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Incidence of equine viral arteritis in the French breeding stock and sensitivity of its surveillance: Estimation using a capture-recapture method

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Equine viral arteritis (EVA) may have serious health and economic impact on equine industry. For this reason, it is monitored in many countries, especially in breeding stock, to avoid its spread during breeding activities. In France, surveillance is mainly based on serological tests (viral neutralization test) but difficulties in interpreting a lot of results may impair the estimation of the number of outbreaks. In this study, we propose ad hoc rules for identifying seroconversion in order to estimate the number of outbreaks that were detected by the breeding stock surveillance component (BSC) in France between 2006 and 2013. Seroconversion was defined by an expert panel as a change in antibody titre from negative to at least 32, or as an eight-fold or greater increase in antibody level. Using these rules, 239 cases and 177 detected outbreaks by the BSC were identified. Subsequently, we calculated the BSC's sensitivity as the ratio of the number of detected outbreaks to the total number of outbreaks that occurred in breeding stock (including unreported outbreaks) estimated using a unilist capture-recapture model. The total number of outbreaks was estimated at 215 (95% credible interval: CrI95% 195-249) and the surveillance sensitivity at 82% (CrI95% 71-91) using a Bayesian approach. Our results confirm EVA circulation in French breeding stock and suggest that certain horses have been re-infected. Using the proposed rules for identifying seroconversion in other surveillance studies would improve future incidence investigations regarding other horse populations in France. Monitoring the EVA in breeding has good sensitivity and plays a relevant role in controlling the risk of transmission through mating.

Targeted selective treatment against gastrointestinal strongyles in first grazing season cattle based on the combination of grazing management practices indicators and individual average daily weight gain

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A two-year study was carried out to evaluate the combination of grazing management practices (GMP) at group level and individual average daily weight gain (ADWG) in first grazing season (FGS) heifers at housing, to identify groups/animals that needed to be treated against gastrointestinal nematodes (GIN). Overall, 577 heifers from 24 groups were followed. The first step was to define retrospectively, by grazing management practices (GMP) indicators, two levels of exposure to GIN (Low/high) determined by anti-O. ostertagi antibody level (Ostertagia-ODR). The best classification was obtained with an expert system (Parasit'Sim) modelling the infective larval density (ILD) on paddocks, combining GMP (rotation planning, supplementary feeding amount) and monthly temperatures; only 8% of groups were

misclassified. Individual ADWG was only found to be negatively associated with GIN exposure (Ostertagia-ODR) in heifers from groups classified as highly exposed to GIN (high ILD≥ 3 larval generations). In these groups, sensitivity and specificity of treatment thresholds based on ADWG were calculated for several individual Ostertagia-ODR thresholds. The best compromise between sensitivity and specificity was equivalent respectively to 76% and 56%, and was reached using an end-season ADWG threshold of 683 g/day to detect animals exhibiting an Ostertagia-ODR cut-off at 0.93. This threshold corresponded to an anthelmintic treatment of 50% of animals allowing the conservation of parasite population in refugia from untreated animals (parasite population not exposed to the drug). Thus, a targeted selective treatment for FGS heifers based on GMP and ADWG seems feasible at housing, accepting that some animals probably highly infected (high Ostertagia-ODR) will not be treated because they present an acceptable ADWG (resilient animals).

Critical problems for sheep farms in the opinion of Italian breeders: A survey to orientate animal health interventions

Vercellino Davide, Bona Maria Cristina, Aiassa Eleonora & Ru Giuseppe

In many Italian regions, sheep farming development appear to be backward: So, information about existing problems could be useful to direct support interventions. During 2014 and in the context of a research on scrapie, we conducted a survey on livestock management to identify animal health issues that concern farmers and cost items they consider penalizing. The involved breeders were selected by random sampling and a standardized first-tested questionnaire was administered via telephone interviews. The response rate was 60% (286 contacted eligible farmers and 172 respondents) and the average interview length was 22 minutes. Veterinary health interventions to fight against the causes of mortality and infertility would be particularly appreciated by farmers; similarly, a training on good practices for farm management could be helpful. In addition, economic or sanitary interventions should be provided to facilitate the removal of dead animals.

Surveillance of exotic diseases in cattle: Feasibility study on a diagnostic tool and its implementation in France

Ginhoux Mathilde, Morignat Éric, Bronner Anne & Calavas Didier

In the context of an efficient control of the animal diseases present in France, it has become vital to monitor exotic diseases. However, their rarity and the diversity of related clinical signs complicate recognition by veterinarians in the field, which is nevertheless an essential component of clinical surveillance systems. It was decided to develop a diagnostic tool to help veterinarians decide on suspicious cases, thus consolidating such surveillance systems. An initial prototype was designed for application to domestic ruminants. Its development revealed the scope of this kind of tool and those stages needing further efforts. The inclusion of this tool in the general animal disease surveillance scheme has also revealed other potential uses of the data issued from the diagnostic tool, such as setting up a syndromic surveillance system.

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Surveillance of bovine tuberculosis in France: Molecular biology to the aid of histopathology

Michelet Lorraine, de Cruz Krystel, Phalente Yohann, Bulach Tabatha, Karoui Claudine, Hénault Sylvie & Boschiroli Maria Laura

Surveillance of bovine tuberculosis (bTB) is partly based on the detection of lesion during veterinary inspections in the slaughterhouse, which are analysed by bacteriology, histopathology (official tests, according to UE recommendations 64/432/EEC) and by PCR. Histopathology has a better sensitivity than bacteriology however a lower specificity. In a previous study, we have demonstrated that the current PCR method employed in France possesses similar Se values as histopathology albeit with similar Sp values as bacteriology. We present here a retrospective study on 170 cattle samples (bTB histopathology positive and MTBC negative PCR) between 2013 and 2015. Supplementary molecular analysis allowed highlighting the presence of bacteria which could be responsible for theses lesions in histopathology and PCR discordant samples: non tuberculous mycobacteria (22%) or Actinomycetales (57%), such *Rhodococcus equi* (53%); 23% were negative. On none of these samples, *M. bovis* was isolated at the end of the 3 months of culture. In conclusion, the use of a first line PCR allows to simplify and accelerate the diagnostic process and to reduce the number of bTB suspicions generated due to false-positive bTB-like lesions at the abattoir.

Foodborne diseases among the French armed forces: Investigation statement (from 1999 to 2013)

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Foodborne diseases are a major public health concern in the French armed forces. Therefore, outbreaks must be investigated, to better know the epidemiology of these events and to improve prevention. A review of investigations of outbreaks of foodborne diseases that occurred within the French armed forces, between 1999 and 2013, was performed. It revealed that an etiologic agent was isolated in about one third of the investigations. This low proportion is similar to that observed in the civilian world and is due to several issues. Most of them are increased when the outbreak occurs outside metropolitan France. This assessment leads to several reflections aimed at improving preventive measures and at changing the investigation methods of foodborne diseases in the French armed forces.

EPIDEMIOLOGY PAPERS

Evaluation of the bovine tuberculosis surveillance efficiency in wildlife in France

Rivière Julie, Le Strat Yann, Hendrikx Pascal & Dufour Barbara

Bovine tuberculosis (TB) is a common disease in cattle and wildlife, with animal health, zoonotic and economic impacts. In 2011, the French Ministry of Agriculture launched a national surveillance program for bovine tuberculosis in wildlife, named Sylvatub. The main goals of this surveillance system were to early detect cases in wild animals, to monitor the progress of bovine tuberculosis infection in wildlife and to harmonize the surveillance system within the country. Sylvatub is composed of several surveillance components (active or passive), applied according to local risk analysis. The Sylvatub efficiency has been

quantitatively evaluated through the estimation of its sensitivity (probability of detecting at least one TB case if the disease is present at a specified prevalence) using scenario tree modelling, for each species and risk level. For passive components, the surveillance by carcass inspection has a higher collective sensitivity than the surveillance by the Sagir network, on dead or dying animals, because higher probability of inclusion and detection. The active component has also a good collective sensitivity, as it depends on few environmental or human factors, but it is applied in some departments only. Our results also show that it seems relevant to continue the surveillance on wild boars, species particularly receptive to *M. bovis*.

Contagious equine metritis in France on 2015; epidemiological situation and perception by equine industry players

Barberet Céline & Dufour Barbara

Contagious equine metritis (CEM) is a contagious bacterial disease, mainly sexually transmitted. Although its prevalence is probably very low, it is an insidious disease and its real importance in the equine population in France is unknown. Indeed, CEM has evolved over the years. It is now classified in the list of reportable diseases. From 1977 to 2015, the number of reported cases of contagious metritis varied from a hundred to zero. The first part of this article reports the evolution and effects of various regulatory changes that occurred in 1981, 1992, 2006 and 2012. The second part of the article reports the results of a survey conducted among the chain of stakeholders to gauge their perception of this health problem. Two studies were conducted simultaneously, one with farmers through an online questionnaire and the other with industry players through interviews. The real impact of the disease in the equine industry is not known at this time because the disease is not detected in all equines in France.

HISTORY

Teaching of contagious diseases and of sanitary regulations at Alfort veterinary School since its creation (250 years)

Toma Bernard, Bénet Jean-Jacques & Dufour Barbara

The teaching of the animal contagious diseases and the sanitary regulations began at Alfort veterinary School since its creation, at the time when the most serious of them were frequent and could easily be observed in France: rinderpest, glanders, contagious bovine pleuropneumonia, rabies, anthrax, and so on. The knowledge on their etiology was still rudimentary in this period preceding by a century the discoveries made by Louis Pasteur. This teaching, originally included unclearly in the « diseases » courses, was individualized by regulations in 1824 and developed from 1833 by Onésime Delafond (1805-1861), « one of the most famous names of the French veterinary medicine », according to Neumann. It was Edmond Nocard's task (1850-1903), veterinarian, member of the Louis Pasteur team, to participate in the harvest of discoveries on the major contagious animal diseases and to make known all over the world his name and that of the School of Alfort, as well as the result of this work. In the XXth century, this teaching benefited from the huge increase of knowledge and of production capacities of screening and diagnosis tools as well as immunological weapons. It evolved at the same time as improvement of epidemiological situation of the diseases, so as

to enhance epidemiology, in particular epidemiological, surveillance, defensive strategy of management and prevention of risks.

AEEMA MEETING, MARCH 25th, 2016: POSTER

Highly pathogenic avian influenza episode in France on 2015-2016 winter. Main epidemiologic features and organisation of monitoring

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Since the end of November 2015, the South-West of France is faced to an unprecedented occurrence of highly pathogenic avian influenza episode, affecting mainly the foie gras palmipeds' production. Influenza viruses, genetically very close to their H5 sequences from at least three different neuraminidase subtypes, have been characterized in the 74 outbreaks identified at the end of February 2016. In addition to protection and surveillance zones implemented at each outbreak, a large restriction area covering the whole of foie gras palmipeds' production area was set up, in which specific measures should be applied. This article describes the main features of the episode. Then it describes the monitoring strategy implemented at national level. A large number of stakeholders contribute, requiring the establishment of a structured and centralized device information. This is the key point to monitor the quality and results of monitoring.