Integrative approach and method harmonization in wildlife health surveillance: population dynamics and pathogen distribution in wild boar and red fox from Switzerland

Marie-Pierre Ryser-Degiorgis[1], Roman Kaspar Meier[1], Claude Fischer[2]
[1]Centre for Fish and Wildlife Health, Vetsuisse Faculty, University of Bern, [2]University of Applied Sciences of Western Switzerland, Dept. Nature Management

Key words
Aujeszky disease virus, Harmonized protocols, Population estimation, Red fox, Serosurvey, Wild boar, Wildlife health surveillance

Aim of the study
Effective wildlife health surveillance requires knowledge of host occurrence and abundance as well as the use of harmonized protocols. The aim of this project, which was embedded in an EMIDA EraNet project (www.aphaea.eu), were: (1) To develop, implement and encourage the use of harmonized procedures for wildlife population abundance estimation and disease diagnosis; (2) To provide data on red fox and wild boar abundance in Switzerland according to current records and harmonized procedures; (3) To provide new data on Aujeszky's disease virus (ADV) prevalence in wild boar and other wildlife pathogens in Switzerland.

Material and methods
In the framework of the APHAEA project, numerous experts in Europe carried out reviews on methods for population abundance estimation or disease diagnostics and proposed methods for harmonized investigations; colleagues involved in wildlife health surveillance could submit a feedback on the proposed protocols. In Switzerland, three methods (hunting bag analysis, feces counts, animal counts by thermal imaging) were evaluated for wild boar abundance estimation; similar hunting bag analysis was also done with fox data. Seroprevalence of ADV and bacteria of the *Mycobacterium tuberculosis* complex (MTBC) was estimated by ELISA in wild boar sampled from 2008-2012 and compared with data obtained with the same method for earlier periods and other countries. An ELISA for the detection of anti-*Sarcoptes scabiei* antibodies in pigs was evaluated for its use in wild boar (potentially future harmonized protocol). Finally, available data on wild boar health in Switzerland and neighboring countries were reviewed to assess the health risk posed by wild boar.

Results and significance
"APHAEA Species Cards" and "APHAEA Diagnostic Cards" including protocols for harmonization at large scale are now available through the APHAEA website. These cards are an important milestone for data harmonization on a continental scale. In Switzerland, feces counts and thermal imaging did not seem to be appropriate for routine use but graduated maps based on recorded dead wild boar suggested the highest relative abundance along the northern country border and in the south of Ticino, and a numeric increase and spatial expansion of the species over the past decade. By contrast, the reliability of data generated for fox is questionable. Seroprevalence for ADV (0.6%) and MTBC mycobacteria (2.4%) in wild boar was lower than previously documented. Overall, wild boar abundance and pathogen prevalence in this species appear to be lower in Switzerland than in many other countries. These data are useful to design health surveillance plans.

Publications, posters and presentations (selection)
Beerli, O.; Blatter, S.; Boadella, M.; Schöning, J.; Prohaska, S.; Ryser-Degiorgis, M.-P. 2015. Towards harmonized procedures in wildlife epidemiological investigations: A serosurvey of infections with *Mycobacterium b*ovis and closely related agents in wild boar (*Sus scrofa*) in Switzerland. Vet. J. 203: 131-133.

Haas, C.; Rossi, S.; Meier, R.K.; Ryser-Degiorgis, M.-P. 2015. Evaluation of a commercial ELISA for the detection of antibodies to *Sarcoptes scabiei* in wild boar (*Sus scrofa*). J. Wildl. Dis. 51(3): 729-733.

Meier, R.K.; Ruiz-Fons, F.; Ryser-Degiorgis, M.-P. 2015. A picture of trends in Aujeszky's disease virus exposure in wild boar in the Swiss and European context. BMC Vet. Res. 11:277, DOI 10.1186/s12917-015-0592-5.

Meier R.K. 2015. Investigations of health and abundance of free-ranging wild boar (*Sus scrofa*) in Switzerland in a European context. Dissertation, Vetsuisse Faculty, University of Bern, 118 pp.

Project *1.12.16*

Project duration *July 2012 - November 2015*