

***SALIX BABYLONICA*, A TRADITIONAL FODDER WITH PROMISING POTENTIAL.**

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ABSTRACT

In Bhutan, tree fodders are important for ruminant nutrition, especially during the dry winter season. *Salix babylonica* is the preferred species for temperate regions. Farmers above 2000 m plant it widely for fodder, fuel, and fencing. Lack of fodder availability during the dry season, and competition with other crops are its main disadvantages. Crude protein content of *S. babylonica* leaves declined from 25% in May to 11% in October. Voluntary intake was 78 and 85 g dry matter/W^{0.75} and live weight gain 330 and 64 g day⁻¹ for growing bulls and sheep, respectively. Dry matter disappearance after 48 hours of rumen incubation was 85, 65, and 53% for *S. babylonica*, *Robinia pseudoacacia* and *Litsea polyantha* leaves, respectively.

INTRODUCTION

Livestock production plays an important role in traditional farming systems of Bhutan. Fodder production from natural grasslands and fallow vegetation is distinctly seasonal. Tree fodders are important for ruminant nutrition contributing about 20% of the total feed requirement (Roder, 1992). They are especially valuable during the dry winter season, when fodder from other sources becomes limited in quantity and quality. Furthermore, under adverse conditions, such as poor soil conditions, and drought stress, tree fodders are generally superior to herbaceous species. Elevation and other climatic factors dictate the type of fodder species available but the main fodder trees comprise of the genus *Ficus*, *Bambusa*, *Bauhinia*, *Quercus* and *Salix* (Roder, 1992).

It is not known when *Salix babylonica* was first introduced to Bhutan. Today it is found widespread throughout the country at elevations ranging from 800-3000 m. It is by far the most important tree fodder species at elevations above 2500 m (Roder, 1981). First investigations into extent of use, fodder quality and yield were initiated in 1980 (Roder, 1992). The yield from existing stands was estimated at 3.8 - 7.0 t dry matter ha⁻¹ (Roder, 1992; Gyamtsho, 1986).

FARMERS' ASSESSMENT

Following an initial survey carried out in 1981 in Bumthang district in Central Bhutan (elevation 2600-3000 m) *S. babylonica* was clearly the preferred fodder tree species (Roder, 1982). Farmers surveyed had an average of 17.5 plants and increased the numbers by 24% during the year of the survey (Roder, 1981). Similarly, in eastern Bhutan, farmers indicated their preference for this species (Wangdi, 1992). No other tree fodder species are presently planted by farmers in temperate areas.

Salix babylonica is a multipurpose tree. Farmers value it as a source of fodder but give almost equal importance to value for fuel, and fencing. Although farmers appreciate the high quality fodder it provides, they would prefer to have species that can provide fodder during the dry winter season. Fluctuations in quality and quantity of *S. babylonica* fodder is quite similar to the seasonal pattern of natural grasslands and its leaves drop in November. Farmers interviewed cited competition for soil moisture and nutrients as another main constraint towards wider use of *S. babylonica*.

FODDER QUALITY

Various studies have confirmed that *S. babylonica* leaves have high nutritional quality comparable to common forages, such as lucerne (*Medicago sativa*) and that they can be fed to ruminants without any adverse side effects.

Leaves harvested April, May, September, October, and November had crude protein contents of 25, 22, 17, 16 and 11%, and crude fiber contents of 12, 16, 15, 15, and 22%, respectively (Roder 1981). The minimum CP at the end of the season is still higher than the critical level of dietary CP required for acceptability for voluntary intake. Voluntary intake and animal performance was high with sheep and cattle (Table 2).

When comparing dry matter disappearance in rumen, *S. babylonica* was far superior to other tree leaves commonly used as feed. Dry matter disappearance for *S. babylonica*, *Robinia pseudoacacia* and *Litsea polyantha* leaves, and mixed hay was 78, 44, 31 and 31% after 24 hours of incubation, and 85, 65, 54 and 56% after 48 hours of incubation, respectively (Bajracharya, 1990).

RESEARCH NEEDS

Fodder quantity and quality is the main constraint towards increased livestock production in all parts of Bhutan. The present fodder development activities are highly dependent on white clover and phosphate inputs. In efforts to develop alternative systems the potential of *S. babylonica* should be further investigated, especially:

- Production potential under limiting soil fertility, especially phosphorus availability
- Advantage over white clover/grass mixtures in accumulating fodder biomass over the entire growing season
- Optimizing yield and fodder quality towards the end of the growing season
- Complementary properties with white clover based grasslands
- Harvesting systems that optimize labor inputs

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Table 1Main motive for planting *S. babylonica* ^a

Use	Respondents (%) ^b
Fodder	80%
Fencing	77%
Fuel	77%
Erosion Control	3%
For sale (branches for planting)	6%

^a Data from willow survey 1996, n = 35 farmers^b Sum > 100% because all the farmers gave at least two or more uses**Table 2**

Intake and liveweight gain of two types of ruminant animals

Animal type	Voluntary Intake (g DM/W ^{0.75})	Liveweight gain (g/day)	Reference
Bull	78	330	Roder, 1985
Sheep	85	64	Bajracharya, 1990