

New *Eimeria* species in the endangered Amami rabbit, *Pentalagus furnessi* (Stone, 1900): Implications for conservation and parasitic diversity

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Abstract. The Amami rabbit, *Pentalagus furnessi* (Stone, 1900), an endangered species endemic to Amami Ōshima Island, hosts a unique parasitic fauna. Recent studies have identified three novel *Eimeria* species—*Eimeria amamiensis*, *Eimeria sagentae*, and *Eimeria hilleri*. These intracellular protozoan parasites infect the intestinal epithelium, potentially impacting the health and conservation of this rare lagomorph. By integrating morphological and molecular analyses, researchers have expanded the known diversity of *Eimeria* in *P. furnessi*. This article critically examines these findings, emphasizing their implications for conservation biology and host-parasite interactions.

Key Words: coccidiosis, conservation biology, *Eimeria*, *Pentalagus furnessi*, host-parasite interactions, parasite biodiversity, protozoan parasites.

Eimeria is a genus of intracellular protozoan parasites belonging to the family Eimeriidae, known to infect a wide range of vertebrate hosts, including mammals, birds, and reptiles. These parasites primarily colonize the intestinal epithelium, causing coccidiosis, a disease characterized by diarrhea, weight loss, dehydration, and, in severe cases, mortality, particularly in young or immunocompromised individuals (Bud et al 2011) (Figure 1). The purpose of this article is to critically analyze and contextualize recent findings on newly identified *Eimeria* species in the endangered Amami rabbit, *Pentalagus furnessi* (Stone, 1900), emphasizing their significance for conservation efforts and the broader understanding of host-parasite interactions.

In a recent study titled "Three new species of *Eimeria* (Apicomplexa: Eimeriidae) from the Amami rabbit, *Pentalagus furnessi* (Mammalia: Leporidae)," published in the International Journal for Parasitology: Parasites and Wildlife, researchers Toshihiro Tokiwa, Shyun Chou, Hina Kitazoe, Keiko Ito, Ryouta Torimoto, and colleagues focused on identifying and describing new coccidian parasites infecting the Amami rabbit (*P. furnessi*), an endangered species (Păpuc & Proorocu 2023) endemic to Amami Ōshima Island in Japan (Hamada & Mizuta 2020). Given the limited knowledge about the parasitic fauna of this rare lagomorph, Tokiwa et al (2022) aimed to enhance understanding of its parasitic diversity, which is crucial for conservation efforts.



Figure 1. Hepatic coccidiosis in the host species *Oryctolagus cuniculus* (Linnaeus, 1758) (original pictures).

Tokiwa et al (2022) collected fecal samples from Amami rabbits in their natural habitat. Through microscopic examination, they identified oocysts—resilient stages in the life cycle of coccidian parasites. Detailed morphological analyses, including measurements and structural assessments, were conducted to differentiate and characterize the oocysts. Additionally, molecular techniques, such as polymerase chain reaction (PCR) amplification and sequencing of specific genetic markers, were employed to support species identification and explore phylogenetic relationships (Tokiwa et al 2022).

The study led to the discovery and description of three novel *Eimeria* species: *Eimeria amamiensis*, *Eimeria sagentae*, and *Eimeria hilleri* (Figure 2). Each species exhibited distinct morphological features, such as oocyst size, shape, and wall structure (Tokiwa et al 2022). Molecular analyses corroborated these findings, revealing unique genetic sequences for each species and placing them within the phylogenetic framework of the genus *Eimeria* (Tokiwa et al 2022). These results expanded the known diversity of coccidian parasites associated with the Amami rabbit.

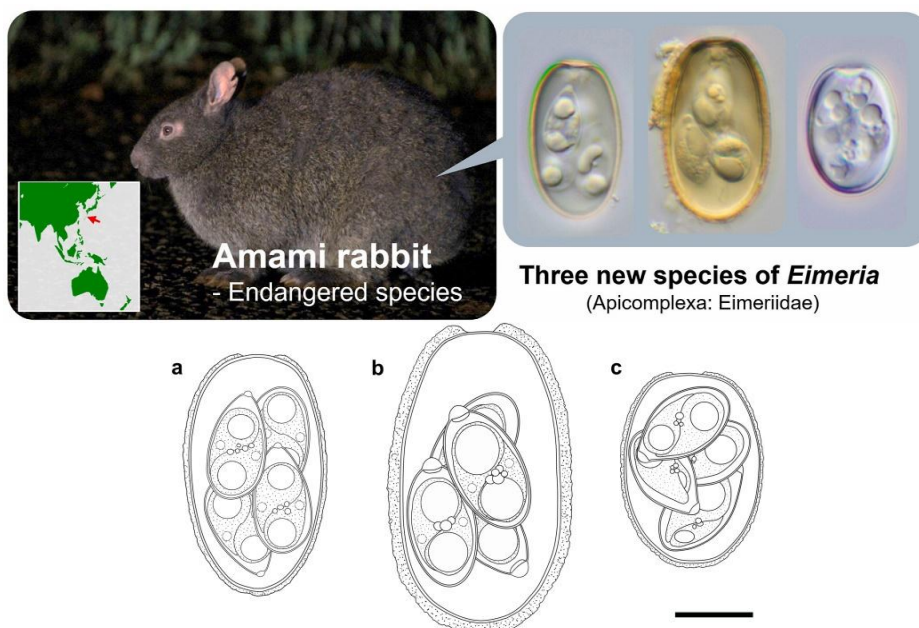


Figure 2. *Eimeria* species detected in the Amami rabbit; (a) *Eimeria furnessi*; (b) *Eimeria hilleri*; (c) *Eimeria sagentae*; scale bar = 10 μm (source: Tokiwa et al 2022).

The identification of these new *Eimeria* species has significant implications for the conservation of the Amami rabbit. Understanding the parasitic organisms that infect this endangered species is vital for assessing potential health risks and developing management strategies. The study provides baseline data that can inform future research on host-parasite interactions, disease dynamics, and the impact of parasitism on the conservation of endangered mammals. Moreover, the integration of morphological and molecular approaches in this research highlights the importance of comprehensive methodologies in accurately identifying and describing parasite biodiversity.

Conflict of Interest. The authors declare that there is no conflict of interest.

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