4.10/T_4-42

Trees as Feed and Fodder Resources: Potential and Prospects for Small Ruminants

M.L. Sukhadiya*, N.S. Thakur and R.P. Gunaga
Department of Silviculture and Agroforestry, College of Forestry, Navsari Agricultural University, Navsari-396 450, India
*E-mail: sukhadiyamadhuri@gmail.com
Keywords: Fodder, tree, browsing, ruminants, alternate feed

1. Introduction

India caters to approximately 20% of the world's livestock population and about 17.50% of the human population on just 2.30% of the world's land area. Escalating human and animal population are fighting tooth and nail for land resources for food and fodder production. Cultivated fodders occupy only 4.00% of the entire cultivable land in the country. Presently, the country faces a net shortfall of 35.60% green fodder, 10.50% dry crop leftovers, and 44.00% concentrate feed ingredients. The option for increasing land area under fodder cultivation is very limited. Leaves and pods of fodder trees or shrubs are known as "Top Feeds" which serve as fodder for small ruminants. These trees and shrubs provide nutrients to the livestock virtually free of cost during lean period when surface grass is grazed away and other type of fodder are not available.

2. Materials and methods

The literature pertaining to trees as feed and fodder source were collected from the internet and University Library. The status of use of trees as fodder was interpreted for different regions of country being used commonly. Proximate, mineral matter and other phytochemical compositions was compared among the available studies. To make the small ruminant, rearing sole or integrated manners, productive and economical, it is important to explore the quality and extent of tree feed and fodder resources.

3. Result and discussion

Sufficient evidence from research has shown that improved animal production can be obtained by

Table 1. Overview of proximate and mineral matter content of commonly browse tree species

Tree Species	Crude Protein	Ether Extract	Crude Fiber	Nitrogen Free Extract	Total Ash	P	Ca	Neutral Detergent Fiber
Sesbania grandiflora	33.4	-	-	-	-	0.34	-	-
Sesbania sesban	25.6	6.2	21.7	45.2	10.8	-	-	32.2
Gliricidia sepium	22.3	4.2	19.70		7.10	2.3	11.9	49.10
Grewia oppositifolia	22.5	4.4	34.6	-	9.6	-	-	57.9
Leucaena leucophala	23.33	1.92	12.83	55.77	6.15	-	-	-
Melia azedarach	29.25	-	15.47	-	8.78	-	-	21.81
Moringa oleifera	25.0	10.6	7.9	-	8.40	-	-	-
Morus alba	17.49	2.61	12.41	56.04	11.45	-	-	24.4
Morus rubra	25.89	-	15.67	-	15.74	-	-	22.8
Pongamia pinnata	19.36	-	30.85	-	9.19	-	-	52.59
Prosopis chilensis	18.30	1.82	21.79	39.94	18.15	1.20	4.86	64.18
Acacia Catechu	18.2	-	34.32	-	-	-	-	53.62
Acacia nilotica	16.9	5.5	23.9	-	6.6	-	-	33.1
Ailanthus excelsa	19.87	3.53	12.82	51.81	11.97	-	2.11	-
Albizia procera	19.0	3.58	29.41	-	8.40	-	-	-
Azadirachta indica	17.04	2.74	29.41	46.27	8.44	-	-	-

Antony and Lal (2014)

incorporating tree and shrub as fodder for small ruminants. Reynolds and Cobbina (1992) found that sheep and goats fed with *Leucaena leucocephala* and *Gliricidia sepium* foliage increased the overall productivity. In another study they found that supplementary browse resulted in increased rate of weight gain in growing and fattening sheep. Rangnekar (1991) found that many tree leaves, flowers and pods are useful in improving milk production, milk fat, body condition and induction of oestrus. Leng *et al.* (1991) revealed that supplements of *Enterolobium cyclocarpum* leaves significantly increased the rate of body weight gain (24%) and wool growth (27%) in sheep.

Table 2. Comparative effect of tree fodder feeding on performance of sheep and goat

Basal feed	Fodder supplement	Response	Livestock species
Rice straw	*Leucaena* (50% of ration)	Significant increase in organic matter digestibility (9%), energy intake (86%), and nitrogen retained (256%)	Sheep
Gliricidia	*Leucaena* (50% of ration)	Significant increase in digestible dry matter intake (12%) and growth rate (55%)	Goats
Guinea grass hay	*Gliricidia* (30g/kg $W^{0.75}$)	Doubling effect on digestible dry matter intake	Goats
Guinea grass hay	*Leucaena* (30g/kg $W^{0.75}$)	66% increase in digestible dry matter intake	Goats

Smith (1991)

The available literature shows that tree feed and fodder provide protein rich resource during lean period. The studies show that the tree fodder either sole fed or in combination with grasses/concentrates result in increased milk and meat production in small ruminants. Inclusion of tree fodder in ration of small ruminants increase the feed intake, digestibility and its efficiency, thus fodder trees/shrubs act as productive potential source for small ruminants.

References

Antony JR and Lal SB 2014. Agroforestry theory and practices, Scientific publishers, Jodhpur, India. Pp 602-612.

Leng RA, Bird SH, Klieve A, Choo BS, Ball FM, Asefa G, Brumby P, Mudgal VD, Chaudhry UB, Haryono SU and Hendratno N 1991. The potential for tree forage supplements to manipulate rumen protozoa to enhance protein to energy ratios in ruminants fed on poor quality forages. *In:* Legume trees and other fodder trees as protein sources for livestock, (MARDI), Malaysia.

Rangnekar DV 1991. Feeding systems based on the traditional use of trees for feeding livestock, *In:* Legume trees and other fodder trees as protein sources for livestock, (MARDI), Malaysia.

Reynolds L and Cobbina J 1992. Contributions of leguminous trees to livestock nutrition, Unit 4: The Integration of Livestock Production in Alley Farming, The AFNETA alley farming training manual - Volume 1: Core course In alley farming, Alley Farming Network for Tropical Africa – Ibadan.

Smith OB 1991. Fodder trees and shrubs in range and farming systems in tropical humid Africa, *In:* Legume trees and other fodder trees as protein sources for livestock, MARDI, Malaysia.