



ESTABLISHMENT OF HEALTH MANAGEMENT PACKAGE FOR NATIVE SHEEP OF BANGLADESH

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ABSTRACT

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The present study was designed to explore the disease status of sheep in Bangladesh with the aim of developing health management package for sheep for better and efficient sheep production in Bangladesh. Both retrospective and prospective investigations on the incidence and prevalence of different diseases of sheep have been conducted in the study areas. Information on the disease related factors like health status, sex and age, vaccination, deworming, etc. were collected. Samples (faeces, blood, etc.) were collected from the diseased/dead animals and preserved following the standard procedure. Faecal samples were examined to determine the parasitic loads and faecal as well as blood samples were examined to determine any protozoan infection present in the study animals. Samples from diarrhoeic animals were studied to isolate and identify causal organisms. Antibiotic resistance and sensitivity studies of the aetiological agents responsible for common infectious diseases in sheep were also conducted in order to suggest the most suitable antibiotic to treat the concerned diseases in the field. Since helminthic infections, diarrhea, pneumonia and foot rot were found to be the mostly occurring health hazards in sheep of all ages, especial attempts were made to develop herbal based novel approaches to treat and control major intestinal helminthic infestations of sheep. However, gentamicin and ciprofloxacin were found most effective antibiotics and recommended to use in diarrhoeal cases in the field. On the other hand, methanol extract of mahogany seeds (100 mg), betel leaf (100 mg) and dodder (100 mg) were found significantly effective against 100% worms in 2 hours *in vitro* and thus recommended to be used in the field against helminthic infection in sheep. Therefore, a health management package for native sheep of Bangladesh can be designed using the present findings with some fluctuations for different sites after doing the *in vivo* evaluation of the medicinal plants used in this experiment.

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INTRODUCTION

The small ruminants (goat and sheep) play very important role in the rural economy of Bangladesh by providing source of employment, women empowerment and the tool for poverty alleviation. Goat production has drawn the attention of the policy makers over a decade back and become popular to the livestock farmers especially the small scale livestock farmers of Bangladesh. Nowadays, especial emphasis has also been given to the preservation, conservation and rearing of native sheep through commercial and community farming. Considering the importance and potentiality of sheep production, the government of Bangladesh has granted the second phase of the developmental project 'Conservation and Improvement of Native Sheep through Community Farming and Commercial Farming (CINSCFCF)'. But numerous health problems of sheep continue to be the major threat to the efficient sheep production in Bangladesh. Among the multitude of problems hindering the development of sheep industry in Bangladesh, infectious diseases and endoparasitism constitute serious threats to the successful small ruminants industry like sheep farming. The diseases are responsible for loss of production, reduced fertility rate, reduced feed conversion efficiency, higher production cost, higher risk of zoonotic diseases and public health hazards. All these diseases lead to a great economic loss to the farmers. For these reasons, planned animal health and good herd management packages designed to maintain the optimum animal health and production are necessary for better sheep health management. Therefore, the present study was proposed with the aim of developing health management packages for native sheep for better and efficient sheep production in Bangladesh.

MATERIALS AND METHODS

The study was conducted in 11 selected areas of Bangladesh where the CINSCFCF Project is being implemented. The study has been proposed for a period of two years (July 2013 to June 2015) and the first phase (July 2013 to June 2014) of the study has been designed to explore the disease status of sheep in Bangladesh. Both retrospective and prospective investigations on the incidence and prevalence of different diseases of sheep have been conducted in the study areas. Information on the disease related factors like health status, sex and age, vaccination, deworming, etc. were collected. Samples (faeces, blood) were collected from the diseased/dead animal and preserved following the standard procedure.

Faecal samples were examined to determine the parasitic loads and fecal as well as blood samples were examined to determine any protozoan infection present in the study animals. Samples from diarrhoeic animal were studied to isolate and identify causal organism. Antibiotic resistance and sensitivity studies of the aetiological agents responsible for common infectious diseases in sheep were also conducted in order to suggest the most suitable antibiotic to treat the concerned diseases in the field. Since helminthic infections, diarrhea, pneumonia and foot rot were found to be the mostly occurring health hazards in sheep of all ages, especial attempts were made to develop herbal based novel approaches to treat and control major intestinal helminthic infestations of sheep. Locally available herbal plants known to have anthelmintic properties like neem (leaves), mahogany (seeds), betel (leaves), dodder (swarnalata; whole plant), bitter gourd (fruit) were collected and both aqueous and solvent extract were prepared. Mature live stomach worms were collected from sheep slaughtered at the abattoir to determine the effect of aqueous or methanolic extract on the parasites. A minimum of ten worms were exposed in three replicates to different concentrations of the plant extracts of each plant.

RESULTS AND DISCUSSION

The GIT parasitic infection, diarrhoea, pneumonia, PPR and foot rot are the major disease problems of sheep population in Bangladesh (Figure 1). A total of 334 sheep were examined for helminthic infection of which 299 (89.5%) were found infected with one or more species of helminth parasites, among them *Fasciola gigantica*, *Schistosoma indicum*, *Paramphistomum cervi*, *Cotylophoron cotylophorum*, *Moniezia expansa*, *Haemonchus contortus*, *Oesophagostomum sp.*, *Trichuris ovis*, *T. vitulorum* and *Ostertagia sp.* were more prevalent. But in a study at Tangail district of Bangladesh, 81.1% sheep were found positive for one or more species of helminth parasites (Sangma *et al.*, 2012). In another study at Mymensingh district of Bangladesh, it was found that 94.67% sheep were found positive for one/more species of helminth parasites (Mazid *et al.*, 2006). These differences in findings may be due to geographical and seasonal variations.

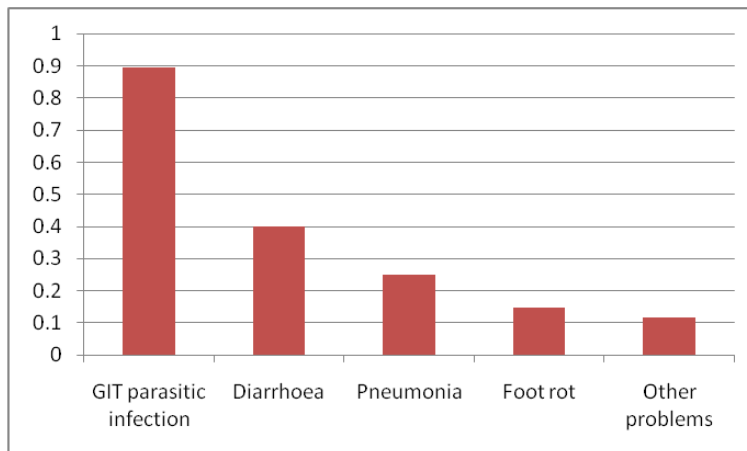


Figure 1. Status of disease incidence in all age group of sheep

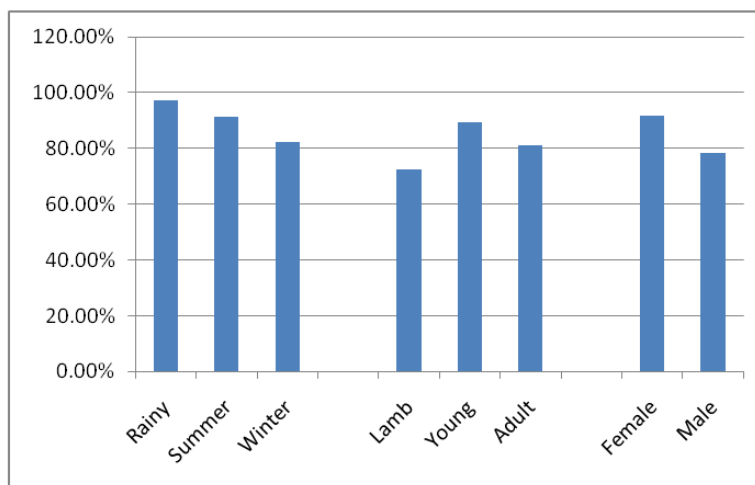


Figure 2. Status of parasitic infection in relation to season, age and sex in sheep

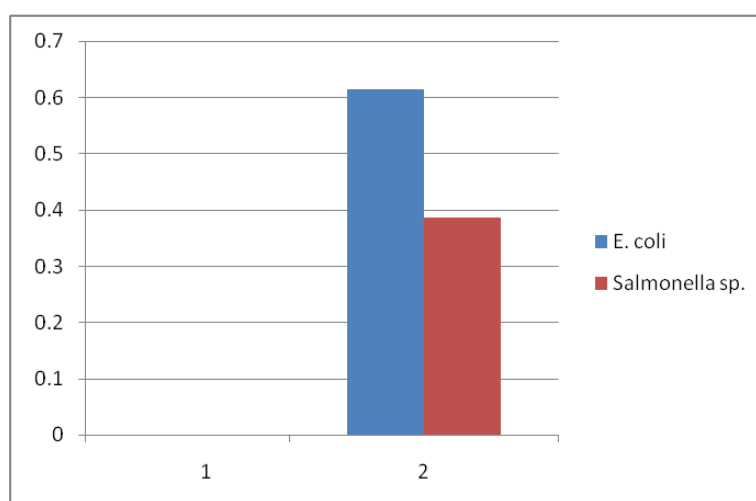


Figure 3. Status of bacterial infection in relation to diarrhoea in sheep

Relatively higher occurrence of parasitic infection in sheep was recorded in rainy season (97.41%) followed by summer (91.33%) and winter (82.35%). Prevalence of helminths in sheep was significantly higher in young sheep (89.27%) than in adult (81.11%) and in lamb (72.41%). Female (91.61%) sheep were found more susceptible than their male counterpart (78.24%) (Figure 2). However, parasitic infection is a matter of great concern for the livestock owners as it significantly interferes with their productivity. Heavy burdens of trichostrongylid nematodes can lead to anaemia, oedema, haemorrhage, traumatic injury to the intestinal epithelium and even death. In hyperacute cases of haemonchosis, sheep died suddenly from haemorrhagic gastritis (Urquhart *et al.*, 1996). In addition to losses through mortality, major losses are attributed to reduced feed efficiency, lowered production of meat, and labor and drugs associated with control (Hartwig, 2000).

Bacteriological investigations of diarrhoeic cases revealed *E. coli* and *Salmonella sp.* as the aetiological agents in 61.44% and 38.56% cases, respectively (Figure 3). *In vitro* drug sensitivity profile of *E. coli* and *Salmonella* isolates against a set of common antibiotics indicated a marked heterogeneity in the sensitivity pattern. But they were found sensitive to gentamicin and ciprofloxacin. Thus, these antibiotics are recommended to use in diarrhoeal cases in the field.

The study revealed that the herbal plants used in this experiment have remarkable anthelmintic properties. Herbal extracts exhibited anthelmintic effects in a dose dependent manner and all the worms were found dead within 6 hr post-exposure. Mahogany (seeds) (100 mg), betel leaf (100 mg) and dodder (100 mg) were found significantly effective against 100% worms in 2 hours *in vitro* (Table 1). The anthelmintic properties of these herbal plants were proved by Sharma *et al.* (2003), Chandrawathani *et al.* (2006), Islam *et al.* (2008), Adate *et al.* (2012), Priscilla *et al.* (2014) and Akter *et al.* (2014). Thus, these herbal plants are recommended to be used in the field against helminthic infection in sheep.

Table 1. *In vitro* anthelmintic efficacy of different concentrations of methanol extracts of selected indigenous medicinal plants against adult gastrointestinal nematodes of sheep

Medicinal plants	Effectiveness (%)		
	25 mg	50 mg	100 mg
Mahogany (seeds)	40%	70%	100%
Betel (leaves)	20%	60%	100%
Dodder (whole plants)	30%	50%	100%
Bitter gourd (fruit)	40%	60%	100%
Neem (leaves)	40%	70%	90%

CONCLUSION

As helminthic infections, diarrhea, pneumonia and foot rot are the mostly occurring health hazards in sheep of all ages, in addition to hygienic measures regular deworming practice should be adopted by the farmers. Regarding antibiotic sensitivity, gentamicin and ciprofloxacin were found most effective and recommended to use in diarrhoeal cases in the field. On the other hand, mahogany (100 mg), betel leaf (100 mg) and dodder (100 mg) were found significantly effective against 100% worms in 2 hours *in vitro* and thus recommended to be used in the field against helminthic infection in sheep. Therefore, a health management package for native sheep of Bangladesh can be designed using the present findings with some fluctuations for different sites after doing the *in vivo* evaluation of the medicinal plants used in this experiment.

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