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Occurrence of strongylosis in cattle of Thrissur district, Kerala, India

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Abstract
Gastrointestinal parasites (GIP) are important parasites which cause parasitic gastroenteritis in ruminants. Of the parasites, infections with strongyles are very common which have varied pathological significance and hence has varying economic impact. This study was carried out to determine the occurrence of strongylosis in cattle of Thrissur district, Kerala. A total of 300 faecal samples were collected and subjected to coproscopy and coproculture to determine the occurrence of strongyles as well as concurrent gastrointestinal parasites in cattle. Faecal samples were examined by direct smear method, floatation and sedimentation methods. Among the 300 samples examined, an overall occurrence of 34 per cent was obtained for strongyle infection. The overall percentages of other GIP like amphistomes and coccidia were 3.6 and 1.6 per cent respectively. The faecal samples were also subjected for coproculture technique for detection as well as species identification of strongyle larvae. The species of strongyle larvae identified on coproculture were *Haemonchus* spp. (13.66%), *Mecistocirrus* spp. (8%), *Trichostrongylus* spp. (3.33%), *Bunostomum* spp. (2%) and *Cooperia* spp. (1.33%). The study indicated that, even though strongyle infections are subclinical in nature, they pose a major impact on the health and productivity of the animals thus affecting the economics of the farming community. Programmes to minimize and control strongylosis in cattle warrants the proper identification of strongyles and knowledge of its epidemiology.

Keywords: Occurrence, Strongyles, Coproculture, Coproscopy, Cattle

Introduction
Infection by gastrointestinal nematodes is an important cause of production loss in cattle that results in poor general performance. Epidemiological reports of the Animal Husbandry Department of Kerala revealed strongylosis to be a major infection accounting for 33.36 per cent of the parasitic infections. (AHD, 2008) [1]. the diagnosis of strongylosis mainly relies on routine coproscopy and coproculture. Among the GI helminths, disease caused by strongyles are of major threat to our livestock as it causes great economic loss to the dairy industry by way of retarded growth, low productivity and increased susceptibility of animals to other infections. *Haemonchus* and *Mecistocirrus* are the haematophagous, pathogenic worms which are seen in the abomasums of cattle. Strongyles of cattle cause parasitic gastroenteritis with watery diarrhoea, weakness, weight loss, decreased milk production, reduced product quality, mortality and other secondary infections (Soulsby, 1982) [2].

Materials and methods
Three hundred faecal samples collected directly from the rectum of cattle or collected without soil contamination when freshly laid, were individually labelled in polythene bags for examination. The samples were collected from farms, households of Thrissur district, Kerala state and also from those brought to University Veterinary hospitals at Mannuthy and Thrissur, Kerala, India for a period of six months from December 2017 to June 2018. The samples were brought to the laboratory and were processed by direct smear examination, faecal floatation technique using saturated salt solution for detection of nematode and cestode eggs and sedimentation techniques for trematode eggs (Soulsby, 1982) [2]. Samples were refrigerated at 4ºC if it could not be processed on the same day.

All the 300 faecal samples were kept for coproculture following modified Veglia's method (Sathianesan and Peter, 1979) [3] on the day of collection itself. They were cultured in clean dry glass or plastic bottles measuring 10 cm in height and 5.0 cm diameter. About 25 gms of faecal sample was transferred into culture bottles without soiling the sides. The bottle was closed and kept in dark at room temperature.

The presence of larvae on the sides of the bottle was detected when they were examined in light after 7-10 days. The strongyle larvae were collected from the culture bottle by recovering the small quantity of water that was used to wash the inner sides of the culture bottle without faecal contamination. The infective strongyle larvae could be identified based on the peculiarities of the larvae as well as length of its tail sheath (Van wyk *et al*., 2004) [4]. The percentage of different strongyle larvae could be found.

Results

Occurrence of strongylosis in cattle of Thrissur district, Kerala was studied. An overall occurrence of strongyle infection was 34 per cent and concurrent infections with amphistomes (3.6%) and coccidia (1.6%) were also obtained. Floatation was the most preferable method for detecting the strongyle ova where in early detection of infection was required. Culture was found to be the best diagnostic method for species identification of strongyles, if an immediate diagnosis was not required.

These faecal samples were subjected for coproculture for recovering the strongyle larvae. A total of 26.33 per cent samples were positive by coproculture method and infective third stage strongyle larvae recovered from coproculture were identified. *Haemonchus* spp. (13.66%) was the most predominant followed by *Mecistocirrus* spp. (8%), *Trichostrongylus* spp. (3.33%), *Bunostomum* spp. (2%) and *Cooperia* spp. (1.33%). Strongyle larvae were morphologically identified (Fig.1-5). The species of *Haemonchus* was identified by the presence of a sharp kink in the tail sheath just posterior to the end of the tail. The tail sheath enclosed a fine whip-like filament. The length of the tail sheath was 2.5 X (75µm) with 10 to 15 per cent filament. The buccal capsule was found to be globular. The species of *Trichostrongylus* larvae had a conical sheath tail extension (STE) without filament and tapered sharply and it resembled the point of a wooden pencil. This short STE was used as the basis of classification system. The length of the sheath tail of *Trichostrongylus* spp. (30 µm) was considered to be the standard and designated as 1.0 X with which the length of the sheath tails of other strongyles was compared.

Fig 1: *Haemonchus* sp.

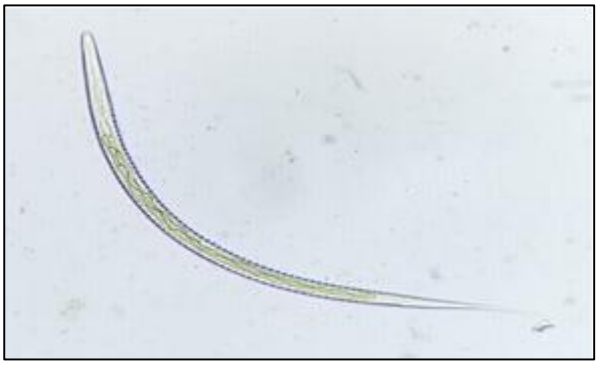

Fig 2: *Mecistocirrus* sp.

Fig 3: *Trichostrongylus* sp.

Fig 4: *Bunostomum* sp.

Fig 5: *Cooperia* sp.

Infective larvae of *Mecistocirrus* sp. could be differentiated from other species by an inverted 'U' shaped structure at the anterior end and its simple tail with absence of kink at the posterior end. More over *B. phlebotomum* larvae was characteristically smaller in size with club shaped oesophagus. The buccal capsule was very small, somewhat funnel shaped. The specimen showed teeth like structures at anterior most extremity. The prominent caudal bulb of the oesophagus was easily observed in live specimens. The infective larvae of *Cooperia* spp. had two unique oval refractile bodies in the head which was the most striking feature from those of other genera. The buccal cavity was pear shaped. The filament of *Cooperia punctata* measured 20 per cent.

Discussion

Out of total 300 faecal samples examined 34 per cent animals were found positive for strongyle parasites and concurrent infections with amphistomes (3.6%), coccidia (1.6%) were also detected. Strongyles were recorded to be the predominant gastrointestinal helminths in ruminants. This may be due to their direct life cycle and the typical grazing habit of ruminants facilitating the transmission of the parasite. A significantly higher occurrence was recorded during monsoon season as the ambient temperature and high relative humidity due to rainfall in Kerala, favour the development of preparasitic larval stages. Coproculture technique was useful for recovering different species of strongyle larvae and hence specific species identification of the strongyle is possible with coproculture method. The present study was in accordance with the infective strongyle larvae identification conducted by Jeyathilakan *et al.* (2012) [5], Van Wyk and Mayhew (2013) [6] and Rajput *et al*. (2017) [7].

Conclusion

The species of different strongyle larvae by coproculture revealed *Haemonchus* as the predominant strongyle, followed by *Mecistocirrus*, *Trichostrongylus*, *Bunostomum* and *Cooperia*. These parasites are responsible for causing heavy economic losses due to reduced production, morbidity and mortality. Strategic deworming of animals should be scheduled based on the knowledge of the epidemiology of the parasites as well as based on the season of occurrence of the parasite. Proper diagnosis of the strongyle species will help in finding out the pathogenic species of strongyle and also aid in anthelmintic treatment of the required animals only. It helps in devising strategic treatment and thereby reduces unnecessary anthelmintic treatment which is beneficial in times of anthelmintic resistance.

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