

Assessing the Impact of Gastrointestinal Parasites and Husbandry Practices on Dairy Cow Productivity in Chitwan, Nepal

Prasiddha Paudel^{1,*}, Anisha Subedi¹, Subir Singh², Sushil Paudyal³, Prajwol Dhakal¹

¹Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Rampur, Nepal

²Department of Veterinary Medicine and Public Health, Agriculture and Forestry University, Rampur, Nepal

³Department of Animal Science, Texas A&M University, College Station, TX 77843, USA

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Livestock is an indispensable part of Nepalese agriculture, and within the livestock sector in Nepal, the dairy subsector is the most important one in terms of its contribution to agriculture Gross Domestic Product (GDP). Dairy farming in Nepal is characterized by smallholder farmers who rely on it for their income and sustenance. However, limited data exist on the correlation between livestock production with animal husbandry practices, the prevalence of gastrointestinal (GI) parasites, and their potential relation to production, body condition score, and fertility rates. Gastrointestinal parasites cause several significant health issues in cattle, such as reduced feed efficiency, weight loss, diarrhea, and lower milk production, ultimately affecting the economic viability of dairy farms. Understanding the prevalence of GI parasites and their impact on dairy cow productivity is crucial for developing effective management strategies to enhance the productivity and sustainability of the dairy industry in Nepal. The objective of this study was to assess the husbandry practices, prevalence of GI parasites, and their impact on reproductive status in dairy cow productivity in Chitwan district, Nepal.

A semi structured questionnaire was developed, and face-to-face interviews were conducted from September 2023 to February 2024 to collect data regarding husbandry practices (housing system, grazing management, vaccination, and deworming frequency) and reproductive status (milk yield, calving interval, calving to conception interval, lactation length, dry period, service per conception) of dairy cows from the selected households. Freshly defecated fecal samples of dairy cows (n=322) were collected and examined for GI parasite eggs. The samples were analyzed for nematode and cestode eggs, as well as *Eimeria* oocysts, using the floatation technique. Trematode eggs and the oocyst of *Balantidium* and *Entamoeba* were analyzed using the sedimentation technique. The body condition score was recorded on a scale of 1 to 5, where 1 indicated severe underconditioning and 5 indicated severe overconditioning. A chi-square test was used to assess the relationship between husbandry practices and the prevalence of GI parasites. Additionally, data on reproductive status, including the history of abortion and repeat breeding, and production parameters such as peak milk yield and lactation length were collected and analyzed using one-way ANOVA in SPSS 25.

The study results revealed that 115 out of the 322 examined fecal samples (35.71%) tested positive for one or more GI parasite infections.

Percentage distribution of different parasitic infections is presented in Figure 1. Among trematodes, 59.46% were *Fasciola hepatica*, and 40.54% were *Paramphistomum* sp. Among nematodes, 48.28% were *Ascaris* sp., 27.59% were *Trichostrongylus* sp., and 24.13% *Haemonchus* sp. *Moniezia* sp. was the only identified cestodes. *Balantidium coli* was the most prevalent protozoa followed by *Entamoeba* sp. and *Eimeria* sp. A higher prevalence (42.93%, $p < 0.05$) of GI parasites was recorded in cows reared in the loose housing system (animals kept in partially covered outdoor areas with an open yard ranging from 10-14 m²) compared to intensive system (26.08%), where animals were confined to individual stalls.

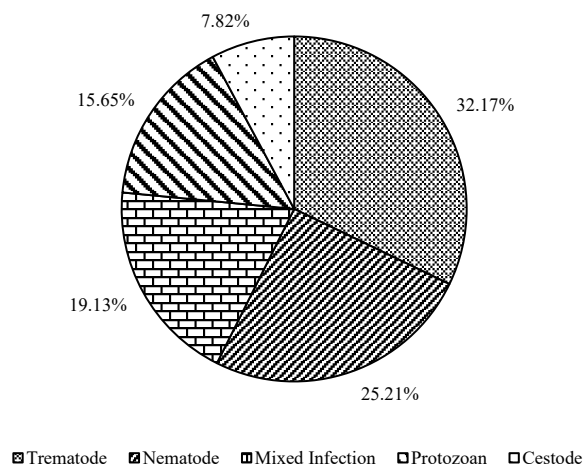
Chi-square analysis revealed a significant relationship between gastrointestinal parasite prevalence and grazing management, body condition score (BCS), and deworming frequency (χ^2 , $p < 0.05$), as represented in Table 1. However, there was no difference in prevalence across parities ($p > 0.05$). The mean ($\pm$ SE) peak milk yield and lactation length were 6.05 ($\pm$ 0.09) liters per milking and 10.80 ($\pm$ 0.08) months, respectively. Mean ($\pm$ SE) calving-to-conception intervals were 3.77 ($\pm$ 0.08) months. Similarly, mean ($\pm$ SE) services per conception and the dry period were 2.36 ($\pm$ 0.06) months and 1.93 ($\pm$ 0.02) months, respectively. We reported 9.62% (n = 31) of cows had a history of abortion, and 62.42% (n = 201) were repeat breeders. The average peak milk yield (liters per milking per cow) was higher (6.673 liters) in cows with a deworming frequency of 4 months compared to those with a missed deworming schedule (6.014 liters). Additionally, 37.88% of the farmers in the study area opted to treat animals themselves, followed by para-veterinarians and cooperatives. Gastrointestinal parasitic infections were mostly associated with diarrhea and anorexia, which may have affected the overall health and production of these cows.

The study revealed that gastrointestinal parasites significantly impacted dairy cow health and productivity in Chitwan District, Nepal, with 35.71% of cows infected, predominantly by trematodes and nematodes. Prevalence of GI parasites was higher in loose housing systems compared to intensive systems. The study found that better deworming practices correlated with higher milk yields, highlighting the importance of regular deworming. The findings suggest that improving husbandry practices, regular deworming, and better management of housing conditions are crucial for enhancing the productivity and sustainability of the dairy industry in Nepal.

* Corresponding author. E-mail address: prasiddha.paudel@favf.edu.np

Table 1. Association between husbandry practices (housing type, parity, grazing, deworming frequency, BCS) and gastrointestinal parasite prevalence in the dairy cows, September 2023–February 2024, Chitwan, Nepal.

SN	Variables	Group description	Prevalence		X ² Value	P value
			Yes (%)	No (%)		
1	Housing	Loose (n=184)	79 (42.93)	105 (57.07)	9.749	0.002**
		Intensive (n=138)	36 (26.09)	102 (73.91)		
2	Parity	Primiparous (n=61)	19 (31.15)	42 (68.85)	0.684	0.408
		Multiparous (n=261)	96 (36.78)	165 (63.22)		
3	Grazing	Yes (n=53)	37 (69.81)	16 (30.19)	29.948	<0.001***
		No (n=131)	42 (32.06)	89 (67.94)		
4	Deworming frequency	Every 4 months (n=200)	45 (22.5)	155 (77.5)	69.269	<0.001***
		Every 6 months (n=87)	37 (42.53)	50 (57.47)		
		Occasionally (n=35)	33 (94.29)	2 (5.71)		
5	BCS	Good (n=235)	65 (27.66)	170 (72.34)	24.578	<0.001***
		Poor (87)	50 (57.47)	37 (42.53)		

**Figure 1.** Distribution of different types of parasitic infections in dairy cows, September 2023–February 2024, Chitwan, Nepal.

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