# **Titre d’article**: Molecular characterization of zoonotic Cryptosporidium spp. and Giardia duodenalis pathogens in Algerian sheep

**Abstract :**

Little is known about the presence of Cryptosporidium spp. and Giardia duodenalis in Algerian sheep, nor their potential role as zoonotic reservoirs. This study aimed to investigate the occurrence and distribution of these two protists in lambs. A total of 83 fecal samples were collected from lambs (< 40 days old) from 14 different farms. Samples were screened for Cryptosporidium spp. and Giardia duodenalis presence using immunofluorescent techniques (IF). Nested PCR of the small subunit ribosomal RNA (rRNA) gene, followed by restriction fragment length polymorphism (PCR-RFLP) and sequence analyses were used to identify Cryptosporidium species. C. parvum was further subtyped by sequencing the highly polymorphic 60 kDa glycoprotein (gp60) gene. For G. duodenalis, nested PCR of the glutamate dehydrogenase (gdh) and triose phosphate isomerase (tpi) genes was performed and then PCR-RFLP was used to identify G. duodenalis assemblages. Cryptosporidium oocysts and Giardia cysts were detected in 36/83 (43%) and 23/83 (28%) of fecal samples, respectively. Of the 21/36 (58%) Cryptosporidium samples that were positive with IF, 16/21 (76%) were identified as C. parvum, and 5/21 (24%) as C. ubiquitum. From 15C. parvum isolates, 2 subtypes were identified within the IIa subtype family, including IIaA21G2R1 (3/15) and IIaA13G2R1 (1/15), while IIdA16G1 (11/15) was the only subtype identified from the IId subtype family. Of the 16/23 (69%) G. duodenalis IF-positive samples, the most frequent assemblage was ruminant-specific assemblage E (10/16), followed by assemblage D (4/16), and A + E mixed assemblages (2/ 16). This study is the first to identify and genotype both Cryptosporidium spp. and Giardia duodenalis in Algerian lambs, and is also the first to describe G. duodenalis assemblage D in small ruminants. The presence of zoonotic C. parvum subtype families (IIa, IId), C. ubiquitum, as well as G. duodenalis assemblage A + E, indicates that sheep could play an important role as a potential reservoir for protists.