

**Proceedings of the
2nd European South-American
Camelid Congress
Vol. 2: Short & poster presentations**

hosted by:



5 & 6 September 2025

Churchill College, Cambridge (UK)

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Eimeria spp. infections in South American camelids bred in Switzerland

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Introduction

South American camelids (SACs) are commonly infected with *Eimeria* species. Five species have been described in alpacas and llamas: *Eimeria macusaniensis*, *Eimeria ivitaensis*, *Eimeria lamae*, *Eimeria alpaca*, and *Eimeria punoensis*. Among these, *E. macusaniensis* is considered the most pathogenic species, although *E. lamae* and *E. ivitaensis* may also be associated with clinical disease. The most frequently reported clinical signs include lethargy, diarrhea, abdominal distention, anorexia, weight loss, colic, and death.

In Switzerland, the popularity and number of SACs has increased markedly in recent years, growing from an estimated 1,622 animals (623 alpacas and 999 llamas) in the early 2000s to 6,871 (4,073 alpacas and 2,798 llamas) in 2024. While traditionally kept for fibre and meat, SACs are now also used for landscape maintenance, trekking, animal-assisted activities and therapy, as companion animals, and, in the case of llamas, as guard animals for sheep herds against lynx predation.

Aims & objectives

The objective was to identify and assess the frequency of occurrence of the different *Eimeria* species in SACs bred in Switzerland.

Materials & methods

A total of 596 faecal samples from SACs — comprising 515 alpacas and 81 llamas — were received between 2017 and 2025 and analysed at the Institute of Parasitology in Bern for endoparasites. Examination was performed using flotation with a zinc-chloride solution (specific gravity 1.45) and sedimentation techniques. The samples derived from animals of different age groups: juveniles (<1 year; n= 61, 10.2%), sub-adults (1-2 years; n= 31, 5.2%) and adults (>2 years; n= 504, 84.6%).

Results

Eimeria spp. were detected in 57.7% (344/596) of the samples, with a higher prevalence in alpacas (59.2%; 305/515) than llamas (48.1%; 39/81). Infection rates varied by age: 80.3% (49/61) in juveniles, 61.3% (19/31) in sub-adults and 54.8% (276/504) in adults. *E. punoensis* was identified in 80.5% (n=277), *E. alpaca* in 60.4% (n=220), *E. lamae* in 12.5% (n=43), and *E. macusaniensis* in 14.0% (n=48) of the positive samples as mono- or mixed infections including two to four species. No oocysts of *E. ivitaensis* were detected.

When categorized by age, *E. lamae* was found in 19.7% (12/61) of juveniles, 9.7% (3/31) of sub-adults, and 3.4% (17/504) of adults, while *E. macusaniensis* appeared in 23.0% (14/61) of juveniles, 12.9% (4/31) of sub-adults, and 5.4% (27/504) of adults. Overall, juvenile animals were more frequently infected than older age groups.

Flotation and sedimentation techniques allowed detection of *E. macusaniensis* in 35/48 and 34/48 positive samples, respectively, showing moderate agreement between methods (Kappa = 0.585).

Conclusions

Four of the five described *Eimeria* species were detected in SACs in Switzerland. Juvenile SACs showed a significantly higher prevalence of *Eimeria* spp. infections—including the pathogenic species *E. macusaniensis* and *E. lamae*—suggesting age as a key risk factor for coccidiosis. The combined use of flotation and sedimentation techniques improved the detection of *E. macusaniensis*, yielding more positive samples than either method alone. Identifying oocysts at the species level is crucial for accurate diagnosis and management of coccidiosis in SACs, especially considering that certain species like *E. macusaniensis* and *E. lamae* are more pathogenic and pose a greater risk.

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