

# Leptospirosis in Switzerland: Prevalence study in free-ranging wildlife

Nelson Marreros<sup>1</sup>, Zorée Djelouadji<sup>2</sup>, Daniel Hegglin<sup>3</sup>, Marie-Pierre Ryser-Degiorgis<sup>1</sup>

<sup>1</sup>Centre for Fish and Wildlife Health, Vetsuisse Faculty, University of Bern, <sup>2</sup>Vet. Agro. Sup., Campus vétérinaire de Lyon, Laboratoire des Leptospires, Marcy l'Etoile, France, <sup>3</sup>Institut für Parasitologie, Vetsuisse Faculty, University of Zurich

## Key words

Leptospirosis, prevalence, renal carriage, wildlife, Switzerland, zoonosis, wild boar, red fox, beaver, rodents

## Aim of the study

Leptospirosis is an emerging zoonosis in temperate regions. The emergence of this disease in domestic dogs and free-ranging beavers in Switzerland has raised concern about the existence of a reservoir in Swiss wildlife, about the factors driving disease emergence, and about the possible threat for domestic animals and humans. The main objective of this study was to document the occurrence of infections with leptospires in *a priori* most relevant wildlife taxa, namely rodents (including beavers), red fox and wild boar, and to attempt to: (i) evaluate their epidemiological role; (ii) identify geographic areas with higher infection risk; (iii) detect potential changes of prevalence over time; (iv) and identify other risk factors for infection.

## Material and methods

Archived and newly collected blood and kidney samples of selected wildlife taxa were analysed by micro-agglutination test (MAT) and PCR, respectively. A panel of 25 serovars belonging to 14 serogroups was used for the MAT. In total, 2617 animals were tested. Considered risk factors for infection included species, age, sex, season, sampling period (retrospective vs prospective) and geographical region. In addition Multi Spacer Typing was performed on 13 clinically affected beavers submitted to necropsy from 2010 through 2014.

## Results and significance

Seroprevalence differed between taxa (59% in beavers, 45% in foxes, 22% in wild boar, 5% in small rodents). Except for small rodents, PCR prevalence was lower than seroprevalence (23.7% beavers, 15.8% in small rodents, 5.8% in foxes, 1.6% in wild boar). Wild boar were more likely to be seropositive in the northern than in the southern population, and the risk to be seropositive increased with age in all taxa. The most relevant serogroups differed between species (Australis in red fox and wild boar; Ictohemorrhagiae in beaver and wild boar; Grippotyphosa in small rodents) and suggested the parallel occurrence of distinct epidemiological cycles. Overall, the data revealed that infection occur everywhere in Switzerland but the risk seems to be highest on the Swiss Plateau in the summer and fall months.

The lesions in necropsied beavers typically consisted in lung damages such as hemorrhages, presence of fibrin and edema, and kidney damages such as tubular degeneration, interstitial nephritis and fibrosis. Four different strains were detected including an undescribed strain. Our data revealed that the disease has not recently emerged in the beaver population but had formerly not been recognized. This is in accordance with the lack of significant differences of prevalence between the two sampling periods in other taxa.

Overall, the results indicate that wildlife is frequently in contact with leptospires in Switzerland but that shedding is uncommon in wild boar and foxes. Beavers seem more likely to be affected by the disease than to be asymptomatic carriers. In contrast, small rodents present characteristics of a reservoir and are the most likely source of leptospire infections in humans. Wild boar, foxes and domestic dogs on the one hand, and wild boar and beavers on the other hand, are apparently exposed to the same infection sources, which for the most differ from that of small rodents.

## Publications, posters and presentations

Schreiber, P.W.; Aceto, L.; Korach, R.; Marreros, N.; Ryser-Degiorgis, M-P, Günthard, H.F.; Cluster of leptospirosis acquired through river surfing in Switzerland. Open Forum Infect. Dis., 2015;2, doi: 10.1093/ofid/ofv102

Mavrot, F.; Angst, C.; Wimmershoff, J.; Lewis, F.; Marreros, N.; Ryser-Degiorgis, M-P; Spatial and temporal patterns of mortality in the Swiss beaver population; 11<sup>th</sup> EWDA Conference, Edinburgh, UK; August 25<sup>th</sup>-29<sup>th</sup> 2014

**Project** 1.14.01

**Project duration** December 2013-November 2015