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Morphological features, economic aspects and nutritional profiles of Baksha and Oat grass

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ABSTRACT

To accomplish the goals of the current study, a total of sixty (60) households from the Pathalia Union cluster area under Savar upazila of Dhaka district were surveyed and various morphological and productive parameters of Oat (*Avena sativa* L.) and Baksha (Family: Poaceae) fodder were recorded from thirty (30) households for each at the time of harvesting and samples were collected for knowing the nutritive value. The collected data were tabulated and analyzed following one-way ANOVA including descriptive statistics. It was observed that farmers related to fodder production only 2% were graduated, 33% were secondary passed, 32% were primary passed, 8% were higher secondary passed and 25% were illiterate. 45% of farmers used their own lands, 38% of farmers used leased lands and about 17% of farmers used leased lands accompanied by their own lands. In addition, about 22% Baksha fodder, 28% Napier fodder, 20% Oat fodder, 9% both Oat and Bahsha, 14% both Napier and Baksha, 5% all three fodder (Napier, Baksha and Oat) and only 3% farmers were cultivating other fodders. About 38% of cultivators in the study area used their produced fodder only for their cattle feeding and about 25% of cultivators sold their produced fodder directly in the market without resting any cattle feeding. 25% of farmers sold their produced fodder in the market accompanied by cattle feeding. The biomass yield (ton/hector/c) of oat grass was 27.05±0.15 whereas the biomass yield (ton/hector/c) of Baksha grass was 40.18±0.26. Crude protein (CP) percent (%) of Oat grass was 9.06±0.29, in the contest of 12.80±0.76 in Baksha. Production cost and selling price of Oat were 1190.83±12.40 BDT/ton and 449.87±6.40 BDT/ton and Baksha grass were 4381.84±24.51 BDT/ton and 5694.60±36.84 BDT/ton, respectively. Farmers can make a profit Tk. 3190±33.28 from selling 1-ton Oat grass whereas Tk. 5244.62±33.28 from selling 1-ton Baksaha grass. Oat and Baksha production and marketing at Savar is considered a profitable enterprise. The overall production and marketing status could be improved through facilitations of farmers cultivating fodder scientifically.

INTRODUCTION

In Bangladesh livestock development is mainly constrained by three factors, deficiency in feed and fodder resources and poor nutritive of these feed-stuffs, prevalence of wide spread diseases and poor genetic quality of livestock species and hence low productivity (Sayeed et al., 2008). Forage and fodder production at farm levels is one of the priority tasks along with breeding policy implementation, strengthening veterinary services, enforcement of hygienic regulations and legal frame works, introduction of good manufacturing practices of traditional dairy products and development of human resources for expediting livestock development in the country. Fodder production may be gaining popularity in many parts of the country for livestock production, especially for dairy farming (Sarker et al., 2021). Fodder production led to an increase in crossbred cows which led to an increase in milk production (Islam et al., 2016). Feeds and fodder constitute about 60-70% cost of the total cost of dairy farming (Grover and Kumar, 2012). Livestock development depends mainly on the improvement of animal nutrition through improved feeding and availability of fodder. Around 90% of the cattle feed supply comes from poor quality roughage, mostly rice straw and a very small quantity of green grass with little concentrate (Aquinoet al., 2023). Most of the livestock farmers meet their fodder requirements in Bangladesh by cultivation

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of fodder. In the country, 20% of people are directly and 50% are indirectly involved in livestock production which clearly indicates that the poverty reduction potentiality of the livestock sub-sector is high (DLS, 2015). Assuming that milk production, breeding efficiency, growth rate and disease resistance are fully dependent on green grass due to its mineral contents. Recently, fodder production has gained momentum as an income generation and employment opportunity in certain areas of Bangladesh (Uddin et al., 2023) and the Savar upazilla under Dhaka district is one of the examples of the above. Some of the innovative farmers in this area are acting as pioneers of fodder production. Therefore, the present study was undertaken to understand the current scenario of oat and Baksha fodder production and marketing system along with morphological characterstics and nutritional composition as a livelihood activity of farmers at Savar.

MATERIALS AND METHODS

Study area and data collection

A total of sixty (60) households were surveyed to achieve the objectives of the present study from acluster area named Pathalia Union under Savar upazila of Dhaka district in Bangladesh. A structured questionnaire was prepared based on the farmers economic condition, cost of items required for fodder production, land size of fodder production, fodder production cost and income etc. Single and multiple response questions were considered for preparing the final questionnaire. Prior to conducting the formal survey, the structured questionnaire was pre-tested by interviewing some households and subsequently refined for finalization.

Morphological data recording, fodder sample collection and proximate analysis

From the surveyed area various morphological and productive parameters of Oat and Baksha fodder were recorded from thirty (30) households. During harvesting Plant height, leaf width, leaf length of Oat and Baksha fodder was measured by using measuring tape in centimeter (cm). Also, records were taken for number of node per stem, number of till per hill, labour (hour/ha) and fertilizer (kg/ton) required for fodder production and total biomass yield (Ton/acre). Each 30 representative fodder samples were collected at the time of harvesting.

Oat Grass

Baksha Grass

Freshly harvesting fodder samples were chopped into small pieces up to 1-2 cm, weighed and sun dried for 2-3 d. After proper sun drying, the samples were kept in a drying oven (DZF series hot air vacuum drying oven DZF-6050 vacuum drying oven, Xingang, Tianjin, China) at a temperature of 105ºc for determination of dry matter. The dried samples were then grounded by

using grinding machine. After grinding, the samples were kept into polythene bag, labeled and stored for chemical analysis. Then fodder samples were analyzed for knowing the different nutrient contents at Animal Nutrition Laboratory, Bangladesh Livestock Research Institute, Savar, Dhaka-1341.

Analysis of data

Collected data were complied, tabulated and analyzed following one-way ANOVA including descriptive statistics using Microsoft Excel and using statistical SPSS program.

RESULT AND DISCUSSION

Educational status of farmer

According to the findings of the household survey, only 2% of farmers who are involved in the production of fodder were graduates, 33% had secondary education, 32% had primary education, 8% had higher secondary education, and 25% were illiterate (Figure 1).

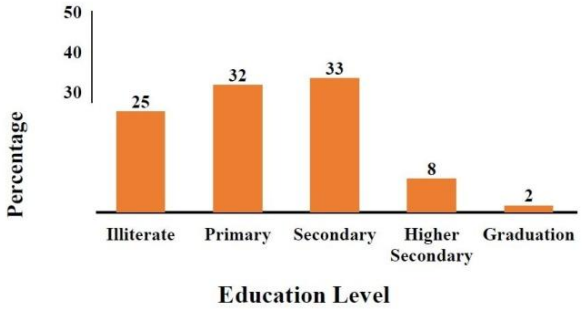

Figure 1: Farmers education level of the surveyed area

Education Level

The findings of Moaeen-ud-Din and Babar (2006) and Yasin et al. (2012), who studied social issues in peri-urban and urban areas and recommended improvements to health and education facilities as major ways to improve fodder production, lend support to these findings. According to Ul-Allah, S. (2014), the majority of respondents (26.6%) were illiterate, only had a primary education (26.6%), and only a small percentage (10%) had a graduate degree. The adoption of innovations like the balanced use of fertilizer and new machinery depends in large part on education (Whartion, 1966; Asfaw and Admassie, 2004). More than 50% of respondents had only completed primary school or were illiterate.

Land and types of fodder cultivation

The results regarding the pattern of land use for the production of fodder revealed that for the production of fodder, 45% of farmers used their lands, 38% of farmers used leased lands, and approximately 17% of farmers used leased lands along with their lands (Figure 2a). Additionally, the findings regarding the types of fodder that the farmers were growing revealed that about 22% of them were growing Baksha, 28% Napier, 20% Oat, 9% were growing Oat and Bahsha, 14% were growing Napier and Baksha, 5% were growing all three fodders (Napier, Baksha, and Oat), and only 3% were growing other fodders (Figure 2b).

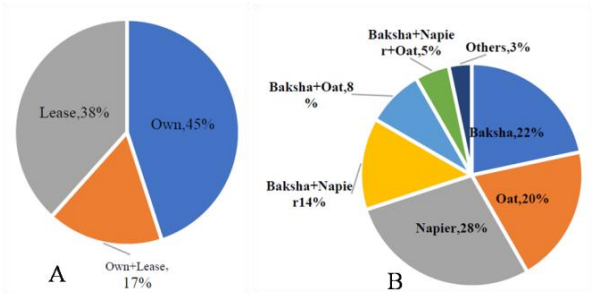

Figure 2: A- Land used pattern; B- Fodder type cultivated by the farmers

According to a study by Ul-Allah, S (2014), farmers had two different types of land holdings: they either owned (56%) or rented (13%) their land, but mixed tenure systems were also present (31%). As is typical in Bangladesh, Pakistan, India, and other agricultural nations (Iqbal et al., 1999; Devendra and Thomas, 2002; Holden and Yohannes, 2002; Köbrich et al., 2003; Ali, 2007), the majority of livestock owners had small land holdings. They primarily grow napier, maize, berseem, and sorghum as fodder crops on their land. The majority of farmers produced fodder for sale, but some also produced it for their own livestock and sold the extra (Sarwar et al., 2002; Younas and Yaqoob, 2005).

Sources of seed and the intended use of the produced fodder

According to the household survey, 22% of farmers obtained seed or cuttings from BLRI, 10% from DLS, 41% from the local market, and 27% from various NGOs and additional potential sources (Figure 3a). In the study area, about 38% of farmers used their produced fodder only for feeding their cattle, 25% of farmers sold their produced fodder to buyers without stopping any cattle feeding, and 25% of farmers sold their produced fodder to buyers alongside cattle feeding (Figure 3b).

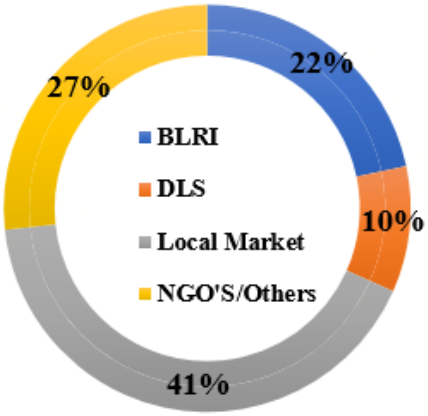

Figure 3a: Seed/Cutting sources

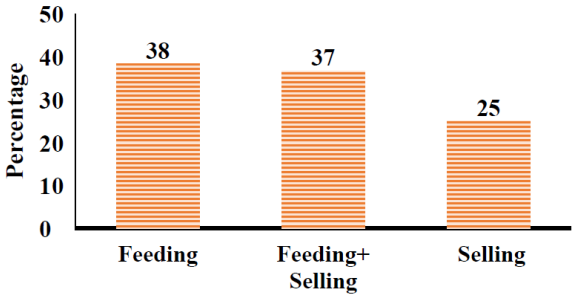

Figure 3b: Using pattern

In a study Roy et al. (2012) reported that about 37% cultivators in the study area sold their produces directly either in market or to the middlemen, 6% used for their own farm and the rest of 57% producers used Napier for both their own farm and sell it to market. However, B. K. Roy (2012) also reported about the marketing system of Napier and he stated that about 45% producers sold Napier grass in the market, 30% supply directly to middlemen and the rest of 25% farmers marketed their produces directly in the market and to middlemen.

Problems in fodder production

From the household survey, it was revealed that different problems were associated with fodder production in cattle farming community (Figure 4). Results showed that 7% of farmers did not face any problems but 93% of farmers found various problems during fodder production including irrigation (45%), insect infestation (37%), shortage of land (10%), higher labour cost (8%) and higher price of seed or cuttings (7%). Farmers reported that due to insufficient supply of canal water they had to rely on costly ground water (Masood et al., 2012; Trimmer, 1990). By using this ground water, costs of production increased significantly, while in some areas ground water was not appropriate for irrigation, so farmers had to rely on insufficient quantity of canal water, which resulted in low production. Similar results were observed by Satapathy and Tripathy (2001) who found significantly more cost of irrigation in fodder production.

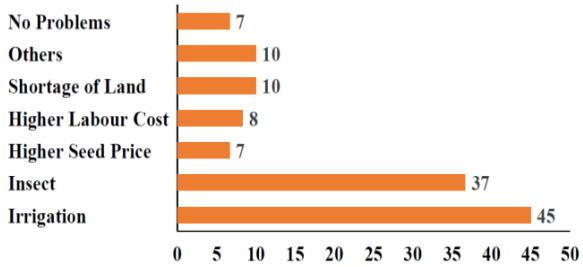

Figure 4: Problems of fodder production

Morphological characteristics, production performances, nutritive value and production cost of Baksha grass

Table 1 represents the morphological characteristics, production performances, nutritional value, and production costs of Baksha grass. The findings indicated that the average plant height (cm), leaf length (cm), tiller number (cm), and leaf width (cm) of Baksha grass were

150±23.71, 101±4.93, 57.20±15.43 and 2.06±0.37, respectively. Biomass yield (ton/hector/cut) of Baksha grass was 40.18±0.26 and fertilizer requirement per ton grass production was 4.99±0.20 kg. The percentages of DM, CP, ADF, and NDF for Baksha grass were 13.53±0.24, 12.80±0.76, 38.97±1.39 and 64.22±0.76, respectively. Baksha had production costs of 449.87±6.40 BDT/ton and selling prices of 5694.60±36.84 BDT/ton, respectively.

Selling one ton of grass can bring in Tk. 5244.62±33.28 in profit for farmers. Nabila et al. (2017) reported that the DM, CP and CF content of Baksha grass were 22.89%, 12.5% and 37.32%, respectively. One hectare of land can produce 18-20 tons of Baksha grass every cut. Raw Baksha grass weighs 100 kilograms and contains 23 kg DM, 11.5 kg CP, and 21 kg fiber. 2/3 hours after planting, 30 kg of urea will be spread across the entire field. Following that, 30 kg of urea will be administered each time the grass is cut (Nabila et al., 2017).

Table 1: Morphological characteristics, production performances, nutritive value and production cost of Baksha grass

Parameter	Mean±SE	Parameter	Mean±SE
Plant Height (cm)	150±23.71	DM (%)	13.53±0.24
Leaf Length (cm)	101±4.93	CP (%)	12.80±0.76
No. Node	17.4±2.46	ADF (%)	38.97±1.39
Leaf Width (cm)	2.06±0.37	NDF (%)	64.22±0.76
No. of Tiller	57.20±15.43	Production cost/ton, BDT	449.87±6.40
Yield (ton/hector/c)	40.18±0.26	Selling price/ton, BDT	5694.60±36.84
Labour (hr/ha)	140±3.60	Profit/ton, BDT	5244.62±33.28
Fertilizer (kg/ton)	4.99±0.20		

(DM=Dry Matter, CP=Crude Protein, ADF=Acid Detergent Fiber, NDF=Neutral Detergent Fiber)

Morphological characteristics, production performances, nutritive value and production cost of Oat fodder

Morphological characteristics, production performances, nutritive value and production cost of oat are presented in Table 2. Results showed that average plant height (cm), leaf length (cm), No. of tiller and leaf width (cm) of oat grass was 124±4.95, 41.40±3.31, 23.80±1.74 and 8.00±0.44, respectively. Biomass yield (ton/hector/c) of oat grass was 27.05±0.15 and fertilizer requirement per ton grass production was7.65±0.14 kg. The percentages of DM, CP, ADF, and NDF of oat grass were 12.10±0.27, 9.06±0.29, 40.87±2.56 and 67.39±0.72, respectively. Oat had production costs of 1190.83±12.40 BDT/ton and selling prices of 4381.84±24.51 BDT/ton, respectively. Selling one ton of grass can bring in Tk.3190±33.28 in profit for farmers. These results are in line with the finding of Irfan et al. (2016); Beyene et al. (2015); Lodhi et al. (2009); Mekasha et al. (2008); Bakhsh et al. (2007) who also reported that average plant height of oat grass was 123.8 cm, leaf length was 43 cm, number of tiller was 21.4.

Shangguan et al. (2004), Ahmad et al. (2011) and Amanullah and Stewart (2013) reported that yield of oat varies from 35 to 40 tons/hector/cut. Kim et al. (2006) found 13.5% DM and 9.65% CP content in oat which is in the line of the present study.

CONCLUSION

Presently, Oat and Baksha production and marketing at Savar is considered a profitable enterprise and all the stakeholders involved in this production and marketing system getting economic benefits. The overall production and marketing status of Oat and Baksha fodder in the surveyed areas could be improved morethan the existing through facilitations of farmers cultivating fodder with planned research guidelines regarding the aspect.

Table 2: Morphological characteristics, production performances, nutritive value and productioncost of Oat fodder

Parameter	Mean±SE	Parameter	Mean±SE
Plant Height (cm)	124±4.95	DM (%)	12.10±0.27
Leaf Leangth (cm)	41.40±3.31	CP (%)	9.06±0.29
No. Node	8.00±0.44	ADF (%)	40.87±2.56
Leaf Width (cm)	1.68±0.13	NDF (%)	67.39±0.72
No. of Tiller	23.80±1.74	Production cost/ton, BDT	1190.83±12.40
Yield (ton/hector/c)	39.05±0.15	Selling price/ton, BDT	4381.84±24.51
Labour (hr/ha)	276±4.23	Profit/ton, BDT	3190±33.28
Fertilizer (kg/ton)	7.65±0.14		

(DM=Dry Matter, CP=Crude Protein, ADF=Acid Detergent Fiber, NDF=Neutral Detergent Fiber)

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