et al., 1998). Murthy et al (2007) enumerated ethnoveterinary plants Koyas of Pakhal wildlife sanctuary. Reddy et al (2003) reported plants used in ethnoveterinary practices by Gonds of Karimnagar district. In the present communication, 44 plant species eaten by the wild ungulates particularly Indian gaur of Eturnagaram wildlife sanctuary are being used by Koya tribe to cure different veterinary diseases like anthrax, babesiosis, cough, dysentery, ephemeral fever, epitaxis, horn cancer, opacity of cornea, panting, retaining placenta, skin diseases besides bone fracture, snake bite, insect-bite, cuts, wounds and lack of milk secretion (galactagogue).

Study Area:

Eturnagaram wildlife sanctuary is one the oldest sanctuaries in Telangana, declared during 1953. Earlier it was as Tadvai wildlife sanctuary. The forests of the sanctuary contain predominantly teak with miscellaneous species of plants supporting a number of both

herbivorous and carnivorous wild animals. This sanctuary is situated in Warangal revenue district of Telangana in its Mulugu revenue subdivision and revenue mandals of Tadvai, Eturnagaram and Govindraopet. The sanctuary area comprising Eturnagaram and Tadvai Forest Ranges extends over 806.15 KM² and the Eturnagaram range an area of 380.35 KM². It is located in northeast direction at about 80 km from Warangal city, and at elevation of 251' above sea-level, and between longitude 79° 30' East to 80° 42' East and latitude 17° 15' North to 18° 40' North, located in the Deccan peninsular biogeographical zone and Chhota-Nagpur biotic province with dry deciduous forest (Rodgers and Panwar, 1992). The area is rich in both flora and fauna representing Deccan plateau and Godavari river system.

MATERIALS AND METHODS

Specimen Collection from Feeding Sites:

The food spectrum of Gaur in the sanctuary was monitored directly during the study period, and an inventory of their food plants was made through direct observations of these animals at different feeding sites inside the sanctuary. Soon after these animals leave the feeding locations these sites were examined for freshly browsed plant species and their parts, which were collected carefully, brought to the laboratory and the plants were examined and identified. The food plant parts were identified from the small pieces of the leaf portions, with help of a binocular stereomicroscopic zoom microscope (Wild, Heidelberg) and a related key (Todd and Hansen, 1973; Srivastava et al., 1996). Prof. Vastavaya S. Raju. Department of Botany, Kakatiya University, Warangal identified the collected plant species.

Methodology:

Our ethnoveterinary survey included repeated interviews with aged ethnic people (Koya), local herbal healers, shepherds and tribal headmen etc. in different seasons for consecutive years. Several field trips were conducted between the years 1998 and 2000 to record the medicinal utilization of the plants by the tribal communities. The data were collected through questionnaires and discussions among the tribal people in their local language. The information on useful plant species, parts used, local names and mode of utilization was collected. The data collected were further verified and cross-checked with different tribal communities. The specimens were pressed and deposited in the Herbarium of the Botany department (KUH) at Kakatiya University, Warangal, Telangana State, India. The sorted information on the ethnoveterinary knowledge of tribal inhabitants in enumerated alphabetically by the botanical names of the plants, in addition to the plant family, local (vernacular) names and plant part and mode use of ethnoveterinary plants.

Enumeration:

Data on 44 ethnoveterinary medicinal plant species belongs to 26 families, arranged in alphabetic order of scientific names of the plants followed by family name, vernacular names in telugu and ethnoveterinary uses.

RESULTS AND DISCUSSION

Indian Bison (Gaur) diet chiefly includes shoots and foliage of trees, shrubs, herbs and grass and also feeds on fruits, tender seeds and barks of trees as reported in different observations (Chetri, 2006; Nayak and Patra, 2015). These observations are in agreement with the reports of Shukla and Khare (1998) who reported that Indian Bison grazed and browsed on a much wider

variety of plants than any other ungulate species of India, showing preference for the upper portions of plants, such as leaf blades, stems, seeds and flowers of grass species. In contrast, some earlier study by Sathyanarayana and Murthy (1996) shows that Indian Bison feeds selectively on grass-dominated areas and are primarily grass eaters.

Diseases are basic problems for both the human beings and animals. Living beings have always been

Table-1. List of ethno veterinary medicinal plants eaten by Gaur in Eturnagaram Wildlife sanctuary

S. No.	Name of species	Vernacular Name	Family	Medicinal Uses
1	<i>Acacia catachu</i>	Nalla Sandra	Mimoseaceae	Stem bark decoction used to cure Ephemeral fever
2	<i>AeglemarmelosL.</i>	Maredu	Rutaceae	Pulp of fruit is applied to treat foot and mouth disease
3	<i>Anogeissuslatifolia</i>	Thiruman	Combretaceae	Stem bark given to control dysentery
4	<i>Bauhinearacemosa</i>	AdaviAvishe	Fabaceae	Leaf juice is applied over forehead to heal redness of eye
5	<i>Bauhineavahlii</i>	Addakuteega	Fabaceae	Hoof disease, boils, pimples, carbuncles, post-calving care
6	<i>Brideliahamiltoniana</i>	Panchoti	Euphorbiaceae	Stem bark and leaf is used to treat boils, blisters and wounds
7	<i>Calycopteris floribunda</i>	Bontha	Combretaceae	Root bark is used in the treatment of snake bite
8	<i>Cardispermumhelicacabum</i>	Buddaku	Sapindaceae	Leaf decoction used to cure Ephemeral fever
9	<i>Cassia auriculata</i>	Thangedu	Caesalpinaceae	Stem bark paste is used for Dysentery
10	<i>Cassia fistula</i>	Rala	Caesalpinaceae	Stem bark paste is used for Diarrhea and Dysentery
11	<i>Cassia occidentalis</i>	Kasinota	Caesalpinaceae	Root extraction is given to treat indigestion
12	<i>Centellaasiatica</i>	Saraswathiaku	Umbelliferae	Leaf juice is used for fever and sunstroke
13	<i>Cynodondactyla</i>	Garikagaddi	Poaceae	Plant parts are used to cure Rheumatism
14	<i>Desmodiumpulchellum</i>	Kondaantheetha	Papilionaceae	Plant parts are used to cure diarrhea
15	<i>Ecliptaprostrata</i>	Guntakalagura	Asteraceae	Apply externally on affected hooves to cure foot rot
16	<i>Elephantapusscaber</i>	Aatpoolu	Asteraceae	Root decoction is given to get relief from stomach ache
17	<i>Phyllanthus emblica</i>	Usiri	Euphorbiaceae	Stem bark juice is given to treat ephemeral fever, dyspepsia and diarrhea
18	<i>Erythroxylonmonogynum</i>	Devadaru	Linaceae	Stem bark is applied on bone fractures
19	<i>Gardenia gummifera</i>	Manchibikki	Rubiaceae	Bark paste is applied on wounds to kill worms and relieve pain
20	<i>Gardenia latifolia</i>	Katika	Rubiaceae	Stem bark paste is applied to treat horn cancer
21	<i>Gmelinaarborea</i>	Tellagummadi	Verbenaceae	Bark boiled with water applied on tumors
22	<i>Grewiahirsuta</i>	PeddaJuvilika	Tiliaceae	Roots are powdered and applied over boils, blusters and cuts
23	<i>Helicteresisora</i>	Thada	Sterculiaceae	Stem bark extract is given orally to treat trypanosomiasis

....Table-1. List of ethno veterinary medicinal plants eaten by Gaur in Eturnagaram Wildlife sanctuary

24	<i>Hemidesmusindicus</i>	Sugandhipala	Asclepiadaceae	Root juice is given orally to treat Haematuria
25	<i>Hydroleazeylanica</i>	Alumu	Hydrophyllaceae	Paste of whole plant is applied and bandaged till cure maggot infested sores
26	<i>Justiciaadhatoda</i>	Addasaram	Acanthaceae	Leaves are used to treat Bronchitis and Asthma
27	<i>Madhukalatifolia</i>	Ippa	Sapotaceae	Handful of flowers are given orally for galactagogue
28	<i>Manilkarahexandra</i>	Pala	Sapotaceae	Stem bark decotion is given to treat fever
29	<i>Miliusatomentosa</i>	Barredudduga	Annonaceae	Stem bark decotion administered to treat Trypanosomiasis
30	<i>Mimosa pudica</i>	Nidrakanti	Mimoseaceae	Leaf paste applied on bitten areas of unknwn insect bite
31	<i>Mongiferaindica</i>	Kondamamidi	Anacardiaceae	Stem bark extract is applied locally on boils, blusters and wounds.
32	<i>Plumbagozeylanica</i>	Chitramulam	Plumbaginaceae	Leaf juice given orally to treat Tympany (swelling of abdomen)
33	<i>Pterospermumxylocarpum</i>	Oleka	Sterculiaceae	Stem bark paste applied on wounds to relieve pain
34	<i>Schleicheraoleosa</i>	Pusuka	Sapindaceae	Stem bark is applied on worm infected wounds, wounded shoulders oxen
35	<i>Sidaacuta</i>	Kampa	Malvaceae	Fresh leaf juice is given orally to cure Diarrhea and Dysentery
36	<i>Syzygiumcumini</i>	Jinna	Myrtaceae	Stem bark extract is used as nasal drops to cure epitaxis
37	<i>Terminaliaarjuna</i>	Tellamaddi	Combretaceae	Stem bark crushed and applied over the fractures.
38	<i>Terminaliabellarica</i>	Tandri	Combretaceae	Paste of bark applied on tumors and warts
39	<i>Terminaliachebula</i>	Karaka	Combretaceae	Dry fruit juice is given orally to cure bloody diarrhea
40	<i>Urenalobata</i>	Anthorsa	Malvaceae	Leaf paste is applied on wounds.
41	<i>Xyliaxylocarpa</i>	Bojja	Mimoseaceae	Stem bark juice given orally to treat Diarrhea
42	<i>Ziziphusmaurtiana</i>	Regu	Rhamnaceae	Stem bark juice given orally to treat Diarrhea and Dysentery
43	<i>Ziziphusoenophila</i>	Pariki	Rhamnaceae	Leaf juice given orally to treat Diarrhea and Dysentery
44	<i>Ziziphusxylopyrus</i>	Gotti	Rhamnaceae	Leaf paste is applied on wounds and root decotion used to treat anthrax

fighting with diversified types of diseases since prehistoric periods. Livestock keepers who live close to their animals often have detailed information on various diseases, their causes and control. In the present study, a total of 44 plant species representing to 35 genera and belonging to 26 families have been collected for ethnoveterinary practices as remedy for several animal ailments of which 43 were dicotyledons and 01 was monocotyledon species. The scientific name of the species along with vernacular names, families, Part(s) used, ailment and with mode of administration presented in Table-1.

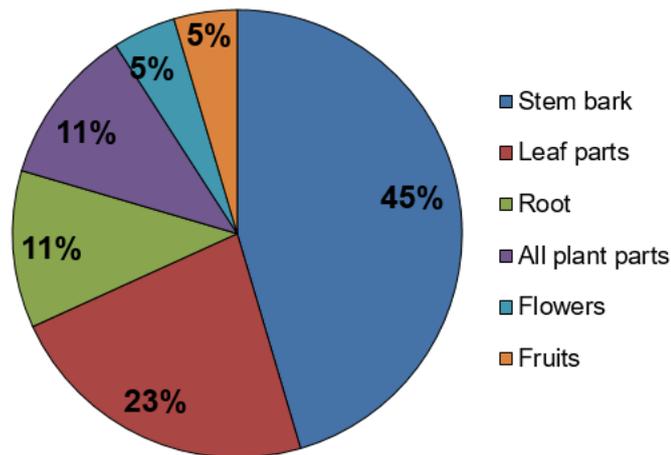
The ethnoveterinary information on the food plants of Gaur used for treating ailments of animals, it has been observed that stem bark (45.45%) is the most commonly used plant part followed by leaves (22.73%), roots

(11.36%), whole plant parts (11.36%), flowers (04.54%) and fruit (04.45%) (Fig.1). It is interesting to note that for the 44 plant species enumerated, major ethnoveterinary uses are treatment of several common ailments of livestock by the Koya tribal people. Some plants were noteworthy for the treatment of anthrax by one species *Ziziphusxylopyrus*, Foot and Mouth Disease (FMD) by *Aeglemarmelos*, and flowers for galactagogue *Madhukalatifolia*.

Of the plants used by the Koya tribal people in the present study, similar observations were also made to treat different types of diseases in animals. Reddy et al (1998; 2006) reported ethnoveterinary medicinal plants of Warangal district and Eastern Ghats of Andhra Pradesh. Reddy et al (2003) reported ethnoveterinary plants used by Gonds of Karimnagar district. Murthy et al. (2007)

enumerated plants used in ethnoveterinary practices by Koya tribes of Pakhal wildlife sanctuary, Warangal district. The common veterinary diseases in Warangal district for which folklore phytocure is available include anthrax, babesiosis, cough, dysentery, ephemeral fever, epitaxis, horn cancer, impaction, inflammatory diseases, lack of milk secretion, maggot-infected sores, oestrus, opacity of cornea, panting, retained placenta, rheumatism, skin diseases, trypanosomiasis, tympany and yoke gall (Reddy et al., 1998; 2003).

Figure-1. Different food plants parts used in the Ethno veterinary practices



Bone fracture, insect bite, etc. are also treated with plant crude drugs (Reddy et al, 1998; Reddy and Raju, 2002; Reddy et al. 2003; Suthari et al., 2014; Narender, 2018). This is the fact the wild ungulates particularly Gaur depend on their food sources to protect them self from different ailments naturally.

CONCLUSION

The study suggests that there is a vast amount of indigenous knowledge on ethnoveterinary medicinal plant and this knowledge plays an important role for the treatment of different animal ailments in the study area. The wild animals particularly Gaur using different medicinal plants and their food resources to protect them self from various diseases. The Koyatribal people in Eturnagaram Wildlife sanctuary, Eturnagaram, JayashankarBhupalapally district, Telangana state, healers have a very high intention to keep their traditional knowledge secret and none of them was ready to transfer their knowledge either freely or on incentive bases to other people; they need to convey their knowledge only to their selected scions after getting very old. The knowledge is passed from generation to generation in an oral manner. Without being properly documented this information it could easily be lost or distorted. Many wild species of medicinal plants are under pressure from various human induced factors. In addition disinterest of the young generation on traditional medicine. Since younger generation show lack of interest to use or to know medicinal plants from elders, the

knowledge of traditional might be eliminated in the future unless proper documentation is made.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

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