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Incidence of gastro-intestinal parasitic infestation in goats in Northeastern Karnataka

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Abstract
The incidence study of gastro- intestinal parasitic infestation in goats was carried out in Kalagi, Humnabad and Chincholi talukas of north eastern Karnataka. Present study was carried out from 1 June 2022 to 31 August 2022. The incidence of Gastro-intestinal parasite in goats were recorded based on history from owners, clinical parameters and microscopic examination of selected feacal samples. The goats were screened out of 900, 724 were found to be Gastro-intestinal parasitic infested. The overall incidence rate was 80.24 Percent. The observation of clinical parameters in kids were dull, weakness, pale to paper white oral and conjunctival mucus membrane, varying degree of anorexia and diarrhoea, soiled hind quarters, retarded growth, pot belly, emaciated and rough hair coat. Where as in adults goats moderate to severe anaemia, low to high intensity of diarrhoea, rough hair coat, pale to paper white mucus membrane, weakness, bottle jaw, anorexia, loss of weight and exercise intolerance. Out of 900 animals higher incidence were recorded in female (86.98%) followed by male (72.60%). Based on age group, upto one year goats (85.42%) were more susceptible for parasitic infestation followed by one-three year goats (79.00%) and 3 years and above age group goats (72.49%). Based on Month wise incidence, highest was recorded in August (90.67%) followed by July (78.67%) and June (72.00%). The selected goats feacal samples were collected and microscopic examination and highest incidence were recorded Strongyle ova (23.22%) followed by Coccidiosis (20.67%), Moniezia (16.89%), Trichuris (8.00%), Strongyloid (7.23%), Trichostrongyle (4.45%) and mixed infestation was (9.23%). Present study was conducted to know the incidence of gastro- intestinal parasitic infestation in goats in north eastern Karnataka.

Keywords: Incidence study, gastro- intestinal parasites, clinical symptoms and goats

Introduction
According to the 20th Livestock Census Report-2019 by Govt of India, India has 148.88 million goats, which is 5th highest population in the world. There was an increase of 10.14 percent in goat the population compared to the 19th Livestock Census Report-2012. This indicates that there is a progressive growth in the goat population and goat rearing in India. Goat contributes 27.8% of the total Livestock population of India. Goat farming has tremendous potential in employment generation and poverty reduction. (www.dhad.gov.in/livestock census report 2019). Goats will adapt to a wide variety of climatic conditions and vegetation, they can thrive well with poor-quality roughage. The goat is a multipurpose animal that produces milk, meat, fiber, kid, and manure. Goat is known as a poor man's cow because of its output which cow at very low-cost and contributes to the poor people's economy. Goat milk is highly nutritious, easily digestible, and less allergic compared to other livestock species. Being small sized friendly animal, the goat can be easily reared by women and children. Four goats can be maintained at the cost of the maintenance of one cow. The manure of goat is rich source of nitrogen, potash, and phosphorus compared to cattle manure. Goats are excellent experiment animals for physiological and biomedical research (Jagadish Prasad, 2010) [8]. Parasitic diseases cause greater economic losses, morbidity, and mortality in goats. Severe infestation of endo parasites including roundworms and tapeworms causes severe morbidity and mortality thereby loss of production in terms of decreased production of milk and meat, also makes them susceptible to diseases, loss due to condemnation of carcass, cost of veterinary expenses, poor reproductive performances and anaemia (Lata *et al*. 2017) [16]. So, the present study was conducted to know the incidence of parasitic gastro-enteritis in goats in the northeastern part of Karnataka.

Material and Methods

The present study was carried out in field conditions to know the prevalence of gastrointestinal parasitic infestation in goats in the Kalagi, Chincholi, and Humnabad taluka areas of the northeastern part of Karnataka, for the selection of an ideal anthelminthic agent in goats prior to deworming. Goats belonging to small and marginal farmers were screened. Detailed clinical examination was carried out including the colour of the conjunctival mucus membrane, the status of skin coat, soiled hind quarters, oral mucosa, the status of hydration, and rectal temperature. Information related to the previous history of deworming, feeding practices, and previous illnesses was collected from the owner. A total of 900 fecal samples were collected over a period of 3 months from 18 villages. 2 Grams of the fecal sample were collected from the rectum of goats and kept in a small plastic bag with air-tight packing after labeling of age sex and breed with the sample number. Collected fecal samples were kept in the refrigerator until further microscopic examination. A fecal sample examination was carried out as per the standard procedures recommended by Soulsby, (1984) [26]. Postmortem examination of goats was conducted as per the standard procedures under field conditions. Obtained results were tabulated and overall prevalence, month-wise prevalence, sex-wise prevalence, age-wise prevalence, and prevalence based on etiology were calculated as percent values.

Results and Discussion

Incidence of gastro-intestinal parasitic infestation in goats

Particulars	Number of goats screened	Number of goats positive for endoparasitic infestation	Prevalence
Overall prevalence			
	900	724	80.45
Month wise prevalence			
June 2022	270	196	72
July 2022	290	236	78.67
August 2022	340	292	90.67
Sex wise prevalence			
Male	278	183	72.60
Female	622	541	86.98
Age group-wise prevalence			
Up to 1 year	432	369	85.42
1-3 Years	239	189	79.00
3 Years and above	229	166	72.49
Prevalence based on etiology			
Strongyle	900	209	23.22
Coccidiosis	900	186	20.67
Moniezia	900	152	16.89
Trichuris	900	72	08.00
Strongyloid	900	65	07.23
Trichostrongyle	900	40	04.45
Mixed infestation	900	83	09.23

Kids which are positive for gastro-intestinal parasitic infestation were dull, weakness, pale to paper white oral and conjunctival mucus membrane, varying degree of anorexia and diarrhoea, soiled hind quarters, retarded growth, pot belly, emaciated and rough hair coat, these findings were in accordance with the earlier reports of Jana and Jana, (2009) [31] and Singh *et al*. (2015) [24]. Adult gastro-intestinal parasitic infested goats were had moderate to severe anaemia, low to high intensity of diarrhoea, rough hair coat, pale to paper white mucus membrane, weakness, bottle jaw, anorexia, loss of weight and exercise intolerance. The current study findings were in accordance with Khajuria *et al*. (2009) [13] and Singh *et al*. (2015) [24].

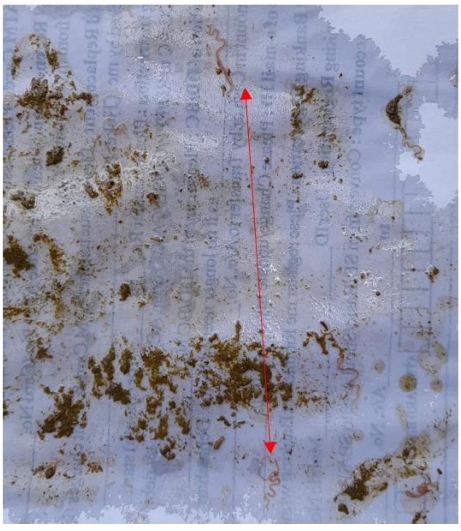

Fig 1; Round worms isolated from the abomasum of goat

Fig 2: Adul goat with pale conjunctival mucus membrane

Fig 3: Tape worms isolated from the intestine of kid

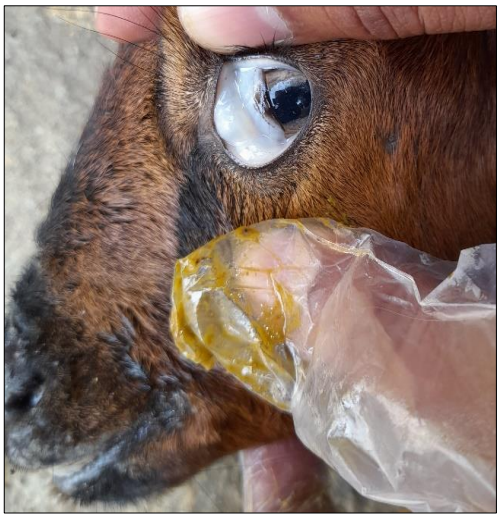

Fig 4: Kid with pale conjunctival mucus membrane

Overall gastrointestinal parasitic incidence is 80.45 percent. Various researchers reported gastro-intestinal prevalence in India ranging from 35 percent recorded by Velusamy *et al.* (2015) [27], 38.04 percent recorded by Shashank *et al.* (2019) [23], 58.40 percent recorded by Anugrah *et al.* (2018) [1], 64.03 percent recorded by Joseph, (2011), 65.62 percent recorded by Hafiz and Talukdar, (2013) [7], 73.07 percent recorded by Lata *et al.* (2017) [16], 84 percent recorded by Khajuria *et al.* (2009) [13] and 94.48 percent recorded by (Singh *et al.* 2015) [24]. Moderately higher prevalence in the present study may be due to resistance to the regular using anthelminthic agents (Lata *et al.* 2017) [16], mixing of different age group goats, poor hygienic practices in the farm (Anugraha *et al.* 2018) [1], overcrowding, excessive grazing in the pasture (Namutoshi *et al.* 2019) [18] causing gastro-intestinal parasitic infestation in goats.

Present study findings show a higher incidence of gastro-intestinal parasitic infestation in August month when compared to June and July months, the findings are in accordance with Velusamy *et al.* (2015) [27]. High rainfall and humidity in August month will predispose the propagation of stages of the parasites (Singh *et al.*, 2015) [24]. High rainfall promotes larval contact with the host from the soil via green forage predisposes the higher prevalence (Soulsby, 1984) [26] of gastro-intestinal parasitic infestation in August month.

The present study revealed a higher incidence of gastro-intestinal parasitic infestation observed in female goats compared to male goats, which may be due to physiological stress like pregnancy and lactation, genetical differences make them more susceptible to the gastro-intestinal infestation (Sivajothi and Sudhakar Reddy, 2018) [25] compared to male goats.

The current study reported the more incidence of gastro-intestinal parasitic infestation in kids compared to adult goats, present study findings are in accordance with Shashank *et al.* (2019) [23]. Poor immune status, overcrowding, and poor hygienic practices on the farm (Shashank *et al.* 2019) [23] predispose the higher prevalence of gastrointestinal parasitic infestation in kids. Repeated exposure and developed immunity make adult goats to resistant gastrointestinal parasitic infestation (Singh *et al.*, 2015; Shashank *et al.* 2019) [24, 23].

The present study revealed that a higher prevalence of Strongyle infestation followed by Coccidiosis, Monieziasis, Trichuriasis, Strongyloidiasis, and the least prevalence was due to Trichostrongyle infestation in goats, similar findings were recorded by Anumol *et al.* (2012) [3], Lata *et al.* (2017) [16] and Sivajothi and Sudhakar Reddy, (2018) [25]. A higher prevalence of Coccidiosis and Monieziasis observed in kids, which are responsible for anaemia, stunted growth, rough hair coat, diarrhoea, soiled hind quarters, hide and bone, and in extreme cases collapse and death (Anumol, 2011; Lata *et al.* 2017) [2, 16]. Nematode infestation in goats causes stunted growth, clinical anaemia, parasitic gastro-enteritis, weakness, loss of body weight, and rough hair coat (Anugrah *et al.* 2018) [1]. Poor hygiene practices in the farm, contaminated feed and water, and overcrowding (Anugrah *et al.* 2018) [1], grazing in the contaminated grassland, prolonged usage of the same deworming agent over a long period of time, extensive rearing system with the mixing of various age group and sex (Lata *et al.* 2017) [16] are the reasons for the higher prevalence of gastro-intestinal parasitic infestation in goats. About 09.23 percent of mixed gastro-intestinal parasitic infestation was reported in the present study, Singh *et al.* (2015) [24], Lata *et al.* (2017) [16], and Anugrah *et al.* (2018) [1] recorded mixed gastro-intestinal parasitic infestation in goats. During the present study, 3 goats died due to a history of diarrhoea and emaciation, not responding to symptomatic therapy. On post-mortem examination of 2 adult goats revealed pale to paper white mucus membrane, dehydrated and emaciated carcass, rough hair coat, ulcers in the abomasum, and the large number of reddish worms found in the abomasum, these findings are

in accordance with Khajuria *et al*. (2009) [13], suggestive of Haemonchosis species infestation based on the parasitological investigation (Soulsby, 1984) [26]. One kid carcass revealed pale carcass, rough hair coat, presence of long tapeworm in the small intestine and whitish tapeworm proglottids in the rectum, ulcers, and enteritis lesions in the intestine, these findings are in accordance with Jana and Jana, (2009) [31].

Conclusions

An effort was made to know the status of gastro-intestinal parasitic infestation in goats of Chincholi, Humnabad, and Kalagi taluka of north-eastern part of Karnataka prior to deworming. Moderately higher prevalence of gastro-intestinal parasitic infestation was recorded in the present study. Mixed nematode infestations were recorded in adult goats, whereas higher prevalence of coccidiosis and Monieziasis was observed in kids. Broad spectrum anthelminthic agent is essential for both adult and young goats, whereas kids also need anti-coccidial agents in the feed to overcome the Coccidial infestation. Regular deworming and supplementation of anti-Coccidial agents to goats is essential to overcome the of gastro-intestinal parasitic infestation in goats.

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