

## 2003, issue 43 – Abstracts

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#### **Cost-benefit analysis of contagious bovine pleuropneumonia control strategies at herd level in Boji district, West Wellega (Ethiopia)**

G. Laval

CBPP (Contagious bovine pleuropneumonia), a respiratory disease of cattle, is one of the major threats to livestock health and productivity in Africa in general and in Ethiopia in particular. Its control is an important issue to African veterinary services. Results from economic analysis are necessary to justify implementation of appropriate control programs. This study provides the results of a cost-benefit analysis (CBA) of CBPP control strategies at herd level under traditional management in the highlands district of Boji (West Wellega, Ethiopia). Necessary data were collected from on-farm longitudinal surveys in 70 herds. Four strategies were compared: the first was antibiotic treatment and isolation of sick animals as locally practised and the others were various vaccination protocols. Results showed that, according to farmer's view, individual CBPP management strategies involving antibiotic treatments were cost-effective on a short-term basis. A community-based participatory approach and private management of CBPP aiming at reducing herd-level economic impact were indicated as complementary options to that suggested by official national and international regulations.

#### **Report on ten years of rabies surveillance in Spanish bat colonies**

Blanca Amengual, J. Serra-Cobo, L. Audry, Florence Larrous & H. Bourhy

Rabies is a worldwide zoonosis due to lyssavirus infection with multiple host species acting as reservoir. It infects the central nervous system of humans and other mammals including bats. Between the years 1992 to 2001, 1081 sera, 27 blood pellets and 107 brains were obtained from 14 bat species in Spain. Specific anti-EBL1 neutralizing antibodies have been detected in *Myotis myotis*, *Miniopterus schreibersii*, *Tadarida teniotis* and *Rhinolophus ferrumequinum* in the region of Aragon and the Balearic Islands. Positive results were also obtained by nested RT-PCR on brain, blood pellet, lung, heart, tongue and esophagus-larynx-pharynx of *M. myotis*, *Myotis nattereri*, *R. ferrumequinum* and *M. schreibersii*. The determination of the nucleotide sequence confirmed the presence of EBL1 RNA in the different tissues. In one colony, the prevalence of seropositive bats over time corresponded to an asymmetrical curve with a sudden initial increase peaking at 60% of the bats, followed by a gradual decline. Banded seropositive bats were recovered during several years indicating that EBL1 infection in these bats was non-lethal. At least, one of this species (*M. schreibersii*) has a migratory behaviour and could be one of the responsible of the dissemination of EBL1 on both shores of Mediterranean Sea.

#### **The Borna disease virus: an emergent one in France?**

Gwenaëlle Dauphin & S. Zientara

Borna disease, a meningo-encephalitis that affects mainly horses and sheep, was first recognised in Germany two hundred years ago. For about 10 years, studies have shown

Bornavirus infections both in numerous countries and animal species, probably including humans. The zoonotic aspect of the disease is still controversial, mainly because of the lack of reliable diagnostic techniques and of detailed knowledge on viral transmission. Both molecular (RT-nested-PCR) and serological (ELISA and Western blot based on P recombinant protein expressed both in eucaryotic and procaryotic systems) methods have been developed at the AFSSA laboratory. Our molecular technique, applied on 206 brain or blood samples, mainly obtained from animals with nervous disorders, has allowed the detection of viral RNA in cattle, red fox and horse brains and in equine blood samples. This result represents the first detection of BDV genome in France. Furthermore, the ELISA based on P antigen allowed to assess BDV seroprevalence rate in two horse populations: 9% in clinically healthy horses (15/155) and 30% in horses suffering from nervous disorders (35/119). Finally, the first clinical cases of Borna disease in France are described. Hence, this preliminary study has shown that BDV circulates in France. However, no information can tell if BDV is an emerging virus in France or if it has been present for a long time. The equine neurological network, recently created by the RESPE (Epidemio-surveillance Network for Equine Pathologies), should allow the collection of useful information concerning the incidence of the main infectious nervous diseases in horses.

### **The new wave of White Spot Syndrome**

O. Sparagano, Adriana Ianieri & Annunziata Giangaspero

White Spot Syndrome (WSS) is a very contagious viral disease considered as one of the 20 most costly in aquaculture. At least 43 species of crustaceans are infected with this baculovirus. It is a dsDNA virus with a size of 350nm x 100nm. This disease emerged from Asia a few years ago and is now present on the American continent, with mortality reaching 90 to 100% and costing £2 billion pounds each year worldwide. DNA size is around 300Kb and part of it was recently sequenced. Therefore, new molecular tests have been developed based on PCR, RT-PCR, nested-PCR or quantitative PCR to detect this virus in crustaceans with a sensitivity limit down to 4 viral particles. Genes are now studied to block the virus proliferation. This paper also points out treatment methods and ways to eradicate this emerging disease.

### **Modelling the spread of the Bovine Viral Diarrhoea Virus (BVD) within a dairy herd: Influence of the separation of animals into subgroups**

Anne-France Viet, Christine Fourichon, H. Seegers, Christine Jacob & Chantal Guihenneuc-Jouyaux

In dairy herds, animals are separated into subgroups according to their age and reproductive status. The management of animals into subgroups can influence the horizontal transmission by inducing a heterogeneity of probability of transmission according to the level of contacts between subgroups. The aim of this paper is the study of the influence of the separation into subgroups on the spread of the Bovine Viral Diarrhoea Virus (BVDV). The study was carried out with a stochastic model. Two levels of contacts between subgroups were simulated: no contact and high contacts. For simulation, the virus was introduced in the herd by the purchase of a freshening PI heifer and simulated over 10 years with 600 replications for each level of contacts. The levels of contacts between subgroups influenced the BVDV spread and

the extent of the virus spread. Consequently, the BVDV models have to consider the separation of animals into subgroups which induces a heterogeneity in the virus transmission.

### **Rift Valley fever: a seroprevalence study of domestic ruminants in N'Djamena and Abeche (Chad)**

D. Ringot, J-P. Durand, Hugues Tolou, J-P. Boutin & B. Davoust

In order to evaluate the importance of the human exposure to the Rift valley fever, a transverse investigation of seroprevalence was carried out in Chad during the rainy season 2002, among sheep, goats and horned cattle led to the slaughter-houses of Farcha and Abeche. Sera were tested for RVF specific IgG antibodies by direct ELISA method and positive samples were examined for IgM by immunocapture method. The serologic results objectify a recent, even active, circulation of this virus within the populations of Chad-bred ruminants in significant proportions. Finally, 10.7% of the sheep, 8% of the goats and 4% of the cattle presented IgG antibodies and 45.4% of the seropositive animals in IgG were it also in IgM.

### **Is there a spatial heterogeneity of BSE cases in France?**

D. Abrial, Nathalie Lauvergne, E. Morignat, D. Calavas & C. Ducrot

This paper presents a spatial study of BSE cases in France; it is part of a project called "bovins NAIF" (animals born after the feed ban) that aims at determining the reasons why hundreds of cattle were contaminated in France after the Meat and Bone Meal feed ban for cattle on July 1990. The objective of the study is to analyse if it does exist spatial clusters of cases that could be linked to the activity areas cattle feed suppliers: the hypotheses of the whole project are the possible contamination of cattle, either with the MBM via cross-contamination between feed for monogastric and those for cattle, or the contamination of abattoir products derived from cattle (fat and phosphates). For that, two sets of data are available (optimal and comparable monitoring between geographical areas): the first concerns the Western France (*Basse-Normandie, Pays de la Loire and Bretagne*) during the second half of 2000, with 84 BSE cases, the second is the whole French territory, between July 2001 and December 2002, with 378 cases. BSE data are supplied by the "Agence Française de Sécurité Sanitaire des Aliments". The statistical analysis (presented in detail) associates a method of cartography of the standardised contamination rates with Bayesian estimate and two methods of clustering (Scan of Kulldorff and method of Besag and Newell). The analysis of the data of the Western France highlights a spatial heterogeneity and the analysis in the whole France shows a non-significant heterogeneity at a large scale. However, the later has been carried out at the "arrondissement" level. A smaller geographical scale might be more appropriate, due to the hypotheses under consideration. So, another analysis is under way using a different geographical scale and taking into account the non-independence of contiguous geographic areas.

### **Research of risk factors of *Salmonella enterica* shedding by fattening pigs. Analytical survey in pig farms**

Christelle Fablet, P. Fravallo, J-P. Jolly, E. Eveno, F. Madec & P-A. Beloeil

An analytic epidemiologic survey was carried out from November 2000 to October 2001 in 105 French pig farms. The aim of the study was to point out risk factors of *Salmonella* shedding at

the end of the fattening period. In each herd, a batch of pigs was followed from the end of the post-weaning phase up to slaughter. *Salmonella* shedding was assessed by environmental sampling of faecal material taken on the slatted floor of the pens a few days before leaving to the slaughterhouse. Questionnaires dealing with management procedures and health status have been used. Logistic regression was used to identify the circumstances associated with *Salmonella* shedding. Hygienic procedures carried out in the different rooms where the pigs were raised and pig's health status related to Porcine Respiratory Coronavirus and *Lawsonia intracellularis* were associated with *Salmonella* shedding. On the other hand, wet feeding during the fattening period was linked to the absence of shedding at the end of the finishing phase.

### **Fertility of dairy cows associated with Bovine Viral Diarrhoea Virus infection**

Aurélie Robert, F. Beaudeau, H. Seegers, J-M. Philipot & A. Joly

The aim of this study was to quantify the effect associated with the Bovine Viral Diarrhoea Virus (BVDV) infection status of herds on fertility of dairy cows. Fertility was assessed by a return-to-service, *i.e.* occurrence (yes/no) of a repeat artificial insemination (AI). Two outcome variables were considered: (i) 3-week-returns-to-service from 19 to 25 days and (ii) late-returns-to-service from 26 days. BVDV-antibody levels in bulk tank milk were assessed four times at a four-month interval by a blocking ELISA test to define three BVDV-infection-herd-statuses: (i) presumed non-infected herds, (ii) presumed recently-infected herds, (iii) presumed past-infected herds. A total of 150,854 AI of 122,697 cows from 6,149 herds was included in the analysis. The risk of return-to-service was assessed using logistic regression or survival analysis models. BVDV-infection-herd-status was not significantly associated with the risk of 3-week-return-to-service, but significantly with that of late-return-to-service. Cows in herds presumed recently-infected or past-infected had a significantly higher risk of late-return-to-service (Relative Risk of 1.12, 1.03 respectively) compared with cows in herds presumed non-infected. To conclude BVDV-infection was found to mainly increase the risk of embryonic and foetal-death.

### **Survey of *Dictyocaulus spp* infection of wild cervids in Wallonia, Belgium**

P. Canivet, Bénédicte Mousset, H. Ferté, J. Depaquit, H. Gianfreda, B. Losson & Annick Linden  
Dictyocaulosis was frequently reported worldwide in wild cervids. During hunting season 2001-2002, lungs of 532 red deer (*Cervus elaphus*) and 114 roe deer (*Capreolus capreolus*) harvested (group 1) were dissected for parasitological evaluation. Faeces of 140 cervids were also collected and tested according the Baermann method. Furthermore, 55 non-harvested death wild cervids (group 2) were necropsied and a parasitological evaluation was done. A few *Dictyocaulus* specimens were collected for identification. The specimens studied showed morphological differences with *D. viviparus*, but molecular biology is required for identification till specie level. The prevalence, estimated on the basis of the inspection of the airways and on the basis of the Baermann test were respectively: 22 and 57% in fawns, 4 and 27% in adult red deer and 4 and 6% in roe deer. Individual level of infection appears to be low, excepted for the group 2.

## **Estimation of the IBR ELISA tests characteristics starting from the comparison of five tests carried out by the AFSSA**

E. Petit & Myriam Perrin

In order to compare several serological tests detecting antibodies against BHV-1, a sera collection was constituted by AFSSA with 700 sera coming from various departmental laboratories of analyses. From the various combinations of results obtained with the various tests, sensitivities and specificities of each test, like their respective factors of dependence, were evaluated in the absence of a "Gold standard" reference by using a maximum likelihood method. Several approaches were used. Each possible pair of tests was evaluated on the basis of two and three populations resulting from the sera collection. Lastly, by using a model developed to calculate the probability of obtaining a combination of several results, sensitivities, specificities and factors of dependence of the five tests were adjusted to maximize the likelihood of such results combinations obtained with the five tests. According to the methods used, the adjustment of the models to the data can be very variable, which results in a so variable estimation of the parameters. The best adjustment is obtained with the complete model. With these methods, it's possible to approach and compare characteristics of the studied tests. It is however necessary to moderate these results because of the selection of the sera which constituted the collection. Indeed, a part of them were addressed to the reference Laboratory of AFSSA because they had unmatched results. The whole results are presented and discussed.

## **Simulation of swine fever in Brittany: usefulness for risk evaluation and management of epidemiological surveys**

V. Auvigne, P. Amar & X. Pacholek

Four simulations of epidemiological surveys were carried out in pig farms in Brittany. The objective was to evaluate the importance of the various contamination factors in case of Classical Swine Fever outbreaks (CSF) and to formalise an optimal use of the data obtained from these surveys. The surveys were carried out during a three-month period. For all four surveys, backward and forward tracing allowed to identify 570 contacts. These contacts were then sorted according to importance, using a risk assessment grid for the various types of contact. Depending on the risk level taken into account, the number of farms at risk of being contaminated by the supposedly infected farm varied from three to 85. These in-contact farms were not necessarily located within the 10 km surveillance zone. This study also shows that a type of contact with a low probability of infection transmission, such as indirect contacts during transport to the slaughterhouse, may become epidemiologically important if these contacts are frequent. This method developed for the use of CSF surveys can be generalised for all epizootics where farm-to-farm contamination is the major factor.

## **Atypical myoglobinuria: a new disease?**

Claire Moussu, Anne Saison, Frédéric Bermann, P-H. Pitel, M. Bernadac & S. Zientara

In autumn 2002 (between October, 17, and November, 31), 66 grazing horses (located in 34 French areas) suffered a prostrating illness caused by a myopathy and died (56/66) within 12 to 72h. They were suspected to developed atypical myoglobinuria according to clinical and epidemiological investigations and were registered by the French national Network for

epidemiological surveillance of Equine Diseases (RESPE). Although several outbreaks were described in other European countries (England, Germany, Ireland, Switzerland, Denmark, Latvia), it was the first description in France. Serum biochemical abnormalities (elevated muscle and hepatic enzymes) and myoglobinuria were demonstrated. The affected horses were mainly young and permanent grazing horses. A number of potential aetiological and contributory factors (vegetal poisoning, mycotoxins, bacterial toxins...) were considered, but the aetiology remains unresolved.

## **PAPER**

### **Risk assessment for preventive culling in the fight against foot-and-mouth disease**

B. Toma, Barbara Dufour & F. Moutou

The slaughter of all susceptible species in outbreaks of foot-and-mouth disease (FMD) has been the method used for decades when an outbreak occurs, in countries normally free of the disease. Used in conjunction with other disease prevention measures aimed at limiting the spread of the virus (including bans on movement and use of disinfectants), it will remain certainly so in the future. Preventative culling, or the slaughter of apparently healthy animals that may have been infected by the FMD virus outside of an outbreak, is a method that has been introduced in more recent times. In some countries, where the objective is to prevent outbreaks of the disease, this method can show itself to be a very effective means of preventing an epizootic. However, this can lead to the destruction of numerous herds of healthy animals, in turn bringing financial difficulty and provoking increased public opposition. The decision to employ this method needs to follow on the form of a risk analysis taking relevant factors into account. This article presents one such qualitative line of reasoning, and concludes with a plan to help decision-making that may include ring vaccination.