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Occurrence and molecular characterization of *Cryptosporidium* spp., *Giardia duodenalis*, and *Enterocytozoon bieneusi* from Tibetan sheep in Gansu, China

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Abstract

Cryptosporidium spp., *Giardia duodenalis*, and *Enterocytozoon bieneusi* are globally ubiquitous pathogens. However, little is known about the occurrence and distribution of *Cryptosporidium* spp., *G. duodenalis*, and *E. bieneusi* in Tibetan sheep. In the present study, fecal specimens of 177 Tibetan sheep were examined by nested PCR. 4.5% (n=8), 1.7% (n=3) and 34.5% (n=61) of the Tibetan sheep were positive for *Cryptosporidium* spp., *G. duodenalis*, and *E. bieneusi*, respectively. *Cryptosporidium ubiquitum* was the only species found by small subunit (SSU) rRNA-based PCR, and subtyping of *C. ubiquitum* (n=6) by 60-kDa glycoprotein (gp60) revealed that all positive isolates belonged to zoonotic XIIa subtype 2. Multilocus genotyping at the

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