

Survey of indigenous fodder trees and shrubs in Wag-Lasta

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Abstract

The study was conducted to identify the major fodder tree and shrub resources and to assess their utilization and feeding calendar of the species in Bugna, Ziquala and Dahinaworedas. The identified indigenous fodder trees and shrubs, common names, species scientific name, propagation method, feeding calendar and livestock species feeding on them were identified. The fodders were found mostly in open grazing lands, around fences and in protected areas. The feeding system in all woredas were free grazing and browsing and in small scale cut and carry is practiced especially for lambs, kids and sick animals. Parts of the browse species utilized by animals were leaves, pods, twigs and flowers. Most of the selected species do not have the ability to remain green throughout the year due to severe moisture stress and biological nature of the plants in the area. And most of the plants have maximum foliage production in the wet seasons of the year (July to October). Few browse species shed leaves early, while others retained leaves late into the dry season. In difficult environmental conditions, where the available grazing is not sufficient to meet the maintenance requirements of animals for part of the year, the contribution from trees and shrubs is significant. Research on nutritive value of the major browse species, detailed tagged study, their seedling establishment mechanisms and problems, soil seed bank analysis and further ethno-botanical studies should be done.

Key words: Dry season, feeding calendar, indigenous fodder tree, shrub.

Introduction

In many parts of the country where land holdings are small and risks are high, crop and animal husbandry are strongly interlocked to the extent that one cannot exist without the other. As a result, segregating livestock and crop production, which are the mainstay of the society, will not seem to be an appropriate strategy, at least in the short term. At least a

system whereby livestock strongly complement crop production. But livestock productivity has mainly been stagnant due to a range of biophysical constraints. One of the major constraints in livestock production is feed shortage.

The major animal feed resources in the district have been crop residues, grazing areas, bushes and shrubs and barks and leaves of fodder trees. Given the ever increasing population pressure, declining soil fertility and low annual rainfall, the carrying capacities of small private plots and a few patches of communal grazing fields is markedly low. Consequently, farmers use feeds obtained from locally available indigenous forage and crop residues. Many of the most palatable species are believed to have been over grazed.

Despite the ever increasing feed deficit, no valuable coping mechanisms against this problem have been devised so far except that the community by themselves started to reserve the scarce feeds of the rainy season for the dry seasons when feed is deficient and some animals changed their feeding habit (started consuming less palatable plant species). Attempts made so far to fill the feed deficit gap through various external measures such as promoting exotic forage species are all insignificant (Daniel & Hana, 2000). Promotion of the indigenous forage crops may require little turning towards environmental and social adaptation and may be adopted by the local farmers easily since they have already existed within the farming systems for a long period. This is, in general, not an attempt made to entirely replace the introduced forage crops, which are being promoted in some areas. Instead, it is to look for landrace forage resources and device methods of promoting them so as to complement the feed from other sources including exotic forage species and hence to diversify the potential fodder sources.

Therefore, the society and researchers have to look for local measures that can be operational and mutually co-existing with the land shortage problem of the district to retain the local palatable and acceptable forage species for longer period. The objective of this study was to identify the major fodder tree and shrub resources in Waghimra and Lasta *woredas* and to assess their utilization and feeding calendar of the species in the area.

Materials and methods

Sampling and identification

The study was conducted in selected woredas of Waghimra and Lasta. For the study, purposive sampling method was used considering livestock number and vegetation cover, three *woredas* were selected and three PAs were selected per *Woreda*. From each selected 9 PAs, 15-20 key informants (especially elders) who are well experienced in animal husbandry were selected to take the informal survey using the PRA tools.

The reconnaissance tour, semi-structured interview and group discussion were done to determine the study areas and preference ranking of the species was done to prioritize the species according to their advantages in the study areas. Identification of the different browse species followed the Flora of Ethiopia (Hedberg and Edwards, 1989). Finally, data analysis was performed using Microsoft Office Excel and organized, interpreted and presented in tables.

Results and discussion

Identified indigenous fodder trees and shrubs and their utilization

The identified indigenous fodder trees and shrubs, common names, species scientific name, propagation method, feeding calendar and livestock species feeding on them are presented in Tables 1, 2 and 3 for Bugna, Ziquala and Dahina *Woredas*, respectively. Farmers do not plant any of the indigenous fodder trees and shrubs for their feeding value. The fodders are found mostly in open grazing lands, around fences and in protected areas. The feeding system in all *woredas* were free grazing and browsing and in small scale cut and carry is practiced especially for lambs, kids and sick animals. Similar uses of browse species were reported by Teferi *et al.* (2008) in Abergelle, Ethiopia.

In an effort to alleviate the animal feed supply problem, looking for potential feed resources, particularly those which survive during the dry season, deserves due attention. In this regard, the use of browse species has great potential. As mentioned in many studies

(Bamualin *et al.*, 1980; Ibrahim 1981; Devendra, 1990) the importance of these plants in the arid and semi-arid areas is well recognized throughout the world. The major use of foliage of browse species is as a source of CP. This quality of browse species is most useful during the dry season when most of the range grasses and other herbaceous species dry off (Devendra, 1990). Livestock species utilizing the fodder resources in order of farmers' preferences are goats, cattle and sheep. This might be because goats are the most important livestock in the area in supporting farmers livelihood compared to other livestock species. Parts of the browse species utilized by animals were leaves, pods, twigs and flowers. Almost all selected fodder trees and shrubs have also additional uses in the area for ethno-medicine, ethno-veterinary, fuel wood, charcoal, building materials and others.

Seasonal availability

Most of the selected species did not remain green throughout the year due to severe moisture stress and biological nature of the plants in the area. And most of the plants have maximum foliage production in the wet seasons of the year from July up to October. Certain browse species shed leaves early, while others retained leaves late into the dry season. Livestock herders in the area ranked those browse species which could retain leaves late into the dry season so that more feed could be supplied at critical times of the year when there is less availability of fresh vegetative biomass for feeding to livestock. Acacia species have good adaptation to produce foliage immediately after a short rain

Fodder trees and shrubs have always played a role in feeding livestock. Trees and shrubs are increasingly recognized as important components of animal feeding, especially as suppliers of protein. In difficult environmental conditions, where the available grazing is not sufficient to meet the maintenance requirements of animals for part of the year, the contribution from trees and shrubs is significant. Tree fodders contain high levels of crude protein and minerals and many show high levels of digestibility. They are readily accepted by livestock and presumably because of their deep-root systems, they continue to produce well into the dry season (Daniel and Hana, 2000). However, antinutritive factors can be a problem in some species.

Table 1. Major browse species identified in Bugina Woreda.

Scientific name	Local name	Propagation method	Parts used as animal feed	Season of used	Type of animals used
<i>Allophylusabyssinicus</i>	Embs	Seed	leaves, twig/ branch	January to May	cattle, shoats
<i>Rumexnervosus</i>	Embacho	Seed	leaves, twig/ branch	year round	cattle, shoats
<i>Oleauropeasspcuscupideta.</i>	Weyra	Seed	leaves, twig/ branch	year round	cattle, shoats
<i>Dodonaeaanguistifolia</i>	Kitikita	Seed	leaves, twig/ branch	year round	cattle, shoats
<i>Grewia bicolor</i>	Sefa	Seed	leaves, twig/ branch	year round	cattle, shoats
<i>Stereospermumkunthianum</i>	Zana	seed	leaves, fruit		cattle, shoats
<i>Arundodonax</i>	Shebeko	seed and root split	leaves, twig/ branch		cattle, shoats
<i>Acacia bervispica</i>	Gorngoro	seed	leaves, twig/ branch	October to January	cattle, shoats
<i>Acacia sp</i>	Girar	seed	leaves, pod and seed	October to January	cattle, shoats
<i>Myricasalicifolia</i>	Haya	seed and stem	leaves, twig/ branch		cattle, shoats
<i>Acacia lahi</i>	Qarita	seed	leaves, pod	year round	cattle, shoats
<i>Grewavillosa</i>	Lenquata	seed	leaves, fruit	year round	cattle, shoats
<i>Capparismicrantha</i>	Gimero	seed	leaves, fruit	year round	cattle, shoats
<i>Cordiaafricana</i>	waniza	seed	leaves, twig/ branch		cattle, shoats
<i>Grewiamollis</i>	betremusie	seed	leaves, twig/ branch		cattle, shoats
<i>Dombeyatorrida</i>	wulkifa	seed	leaves ,twig/ branch	year round	cattle, shoats
<i>Rhusnatalensis</i>	qaqimatalo	seed	leaves		cattle, shoats
<i>Buddlejapolystachya</i>	anfer	seed and stem	leaves, twig/ branch		cattle, shoats
<i>Phytolaccadodecandra</i>	endod	seed	leaves, twig/ branch		cattle, shoats
<i>Ficussycomorus</i>	warka	seed	leaves, twig/ branch		cattle, shoats
<i>Stephaniaabyssinica</i>	nechihareg	seed	leaves, twig/ branch		cattle, shoats

Table 2. Major browse species identified in Ziquala Woreda.

Scientific name	Local name	Propagation		Season of used	Type of animals used
		method	Parts used as animal feed		
<i>Grewiavilosa</i>	Mata	seed	leaves, twig/branch and fruit	Oct. to Dec.	cattle, shoats
<i>Commiphoraabyssinica</i>	anqwa	seed	leaves, twig/ branch	year round	cattle, shoats
<i>Ziziphusspina-christi</i>	giba	seed	leaves, twig/ branch	year round	cattle, shoats
<i>Acacia asak</i>	tsalwa	seed	leaves, twig/branch, pod	Oct. to Nov.	cattle, shoats
<i>Balanitesaegyptiaca</i>	goza	Seed	leaves, twig/ branch	Sept. to Dec.	cattle, shoats
<i>Acacia tortolis</i>	abiqa	Seed	leaves, twig/branch, pod	Sept. to Nov.	cattle, shoats
<i>Dodonaeaanguistifolia</i>	kitikta	Seed	leaves, twig/ branch		cattle, shoats
<i>Combretummolle</i>	abelwa	Seed	leaves, twig/ branch		cattle, shoats
<i>Cappastomentosa</i>	Gimero	Seed	leaves, twig/ branch		cattle, shoats
<i>Cordiaafricana</i>	Wanza	Seed	leaves, twig/ branch		cattle, shoats
<i>Stereospermumkunthianum</i>	Zana	Seed	leaves, twig/ branch		cattle, shoats
<i>Arundodonax</i>	Shenbeqo	Seed	leaves, twig/ branch		cattle, shoats
<i>Dombeyatorrida</i>	Wulkifa	Seed	leaves, twig/ branch		cattle, shoats
<i>Grewiaferugina</i>	Lenquata	Seed	leaves, twig/ branch		cattle, shoats
<i>Rhusnatalensis</i>	QaqmaTalo	Seed	leaves, twig/ branch		cattle, shoats
<i>Grewia bicolor</i>	Sefa	Seed	leaves, twig/ branch		cattle, shoats
<i>Buddlejapolystachya</i>	Anfer	Seed	leaves, twig/ branch		cattle, shoats
<i>Phytolaccadodecandra</i>	Endod	Seed	leaves, twig/ branch		cattle, shoats
<i>Carrisaspinarum</i>	agam	Seed	leaves, twig/ branch		cattle, shoats
<i>Acacia lahi</i>	qarita	Seed	leaves, twig/ branch		cattle, shoats
<i>Terminaliabrowni</i>	ekma	Seed	leaves, twig/ branch		cattle, shoats
<i>Acacia brevispica</i>	girar	Seed	leaves, twig/ branch		cattle, shoats
<i>Commiphoraafricana</i>	anqua	Seed	leaves, twig/ branch		cattle, shoats
<i>Grewiavilosa</i>	Mata	Seed	leaves, twig/ branch		cattle, shoats
<i>Cappastomentosa</i>	gimero	Seed	leaves, twig/ branch		cattle, shoats

Table 3. browses species identified in Dahina Woreda.

Scientific name	Local name	Propagation method	Parts used as animal feed	Season of used	Type of animals used
<i>Acacia lahi</i>	karita	Seed	leaves, pod	year round	cattle, shoats
<i>Ziziphus spina-christi</i>	geba	seed	leaves, fruit, twig/branch		cattle, shoats
<i>Rhus natalensis</i>	talo	seed	leaves, twig/branch, seed		cattle, shoats
<i>Terminalia browni</i>	ekma	seed	leaves, twig/branch		cattle, shoats
<i>Acacia sp.</i>	gerar	seed	leaves, twig/branch, pod	July-Sept Sep.-Oct. July-Dec. June-Jan.	cattle, shoats
<i>Olea europaea sp. cuspidata</i>	weira	seed	leaves, twig/branch		cattle, shoats
<i>Clematis hirsute</i>	azohareg	seed	all parts		cattle, shoats
<i>Rosa abyssinica</i>	kega	seed	leaves, fruit, twig/branch		cattle, shoats
<i>Stephania abyssinica</i>	nechihareg	seed	all parts		cattle, shoats
<i>Arundodonax</i>	shembeko	cutting, root	leaves		cattle, shoats
<i>Buddleja polystachya</i>	anfar	seed	leaves, twig/branch		cattle, shoats
<i>Acacia lahi</i>	karita	seed	leaves, pod, twig/branch		cattle, shoats
<i>Dodonaea angustifolia</i>	ketkita	seeds	leaves, twig/branch		cattle, shoats
<i>Carissa spinarum</i>	agam	seed	leaf, twig/branch, fruit		cattle, shoats
<i>Commiphora africana</i>	ankwa	seed	leaves, twig/branch		cattle, shoats
<i>Combretum molle</i>	abalo	seed	leaves, twig/branch		cattle, shoats
<i>Ziziphus spina-christi</i>	geba	seed	leaves, twig/branch		cattle, shoats
<i>Grewia sp.</i>	lenqwata	seed	leaves, twig/branch		cattle, shoats
<i>Terminalia browni</i>	ekma	seed	leaves, twig/branch		cattle, shoats
<i>Jasminum grandiflorum</i>	tembelet	seed	all parts		cattle, shoats
<i>Capparis tomentosa</i>	gemero	seed	all parts		cattle, shoats
<i>Grewia villosa</i>	mata	seed	leaves, fruit		cattle, shoats
<i>Grewia bicolor</i>	sefa	seed	leaves, fruit		cattle, shoats

The importance of trees and shrubs in the feeding of animals in the tropics and sub-tropics has long been recognized by livestock owners. In arid areas where the growth of herbaceous plants is limited by lack of moisture, leaves and edible twigs of trees and shrubs can constitute well over 50% of the biomass production of rangeland. At high altitudes, tree foliage may provide over 50% of the feed available to ruminants in the dry season, branches being harvested and carried to the animals (Daniel and Hana, 2000). Even in regions of higher rainfall where grass supplies the major proportion of the dry matter eaten by ruminants, tree leaves and fruits can form an important constituent of the diet, particularly for small ruminants.

Conclusion and recommendations

Certain browses were consumed preferentially by certain species, but not by others. Grazers were much more selective in feeding on browse species than browsers. But during the long dry seasons where feed is severely scarce, any plant species that stayed green will be consumed, since there is no preference. Certain browse species shed leaves early, while others retained leaves late into the dry season. Parts of the browse species utilized by animals were leaves, pods, twigs and flowers. In all browses, leaves were the plant parts most utilized by animals. All browse species were reported to have other uses. Based on the results of the study, further works are recommended on assessing nutritive value of the major browse species, their seedling establishment mechanisms and problems, soil seed bank analysis and ethno-botanical values.

References

- Bamualin A Jones R J and Murray R M. 1980. Nutritive value of tropical browse legumes in the dry season. *Proceedings of Australian Society of Animal Production* 13: 229-232.
- Daniel Fantaye and Hana Haile. 2000. *Indigenous Fodder Crops Availability*, Weldia.
- Devendra C. 1990. The use of shrubs and tree fodders by ruminants. In: Devendra C (Editor). *Shrubs and Tree Fodders for Farm Animals. Proceedings of a Workshop*,

24-29 July 1989, Denpasar, Indonesia. International Development Research Center, Ottawa, Canada.

Hedberg I and Edwards S. 1989. Flora of Ethiopia. Volume 3. The National Herbarium, Addis Ababa, Ethiopia.

Ibrahim K M. 1981. Shrubs for fodder production. In: Advances in food producing systems for arid and semi-arid lands. Academic Press Inc.

Teferi Aregawi, Solomon Melaku and Lisanework Nigatu 2008 Management and utilization of browse species as livestock feed in semi-arid district of North Ethiopia.