

EFFECTIVE PARASITIC MANAGEMENT OF MIGRATORY BUFFALOES FOR
ENHANCED PRODUCTIVITY AND SUSTAINABLE LIVELIHOODS IN
A FRAGILE ECO-SYSTEM IN THE NORTH-WESTERN HIMALAYAS

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ABSTRACT

The aim of present study was to observe the health status, prevalence of gastro-intestinal parasites, haematological parameter, yield and quality of milk of migratory buffaloes reared by the *gujjars* communities in high altitude regions of the Himalayas before and after standard anthelmintic treatments. Heavy infections of gastro-intestinal parasites (75%) was observed in the migratory buffaloes with *Amphistome* spp. (53.33%), *Fasciola* spp. (33.30%) and mixed infection (13.32%). The haematological analysis revealed lower values of haemoglobin (10.00 ± 0.76 g%) and packed cell volume (28.00 ± 1.15 %). An average milk production of 5.83 ± 1.11 L / day was recorded. The average content of fat, total solids and solids not fat in milk obtained from these buffaloes in percent was 6.45 ± 0.78 , 16.04 ± 0.91 and 9.60 ± 0.76 , respectively. Qualitative and quantitative variations were recorded in the milk samples. After standard anthelmintic treatment with fenbendazole 7.5 mg/kg body weight, the migratory buffaloes recovered 100 percent with two doses fortnightly with nearly normal haematological parameters and

an average increase in milk yield (0.335 ± 0.014 L / day) along with an increase in milk fat, total solids and solids not fat (0.21 ± 0.55 %, 0.34 ± 0.80 % and 0.13 ± 0.79 % respectively). Finally it is concluded that proper anthelmintic treatments will enhance the health and production status resulting in better economic returns to farmers. However, the migratory *gujjars* need to be sensitized regularly to the need for adopting these anthelmintic practices.

Keywords: migratory buffaloes, *gujjars*, gastro-intestinal parasites, anthelmintic treatments, haematological value, milk production

INTRODUCTION

The district Chamba of Himachal Pradesh represents a hill and mountain agro-ecosystem with a temperate climate (north latitude $32^{\circ} 11' 30''$ and $33^{\circ} 13' 6''$ and east longitude $75^{\circ} 49'$ and $77^{\circ} 3' 30''$) and has a great potential for livestock development. Animal husbandry is the main occupation of the farming communities in this region. Migratory buffaloes are the main important milk production

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animal maintained on grazing pastures in this high Himalayan regions by the *gujjars* communities (Sharma *et al.*, 2008). However, very little attention has been given on the health management of buffaloes by the *gujjars* communities due to their unawareness of its importance and the unavailability of veterinary services in these remote areas.

Parasitism, especially the subclinical gastro-intestinal nematodes, affects the growth rate and productivity of buffaloes (Agnihotri *et al.*, 1992; Gupta *et al.*, 1992), which results in the substantial economic losses to the farming communities (Solusby, 1986, El-Sherif *et al.*, 1999). Recent studies showed that the negative impact of parasitic infection on milk production can be overcome by timely and proper anthelmintic treatments ((Nodtvedt *et al.*, 2002; Sanchez and Dohoo, 2002; Sithole *et al.*, 2005; Charlier *et al.*, 2005; Charlier *et al.*, 2007) by reducing the gastro-intestinal parasitic burden. The reduced gastro-intestinal parasitic burden leads in overall improvement in the health and production of the animals.

Keeping the above facts in view, the present study was undertaken to learn about the health management practices of the *gujjars* for migratory buffaloes reared on the natural high hill pastures of the Himalayas and the effect of anthelmintic treatments on overall health and milk production.

MATERIALS AND METHODS

This study is based on the findings of an extensive survey of animal husbandry practices and livestock productivity patterns in migratory buffalo herds of Chamba district in Himachal Pradesh (India) under the GEF-funded NAIP (ICAR) project entitled “*Harmonizing Biodiversity Conservation and Agricultural Intensification through Integration*

of Plant, Animal and Fish Genetic Resources for Livelihood Security in Fragile Ecosystems”.

In the present study, faecal, blood and milk samples were collected from twenty lactating local breed migratory buffaloes 3 to 8 years old during the six month period from January 2010 to June 2010 in the northwestern Himalayas in Chamba district of Himachal Pradesh before and after treatment with fenbendazole 7.5 mg/kg body weight. The information on the management practices and health status were recorded.

Examination of Faecal Samples:

The faecal samples were collected directly from the rectum of the animals. These samples were subjected to coprological examination by standard concentration techniques employing faecal floatation and sedimentation and examined for the presence of eggs / oocysts of GI parasites (Soulsby, 1982).

Haematological Examination of Blood Samples:

Blood samples were collected from the jugular vein of the buffaloes and mixed with anti-coagulants (EDTA) for further analysis to determine haematological parameters such as haemoglobin (Hb), packed cell volume (PCV), white blood cell (WBC) and differential leucocyte count (DLC) as outlined by Jain (1986).

Production (Yield) and Quality Analysis of Milk Samples:

Milk production (yield) of each buffalo was recorded before and after the intervention. The milk samples were collected from the identified buffaloes and taken to laboratory for further analysis. The milk samples were analyzed for milk fat (MF), solid not fat (SNF) and total solids

(TS) contents. The standard procedures were employed for analysis of milk samples i.e. milk fat content of the milk samples were estimated by the Gerber's methods, while solids not fat and total solids contents were estimated by the Lactometer methods.

Statistical Analysis:

The generated data was analyzed using the standards statistical methods whenever required to assess the impact of anti-parasitic treatments.

RESULTS AND DISCUSSION

In this study most of affected buffaloes showed emaciation, rough hair coat and inappetence, which were similar to the findings reported earlier by Katoch *et al.* (2009) indicating that parasitic infestation in buffalo calves is responsible for poor health status. Major changes were observed in health and production status of migratory buffaloes after anthelmintic treatments. However, it is observed that the migratory herders (*gujjars*) needed to be sensitized for adopting the parasitic and health management practices to improve their economic returns and thereby achieve better livelihoods through scientific rearing (Thakur *et al.*, 2011).

Prevalence and Effect of Anthelmintic Treatments on GI Parasites in Migratory Buffaloes:

In the present investigation, very heavy gastro-intestinal parasitic infection was found in most of the buffaloes. The details of prevalence of GI parasitic infections in migratory buffaloes are presented in Table 1. The overall prevalence of GI parasitic infections was found to be 75 percent (15 out of 20 buffaloes); 53.33 percent, 33.30 percent and 13.32 percent of the buffaloes were found to

be infected by amphistomes, *Fasciola* sp. and mixed infection of amphistomes and *Fasciola* sp, respectively. The high level of GI parasitic infections found in most of the migratory buffaloes might be due to poor management practices and transmission of infection to these buffaloes by grazing and drinking on the same pastures/water resources. In an earlier study, Wadhwa *et al.* (2000) reported similar finding with 71.70 percent overall prevalence of GI parasitic infection with fascioliasis at 35.97 percent followed by amphistome at 16.98 percent, and mixed infections found in the rest of buffaloes in the Kangra valley of Himachal Pradesh, which adjoins Chamba district.

The above identified infected buffaloes were treated with fenbendazole 7.5 mg/kg body weight. After the 14th day of the anthelmintic treatment, the faecal examination was repeated. The overall prevalence was drastically decreased from the initial 75 percent to 20 percent i.e. 3 positive out of 15 treated buffaloes. Infections with amphistomes, *Fasciola* sp. and mixed infection of them were found to be 13.33%, 6.67% and 0.00%, respectively (Table 1). However, the second dose of anthelmintic was delivered to the three buffaloes with complete recovery from these parasitic infections after a fortnight. It is concluded that GI parasites are easily managed by treatment with fenbendazole 7.5 mg/kg body weight in the affected migratory buffaloes with 100 percent recovery.

Haematological Parameter of Migratory Buffaloes Before and After Anthelmintic Treatments:

The details of the haematological parameter of the migratory buffaloes are presented in Table 2. The low hemoglobin concentration (10.00 ± 0.76 g percent), decreased packed cell volume (28.00

Table 1. Prevalence of gastro-intestinal parasite in migratory buffaloes.

Animals	No. of Sample examined	Samples positive	Gastrointestinal parasites		
			Amphistome	<i>Fasciola</i> sp.	Amphistome + <i>Fasciola</i>
Buffalo					
	20	15 (75)	8 (53.33)	5(33.30)	2(13.32)
	15	3 (20.00)	2(13.33)	1(6.67)	0

Figures in parenthesis indicates per cent positive.

Table 2. Haematological parameters before and after anthelmintic treatments to migratory buffaloes (Mean± S.E.).

Parameter		Buffalo (Before treatment)	Buffalo (After treatment)
Hb (g %)		10.00 ± 0.76	10.34 ± 0.68
PCV (%)		28.00±1.15	32.20 ±1.85
TLC (10^3 /mm ³)		11.40 ± 0.46	9.26 ± 0.72
DLC	N	33.67 ± 0.88	32.86 ± 0.76
	L	60.67 ± 1.20	61.77 ± 1.42
	E	2.67 ± 0.33	3.16 ± 0.33
	M	2.33 ± 0.33	2.56 ± 0.33
	B	0.67 ± 0.33	0.67 ± 0.33

Table 3. The yield and composition of milk before and after anthelmintic treatments to migratory buffaloes (Mean ± S.E.).

	Before Treatment	After Treatment	Average Change
Milk Yield L/day	5.83±1.11	6.17±1.09	0.335± 0.014
Milk Fat %	6.45±0.78	6.66±0.72	0.208±0.547
Milk Total Solids % (TS)	16.04±0.91	16.38±0.81	0.337±0.800
Milk Solid Not Fat % (SNF)	9.60±0.76	9.72±0.63	0.130±0.794

$\pm 1.15\%$) and increased total leukocyte count ($11.40 \pm 0.46 \times 10^3/\mu\text{l}$) with differential leukocyte count showed slight neutrophilia ($33.67 \pm 0.88\%$) and decrease of lymphocyte ($32.86 \pm 0.76\%$) was observed in the migratory buffaloes before the anthelmintic treatments. The above haematological values were lower than the normal values, and this was due to heavy infection of gastrointestinal parasites. In earlier studies, similar findings were reported in sheep, goats and buffaloes (Sinha *et al.*, 2008; Alsaad and Al-Iraqi, 2010).

Major changes were observed in the haemogram of migratory buffaloes before and after anthelmintic treatments. After treatment, an overall decrease in mean values of total leukocyte count ($9.26 \pm 0.72 \times 10^3/\text{mm}^3$) towards the normal range was observed, the differential leukocyte count also revealed normal values, while increases in hemoglobin ($10.34 \pm 0.68 \text{ g}\%$) and packed cell volume ($32.20 \pm 1.85\%$) were observed. In an earlier study, Sinha *et al.* (2008) reported similar changes in haematological parameter after proper therapeutic management of buffaloes naturally infected with gastrointestinal parasites.

Milk Yield and Quality of Migratory Buffaloes Before and After Anthelmintic Treatments:

The details of milk yield and quality obtained from migratory buffaloes are presented in Table 3. The average milk production of $5.83 \pm 1.11 \text{ L/day}$ was recorded before treatment. The average content of fat, total solids and solids not fat in milk obtained from these buffaloes before treatment was found to be $6.45 \pm 0.78\%$, $16.04 \pm 0.91\%$ and $9.60 \pm 0.76\%$, respectively. Qualitative and quantitative variations were recorded in the milk samples. However, after standard anthelmintic treatments to these identified buffaloes, the average increase in milk production was found to be $0.335 \pm 0.014 \text{ L/}$

day along with increases in the milk fat, total solids and solids not fat to the tune of $0.21 \pm 0.55\%$, $0.34 \pm 0.80\%$ and $0.13 \pm 0.79\%$, respectively. Quantitative and qualitative improvement in the milk yield and quality were recorded after the intervention. In an earlier study, Gross *et al.* (1999) reported a medium increase in milk production to the tune of 0.63 kg/cow/day after anthelmintic treatment. In another study, Sanchez *et al.*, 2004 demonstrated an increase of 0.35 kg/cow/day after anthelmintic treatments.

CONCLUSION

The health and production status of migratory buffaloes naturally infested with gastrointestinal worms will be enhanced after proper anthelmintic treatment.

ACKNOWLEDGEMENT

The authors acknowledge the GEF- NAIP Project under which this work was undertaken.

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