**Case Report**

**Coccidiosis Outbreak in an Intensive Exotic Crossbred Sheep Farm in Bangladesh**

**Abstract:**

An outbreak of coccidiosis occurred in an exotic intensive crossbred sheep farm in Bangladesh during April 2024. The affected animals showed clinical signs of bloody diarrhea, dehydration, weakness, and anorexia. All the animals were mature adults, and the morbidity rate was 14.29% with no mortality. The fecal oocyst count revealed >5000 oocysts/g of feces, indicative of clinical coccidiosis. The sick animals were isolated immediately and treated with combined coccidiostats with Amprolium and Sulfaquinoxaline for five days. The healthy animals were provided with a preventive dose for seven days. Strict biosecurity was maintained, and cleaning of the shed was strengthened. No correlation was found between age, sex, and breed and the occurrence of coccidiosis. It was evident that the heat wave of April 2024 played a contributing role, whereas stocking density suddenly surged due to the lambing season of that year. Monitoring of the oocyst count in the feces was performed for two weeks post-treatment period. As the months of April-May 2025 didn’t experience heat waves like the previous year, and the animals were more evenly managed, clinical coccidiosis didn’t occur this year. This is the first report of a coccidiosis outbreak in sheep with some new dimensions of disease occurrence, which was successfully managed. These incidents warrant a record for the use of future correspondence by veterinarians, epidemiologists, and farm managers.

**Key Words: Coccidiosis, Outbreak, Sheep**

**Introduction:**

Coccidiosis is caused by the protozoa *Eimeria* spp that destroy intestinal epithelium, causing bloody diarrhea in sheep of all ages, but lambs are particularly vulnerable, whereas the adults act as the source of infection(Foreyt, 1986). There are currently eleven species causing disease in sheep, but *E. ahsata*, *E. ovina*, and *E. ovinoidalis* are the most pathogenic(Andrews, 2013; Levine, 1982). The frequency and distribution of the pathogenic species vary widely from region to region; hence, speciation is important and requires skilled personnel (Karim MJ et al., 1992; Karimzadeh et al., 2022; Sunday et al., 2025). Diagnosis is quite difficult due to concomitant infections; hence, clinical signs, epidemiology, fecal oocyst count, necropsy, and, most importantly, the response to treatment should be considered for confirmation.

Clinical coccidiosis in sheep is rarely reported in Bangladesh (Hossain et al., 2021; Islam & Taimur, 2008; Karim et al., 1992). Though there are no specific reports available, some researches were performed targeting gastrointestinal diseases of sheep and investigating causations that found mixed infection by Eimeria spp. and other parasites. Here, we first report a coccidiosis outbreak in a sheep farm that houses crossbred sheep (native coastal× exotic pure) for adaptation purposes. It was improbable that only the adults were infected (Andrews, 2022). The treatment cost accounted for approximately $ 200 during the ten-day management period. The morbidity rate was 14.29% (15/105), but no mortality. This sheep farm housed pure breeds (Parendale, Suffolk, and Dorper) imported from Australia to develop adaptive crossbreds. The sheds were scientifically structured to ensure maximum air circulation and sunlight. The animals were penned age-wise (lambs with nursing mothers, growing animals, and mature adults) to allow for best management and nutrition. The overall disease incidence in this flock was below 2%, and most of them were metabolic and nutritional diseases due to following strict biosecurity guidelines. After 10 years of adaptation, the animals became well-tolerant of the hot-humid climate. At this point, the peculiarity of such an outbreak warranted proper recording with a key flock-based management strategy to prevent future outbreaks.

**Presentation of the Case:**

On 15th April 2024, a sudden onset of bloody diarrhea was observed in a seventeen-month-old crossbred female sheep accompanied by tenesmus, mild dullness, inappetence, and dehydration. Bloody diarrhea ceased within 2 days of treatment, but mild diarrhea persisted for an additional 2 days. On 17th April, similar symptoms were observed in two more adult male crossbreds of an adjacent pen, followed by another pen on the next day. In total, fifteen sheep were affected within three days of the onset of clinical signs. The lambs remained unaffected throughout the period. From the clinical symptoms, the disease was presumptively diagnosed as coccidiosis (Andrews, 2022). The severely affected animals went off-feed, followed by somnolence, with typical signs of dehydration. The fecal samples were taken directly from the rectum of ailing individuals and brought into the parasitology laboratory for analysis. According to the standard methodology (Ryley et al., 1976), saturated salt flotation technique was employed, and >5000 *Eimeria* spp. oocysts/g of feces (Figure 1) were counted in each sample obtained from affected sheep, which was interpreted as clinical coccidiosis (Andrews, 2022). The samples were also screened for the presence of any concomitant parasitic eggs (especially *Nematodirus battus*) and found negative. As the typicality of disease presentation, diagnosis, and treatment outcome confirmed the clinical coccidiosis, the differential diagnosis was deemed unnecessary. Yet, it should have been performed, but we lacked sufficient resources. Further bacteriological or virological tests were also not conducted to exclude any co-infection of salmonellosis, enterotoxemia, or rotavirus. The post-mortem examination couldn’t be performed since no mortality was encountered.

All the animals from the affected pen were immediately transferred to the isolation shed, while the symptomatic animals were separated and treated with coccidiostats (Amprolium & Sulfaquinoxaline), astringent mixtures, and oral rehydration salts for five consecutive days (Horak et al., 1969). The asymptomatic animals, which were housed with the affected ones in the same pen, were grouped together, and only coccidiostats were provided. The recumbent and severely dehydrated animals were provided with intravenous 5% dextrose saline twice daily for three days. The concentrate was fully restricted for three days during the treatment period to speed up the intestinal mucosal recovery (Godala et al., 2022). All the treated animals showed great signs of improvement, with complete cessation of diarrhea after three days of treatment. The active ingredients and dosage information of the drugs used had been provided in Table 1. After five days, five animals (30%) of the treatment group were randomly selected, and fecal samples were tested for the Fecal Oocyst Count Reduction Test using the McMaster method. On average, this treatment protocol reduced up to 91.5% of oocysts/g of feces in the tested samples after five days, whereas another study found 93.8% after eight days(Ashraf, 2023). The slight difference might be the reason for the two days’ shorter duration of treatment as per the manufacturer’s instruction in our report.

As most of the animals were pure foreign blood, preventive measure was taken simultaneously for the remaining healthy animals by administering a half-dose of the same coccidiostats for seven days through feed mixing. The flock was closely monitored for any signs of bloody diarrhea for seven days post-treatment. Following the end of treatment, 20% of animals were transferred to another shed to reduce stocking density. During the heat wave episodes, spraying of water on hanging jute sacks on the grill of the pens was performed every two-hour interval from 10.00 am to 06.00 pm (Figure 2). Oral rehydration mixed with drinking water was continued for seven more days to reduce stress, until the severe heat wave ceased around mid-May 2024.

**Discussion:**

This is the first report of a coccidiosis outbreak in a sheep farm in Bangladesh. The affected animals neither had any predisposing factors nor had this farm experienced such an incident before. The occurrence of clinical coccidiosis in small ruminants depends on various stress-related factors, the extent of contamination, and exposure to infection(Hundal et al., 2025). Besides, there are age factors where lambs are mainly affected, which can be devastating if they can’t be controlled. Here, we report that the disease under our watch took a different course, infecting only the adults, and no subsequent infection was found in lambs. Though we couldn’t find any associated reason, it might be the prompt isolation and aggressive treatment, and management by the resident veterinarians that limited protozoan sporulation and reinfection, which ultimately controlled the outbreak and saved the lambs from infection (Das et al., 2025). Besides, the attendants were strictly monitored to ensure their visit to the isolation shed at last. Moreover, a preventive dosage was administered to the healthy animals that ensured their safety from being infected. The usual treatment guideline recommends the use of amprolium 50 mg/kg body weight for three to four weeks (Andrews, 2022), but we followed the manufacturer’s guideline for the drugs used in Bangladesh (MedEx, 2025) which is a combined preparation of amprolium, sulfaquinoxaline, and ethopabate (Chapman & Rathinam, 2022). This combination is an excellent option as sulfaquinoxaline acts as both a coccidiostat and antimicrobial that potentially prevent secondary bacterial infection and ethopabate broadens the spectrum of activity of coccidiostats to counter any drug resistance *Eimeria* spp (Chapman HD, 1980; Ryley JF, 1981).

While investigating the reasons, the incidence of extreme temperature was taken into consideration as the timing of the outbreak was in mid-April, which is usually the hottest month of the year (Haque et al., 2024). Though scientific nutrition management, wide-spacious shed architecture, 24-hr fresh drinking water, and an electric fan for each pen allowed the best comfort possible during the hotter months, the incident that happened during the lambing season urged us to dig deeper into the farm record book. It was found that the population growth rate doubled in April 2024 (8.24%) than 2023 (4%). Besides the lambing season (Feb-Mar-Apr) of the year 2024 experienced a four times higher overall growth rate in 2024 (22.09%) than in 2023 (5.4%). As culling was not performed during this period to raise the number of certain breeding lines, the stocking density suddenly increased in April 2024, which created an uncomfortable atmosphere in the shed. Moreover, multiple episodes of heatwaves swept over the country from mid-April 2024 until mid-May, which put more stress on the animals (ReliefWeb, 2024).Such a hot-humid atmosphere is extremely favorable for sporulation of oocysts, which become infective within two to three days of fecal shedding. These typical contributing factors might cause the outbreak all of a sudden. The demographic factors, like age, sex, and stage of reproduction of the animals, were not statistically associated with the outbreak.

It was predicted that the pre-monsoon summer season, especially the time between April and June, with most in May, would be the time of heatwaves sweeping around the country, but the temperature remained <37⁰C most of the time, while elevating to 40⁰C for just two days (Nissan et al., 2017). There was no coccidiosis case encountered during the period from mid-April to mid-May 2025. This could be suggestive that continuity of atmospheric temperature >40⁰C could be an important factor for the occurrence of coccidiosis outbreaks in intensive crossbred sheep farms. As we reached a cause-and-effect conclusion based on circumstantial evidence, we waited one year for the publication of this case report to verify those inferences.

In fine, it was reasonable to conclude that coccidiosis outbreaks can occur in sheep irrespective of age, sex, and other predispositions if extreme temperature and humidity put stress on the densely populated flock and favor the protozoan sporulation to cause reinfection. Though single preparations of coccidiostats were available, a combined preparation with vitamins for blood coagulation (Vit K) and stress reduction (Vit C) was preferred to treat the flock immediately. The outbreak was successfully managed by prompt isolation, treatment, and strict biosecurity measures. It is quite a triumph that no mortality occurred.

**Conclusion:**

The continuous, extremely hot-humid surface temperature could cause coccidiosis outbreaks in adult crossbred sheep. Immediate isolation and treatment strategy could prevent havoc, but it is best to reduce stocking density and take extra measures to cool down the temperature, especially during the hot-humid lambing season. This management approach is very simple, and the theme could be adopted in any resource-limited setting with proper consultation of the veterinarians.

**Competing Interest:**

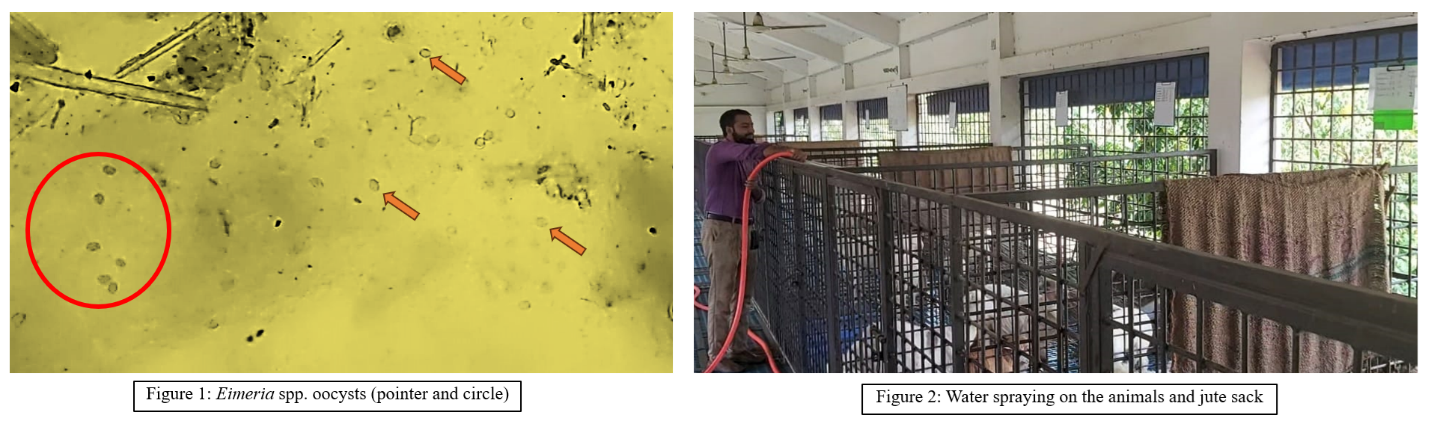
The authors declare no competing interests.

**Ethical approval:**

The ethical approval was not applicable because the case involved standard treatment by the resident veterinarian (as per correspondence) with no experimental procedures.

Table 1: Active ingredients and dosage of the drugs used during outbreak management

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl** | **Active Ingredients** | **Drug Class** | **Dosage** |
| 1 | Amprolium, Ethopabate, Sulfaquinoxaline, Vitamin K3 & C | Coccidiostat | 60mg/kg Body Wt. once in 24 hrs. for five days  Preventive: 30mg/kg Body Wt. in feed once in 24 hrs. for seven days. |
| 2 | Astringents (Chalk, Catechu, Kaolin, Alum, Sweet Chestnut) | Antidiarrheal | 60 gm/1kg Feed, 2 times daily for 5 days |
| 3 | Glucose anhydrous and rehydration salts | Oral Rehydration | 25 gm/20L Drinking Water for 5 days |



Disclaimer (Artificial intelligence)

We hereby declare that no generative AI technologies were used in drafting this manuscript.

**References:**

Andrews AH. Some aspects of coccidiosis in sheep and goats. Small Rumin Res. 2013;110 (2–3):93–95. doi:10.1016/j. smallrumres.2012.11.011.

Andrews AH. Coccidiosis of sheep. Accessed at May 23, 2025. Available from: <https://www.merckvetmanual.com/digestive-system/coccidiosis/coccidiosis-of-sheep>([Merck Veterinary Manual](https://www.merckvetmanual.com/digestive-system/coccidiosis/coccidiosis-of-sheep?utm_source=chatgpt.com))

Ashraf A, Raza W, Zafar B, Khan A, Iqbal M. Comparative efficacy of allopathic and herbal drugs in sheep naturally infected with coccidiosis. Res Vet Sci. 2023;164. doi:10.1016/j.rvsc.2023.105001.

Chapman HD. Studies on the sensitivity of field isolates of Eimeria maxima to combinations of anticoccidial drugs. Avian Pathology. 1980;9(1): 67-76.

Chapman HD & Rathinam T. Focused review: the role of drug combinations for the control of coccidiosis in commercially reared chickens. International Journal for Parasitology: Drugs and Drug Resistance. 2022;18: 32-42.

Das B, Sivajothi S, Parsani HR, Suthar AN. Coccidiosis. Elements of Reproduction and Reproductive Diseases of Goats. Wiley Online Library; 2025.501–516. doi:10.1002/9781394190089.ch45.

Foreyt WJ. Epidemiology and control of coccidia in sheep. Vet Clin North Am Food Anim Pract. 1986;2(2):383–8. doi:10.1016/S0749-0720(15)31249-4.

Godala M, Gaszyńska E, Zatorski H, Małecka-Wojciesko E. Dietary interventions in inflammatory bowel disease. Nutrients. 2022;14(20):4261. doi:10.3390/nu14204261.

Haque F, Lampe FC, Hajat S, Stavrianaki K, Hasan SMT, Faruque ASG, et al. Is heat wave a predictor of diarrhoea in Dhaka, Bangladesh? A time-series analysis in a South Asian tropical monsoon climate. PLOS Glob Public Health. 2024;4(9). doi:10.1371/journal.pgph.0003629.

Horak IG, Raymond SM, Louw JP. The use of amprolium in the treatment of coccidiosis in domestic ruminants. J S Afr Vet Assoc. 1969;40(3):293–9.

Hossain MS, Sultana NN, Akter S, Labony SS, Anisuzzaman. A retrospective survey of gastrointestinal parasites in livestock of hilly areas in Mymensingh. J Bangladesh Agric Univ. 2021;19(3):332–9. doi:10.5455/JBAU.93883.

Hundal RS, Singla LD, Kaur P, Nimbalkar V, Bal MS. Epidemiology and associated risk factors of coccidiosis in small ruminants of northern Punjab, India. Indian J Small Rumin. 2025;31(1):55–60. doi:10.5958/0973-9718.2025.00013.9.

Islam KBMS, Taimur MJFA. Helminthic and protozoan internal parasitic infections in free ranging small ruminants of Bangladesh. Slov Vet Res. 2008;45(2):67–72.

Karim MJ, Begum N, Rahman MH. Age susceptibility and seasonal dynamics of coccidiosis in cattle and sheep. Bangladesh Vet. 1992;7(1):22–6.

Karimzadeh, M., Kojouri, G., Azizi, H., Pirali, Y., & Shiran, B. (2022). Small Ruminants Coccidiosis in High Altitude Region of Iran. Asian Research Journal of Agriculture, 15(4), 116–123. https://doi.org/10.9734/arja/2022/v15i430174

Levine ND. Taxonomy and life cycles of coccidia. In: Long PL, editor. The Biology of the Coccidia. Baltimore (MD): University Park Press; 1982. p. 1–33.

MedEx, Amprol-EP Vet Powder for Solution. Accessed on 21 May 2025. Accessed at https://medex.com.bd/brands/31791/amprol-ep-vet-powder-for-solution

Nissan H, Burkart K, de Perez EC, Van Aalst M, Mason S. Defining and predicting heat waves in Bangladesh. J Appl Meteorol Climatol. 2017;56(10):2653–70. doi:10.1175/JAMC-D-17-0035.1.

ReliefWeb. Bangladesh: Heat Wave - Apr 2024. ReliefWeb; 2024. Accessed on 2025 May 23. Available from: <https://reliefweb.int/disaster/ht-2024-000056-bgd>.

Ryley JF, Meade R, Hazelhurst J, Robinson TE. Methods in coccidiosis research: separation of oocysts from faeces. Parasitology. 1976;73(3):311–326.