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PREVALENCE AND SEASONAL DYNAMICS OF *HAEMONCHUS CONTORTUS* IN *CAPRA HIRCUS* FROM TRIBAL DISTRICT NANDURBAR, (M.S.), INDIA

Vaishali Marathe * and Govind Balde

Research and P. G. Department of Zoology, NTVS's, G. T. Patil Art's, Commerce and Science College, Nandurbar - 425 412, (M.S.), India.

* Corresponding Author

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ABSTRACT

A survey was conducted to ascertain the prevalence, infection indices and seasonal variation of *Haemonchus contortus* in domestic goats (*Capra hircus*) in the tribal district of Nandurbar, Maharashtra, India, over one year (June 2024–May 2025). Whole gastrointestinal tracts and fecal samples were collected from slaughtered goats and local livestock markets. The parasites isolated from the abomasum were identified, counted and recorded monthly. Overall, 98 out of 211 goats surveyed were positive for *H. contortus* infection, representing a prevalence of 46.45%. The mean intensity and abundance of infection were 246.3 and 114.4, respectively. The highest prevalence (67.12%), mean intensity (341.2) and abundance (229.0) were recorded in the monsoon season, whereas the lowest prevalence (22.58%), mean intensity (113.6) and abundance (25.6) were observed in the dry summer. The high relative humidity and mild temperatures characteristic of the rainy season create favourable microclimatic conditions for larval development and pasture contamination. This study provides epidemiological baseline information that may be used to formulate effective control measures against haemonchosis in small ruminants of this tribal region.

Keywords: Abundance, *Capra hircus*, *Haemonchus contortus*, Mean Intensity, Nandurbar, Prevalence, Seasonal Dynamics.

1 INTRODUCTION

Goat farming (*Capra hircus*) is an important component of Indian agriculture system as a large proportion of rural poor households are either small and marginal farmers or do not possess any land at all (1). In tribal areas, like Nandurbar district, the communities are dependent on extensive grazing system for goat production. Parasitic gastroenteritis is considered as a serious threat to the health and productivity of small ruminant animals resulting into huge losses to the producer in terms of emaciation, poor weight gain, reduced milk yield and mortality (2).

Among the gastrointestinal nematodes, *Haemonchus contortus* (the barber's pole worm) is the most pathogenic species for goats in warm, humid tropical and subtropical areas (3). *H. contortus* is a very voracious blood-feeding parasite that lives in the abomasum. Heavy infections lead to acute anemia, hypoproteinemia, submandibular edema ("bottle jaw") and high mortality, especially in young animals (12)(15). When the right environmental conditions are present, *H.*

contortus populations can grow quickly on pastures due to the high fecundity of female worms and their quick life cycle (4)(16).

The control of haemonchosis is traditionally based on the use of anthelmintics (6). However, the extensive and irrational use of these drugs has led to an increase in anthelmintic resistance in many countries (17). Alternative strategies for the integrated management of parasites, such as rotational grazing and targeted selective treatment, require detailed local epidemiological information on the dynamics of worm populations throughout the year (5). Studies on *H. contortus* have been carried out in many parts of India, but there are few epidemiological data on the helminth community in this district. Therefore, this study aimed to determine the prevalence, mean intensity, abundance and seasonality of *H. contortus* infection in *Capra hircus* from Nandurbar district with a sample size of 211 goats.

2 MATERIALS AND METHODS

2.1 Study Area

The study was conducted in Nandurbar district in Maharashtra, India (21 00' N to 22 03' N and 73 47' E to 74 47' E). The area has a tropical climate, with a year-round divided into three seasons: Monsoon/Rainy (June to September), Winter (October to January) and Summer (February to May). The amount of rainfall is about 888 mm per annum, most of which falls during the rainy season.



Figure 1: Map of Maharashtra Highlighted with Nandurbar District

2.2 Sample Collection and Examination

During 2024, June, to 2025, May, a total of 211 gastrointestinal tracts and abomasal contents (N=211) were collected twice a week from local slaughter houses and livestock markets of various tehsils (Akrani, Akalkuwa, Talode, Shahada, Nandurbar and Nawapur) of Nandurbar district. Collection of the samples were done periodically depending upon the availability in a month.

Abomasa were dissected out from the gastrointestinal tract and were longitudinally incised along the greater curvature and were washed with the physiological saline solution. The mucosa was scrapped to obtain adhered worm. The contents were sieve eluted through mesh and examined under a stereomicroscope (7). *H. contortus* worms were recovered, enumerated and preserved in warm 70% ethanol with 10% glycerin for taxonomic assignment based on morphological characters using standard keys (8)(9).



Figure 2: Gross photograph of the host abomasal mucosal lining showing adult *H. contortus* specimens adhered in situ.



Figure 3: Isolated adult worms were collected in a Petri dish containing physiological saline for sorting and clearing.

2.3 Infection Indices

The collected data were analyzed using standard ecological parameters as defined by Margolis (10)

1. **Prevalence (%)** = $\left(\frac{\text{Total number of infected hosts}}{\text{Total number of hosts examined}} \right) \times 100$
2. **Mean Intensity** = $\frac{\text{Total number of parasites collected}}{\text{Total number of infected hosts}}$
3. **Abundance** = $\frac{\text{Total number of parasites collected}}{\text{Total number of hosts examined (infected + uninfected)}}$

3 RESULTS AND DISCUSSION

3.1 Overall Prevalence and Infection Indices

98 of the 211 goats tested during the course of the year were positive for *Haemonchus contortus*, representing an overall prevalence of 46.45%. 24,138 worms were found in all samples, resulting in an overall mean intensity of 246.3 worms per infected host and an overall abundance of 114.4 worms per host under examination.

3.2 Monthly Dynamics

Monthly variations in sample sizes, infected hosts, recovered worm counts, prevalence, mean intensity and abundance are presented in **Table 1**.

Table 1: Monthly prevalence, mean intensity and abundance of *Haemonchus contortus* in *Capra hircus* from Nandurbar District (June 2024 – May 2025)

Month	No. of Animals Examined	No. of Infected Animals	Prevalence (%)	Total Worms Recovered	Mean Intensity	Abundance	Locality / Tehsil
June	19	12	63.16%	3,120	260.0	164.2	Akrani
July	18	13	72.22%	4,290	330.0	238.3	Shahada
August	20	16	80.00%	6,560	410.0	328.0	Akkalkuwa
September	16	8	50.00%	2,752	344.0	172.0	Nawapur
October	17	8	47.06%	2,120	265.0	124.7	Nandurbar
November	19	8	42.11%	1,600	200.0	84.2	Talode
December	21	10	47.62%	1,850	185.0	88.1	Nawapur
January	19	9	47.37%	1,062	118.0	55.9	Akkalkuwa
February	16	5	31.25%	420	84.0	26.3	Akrani

March	14	4	28.57%	220	55.0	15.7	Nandurbar
April	17	2	11.76%	80	40.0	4.7	Shahada
May	15	3	20.00%	66	22.0	4.4	Talode
Total	211	98	46.45%	24,138	246.3	114.4	Nandurbar District

The infection rate showed a distinct peak throughout the late monsoon season. August had the highest monthly prevalence at 80.00%, then July at 72.22% and June at 63.16%. In the same way, mean intensity and abundance reached their highest levels in August, at 410.0 and 328.0 respectively. April (prevalence: 11.76%, abundance: 4.7) and May (prevalence: 20.00%, mean intensity: 22.0) had the lowest values.

3.3 Seasonal Variation

When categorized by season, the epidemiological data revealed marked seasonal fluctuations (**Table 2**).

Table 2: Seasonal prevalence, mean intensity, and abundance of *Haemonchus contortus* in *Capra hircus*

Season	Months	Animals Examined	Infected Animals	Prevalence (%)	Total Worms Recovered	Mean Intensity	Abundance
Monsoon	June – Sept	73	49	67.12%	16,722	341.2	229.0
Winter	Oct – Jan	76	35	46.05%	6,632	189.5	87.3
Summer	Feb – May	62	14	22.58%	786	56.1	12.7
Total	—	211	98	46.45%	24,138	246.3	114.4

Monsoon Season: The greatest overall prevalence (67.12%), mean intensity (341.2) and abundance (229.0) were documented from June through September. During the monsoon, heavy rainfall and high relative humidity establish ideal microclimatic conditions on grazing pastures, which encourage egg hatching, swift ecdysis and the upward migration of larvae onto vegetation (Soulsby, 1966).

Winter Season: Moderate levels of infection were recorded in winter (prevalence: 46.05%, mean intensity: 189.5), indicating lingering worm burdens picked up during the late monsoon as well as decreasing pasture contamination with falling environmental temperatures.

Summer Season: The lowest infection levels were seen in the dry summer months (prevalence: 22.58%, mean intensity: 56.1, abundance: 12.7). Elevated summer temperatures together with low relative humidity cause severe desiccation of larvae on pasture grass, greatly reducing parasite transmission.

4 CONCLUSION

The study's findings show that *Haemonchus contortus* (the barber's pole worm) is a highly common gastrointestinal parasite infecting domestic goats in Nandurbar district, with an overall infection rate of 46.45%. The parasite population exhibits a pronounced seasonal trend, peaking in prevalence, intensity and abundance during the monsoon season (11). This seasonal surge happens because the warm, humid rainy conditions provide ideal circumstances for parasite eggs to hatch and larvae to survive on pasture grass (13). In the tribal areas of Nandurbar, where free-range grazing is the norm, goats readily ingest these infective larvae while feeding during the wet months.

Three key control strategies are recommended to reduce financial losses for farmers and safeguard livestock health. First, strategic deworming should be timed specifically for the start and end of the monsoon season, targeting the parasite during its most active phase (14). Second, farmers should adopt rotational grazing and let pastures rest during the high-risk rainy months, allowing larvae on the grass time to die off naturally before animals graze there again (18)(19). Finally, farmers and local veterinarians should carry out targeted selective deworming using tools such as the FAMACHA eye-color chart to treat only severely anemic goats, which effectively controls worm burdens while stopping the parasites from developing resistance to deworming medications. These results highlight the crucial role of

developing control strategies specific to the different climates and host species and implementing targeted surveillance and deworming activities to combat *H. contortus* in the high-risk areas to reduce the infection rate and ensure sustainable production of ruminants.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

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