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An Ethno-Botanical Study with Special Reference to Fodder Plants of Bastar District of Chhattisgarh

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Abstract

The study with special reference to availability of fodder plants in Bastar, Chhattisgarh state were done in 2014. The objectives of the study were Identification of fodder yielding plants, availability and pattern of its utilization. The study was done through Ethno-botanical survey of two village viz. Titirgaon and Tekameta, 10 peoples of each village were selected for Personal interviews. The primary data were collected from the selected respondents by personal interview with the help of a set of pre-tested scheduled and questionnaire pertaining to the study. The respondents were either livestock holders or graziers/shepherd. The study revealed that good amount of fodder was available during the month of July to October from various sources in adequate quantity. During the study, 20 species of fodder plants were observed which were frequently used as fodder in the area, out of which 18 were tree, 2 were herb (grasses) and 1 species was shrubby in nature. The study also revealed that the farmer mostly preferred to grow and maintain the leguminous plants in the farm for their cattle as fodder. In the area during the study period, the most preferred fodder plants by the farmers were dub grass (*Cynodon dactylon*), babul (*Acacia nilotica*), Sissoo (*Dalbergia sissoo*) subabul (*Leucaena leucocephala*), gular (*Ficus glomerata*) and bamboo leaves (*Bambusa bambos*, *Dendrocalamus strictus*). It was also recorded that some plants like *Madhuca indica*, *Curcuma longa*, *Annona squamosa* and *Azadirachta indica* were used as medicine to cure livestock health problems.

Keywords: Ethno-botany, Fodder, Livestock, Bastar, Species.

Introduction

The Bastar district is located in the southern part of Chhattisgarh state, which is having about 44 % of total forest area and sustaining about 69 per cent tribals population of the area. The largest and the most important river in the Bastar districts is the Indravati, neither the river nor its tributaries dry in the hot session. It comes under the Bastar-plateau agro-climatic zones of Chhattisgarh which is moist, sub-humid region of the State. The climate is tropical moist deciduous type. Lateritic soil and alluvial soil are main soil types of the area. Due to large livestock population and less availability of fodder, most of the livestock in the country are grossly underfed. The total availability of green and dry fodder in the country is grossly inadequate and meets only one-third of its requirement. Regarding the deficiency of fodder the present study were carried out.

The main objects of the study was

1. Identification of fodder plants through Survey and through personal interviews.
2. Assessment of availability of fodder yielding plants in the area.
3. To study the utilization pattern of fodder and grazing system, feed.

Methodology

The information data collected through Ethno-botanical survey in selected two villages namely Titirgaon and Tekameta of Bastar, Chhattisgarh through the personal interviews of graziers/shepherds, Personal interviews of livestock holders, identification and verification of fodder plants through various plant monographs.

Results and Discussion

The study revealed that most of the cattle population preferred to eat grass specially dub grass (*Cynodon dactylon*), babul (*Acacia nilotica*), Sissoo (*Dalbergia sissoo*), su-babul (*Leucaena leucocephala*), gular

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(*Ficus glomerata*) and bamboo leaves (*Bambusa bambos/Dendrocalamus strictus*). Whereas bovines animal they mostly preferred mahua (*Madhuca indica*), gular (*Ficus glomerata*), su-babul (*Leucaena leucocephala*), bohar and kolyari (*Bauhinia racemosa*). Goats mostly preferred pipal (*Ficus religiosa*), mango (*Mangifera indica*), harra (*Terminalia chebula*), amrood (*Psedium guajava*), baheda (*Terminalia bellirica*), gular (*Ficus glomerata*), neem (*Azadirachta indica*), imli (*Tamarindus indicus*), ber (*Ziziphus mauritiana*) and khamar (*Gmelina arborea*). While sheeps preferred papal (*Ficus religiosa*), sal (*Shorea robusta*), harra (*Terminalia chebula*), baheda (*Terminalia bellerica*), gular (*Ficus glomerata*), neem (*Azadirachta indica*), imli (*Tamarindus indica*), ber (*Ziziphus mauritiana*). Cattles mostly preferred papal (*Ficus religiosa*), sal (*Shorea robusta*), amrood (*Psedium guajava*), mango (*Mangifera indica*), mahua (*Madhuca indica*), gular (*Ficus glomerata*) and khamar (*Gmelina arborea*). List of grasses or fodder plants preferred by animals is given in Table (1).

It was noticed and recorded that green fodder was available for fixed duration during the year and it varies with the species. However some of the fodder species were available throughout the year, these were *Azadirachta indica*, *Leucaena leucocephala*, *Morus alba*, *Pithecellobium dulce* and *Ziziphus mauritiana*. Where as *Acacia nilotica* available from May to February, *Albizia lebeck* and *Bauhinia variegata* available from April to November, *Anogeissus latifolia* available in April-October. While *Ficus religiosa*, *Gmelina arborea*, *Terminalia bellerica* and *Terminalia tomentosa* are available from the month of July to November. The yielding of fodder available adequately during the months from July to October, while most of the tree fodder becomes low in fodder yield due to the lean month i.e. from January to March. Availability of fodder yielding plants in the study area is given in Table (2), by showing black line for its availability and Figure (1) depicted the availability of fodder species along with their families.

Table-1
List of Fodder Plants Preferred by Animals

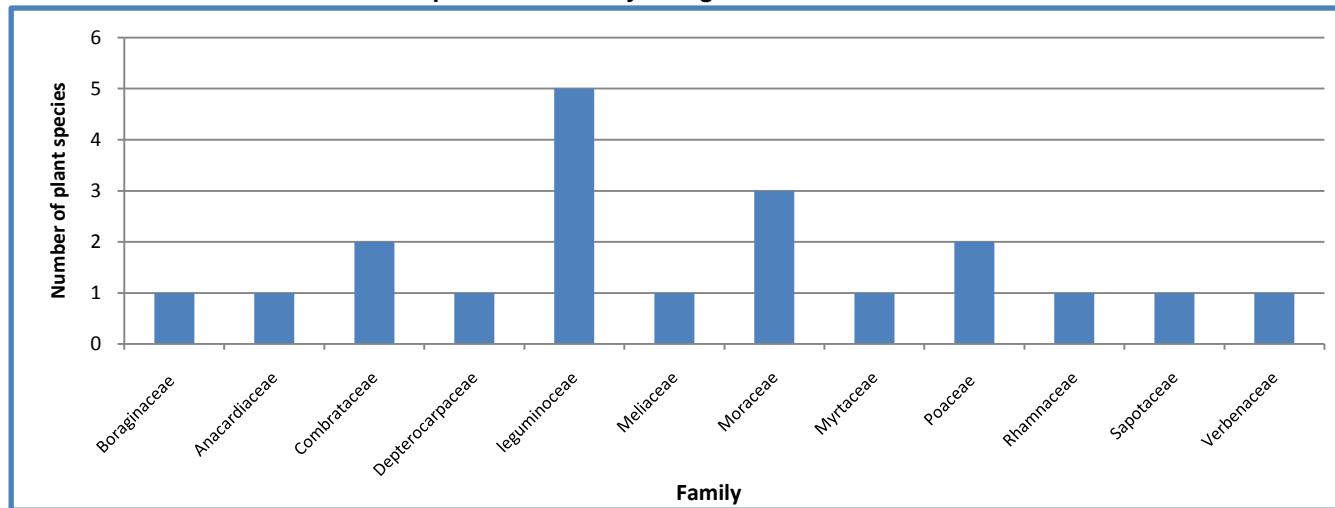
S.N.	Name of Plant	Habit	Family	Habitat	Feeding Animal	Edible Portion
1	Dub ghas (<i>Cynodon dactylon</i>)	Grass	Poaceae	Non-Cultivated	Cattle, bovines, goat, sheep	Fresh & dry leaves
2	Pipal (<i>Ficus religiosa</i>)	Tree	Moraceae	Non-Cultivated	Goat, sheep, cattle	Leaves
3	Sal (<i>Shorea robusta</i>)	Tree	Depterocarpaceae	Non-Cultivated	Cattle, sheep	New leaves, fruits
4	Aam (<i>Mangifera indica</i>)	Tree	Anacardiaceae	Cultivated	Goat, cattle, bovines	Leaves, ripen fruits
5	Harra (<i>Terminalia chebula</i>)	Tree	Combretaceae	Non-Cultivated	Goat, sheep	Leaves
6	Amrood (<i>Psedium guajava</i>)	Tree	Myrtaceae	Cultivated	Goat, cattle	Leaves, fruits
7	Mahua (<i>Madhuca indica</i>)	Tree	Sapotaceae	Non-Cultivated	Cattle, bovines	Flowers
8	Behada (<i>Terminalia bellerica</i>)	Tree	Combrataceae	Non-Cultivated	Sheep, goat	Leaves
9	Gular (<i>Ficus glomerata</i>)	Tree	Moraceae	Non-Cultivated	Goat, sheep, cattle, bovines	Leaves, fruits
10	Babool (<i>Acacia nilotica</i>)	Tree	Leguminaceae	Both	Cattle, goat, bovines, sheep	Leaves
11	Su-babool (<i>Leucaena leucophala</i>)	Tree	Leguminaceae	Cultivated	Bovines, goat, sheep, cattle	Leaves
12	Neem (<i>Azadirachta indica</i>)	Tree	Meliaceae	Cultivated	Goat, sheep	Leaves
13	Imli (<i>Tamarindus indica</i>)	Tree	Leguminaceae	Both	Goat, sheep	Leaves
14	Bamboo (<i>Bambusa bambos</i>)	Grass	Poaceae	Cultivated	Goat, sheep, cattle, bovines	Leaves
15	Bohar (<i>Cordia myxa</i>)	Tree	Boraginaceae	Both	Bovines, cattle	Leaves
16	Ber (<i>Zizyphus mauritiana</i>)	Shrub	Rhamnaceae	Non-Cultivated	Goat, sheep, cattle, bovines	Leaves
17	Khamar (<i>Gmelina arborea</i>)	Tree	Verbenaceae	Cultivated	Goat, cattle,	Leaves & fruit
18	Kolyari (<i>Bauhinia racemosa</i>)	Tree	Leguminaceae	Both	Goat, bovines	Leaves
19	Kathal (<i>Artocarpus heterophyllus</i>)	Tree	Moraceae	Cultivated	Cattle bovines	Ripen fruit
20	Sissoo (<i>Dalbergia sissoo</i>)	Tree	Leguminaceae	Cultivated	Cattle, bovine, goat, sheep	leaves

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Table (2)
Availability of Some Fodder Yielding Plants in The Study Area

Name of Plant	MONTHS											
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Acacia nilotica</i>	█											
<i>Albizia lebbeck</i>				█								
<i>Anogeissus latifolia</i>				█								
<i>Azadirachta indica</i>	█											
<i>Bauhinia variegata</i>				█								
<i>Dalbergia Sissoo</i>	█	█										
<i>Ficus religiosa</i>							█					
<i>Gmelina arborea</i>							█					
<i>Leucaena leucocephala</i>	█											
<i>Morus alba</i>	█											
<i>Pithecellobium dulce</i>	█											
<i>Terminalia bellerica</i>							█					
<i>Terminalia tomentosa</i>							█					
<i>Ziziphus mauritiana</i>	█											

Figure (1)
Fodder Species and Family Along with Number of Plants



The leguminous family has maximum (five species) number of plants followed by Moraceae (3 species), Combretaceae and Poaceae two plants in each family and followed by one plant each in family Boringaceae, Acanthaceae, Depterocarpaceae, Meliaceae, Myrtaceae, Rhamnaceae, Sapotaceae and verbenaceae. This indicates that legume family is suitable as fodder for livestock in villages. As per the available literature it was reported that the plants like *Acacia catechu*, *Leucaena leucocephala*, *Albizia lebbeck*, *Azadirachta indica*, *Albizia amara* and *Ficus religiosa* were rich in nutrition specifically Crude protein (CP), Organic matter (OM), Ether extract (EE), Neutral detergent fibre (NDF), Acid detergent fibre, cellulose and lignin as per shown in the Table (3) as

fodder species with number of plants availability and their family.

The data of Table (3) showed that the chemical contents of the plants specially with respect to the crude protein, the species *Albizia amara*, *Leucaena leucocephala*, *Ficus religiosa*, *Albizia lebbeck*, *Azadirachta indica*, *Grevia optiva* and *Butea monosperma* these contain the 27.60%, 22.50%, 19.80%, 19.70%, 17.60, 16.00% and 14.00% respectively. Whereas the cellulose, the species *Butea monosperma*, *Azadirachta indica*, *ficus religiosa*, *Helicteres isora* and *Albizia lebbeck* these contain the 28.10%, 23.60%, 22.90%, 19.10 and 19.00% respectively.

Table -3
Chemical Composition of Top Feeds (DM Basis)

Foliage	CP	OM	EE	NDF	ADF	Cellulose	Lignin
<i>Leucaena leucocephala</i>	22.50	87.50	5.2	28.50	17.50	10.00	7.20
<i>Albizia lebbeck</i>	19.70	91.00	4.7	47.60	31.80	19.00	12.50
<i>Hardwickia binata</i>	7.80	90.75	2.5	38.60	28.00	16.20	9.75
<i>Grevia optiva</i>	16.00	86.63	4.2	35.03	18.60	13.70	4.40
<i>Anogeissus pendulla</i>	8.20	0.80	4.1	34.90	23.60	15.00	8.20
<i>Azadirachta indica</i>	17.60	91.10	2.4	45.9	35.50	23.60	11.80
<i>Albizia amara</i>	27.60	88.90	5.60	45.20	26.20	12.30	14.10
<i>Ficus religiosa</i>	19.80	87.30	3.8	48.20	33.80	22.90	14.60
<i>Butea monosperma</i>	14.00	89.50	3.8	65.40	48.30	28.10	20.00
<i>Securinega virosa</i>	11.30	90.30	1.9	27.50	17.20	13.40	4.10
<i>Helicteres isora</i>	10.60	86.90	3.1	39.80	24.40	19.10	4.82
<i>Dichrostachys cinerea</i>	12.50	86.70	1.5	42.05	29.01	12.05	14.50
<i>Acacia catechu</i>	12.80	87.40	3.1	38.00	24.55	13.60	9.90
<i>Zizyphus xylocarpa</i>	11.50	91.30	2.4	32.30	19.20	8.50	8.70

Source : Singh (2009)

Plants contain number of compounds which depending upon their situations can have beneficial effect on livestock consuming them. Anti-nutritional factors usually are not lethal but reduce the animal productivity and may be toxic to animals when fed in large amount. Anti-nutritional factors are those substances generated in natural feed stuffs by the

normal metabolism of animal species and by different mechanism e.g. inactivation of some nutrients, interfaces with digestive process or metabolic utilization of feed. The commonly occurring anti-nutritional compounds are in tree leaves and shrubs are tabulated in Table (4) Anti-nutritional factors in top feed.

Table - 4
Anti-Nutritional Factors in Top Feeds

Plant species	Anti-nutritional compound
Non protein amino acid	
<i>Leucaena leucocephala</i>	Mimosine
<i>Indigofera spicata</i>	Indospicine
	Glycoxydes
<i>Acacia giraffe</i>	1. Cyanogens
<i>Acacia cunninghamii</i>	
<i>Acacia sieberiana</i>	
<i>Bambusa bambos</i>	
<i>Albizia stipulate</i>	Saponins
<i>Bassia latifolia</i>	
<i>Sesbania sesban</i>	
Phytohemagglutinins	
<i>Bauhinia purpurea</i>	Ricin
<i>Robinia pseudoacacia</i>	Robin
<i>Ricinus comunis</i>	Ricin
Polyphenolic compound	
All vascular plants	1. Tannins

All vasculsr plants		2. Lignins
Alkaloids		
<i>Acacia berlandieri</i>		N-methyl – phenathylamine
<i>Sesania drummodii</i>		Sessbanin
<i>Sesbania purpurea</i>		
Triterpenens		
<i>Azadirachta indica</i>		Azadirachtin
<i>Azadirachta indica</i>		Limonin
<i>Azadirachta aneura</i>		
<i>Azadirachta aneura</i>	Oxalate	

Source: Singh (2009)

The Rural peoples use the plants for treating the health problems of their pet animals. They cure some minor diseases like wounds and skin diseases. above Table (5) revealed name of the plant, its useful part, health problem for which it is used and method of application of the drugs.

1. Mahua (*Madhuca indica*) seed oils of mahua used to treat the wounds. Heated oil applied of the wounds, due to heat of the oil some worms of the wound get die and remaining worms comes outside, and oil form a layer on wound which protect from infections.
2. The grinded rhizome of turmeric (*Curcuma longa*) and prepared paste from them was applied on

the wounds and cuts on their domestic animals. The layer of turmeric works as antiseptic and it helps in wound healing.

3. Leaves of Sitaphal (*Annona squamosa*) used to kill the worms of wounds, leaves were crushed and filled on the wormy wound. Due to its bitterness worm comes out side.
4. Neem (*Azadirachta indica*) used to treat the many health problems like foot and mouth disease through putting the leaves on mud, cattle or bovines were tied on this mud with the help of rope. Paste of leaves was also applied externally to cure skin diseases.

Table - 5

List of Plants Used to Treat Ailment of Animals

S. N.	Name of Plant	Part Used	Name of Ailment	Method of Drug Use
1	<i>Madhuca indica</i>	Seed oil	Wounds	Oil is heated and applied on wounds
2	<i>Curcuma longa</i>	Rhizome	Wounds	Rhizomes are grinded and applied on wounds
3	<i>Annona squamosa</i>	leave	Worm infected wounds	The leaves are grinded and applied on wormy wound
4	<i>Azadirachta indica</i>	leaves	Mouth disease, worms, skin diseases	Putting the leaves on mud

Some of the other suitable plants which has medicinal properties and that do perform well also on different problematic soils are as follows:

Shallow, Rocky Soil

Neem (*Azadirachta indica*), Aonla (*Embllica officinalis*), Sitaphal (*Annona squamosa*), Bel (*Aegle marmelos*), *Cordia obliqua*, *Holoptellia intigrifolia*, *Wrightia tinctoria*, Malkagni (*Celastrus paniculata*).

Sandy Soils

Bel (*Aegle marmelos*), Katha (*Acacia catechu*), Jamun (*Syzygium cumini*), Arjun (*Terminalia arjuna*), Salai (*Boswellia serrata*), Khamer (*Gmelina arborea*), *Glyricidia sapium*.

Saline Soils

Neem (*Azadirachta indica*), Aonla (*Embllica officinalis*), Katha (*Acacia catechu*), Arjun (*Terminalia arjuna*), Babul (*Acacia nilotica*), Bahera (*Terminalia bellerica*), Harra (*Terminalia chebula*), Sivnag (*Oroxylum indicum*).

Alkaline Soils

Aonla (*Embllica officinalis*), Arjun (*Terminalia arjuna*), Babul (*Acacia nilotica*), Sissoo (*Dalbergia sissoo*), *Eucalyptus teritecornis*, Siris (*Albizzia procera*), Karanj (*Pongamia pinnata*)

Water Logged Soils

Arjun (*Terminalia arjuna*), Salai (*Boswellia serrata*)

The Figure (2) depicted the categories of available plant species on the basis of their habit. Maximum number (eighteen) of plants comes under the category of tree, followed by two species under the category of herb, one species under category of shrubs and under the climber no one species were observed. This indicates that trees are the most preferable fodder yielding plants in the villages. As per the available literature it was reported that the plants like *Acacia tortilis*, *Albizia amara*, *A. lebbeck*, *A. procera*, *Dychrostachys cinerae*, *Leucaena leucocephala*, *Hawaiian giant*, *Sesbania grandifolia*, *S. sesban*, *Azadirachta indica*, *Anogeissus pendula*, *Dendrocalamus strictus*, *Pongamia pinnata*, *Zizyphus mauritiana*, *Acacia nilotica sub sps. Cupressiformis*, *A. nilotica sub sps. Indica*, *Dalbergia sissoo*, *Embllica officinalis*, *Hardwickia binata*, *Melia azadirach*, *Terminalia arjuna*.

The Figure (3) depicted the parts of the plants which are preferred by animals as a fodder. This figure presents among the fodder yielding plants maximum percent (75%) of the plants produce leaf fodder, followed by 15% of plants produce leaves and fruit both. Followed by 5% each is the fruit fodder and flower fodder yielding plants. This indicates that leaves are mostly proffered by the animals and moderately they likes to eat fruits and flowers.

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Figure (2)
 Categories of Plant Species According to Their Habit

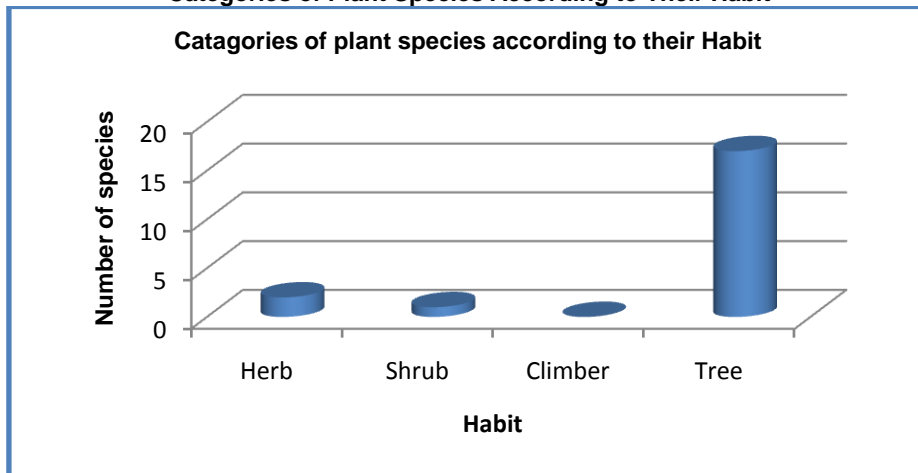
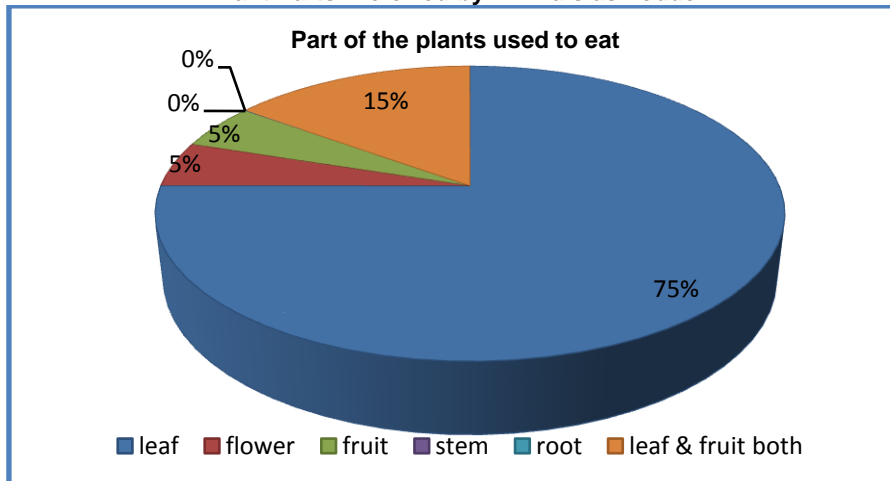


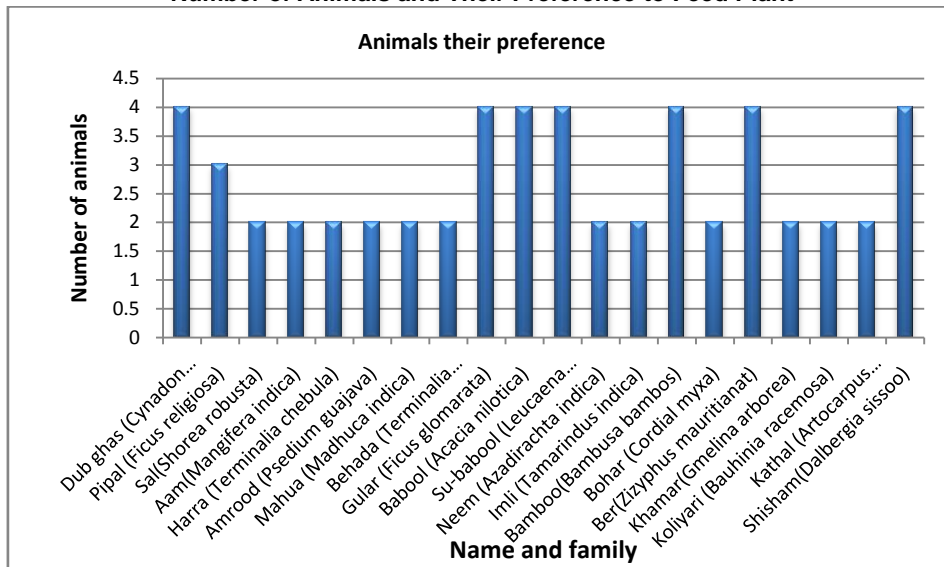
Figure (3)
 Plant Parts Preferred by Animals as Fodder



The Figure (4) depicted the number of animals and their preferences to feed the plants along with botanical name. Highest number of animals (4) like to feed the plants are dub grass (*Cynodon dactylon*), Gular (*Ficus glomarata*), Babul (*Acacia nilotica*), Su-babool (*Leucaena leucophala*), Bamboo (*Bambusa bambos/ Dendrocalamus strictus*), Ber (*Zizyphus mauritiana*), Sissoo (*Dalbergia sissoo*). Followed by three animals feed to Pipal (*Ficus*

religiosa) and followed by two animals each feed the plants viz. Sal (*Shorea robusta*), Aam (*Mangifera indica*), Harra (*Terminalia chebula*), Amrood (*Psedium guajava*), Mahua (*Madhuca indica*), Behada (*Terminalia bellerica*), Neem (*Azadirachta indica*), Imli (*Tamarindus indica*), Bohar (*Cordia myxa*), Khamar (*Gmelina arborea*), Koliyari (*Bauhinia racemosa*), Kathal (*Artocarpus heterophyllus*).

Figure (4)
Number of Animals and Their Preference to Feed Plant



Conclusion

The study recommended that the farmers should apply Silvi-Pasture or Agri-Silvi-Pasture system on their agricultural land or wastelands to fulfil the requirement of fodder during dry season or lean period. At this region, plants such as Subabul (*Leucaena leucocephala*), Sissoo (*Dalbergia sissoo*), Babul (*Acacia nilotica*) and Neem (*Azadirachta indica*) etc. should be planted in the farm either on the boundary or inside the field, if the choice is to produce fodder.

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