

Mixed Intestinal Coccidiosis in *Columba livia* and Its Therapeutic Management

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Abstract

Coccidiosis is an important protozoan disease of pigeons causing considerable morbidity and mortality, particularly in young birds. Three young domestic pigeons from a flock with high mortality were presented with severe diarrhoea, inappetence, weight loss and weakness. Parasitological examination of faecal samples revealed mixed infection with *Eimeria columbae* and *Eimeria tropicalis* confirmed based on oocyst morphology and sporulation characteristics. The affected pigeons and the flock were treated with toltrazuril 2.5% administered through drinking water along with supportive therapy and improved hygienic measures. Marked clinical improvement was observed within a few days with complete cessation of mortality and a significant reduction in oocyst shedding following treatment.

Keywords: Pigeon coccidiosis, *Eimeria columbae*, *Eimeria tropicalis*, Toltrazuril, anticoccidial

Coccidiosis is an important enteric parasitic disease affecting pigeons (*Columba livia*), caused primarily by protozoan parasites of the genus *Eimeria*, particularly *Eimeria columbarum*, *Eimeria tropicalis* and *Eimeria labbeana* (Soulsby, 1982). These parasites invade and multiply within the intestinal epithelium leading to mucosal damage and clinical manifestations ranging from subclinical infections to severe diarrhoea, weight loss, emaciation and increased mortality, especially in young squabs and susceptible flocks (Aboelhadid *et al.*, 2021). The present report describes mixed infection with *Eimeria columbae* and *Eimeria tropicalis* in domestic pigeons and its successful therapeutic management.

Three young domestic pigeons (*Columba livia*) were presented with a history of dullness, severe diarrhoea, complete inappetence, weight loss and progressive weakness. The owner reported that more than 12 pigeons from a flock of seventy had died previously showing similar clinical signs. On clinical examination, the affected birds showed ruffled feathers, dehydration, soiling of vent feathers with watery to greenish diarrhoeic droppings and marked emaciation. The birds were lethargic with reduced responsiveness. No neurological signs were observed.

Blood samples were collected aseptically from the wing vein into heparinized vacutainers for haematological analysis (Table. 1). Fresh faecal samples were collected directly from the cloaca for parasitological examination and the samples were subjected to sporulation using 2.5% potassium dichromate solution. Microscopic examination revealed the presence of numerous unsporulated oocysts of *Eimeria* species. Oocysts of *Eimeria columbae* were ovoid measuring 16.4 μm \times 14.3 μm with a thin, smooth wall (Fig. 1) and sporulated within four to five days at room temperature (Fig. 2), whereas *Eimeria tropicalis* oocysts were subspherical, measuring 19 -24 μm \times 18 -23 μm and sporulated within 40–48 hours under ambient conditions (Fig. 3,4).

Based on the clinical observations and laboratory findings, the affected pigeons were diagnosed with a mixed infection caused by *Eimeria columbae* and *Eimeria tropicalis*. The affected pigeons, along with the remaining birds in the flock, were treated with toltrazuril 2.5% administered through drinking water at a dose rate equivalent to 7 mg/kg body weight once daily for five consecutive days. In birds showing severe infection, the same treatment regimen was repeated after an interval of five days. Supportive therapy included oral multivitamin and electrolyte supplementation for seven days to correct dehydration and facilitate recovery. Following treatment, a marked improvement in appetite and activity levels

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was observed within 3–5 days. Diarrhoea gradually subsided and no further mortality was recorded in the flock. Post-treatment faecal examination revealed a marked reduction in oocyst shedding.

Table 1. Haematological values (n=3) of domestic pigeons affected with coccidiosis

Parameter	Values (n=3)	Reference Range*
RBC ($\times 10^6/\mu\text{L}$)	1.65 ± 0.07	2.5–4.5
Hemoglobin (g/dL)	9.57 ± 0.41	12–18
PCV (%)	32 ± 2	35–55
WBC ($\times 10^3/\mu\text{L}$)	5.20 ± 0.24	5–10
–Nuterophils	48 ± 2	20–45
– Lymphocytes	42 ± 2	50–75
– Monocytes	5.3 ± 0.6	0–5
– Eosinophils	2.7 ± 0.6	0–5
– Basophils	2 ± 0	0–1

* Orakpoghenor *et al.* (2021)

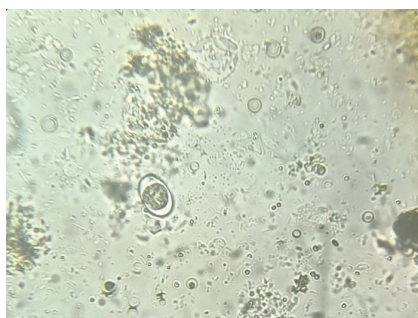


Fig. 1. Unsporulated oocyst of *Eimeria columbae* showing Ovoid shape thin wall (x40)

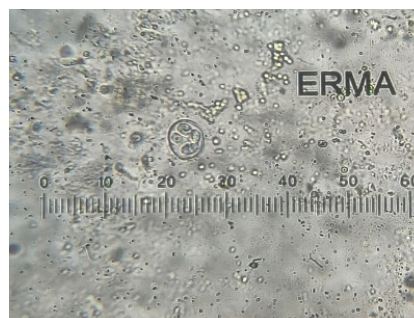


Fig. 2. Sporulated oocyst of *Eimeria columbae* showing 4 distinct sporocysts with refractile sporozoites (x40)

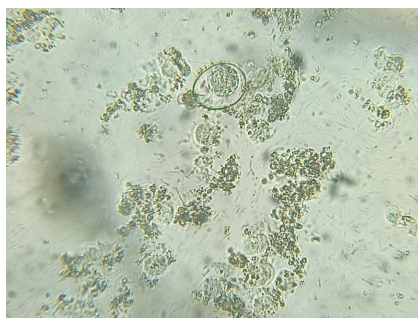


Fig. 3. Unsporulated oocyst of *Eimeria tropicalis* - sub-spherical, thin smooth wall (x40)



Fig. 4. Sporulated oocyst of *Eimeria tropicalis* showing 4 sporocysts with refractile sporozoites.

Coccidiosis remains one of the most common parasitic diseases affecting domestic pigeons worldwide, with reported prevalence ranging from approximately 5.1% to more than 70% in young birds, depending on management conditions and geographical

location. Young pigeons are particularly susceptible, and mortality rates have been documented between 5% and 70%, with most deaths occurring during the third and fourth months of life (Krautwald-Junghanns *et al.*, 2009). Mixed infections involving *Eimeria*

columbae, *Eimeria labbeana* and other related species are commonly reported, reflecting high environmental contamination and efficient faeco-oral transmission among flock members (Gurung and Subedi, 2018). Clinically, *Eimeria* infections are characterized by enteritis, diarrhoea, dehydration and poor growth, resulting from the invasion and multiplication of sporozoites within the intestinal epithelium (Soulsby, 1982). Therapeutically, toltrazuril has been shown in several studies to be highly effective in controlling avian coccidiosis. Its broad anticoccidial spectrum includes activity against both asexual (schizogony) and sexual (gametogony) intracellular developmental stages of *Eimeria*, which significantly reduces oocyst shedding and intestinal lesion severity compared with certain other anticoccidial agents (Lakkundi et al., 2014). Compared with older anticoccidial drugs such as sulfonamides and amprolium, the broader spectrum and prolonged efficacy of toltrazuril make it a preferred therapeutic option in clinical cases of pigeon coccidiosis.

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