

Screening of Potential Perennial Grasses for Ensuring Fodder Security in Poonch District of The North-Western Himalayas

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ABSTRACT

Aim: The present investigation was carried out to assess the suitability of ten potential perennial grasses on the basis of their performance in the local conditions of Poonch for ensuring round the year fodder security in the district.

Materials and Methods: The grasses tested under this study were Bahia grass (*Paspalum notatum* Flügge), Signal grass (*Brachiaria decumbens*), Hair grass (*Agrostis scabra*), Setaria grass: PSS-1 (Golden Timothy) (*Setaria anceps* Stapf.), Vetiver grass (*Chrysopogon zizanioides*), Black vetiver grass (*Chrysopogon nigritanus*), Marvel grass (*Dichanthium annulatum*), Hybrid Napier NB-21, Hybrid Napier-NB-37 and Hybrid Napier PBN-233. Single slip of the grasses with roots were planted per hole (05 cm depth) at 50 cm x 50 cm inter and intra row spacing in 3.0 x 10.0 m plots in single factorial randomized complete block and replicated thrice.

Results: The results of the investigation revealed that Hybrid Napier PBN-233 produced highest green fodder yield of 375.0 t ha⁻¹ in local conditions of Poonch followed by Hybrid Napier NB-21 (175.5 t ha⁻¹) and Hybrid Napier NB-37 (133.9 t ha⁻¹) indicating superiority over other grasses.

Conclusion: Hybrid Napier PBN-233 perennial grass may be grown for green fodder purpose in Poonch district to ensure maximum yield and round the year availability of green fodder for feeding livestock.

Keywords: Green fodder, North West Himalaya, perennial grasses, scarcity, screening etc. .

Introduction

Hill and mountainous areas in India are vastly distributed all over the country with a larger area located in Himalayas, extending up to 2,500 km in length and 250 to 400 km in breadth. The dominant features of hill farming in North-West Himalayas are small land holdings, sloping marginal land, rainfall-dependent farming and shallow soils prone to erosion, which is aggravated by heavy migratory grazing that led to soil degradation [1].

Poonch is one of the hilly, tribal, remote and border districts of Jammu and Kashmir (J&K) situated in the *Pir Panjal* range of the North-Western Himalayas. It is bounded by the Indo-Pak Line of Control (LOC) from three sides. The total geographical area (excluding occupied area) of the district is 1674 sq km. The average size of land holdings is quite low as it is 0.20 ha only.

The average annual rainfall in the district is about 1225 mm with 56 to 73 average rainy days. Higher reaches of *Pir Panjal* receives snow fall in winter months. Majority of the fields in this district are situated across the hilly slopes which demand a treatment little different from the standard followed in the mainland plain areas. Soil is the most crucial input in deciding the agricultural productivity.

Mostly, farmers of the district are economically backward and uneducated belonging to *Gujjar* (who tend cattle and buffaloes) and *Bakarwal* (who rear sheep and goats) communities. These communities rear livestock along with arable agriculture. Livestock is the primary subsistent activity used to meet household food needs as well as supplement farm incomes but they face huge scarcity of fodder because during *rabi* season, most of the area remains uncultivated due to extreme cold and fields covered with heavy snow. In Mandi tehsil of the district, 100 per cent area remains uncultivated during *rabi* season. Farmers are taking only single crop (maize) in a year. Fodder is more costly than the grain crop in the district.

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Farmers used to migrate along with their cattle from the areas like Loran and Sonal Pathri in search of fodders to the low lying area like Mendhar. Moreover, area under fodder crops is also decreasing near the borders due to continuous heavy shelling from Pakistan. There is still great scope in increasing the area under fodder especially barren land under perennial grasses. Forage production depends on many variables such as plant species ecotype, age of the stand, temperature, radiation, water supply, soil fertility, leaf area, growing points (meristems) etc.[2]. Succulence of forages is the major determinant of digestibility of forages. It is of paramount importance that high yielding and palatable grass species are established in their suitable eco-sites [3]. Keeping this in view, the present investigation was carried out to screen out the suitable perennial grasses in the local conditions so that farmers can grow the most promising grass for ensuring round the year fodder security in Poonch district.

Materials and Methods

The present investigation was carried out at Research Farm of Krishi Vigyan Kendra (KVK), Poonch during *khariif* 2014 to screen out ten perennial grasses on the basis of their performance in the local conditions of Poonch. The soil at the KVK farm has sandy loam texture having the physico-chemical characteristics such as; pH 6.42, EC 0.61 dSm⁻¹, organic matter 0.95 per cent, available N, P and K as 290.0, 14.5 and 317.0 kg ha⁻¹, respectively. The perennial grasses included in the investigation were Bahia grass (*Paspalum notatum* Flüggé), Signal grass (*Brachiaria decumbens*), Hair grass (*Agrostis scabra*), Setaria grass: PSS-1 (Golden Timothy) (*Setaria anceps* Stapf.), Vetiver grass (*Chrysopogon zizanioides*), Black vetiver grass (*Chrysopogon nigritanus*), Marvel grass (*Dichanthium annulatum*), Hybrid Napier NB-21, Hybrid Napier-NB-37 and Hybrid Napier PBN-233.

The soil was prepared by three ploughings and single planking. Single slip of the grasses with roots were planted per hole (05 cm depth) at 50 cm x 50 cm inter and intra row spacing in 3.0 x 10.0 m plots. No fertilizer was applied at any stage during the study. Water was applied through surface irrigation at planting time. Experiment was planned in single factorial randomized complete block using ten different perennial grasses with three replications.

Performance of the grasses was recorded by harvesting green foliage 10 cm above the crown of the individual plants by hand clipping at the interval of every 8 weeks. The fresh biomass (green fodder) was calculated by using the formula:

$$\text{Green fodder yield (t ha}^{-1}\text{)} = \text{Green fodder weight} \times 10 / \text{Area (m}^2\text{)}$$

Results and Discussion

Production of increased biomass of fodder is important in the developing countries in order to meet the requirements of enhancing number of livestock that is in turn necessarily desired for meeting the demands of ever increasing population. The results of the investigation revealed that Hybrid Napier PBN-233 produced highest green fodder yield of 375.0 t ha⁻¹ in local conditions of Poonch followed by Hybrid Napier NB-21 (175.5 t ha⁻¹) and Hybrid Napier NB-37 (133.9 t ha⁻¹) indicating superiority over other grasses (Table 1).

Table 1: Comparative green fodder yield (t ha⁻¹) obtained from different perennial grasses at Krishi Vigyan Kendra, Poonch

Name of grass	Green fodder yield (t ha ⁻¹)
Bahia grass (<i>Paspalum notatum</i> Flüggé)	27.5
Signal grass (<i>Brachiaria decumbens</i>)	17.0
Hair grass (<i>Agrostis scabra</i>)	16.7
Setaria grass: PSS-1 (Golden Timothy) (<i>Setaria anceps</i> Stapf.)	34.8
Vetiver grass (<i>Chrysopogon zizanioides</i>)	58.6
Black vetiver grass (<i>Chrysopogon nigritanus</i>)	70.5
Marvel grass (<i>Dichanthium annulatum</i>)	66.0
Hybrid Napier NB-21	175.5
Hybrid Napier NB-37	133.9
Hybrid Napier PBN-233	375.0

The least green fodder yield was recorded in Hair grass (*Agrostis scabra*) with only 16.7 t ha⁻¹. The green fodder yield recorded in Signal grass (*Brachiaria decumbens*) was at par with Hair grass (*Agrostis scabra*), however, Bahia grass (*Paspalum notatum* Flüggé), Setaria grass: PSS-1 (Golden Timothy) (*Setaria anceps* Stapf.), Vetiver grass (*Chrysopogon zizanioides*), Marvel grass (*Dichanthium annulatum*) and Black vetiver grass (*Chrysopogon nigritanus*) was found superior over Hair grass (*Agrostis scabra*).

Further, the Hybrid Napier PBN-233 recorded 22.45 times more green fodder yield in comparison to Hair grass (*Agrostis scabra*) which produced least green fodder yield. Similarly, it produced 2.14 and 2.80 times more green fodder

yield in comparison to Hybrid Napier NB-21 and Hybrid Napier NB-37, respectively. Similar results were obtained that the high yield, palatability and adaptability to varying soil and climatic conditions have made this grass popular among dairy farmers throughout the country [4]. They recommended it as well suited for the "cut and carry" feeding system. *Setaria*: PSS-1 (Golden Timothy) (*Setaria anceps* Stapf.) as a potential perennial grass under cool sub-tropical and sub-temperate conditions of Himachal Pradesh in the North-West Himalayas [5].

Conclusion

Based on the results of this investigation, it is recommended that farmers of Poonch district may grow Hybrid Napier PBN-233 perennial grass for green fodder purpose ensuring maximum yield and round the year availability of green fodder for feeding their livestock.

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