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Evaluation of the Belgian surveillance program for Bovine Brucellosis and Leucosis

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Belgium is officially free from bovine Brucellosis since 2003 and free from bovine Leucosis since 1999. In compliance with the OIE and EU regulations [Council Directive 64/432/EEC], a re-evaluation of the sampling scheme in frequency or in number was authorised. This study was carried out in order to determine a sampling protocol that would allow an optimal use of available resources and increase the detection sensitivity. Scenario trees, as described by Martin *et al.* [2007], were designed for Brucellosis and Leucosis. This study demonstrated how useful these models can be as tools for implementation by Member States of « risk-based » surveillance programmes with an acceptable statistical confidence level, in response to European and international standards.

First questionnaire-based assessment of the intradermal tuberculosis skin test performed in cattle by veterinary practitioners in the field

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Bovine tuberculosis remains a matter of serious concern in the European Union despite the implementation of eradication programs in Member States. The aim of this study was to develop a novel and practical methodology to evaluate TB skin testing practices in various regions and countries using an anonymous postal questionnaire sent out to Belgian veterinary bovine practitioners (N = 859). Several parameters regarding tuberculin skin testing were included and answers were evaluated by a scoring scale based on the opinion of international experts in the field of bovine tuberculosis. For each parameter, a score of 0 was recorded for the « ideal » answer, a score of 1 represented an acceptable answer, whilst a score of 2 was given to unacceptable answers. A global score was calculated for each participating veterinarian by summing up the scores for individual questions. The global score was then checked against the ideal null-score defined by the experts. The participation among contacted veterinarians was statistically representative (18.3%). Averages of global scores for the northern (21.66%) and southern (21.02%) parts of the country were not statistically different. In addition, their values were not null. These results may pave the way for harmonization of tuberculin testing in various regions and countries. New recommendations to the veterinary practitioners should be issued by the sanitary authorities and the questionnaire-based study should be repeated in a few years, after publication of these recommendations, in order to check on improvements in practice and adherence to the recommendations.

Farming conditions and practices linked to *Salmonella* prevalence in slaughter pigs

Isabelle Corrége, Anne Hémonic & B. Gouvars

This study was designed to identify farming conditions and practices associated with *Salmonella* prevalence in slaughter pigs, both in breeder-finisher and in finisher-only herds. The *Salmonella* serological status was determined in meat juice samples using the IDEXX kit. Data considered as potential risk factors for *Salmonella* prevalence were collected on the farms using a specific questionnaire. The statistical analysis was based on logistic regression models defined for the two types of pig farms. In breeder-finisher herds, farming conditions that appeared related to *Salmonella* prevalence were primarily the overall health status of the farm, prior veterinary treatments, liquid feeding of pregnant sows and fattening pigs, the condition of drinking pipes in post-weaning, pre-loading and loading conditions and adherence to cleaning and disinfection protocols. In fattening-only farms, the number of breeding units supplying weaners and the number of antibiotics treatments at the fattening stage appeared as risk factors.

Prioritization of foodborne zoonoses: Methodology and application to the Belgian situation

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A semi-quantitative methodology was developed to rank an extended list of foodborne zoonoses. Scores were given by 35 scientific experts in a standardised manner to 51 zoonotic agents based on five criteria related to public health (severity and occurrence in humans), impact on animal health (severity of disease coupled with economic consequences and occurrence in animals) and food (occurrence in food). Independently, the relative importance of the five criteria was weighted by 7 food chain risk managers. The zoonotic agents were ranked based on overall weighted scores and were grouped in four statistically different levels of importance. The following foodborne zoonotic pathogens were classified as « most important »: *Salmonella* spp., *Campylobacter* spp., *Listeria monocytogenes* and verocytotoxigenic *Escherichia coli* (VTEC). These results support the establishment of the annual monitoring programme. They also make it possible to identify knowledge gaps and to formulate key research questions.

Mortality study of small ruminants to evaluate the efficacy of the TSE surveillance system in Italy

Maria Cristina Bona, Maria Caramelli, Cristiana Maurella, Silvia Bertolini & G. Ru

Regulation (EC) 999/2001 and subsequent modifications fixed the rules for active surveillance plans on TSEs of sheep and goats in the EU Member States. To reach the sampling rate required by the European Commission, the Italian Ministry of Health adopted in April 2005 a program that provides for the systematic testing of all animals found dead. Even in Italy, the prevalence data by risk category (healthy slaughtered vs. animals found dead) confirmed that the chances of detection of the disease were much higher in rendering plants than in slaughterhouses. Our work was designed to check whether the geographic distribution of animals tested in rendering plants may be used to evaluate the efficacy of the monitoring system for scrapie. It was also designed to determine whether the level of surveillance in the various regions had been homogeneous over the years.

The Repamo network: a tool for health surveillance of reared and wild marine molluscs

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The Ifremer's Repamo network (REseau de PATHologie des MOllusques) is the national surveillance network in charge of monitoring marine mollusc health on French coastlines. It is commissioned to enforce the official regulations and to provide a public service, under the supervision of the competent authority (DGAL Veterinary Directorate) in the Ministry for Agriculture and Fisheries. Its goals are to prevent the introduction and the dissemination of infectious agents, in particular pathogens involved in reportable diseases, and to monitor the changes in the pathogens already present on the French coasts.

Study of the initial silent spread of foot-and-mouth disease in the French livestock network

Séverine Rautureau, Barbara Dufour & B. Durand

This study was designed to supply data for an analysis of the network of French livestock and to build a model of spread of foot-and-mouth disease in that network. The analysis focused specifically on the initial spread, prior to the detection of the disease. The first part consisted in collecting available data on livestock, particularly on livestock movements (recorded for cattle) and then to elaborate an evaluation of the initial spread of the disease, in terms of number of infected holdings and geographical extension. This model took into account the local spread as well as the remote spread associated with the movements of animals. The study was illustrated by a comparison of two areas where the disease was introduced: Brittany and the French South-eastern Mediterranean coast area. The intensity and the period of the initial spread were more important in Brittany, a region with high breeding density and higher movement activity.

Contribution of clinical epidemiology to the study of vegetative endocarditis in *equidae* (1994-2006)

Sarah R. Porter, C. Saegerman, Gaby Van Galen, Charlotte Sandersen, Catherine Delguste, H. Guyot & Hélène Amory

This study was designed to identify the risk factors in equine vegetative endocarditis. A total of 153 *equidae*, admitted to the equine hospital of Liège University, were included, 9 definitely infected with endocarditis and 144 with an initial differential diagnosis that included endocarditis but who were later confirmed free from the disease. A retrospective study was performed. The *equidae* infected with endocarditis were significantly younger (mean age= 4.84 ± 5.74 years) than non-infected *equidae* (mean age= 10.8 ± 7.73 years) (P=0.01). Hyperthermia (Odds ratio [OR] = 24.4; CI = 1.40-428), synovial distension (OR = 13.4; CI = 3.00-59.8), lameness (OR = 6.52; CI= 1.63- 26.1), hyperglobulinaemia (OR = 26.4; CI = 3.03-229), hypoalbuminaemia (OR = 11.4; CI = 1.34-96.8), hyperfibrinogenaemia (OR = 9.81; CI = 1.16-82.7) or leucocytosis (OR = 7.12; CI = 1.40-36.4) were associated with a significantly higher risk of endocarditis infection. The presence of two of the clinical signs mentioned above increased significantly the probability of an endocarditis diagnosis (P ≤ 0.05).

Epidemiology of pestivirus infection in wild ungulates in the French South Alps

Claire Martin, Carine Letellier, D. Gauthier, N. Jean, Anahita Shaffii & C. Saegerman

Mountains are a specific site where frequent contacts occur between livestock and wild animals during pasturing seasons. Interspecies transmission is often incriminated in the epidemiology of Pestivirus diseases. The goal of this study was to investigate the prevalence of Pestivirus in some wild ungulates and to determine their role in Pestivirus interspecies transmission. Between 2003 and 2007, a longitudinal epidemiological study was carried out on hunted ungulates in the French department of Hautes-Alpes. Antibodies were found in 45.9 % (95% confidence interval: [40.5-51.3%]) of 343 chamois (*Rupicapra rupicapra*) and in 61.1% (95% CI: [38.6-83.6%]) of 18 mouflons (*Ovis amon musimon*) analysed. The optical density obtained in the ELISA antibody test was significantly higher in mouflons. Comparative virus neutralization tests performed on 7 Pestivirus strains with 15 seropositive samples from chamois showed highest titers to 2 Border Disease Virus strains, named Av and 33s strains. Titers to 3534, a Bovine Viral Diarrhea Virus-2 strain, were significantly lower. Virus neutralization tests confirm the circulation of a Border Disease Virus in wild ungulates in the study area. No Pestivirus was detected by reverse - transcriptase polymerase chain reaction or by viral isolation. Further efforts have to be made to improve the protocol in order to isolate and characterize the local strain.

Probability of visits of poultry farms and their neighbourhood by wildfowl for the transmission of avian influenza in Dombes, France

Cécile Gotteland, Sophie Lubac & D.J. Bicoût

Thanks to its geographical location and environment, the Dombes region brings together sedentary and migratory wild birds, and a number of free-range poultry in breeding farms. The first cases of IAHP in France appeared in this particular region in February, 2006. The role of waterfowls as reservoir for the IAHP virus is well recognized nowadays. However, recent studies indicate that the IAHP virus may also affect other wild bird species then regarded as bridging species in transmission of the virus between waterfowls and domestic species. Our study was designed to evaluate the risk of contagion of the domestic avifauna by the wild avifauna. The aim of this study is to estimate, for an environmental structure in a given ecosystem, which wild bird species use to visit the close surroundings of breeding, and what is the probability of visiting the ecological units, including the poultry outdoor living area, by wild birds. The available data were the ornithological observations of the attendance of ten sites poultry farms in Dombes area in spring 2008. The presence of every species measured with a number of contacts for each species and for each ecological unit frequented was analysed statistically using a generalized linear model and bayesian model. Results allow on a first step, to visualize the attractiveness and the probability of frequentation of each ecological unit, of each site, for different bird species. In general, we observe that: The attractiveness of poultry living area is larger than that of the other ecological units; the attractiveness of poultry living is very low for water-birds; and, the highest probability of frequentation of poultry living was found for passerine. These results require to be completed by studies of presence and detection of each species of bird in each site.

Approach for *Coxiella burnetii* shedding risk assessment in dairy goat herds in South-East of France

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Q fever is a zoonosis due to *Coxiella burnetii*. Transmission of this bacterium takes place mostly by air or by close contact with infected ruminants. An investigation in dairy goat herds in the South East of France showed a high frequency of Q fever asymptomatic carriage. Seropositivity was found in 13/14 and 24/28 herds in 2006 and 2008, respectively. Moreover, bacterial shedding by the vaginal route was detected in 7/9 of these herds: 5% to 100% of the goats were found to be shedders. By combining data on age and serology of the goats, a PCA made it possible to develop a typology of intra-herd infection circulation intensity. A good correlation was found between this typology and the intensity of shedding within a herd (taking into account frequency and quantity). These encouraging results suggest that this typology may be used to identify shedding herds, and thus to evaluate the risk of *C. burnetii* contamination other herds and the human population, may be exposed to.

Poultry population dynamics and spread of the avian influenza virus in poultry farms in Vietnam

Ariane Payne, Stéphanie Desvaux, Karine Chalvet-Monfray, J-F. Renard et D.J. Bicoût

Since 2003, Vietnam has experienced the highest incidence of highly pathogenic avian influenza in Asia. The influenza virus spread through numerous contacts occurring between birds in those networks. This study was designed first to model the local poultry flux dynamics using field data from a province in Northern Vietnam. Then, we developed a disease transmission model within a poultry network, driven by flux dynamics. Simulation results illustrated the changes in poultry livestock over a two-year period. Various aspects of changes in the poultry livestock occurring in response to events perturbing the network could be studied thanks to the flux dynamics model.

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Specificity assessment of an Elisa assay for detection of antibodies against porcine reproductive and respiratory syndrome virus (IDEXX HERDCHEK*PRRS 2XR)

V. Auvigne, J-L. Pinsard & H. Gourgues

The specificity of an indirect ELISA assay designed for the detection of antibody to Porcine Reproductive and Respiratory Syndrome Virus (IDEXX HERDCHEK* PRRS 2XR) was studied in a population of regularly controlled and negative selection and multiplication farms. Two subpopulations were studied: adult sows and young pigs (gilts between 80 and 150 days of age). A total of 641 adult pigs, out of 50 herd samplings, and 1017 young pigs, out of 5 herd samplings were included. The observed specificity was significantly ($p < 0.02$) higher in young pigs (99.51%, CI95: 99.03 – 99.99) than in adults (98.28 %, CI95: 97.20 – 99.37). The lower specificity in adults was not linked to a higher mean S/P ratio but to a higher variability of this ratio in this subpopulation.

Experimental infection of calves with bluetongue virus serotype 8

Fabiana Dal Pozzo, K. De Clercq, H. Guyot, Elise Vandemeulebroucke, P. Sarradin, F. Vandebussche, E. Thiry & C. Saegerman

Bluetongue virus serotype 8 (BTV-8) was identified for the first time in Northern Europe in August 2006. Infected cattle showed severe clinical signs and reproductive disorders. The study of BTV-8 pathogenesis in cattle requires the development of an experimental model reproducing the clinical signs observed in the field.

«Emergences 2», an early warning system to accelerate the detection and identification of emerging animal diseases in Belgium

Cécile Herr, J. Barnouin, L. Ren, I. Boone & M. Dispas

The Belgian sanitary authorities launched the development of a Monitoring and Surveillance System (MoSS) to accelerate the detection and identification of emerging diseases in animals. The MoSS implementation includes the development of a web-based tool designed as a focal point between field veterinarians, veterinary experts and sanitary authorities. A multilingual web interface, created in close collaboration with the French INRA Animal Epidemiology Research Unit, will allow Belgian veterinary practitioners to report atypical syndromes in farm animals. The system focuses not only on emerging diseases but also on known diseases showing unusual clinical expression. A flexible hierarchical clustering method automatically aggregates similar cases based on clinical signs, affected animal categories and spatiotemporal distribution. Data about the relevant detected clusters are directly available for a network of specialists in pathology, semiology and epidemiology for further investigations.

Highly Pathogenic Avian Influenza in Togo: Control and Surveillance

L. Ndriko Mayigane, Jean Yaovi Hounkanly, Youssouf Kabore and Frédéric Poudevigne

In September 2008, Togo was struck, for the second time after the 2007 outbreak, by the Highly Pathogenic Avian Influenza H5N1 virus. The FAO deployed an emergency unit in Togo as part of an early response to help the Togolese government in controlling the outbreak and stopping the virus spread in the country. This unit developed a strategic plan for avian influenza control and surveillance that was promptly implemented in the country. The activities carried out ranged from mass culling of poultry in the infected area with strict application of biosafety measures to the strengthening of the epidemiological surveillance system in Togo.

Serologic survey for selected disease agents in brown bears (*Ursus arctos*) from Karacabey sanctuary (Bursa, Turkey).

C. Roqueplo, H. Cihan, J-L. Marié, Nilufer Aytug & B. Davoust

Sixty brown bears (*Ursus arctos*) (51 adults, 9 subadults / 21 female, 39 male) were chemically immobilized with ketamine hydrochloride and xylazine hydrochloride and sampled at Karacabey Ovakorusu Bear Sanctuary-Bursa, Turkey. All bears were clinically healthy at the time of sampling. Serum samples were tested for the presence of antibodies to Canine distemper virus (CDV), Canine parvovirus type 2 (CPV-2), Canine adenovirus type 1 (CAV-1), *Leptospira interrogans* serovars, *Brucella spp.*, *Borrelia burgdorferi*, *Ehrlichia canis*, *Anaplasma phagocytophilum*, *Leishmania infantum*, *Toxoplasma gondii*, and *Dirofilaria immitis*.

Serologic evidence of exposure was found to the following agents: *Leptospira spp.* (n=39) 65%, *T. gondii* (n=12) 20%, and CDV (n=25) 41.6% (with low titres: 1/2 - 1/11), whereas no antibodies were detected against CAV-1, CPV-2, *Brucella spp.*, *B. burgdorferi*, *Ehrlichia canis*, *Anaplasma phagocytophilum*, *Leishmania infantum*, and *Dirofilaria immitis*. In conclusion, the data obtained in this study provide results on the seroprevalence of selected infectious diseases, and emphasize the need for research and protection against infectious diseases of brown bears in Turkey.