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Local use and knowledge validation of fodder trees and shrubs resources browsed by livestock in Manipur (India)

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Introduction

North Eastern states of India particularly in Manipur livestock rearing were being considered as one of the important homestead activities in the farm household. In the rural household economy, livestock is considered as an inseparable component in the whole farm business, as the production of milk and meat as well as manure, draught and transportation depends on it. It provides nutritional security to farm family and stabilizes farm income too.

As a major source of animal feeds in Manipur, fodder trees and shrubs are highly valued by farmers. They have deep root systems enabling the extraction of water and nutrients from deeper layer in the soil profile (Teferi *et al.*, 2008). Most of these plants have high crude protein content, ranging from 10 to more than 25% on dry matter basis (Moleele 1998). Farmers have an impressive knowledge of browsed species. Involving farmers in the process of data collection is important because as potential users of new technologies to be developed, their knowledge and preferences are critical (Haugerud and Collinson 1990). However, some of the knowledge is liable to be distorted or lost completely if transfer is not done continuously.

In the present study knowledge on utilization of trees and shrubs as feed for livestock in Manipur has been described.

Materials and Methods

The information regarding indigenous knowledge was gathered through literature survey and field visits. Individual interviews were conducted among livestock owners and keepers. Issues related to the knowledge on trees and shrubs such as availability and acceptability by the animals were discussed during the interviews. Plant samples which were utilized as fodder were collected from each farmers and identification was done at the CAU, Imphal and confirmed with the help of plant taxonomist from Manipur University.

Results and Discussion

Different fodder trees and shrubs contribute to the ration of livestock during different seasons. The farmers in the study area identified six seasons based on local feeding. In general, there are two seasons of scarce feed resources reported in the study area: the dry summer season covering a period from early March to mid May, and winter from early December to the end of February. Fodder trees contribute to livestock rations, especially during these scarce seasons. The use of some fodder trees extends beyond the typical scarce season. Some of the shrubs are being freely browsed throughout the entire year, whereas others are lopped and provide foliage for intensive feeding during the scarce seasons. Table 1 summarizes the availability, their habitat favoured plant part by different, animal species and lopping cycle during different seasons. *Moraceae* has appeared to be the dominant family, followed by *Lauraceae* and *Fagaceae*. The identification of more fodder trees is important since, trees have two characteristics, which make them useful particularly during drought. Firstly the trees able to draw as moisture and mineral from deeper layer of the soil which are out of reach for grasses, secondly, the leaves of most trees retain their nutritive value even when they are mature. Trees and shrubs provide fodder which is of great importance during period of nutritional stress in the dry season when the nutritional value of dormant grasses is low. In addition to tree and shrub leaves, cattle and goats consume the fruits of many trees like *Quercus glauca*, *Myrica esculeta*, *Ficus palmate*, *Ficus benghalensis*, *Celtis tetrandia* and ripe fruits of *Meyna spinosa*. So far the lopping cycle is concerned; it varies from species to species. Plant species belonging to *Ficus*, *Artocarpus* and *Bauhinia* had greater importance in providing more edible biomass (Verma *et al.*, 1982). Most of the fodder species have the lopping cycle throughout the lean period (October-May). Majority of the species have longer lopping cycle and higher palatability, which are taken as positive attributes of the fodder trees by the breeders. The main impact of feeding such fodder during lean period as supplementary item has been observed to have maintained the sustainable production of cattle product in Manipur.



Fig. 1: Feeding cattle on *Artocarpus heterophyllus*



Fig. 2: Feeding cattle on *Celtis australis*

Table 1: Plant species available for livestock feeding in Manipur

Plant species	Family	Plant parts used	Animal species	Lopping Cycle
<i>Alnus nepalensis</i> D.Don	Betulaceae	L	Cattle goats	April - May
<i>Antidesma acidum</i> Retz	Euphorbiaceae	L, F	Goats, cattle	Oct - May
<i>Artocarpus chaplasi</i> Roxb.	Moraceae	L	Cattle	Oct - May
<i>Artocarpus gomezianus</i> Wall. Ex Trecul	Moraceae	L, F	Goats, cattle	Oct - May
<i>Artocarpus heterophyllus</i> Lamk.	Moraceae	L	Cattle	Oct - May
<i>Betula alnoides</i> Buch.-Ham.ex D.Don	Betulaceae	L	Cattle	Dec - May
<i>Bridelia pubescens</i> Kutz	Euphorbiaceae	L, F	Goats, cattle	Jan - May
<i>Buddleja asiatica</i> Lour.	Loganiaceae	L	Cattle	Oct - May
<i>Callicarpa arborea</i> Roxb.	Verbenaceae	L, F	Goats, cattle	Jan - May
<i>Castronopsis indica</i> A. DC.	Fagaceae	L	Goats, cattle	Feb - May
<i>Castronopsis kurzii</i> (Hance) S.M. Biswas	Fagaceae	L	Goats, cattle	Feb - May
<i>Castronopsis tribuloides</i> (Sm.) DC.	Fagaceae	L	Cattle	Oct - May
<i>Celtis tetrandia</i> Roxb.	Ulmaceae	L, F	Goats, Cattle, Mithun	March - May
<i>Cinnamomum bejolghota</i> (Buch.-Ham.) Sweet.	Lauraceae	L	Goats, Cattle	Oct - May
<i>Cinnamomum gladiiferum</i> (Nees) Meissn.	Lauraceae	L	Goats, Cattle	March - May
<i>Cinnamomum pauculorum</i> Nees.	Lauraceae	L	Goats, Cattle	Oct - May
<i>Embllica officinalis</i> Gaertn.	Euphorbiaceae	L,F	Goats, Cattle, Mithun	April - May
<i>Ficus auriculata</i> Lour.	Moraceae	L,F	Goats, cattle	Oct - May
<i>Ficus benghalensis</i> Linn	Moraceae	L, F	Goats, cattle	Oct
<i>Ficus bhotanica</i> King ex Hook.f.	Moraceae	L	Cattle, goats	Oct
<i>Ficus fulva</i> Reinwardt.	Moraceae	L	Goats, cattle	Oct
<i>Ficus hispida</i> Linn.f.	Moraceae	L	Goats, cattle	March - May
<i>Ficus oligodon</i> Miq.	Moraceae	F, L	Cattle, goats	Feb - May
<i>Ficus religiosa</i> Linn.	Moraceae	L	Cattle	April - May
<i>Ficus semicordata</i> J.S. Sm.	Moraceae	L	Cattle, goats	Oct - May
<i>Ficus virens</i> Ait.	Moraceae	L	Cattle	Oct - May
<i>Fraxinus floribunda</i> Wall.	Oleaceae	L	Goats	March - May
<i>Glochidion assamicum</i> Hook.f.	Euphorbiaceae	L	Cattle, goats	Oct - May
<i>Glochidion sphaerogynum</i> Kurz	Euphorbiaceae	L	Cattle	March - May
<i>Litsea monopetala</i> (Roxb.) Pers.	Lauraceae	L	Cattle, Goat	Oct - May
<i>Mallotus philippensis</i> (Lam.) Muell.-Arg.	Euphorbiaceae	L	Cattle	Dec - May
<i>Morus australis</i> Poir.	Moraceae	L	Goats, cattle	March - May
<i>Morus serrata</i> Roxb.	Moraceae	L	Goats, cattle, Mithun	March - May
<i>Persea bombycina</i> (King ex. Hook.f.) Kosterm.	Lauraceae	L	Cattle	Oct - May
<i>Persea kingii</i> (Hook.f.) Kosterm.	Lauraceae	L	Cattle	Oct - May
<i>Persea odoratissima</i> (Nees.) Kosterm.	Lauraceae	L	Cattle	Oct - May
<i>Phoebe cuminate</i> (Nees.) Nees.	Lauraceae	L	Cattle	Oct - May
<i>Quercus glauca</i> Thunb.	Fagaceae	L	cattle	Jan - May
<i>Quercus griffithii</i> Hook.f. & Thoms. ex DC.	Fagaceae	L	Cattle, goats	April - May
<i>Quercus serrata</i> Thunb.	Fagaceae	L, F	Cattle, goats	April - Sept
<i>Symplocos paniculata</i>	Symploaceae	L	Cattle, Goats	March - April
<i>Trema cannabina</i> Lour.	Ulmaceae	L	Cattle, Goats	March - May
<i>Trema orientalis</i> (Linn.) Bl.	Ulmaceae	L	Cattle	Oct - May
<i>Vitex penducularis</i> Wall. Ex Sch.	Verbenaceae	L	Cattle	April - May
<i>Leucaena glauca</i> Benth	Mimosaceae	L	Cattle, Goat, Sheep	April-August

<i>Meyna spinosa</i>	Rubiaceae	L, F	Cattle, Goat, Sheep	May-Oct
<i>Ficus palmata</i> Linn	Moraceae	L,F	Cattle, Goat, Sheep	April-Sept
<i>Celtiscinua australis</i>	Ulmaceae	L	Cattle, Goat, Sheep	May-Sept
<i>Spondias Mangifera</i>	Simaroubaceae	L	Cattle, Goat, Sheep, Mithun	April-August
<i>Averrhoa carambola</i> Linn	Oxalidaceae	L	Cattle, Goat	April-Sept
<i>Ardisia cororala</i> Roxb	Myrsinaceae	L	Cattle	March-May
<i>Bambusa olivereina</i> Gamble	Poaceae	L	Cattle, Goat, Sheep, Mithun	Jan-Dec
<i>Alternanther philoxeroids</i> Griseb	Amaranthaceae	Whole part	Cattle	Jan-Dec

L=leaves; F=fruit

Conclusion

In the traditional farming system of the NEH region of India, different types of fodder trees and shrubs are found and used differently by various landowning and landless social segments. The landless herders, who annually rear thousands of cattle, sheep and goats, are at risk because of decreasing lowland grazing areas and fodder availability along trekking routes and resting sites. This paper demonstrates that indigenous tree and shrub species have a high potential in sustaining a pastoral system as the grazing areas are shrinking. It is also imperative that indigenous knowledge is documented and evaluated before it is lost.

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