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SHORT COMMUNICATION

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Palmate newts *Lissotriton helveticus* infected with *Amphibiocystidum* sp. in France

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Infectious diseases are listed among the main causes of global species extinctions (Smith et al., 2006), especially in amphibians (Catenazzi, 2015) which are very sensitive to chytridiomycosis (Fisher & Garner, 2020), Ranavirus (Gray et al., 2009) as well as other viral or fungal pathogens and trematode flukes (Hoverman et al., 2012). The parasite *Amphibiocystidium* (Pascolini et al., 2003), a fungal-like protist on the animal-fungal boundary (González-Hernández et al., 2010) has been found in both frogs (Pascolini et al., 2003; Fagotti et al., 2019) and newts (Raffel et al., 2008; Courtois et al., 2013) in Western Europe and North America. The lesions that result from this infection mainly occur on the skin, which facilitates its detection (Courtois et al. 2013, González-Hernández et al., 2010), but internal organs, particularly the liver, may also be lethally affected (González-Hernández et al., 2010; Raffel et al., 2008). In France, this parasitosis has been reported in populations of palmate newt *Lissotriton helveticus* inhabiting areas with low human influence, in the Pyrenees (Ariège) (Courtois et al., 2013) and in Larzac (Aveyron) (González-Hernández et al., 2010). In this study, we report the case of these large skin lesions, characteristic of infection by *Amphibiocystidium* sp., in the palmate newt *Lissotriton helveticus* in a small forest pond at low altitudes in western France.

On 15 April 2022, around 21:30 h, we were pond netting in search of amphibians suffering from *Amphibiocystidium* sp. infection in two small forest ponds located about 150 m apart in Deux-Sèvres department, France (-0° 25'31.44" W, 46° 8'48.84" N, 70 m a.s.l.). We captured a total of 106 *L. helveticus* from both ponds (Table 1). In pond 1, of 69 specimens we detected eight infected females (12 %) and one infected male (1.4 %). Individuals presented lesions that resemble those of *Amphibiocystidium* (see Courtois et al., 2013), but the presence of the parasite was not formally tested for using DNA analysis. The lesions observed ranged from single or few cutaneous lesions to multiple coalescing skin ulcers (Fig. 1). In pond 2, of 37 *L. helveticus* none were infected. In the two ponds combined, we observed that 8.5 % of individuals were infected of these 7.5 % were female and 1 % male.

The prevalence of *Amphibiocystidium* sp. in newts can vary between populations or ponds. Courtois et al. (2013) investigated the prevalence of *Amphibiocystidium* sp. in nine populations of palmate newt and found that five populations had infected individuals (21 individuals out of 356 were

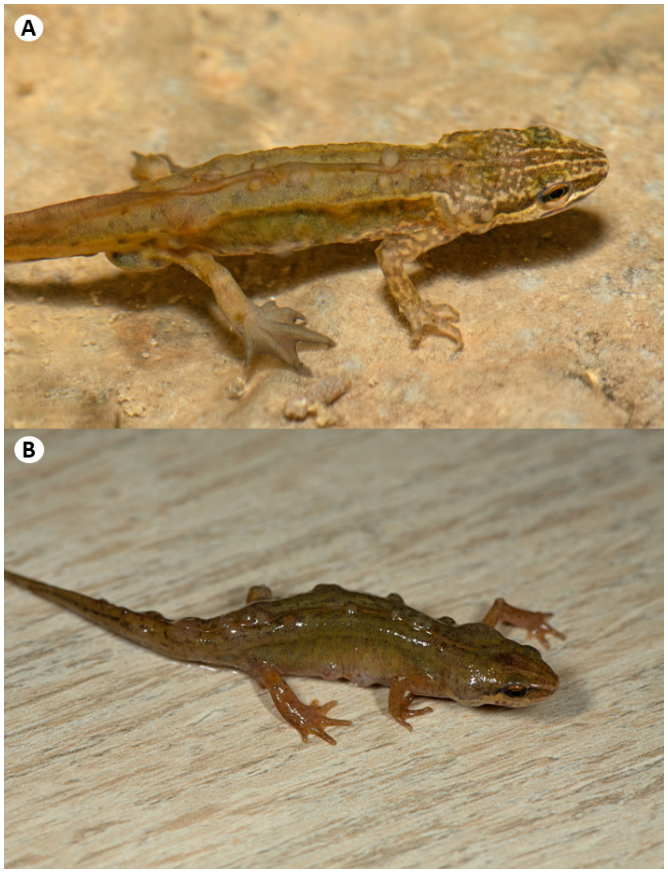

Figure 1. **A.** Male and **B.** female *Lissotriton helveticus* suspected to be infected with *Amphibiocystidium* sp. found in a pond in the Deux-Sèvres Department (Western France)

Table 1. Numbers of uninfected *Lissotriton helveticus* and those presumably infected with *Amphibiocystidium* sp, in two ponds in the Deux-Sèvres epartment (Western France)

	Male		Female		
	Uninfected	Infected	Uninfected	Infected	Totals
Pond 1	11	1	49	8	69
Pond 2	16	0	21	0	37
Totals	27	1	70	8	106

infected). In these populations, prevalence ranged from 2.5 to 25 % (mean ± sd 12.1 % ± 9.5 %). In our study, the difference in prevalence between two closely located ponds, 13 % in pond 1 and 0 % in pond 2, is puzzling and deserves specific investigations in order to understand the individual and environmental drivers of *Amphibiocystidium* infection.

The skin lesions of *Amphibiocystidium* infection may interfere with gas and water exchange through the skin (González-Hernández et al., 2010), increase the risk of secondary infections by other diseases and microorganisms, and the costs of immune responses may also be a trade-off with growth, maintenance, and reproduction (Raffel et al., 2008). Infection may reduce fitness and survival imperiling amphibian populations. Consequently, there is an urgent need to document both the potential impact of this pathogen on amphibian species as well as its geographical distribution.

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