



Occurrence of Amphistomiasis and Fly Bite Associated Skin Lesions in Umbalachery Cattle Breed of Tamilnadu

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Abstract

The Umbalachery cattle breed, a valuable genetic resource, is found in the region of Thanjavur, Tamil Nadu, India. The occurrence of amphistomiasis and fly bite-associated skin lesions in this breed was investigated. The impact of amphistomiasis on cattle production can be particularly significant in areas with high levels of infection, such as wet, marshy areas where the intermediate host snails thrive. *Haematobia* spp. is a blood-sucking fly that primarily infests cattle and severe infestations of *Haematobia* spp. flies in cattle can lead to skin wounds. Ecto- and endoparasitic infections are known to cause significant economic losses in cattle production due to the negative effects on animal health and productivity. Thirty Umbalachery cattle were screened for endoparasitic infection and ectoparasite infestation. Fecal sample examination recorded Amphistome spp. eggs in twenty-six cattle fecal samples and a dense population of flies were recorded on the forehead, the base of horns, along the vertebral column, and withers. The cattle developed fly bite-associated skin lesions on the back and sides. Morphological identification of the flies revealed *Haematobia* spp. The present investigation revealed a high percentage of amphistomiasis (86.6%) in fecal sample examination studies. The free-range pasture grazing feeding habit near water bodies increases the exposure to the infective metacercarial stage of the parasite hence the infection.

Keywords: Amphistomiasis; *Haematobia* spp; skin lesions

Introduction

Umbalachery breed is a highly regarded draught cattle breed primarily found in the eastern coastal districts of Tamil Nadu, known for its exceptional strength and sturdiness. Its draught power, adaptability, indigenous genetic resources, cultural significance, and contribution to sustainable agriculture make it an asset for farmers and an integral part of the agricultural landscape in the eastern coastal districts of Tamil Nadu. Amphistomiasis, a snail-borne trematode infection of ruminants has emerged as a significant cause of productivity loss in ruminant livestock, leading to decreased milk and meat production, reduced nutrient conversion, weight loss, and decreased fertility [1-3]. Several studies have reported the prevalence of multiple species of amphistome parasites among livestock in various states of India [4-6]. Cattle acquire the trematode infection through ingestion of metacercariae attached to the surface of grass and water [7]. The density of snail population influences the availability of metacercaria. The preva-

lence of paramphistomiasis relates to several factors, among them the grazing system plays an important role. Pasture grazing near water bodies with dense snail populations increases the risk of occurrence of paramphistomiasis in animals [8]. Severe infections are attributed to an influx of immature parasites traversing the intestinal tract resulting in acute parasitic gastroenteritis, leading to high morbidity and mortality rates, especially in young animals [9-11].

Haematobia exigua, commonly known as the buffalo fly, is found in large clusters ranging from a few hundred to thousands, causing considerable annoyance, irritation, and blood loss to cattle through their biting behavior. As a result, infested animals exhibit behavioral changes such as head throws, tail flicks, leg stamps, and skin twitches as they try to alleviate the fly menace. These behaviors lead to significant energy loss for the affected animals [12]. Moreover, the continuous piercing of the skin by buffalo flies can lead to the development of wound sores. Additionally, these flies serve as intermediate hosts for *Stephanofilaria stilesi* and act as vectors

for pathogens like *Staphylococcus aureus*, trypanosomosis, and anaplasmosis among the affected animals [13]. The research aims to assess the prevalence and severity of amphiostomiasis in animals and determine the extent to which fly infestations contribute to the development of wounds in Umbalachery cattle breed. The study of parasite infestation in Umbalachery cattle is a pioneering investigation, in this specific breed.

Materials and Methods

Area of study

The study was conducted in Umbalachery Village (Nagapattinam district) of Tamil Nadu.

Faecal collection and parasitological examination

Fresh faecal samples were collected from 30 (calf-4, adult female- 20, adult male- 6) Umbalachery cattle in an air-tight container and labelled for further processing. The examination of faecal samples was conducted using the sedimentation concentration technique. For this technique, 10 g of faeces sss mixed with 10 ml of water. The mixture was then passed through a sieve with a pore size of 0.25 mm. Afterward, the filtrate was collected in a centrifuge tube and centrifuged at 1,000 rpm for 2 minutes. Following centrifugation, the supernatant was discarded, and a drop of the sediment was microscopically examined to identify *Amphiostome* spp. eggs (Soulsby, 1982).

Animal examination and fly collection

A total of 30 Umbalachery cattle were thoroughly examined to assess the presence of wounds and flies on its body. Flies were collected and processed for morphological identification in the laboratory.

Results and Discussion

Parasitological examination revealed that 26/30 (86.7%) faecal samples were positive for the presence of *Amphiostome* spp. eggs while, four faecal samples showed absence of helminth eggs. Among the positive samples 3 calves, 18 cows and 5 bulls were infected with *Amphiostome* spp. eggs. The eggs of *Amphiostome* spp. are transparent with clear embryonal cells. The egg morphometric were recorded as 135 μ m length, and 85 μ m, with an operculum (Figure 1.). A total of 30 animals were examined for fly-inflicted wound sores on the body of the animal. The presence of wounds was recorded in 7 cattle, in some of them the wounds had dried and formed crusts while in others constant rubbing of the fly-bite wound site exacerbated the lesion leading to oozing. Other cattle

had flies over the body without visible lesions. The flies collected from cattle were identified as *Haematobia* spp. (Figure 2.) based on the presence of dorsally plumed arista and the maxillary palp is as long as proboscis (Figure 3.). The fly avoidance activities such as ear flicks, head throws, tail flicks leg stamps, and skin twitches were observed in response to fly bite.

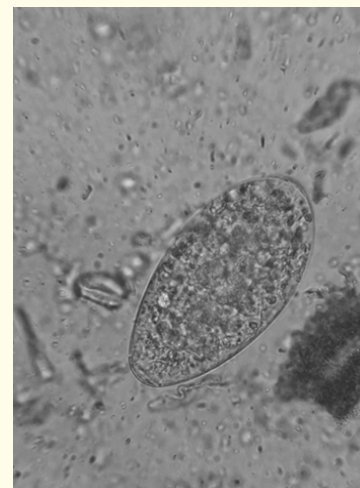


Figure 1: Egg of *Amphiostome* spp.



Figure 2: *Haematobia* spp- Gross.

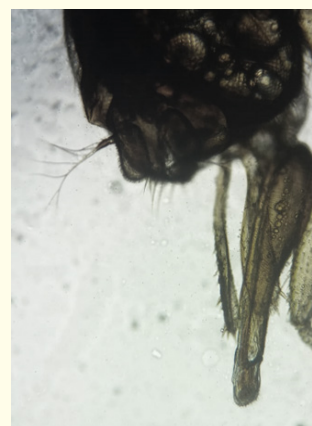


Figure 3: Arista of *Haematobia* spp

The prevalence of amphistomosis is influenced by two key factors: the abundance of infected definitive hosts and the population of snail intermediate hosts. Consequently, the epidemiology and seasonal patterns of Amphistome infections are significantly based on the availability of snail intermediate hosts and the grazing behaviors exhibited by the definitive hosts [15,16]. Phiri et al. [17] observed that the presence of wetlands and high livestock density correlates with an elevated risk of acquiring Amphistome infections. In our study adult animals exhibited no clinical effects of the disease despite presence of Amphistome spp. eggs in the faeces. Adult cattle serve as reservoirs of infection, releasing eggs into the environment and thereby increasing the vulnerability of young animals to both acute and subacute amphistomosis, particularly in regions with abundant populations of intermediate snail hosts [18]. In the study Amphistomosis in adult cattle is subclinical, hence in most cases treatment is not attempted previously, however, these infected animals could serve as carriers and spread the infection to the uninfected young population leading to acute infection. In ruminants, clinical amphistomosis is characterized by a range of symptoms including anorexia, anaemia, submandibular edema, hypoproteinemia, foul-smelling diarrhea, general weakness, increased thirst (polydipsia), reduced feed conversion efficiency, weight loss, decreased milk production, and increased mortality in young animals [19]. All the three calves diagnosed with amphistome eggs in the feces were presented with diarrhoea.

According to previous research conducted by [20], it has been observed that cattle exhibit certain behaviors to avoid flies. Two commonly observed behaviors are tail flicking and skin twitching. These behaviors are considered fly avoidance activities and are reported to be less energy-intensive for cattle. These behaviors are believed to be the cattle's way of trying to deter or ward off the flies that bother them. The advantage of these behaviors is that they require less energy compared to other forms of fly avoidance activities. By engaging in tail flicking and skin twitching, cattle can potentially reduce the annoyance caused by flies without expending excessive energy. Research conducted by Mullen, et al. [21] examined the behavior of cows with varying levels of infestation by buffalo flies. The study found that highly infested cows exhibited a higher frequency of head throws and leg stamps compared to cows with moderate or low infestations. Head-throwing behavior was observed as a more energy-intensive and less frequently used act performed by cattle to avoid flies. The findings of the study indicate that buffalo fly infestation can lead to a higher energy loss in cattle. The increased use of energy-intensive behaviors like head

throws implies that the infested cows are expending more energy to cope with the flies, potentially affecting their overall energy balance and well-being [22]. The economic consequences of horn fly infestations on cattle extend beyond the mere annoyance. The detrimental effects are predominantly manifested through their impact on animal production, ultimately leading to substantial economic losses [23]. The Umbalachery cattle breed is reared in an extensive grazing system, and the cattle included in the study are grazed near water resources. Extensive grazing areas, characterized by vast and undisturbed landscapes, provide an ideal environment for the development, proliferation of horn fly populations and serve as reservoirs for horn fly infestations. This observation, as reported by Sjostrom et al. [24] highlights the significance of these areas in facilitating the growth and persistence of horn fly populations in cattle dung. The undisturbed nature of extensive grazing areas allows for the accumulation of cattle dung over time. Horn flies depend on fresh dung as a crucial breeding and feeding resource. Suitable breeding sites in extensive grazing areas promote the uninterrupted development of horn fly populations. This unrestricted breeding and development contribute to the persistence and increase in horn fly populations within these areas. While intensive production systems, such as feedlots and confined dairy operations, the prevalence of adult horn fly populations on cattle is notably low. This can be attributed to the regular movements for feeding and drinking disrupting the integrity of cattle dung, rendering the dung pats unsuitable or, at best, subpar for optimal horn fly development [25]. Also, the management practices employed in these systems such as periodical removal of dung material from the ground effectively disrupt the life cycle of the horn flies.

Conclusion

In conclusion, the prevalence of both Amphistomes and horn flies in the studied area was found to be significant. Given their presence, it is crucial to ensure that the anthelmintics used are effective against amphistomes, thus enabling effective control and management of these parasites. Also, It is strongly advised to implement restrictions on the grazing of cattle near water bodies during the summer and rainy seasons, due to the favorable environmental conditions, which promote the development of *Amphistome* spp. larvae within snail intermediate hosts. The Umbalachery breed holds significant importance in agriculture and rural livelihoods. Hence, regular monitoring and prompt treatment can help mitigate the impact of these parasitic infections on ruminant health and productivity. It is imperative to address the impact of buffalo flies

on cattle due to their economic importance and the potential harm they cause. Accurately quantifying these losses remains essential due to the significant value that the Umbalachery breed holds as a vital revenue source in the study area.

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