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EPIDEMIOLOGY PAPERS

False positive serological reactions in bovine brucellosis: advances in epidemiological studies

Pouillot (R), Gerbier (G) & Garin-Bastuji (B)

Unusual high rates of false positive serological reactions (RSFP) in bovine brucellosis have been observed in the EU and in New-Zealand since the beginning of the 90'. The infection with Yersinia enterocolitica O:9, which shores epitopes with Brucella, is currently the mat likely hypothesis. This organism has been isolated for the first time from ruminants in a RSFP context. Nevertheless, the link RSFP-Yersinia is difficult to investigate, due to a great variability in individual susceptibility. Epidemiological data could support the hypothesis of a large underestimation of the phenomenon. Many questions remain unanswered.

Method of technical and economic evaluation of epidemiological surveillance networks for animals diseases

Dufour (B)

With hopes to improve the increasing number of epidemiological surveillance networks for animal diseases set up in recent years, a qualitative and quantitative technical and economic evaluation tool was developed and then applied to three epidemiological surveillance networks: RENESA (a French surveillance network for *salmonella* and mycoplasma contamination in poultry production units subject to official sanitary controls), the French foot and mouth disease epidemio-vigilance network and REPIMAT (the epidemiological surveillance network in Chad for major cattle diseases). We identified critical points in epidemiological surveillance networks wing a modified version of the Hazard Analysis Critical Control Point (HACCP) method. An evaluation grid war then developed and validated by experts who were consulted in accordance with the Delphi method. A questionnaire to collect the information needed for the evaluation and a scoring guide were then designed. Our evaluation procedure also included a calculation of the annual operating costs for two of the three networks studied On the basis of the detailed results of the technical and economic evaluation, we formulated specific suggestions for improving the networks. The cost of implementing these proposals was calculated. We then simulated the effects of implementing each of the proposed improvements and a new global evaluation score **was** determined for each network. The “cost per point" of each improvement war then calculated and discussed. This tool for the technical and economic evaluation of epidemiological surveillance networks for animal diseases **is** proposed so that it may be tested on a fur wider scale eventually be used in improving the functioning of such networks and used for risk analysis in international trade.

AEEMA Meeting, 1999, May 7th

Quantitative method to declare a country free of a disease

Audige (L), Doherr (M) & Salman (MS)

The 1995 World Trade Organisation agreement on the application of Sanitary and Phytosanitary Measures requires scientific validation in order to declare a country or a region

free of a disease. This article presents a method to quantify from a survey result with specific confidence limits the likelihood off the absence of a disease (which is also valid to an infection) in a region or a country. This likelihood (post-survey probability), i.e. the negative predictive value of then survey result, depends on our prior knowledge (pre-survey probability) of the absence of the infection in the county or region as well as the validity of the applied survey (a survey being considered as a diagnostic system). The validity of the survey is assessed using the ratio of the probability of observing a negative survey result in the absence of the infection, to the probability of observing the same result in the presence of the infection (likelihood ratio). A method to evaluate the pre-survey probability is briefly discussed. For illustration, this approach is applied for the interpretation of the result of a survey conducted in 1998 to substantiate freedom from infectious bovine rhinotracheitis (IBR) in Switzerland. We believe the method has a valuable application in the current decision' making process of animal health authorities for the trade of animal and animal products.

Retrospective study of BSE incidence in Belgium

Saegermann (C), Claes (M), Vanopdenbosh (E), Bironf (P), Deluyker (H) & Thiry (E)

A descriptive epidemiological study was performed in Belgium with the aim to determine the annual incidence rate of not9ed and BSE suspected neurological cases in cattle population over 1 year old. This study covers years 1980 to 1997, i.e. the period during which the BSE anazootics develops itself in Great-Britain. To realize this aim, archives of rabies and BSE epidemiosurveillance networks and the veterinary diagnostics network were used. After defining a notified neurological case and a BSE suspected notified neurological case, and making an estimation of the target population, spatial and temporal distributions of animal incidence were determined. The presence (South of Sambre and Meuse valley) or absence (north of Sambre and Meuse valley) of rabies was taken into account. An aetiological classification of all neurological cases was established. During 1992-1997 period, when all data were competed, annual incidence rates of notified neurological cases and of BSE suspected notified neurological cases showed a variation: respectively 253 to 532/106 and 86 to 165/106 over one year old cattle South of the valley; respectively 64 to 90/106 and 15 to 40/106 over one year old cattle North of the valley. These rates are discussed and compared to OIE standards. Percentages of morbid cause families do not differ significantly between South and North of the valley. However, differences do appear within single families following the region. These results help to maintain quality of BSE epidemiosurveillance networks.

Analysis of the results of the French small ruminant scrapie surveillance scheme

Calavas (D), Philippe (S), Ducrot (C), Schelcher (F), Andreoletti (O), Belli (P), Fontaine (JJ), Perrin (G) & Savey (M)

The French Small Ruminant Scrapie Surveillance Scheme is functioning since Scrapie became a notifiable disease (June 14th 1996). In response to a Public Health concern (the hypothesis of a form of small ruminant BSE, potentially at risk for humans), the first aim of this network is to study the frequency and the geographical distribution of Scrapie. On April 1st 1999, suspicion of Scrapie has been reported in 216 small ruminant flocks (209 sheep flocks, 7 goat flocks), and histopathological diagnosis has been confirmed in 164 sheep flocks and two gout flocks. Suspicions were issued from 37 different counties and outbreaks were located in 24 countries, one of them showing 70% of the outbreaks. The declaration trend seems to

decrease, as 66 outbreaks have been identified in 1997vs 44 in 1998. The cumulated incidence rate of sheep Scrapie is significantly higher (at a = 0.05 level), compared to the national cumulated incidence rate (1.711 O00 flocks), in 6 counties of the 23 in which sheep Scrapie has been identified so far.

Salmonella introduction and _Salmonella_ persistence in chicken-broiler units: related risk factors

Rose (N), Mariani (JP), Drouin (P), Toux (JY), Rose (V), Beaudeau (F) & Colin (P)

The aim of this study was to find out and to quantify risk factors for *Salmonella* introduction and *Salmonella* persistence in broiler farms. An analytical survey was carried out in western France on 86 broiler units. Risk factors for Salmonella contamination of the flock at the end of the rearing period were: (1) *Salmonella* status of the house before placing day-old chicks (resident *Salmonella*), (2) *Salmonella* status of delivered day-old chicks, (3) feed trucks as mechanical vectors and (4) feed form at starting. In a second part, risk factors for Salmonella persistence in the house after cleansing and disinfection were determined. It has been shown: (1) the importance of a terminal disinfection, (2) the role of limited access for trucks to the house, (3) the role of rodents as vectors and (4) the sanitary status of the previous flock.

Epidemiology and molecular biology. One example: African horse sickness

Zientara (S)

Molecular biology technics applied to some epidemiological branches are really of importance. The usefulness of the combination of these technics will be shown in the fields of molecular epidemiology and analytical (and/or theoretical) epidemiology with the example of African horse sickness (AHS). Molecular epidemiology: We have determined the nucleotide sequences of SI0 segments of different serotypes (2, 4, 5, 6, 7 and 9) of AHS virus. The variability of these sequences and of corresponding amino acids makes possible the separation of the serotypes into different genetic groups. For instance, during two AHS epizootics, in Spain (1987-1990) and in Morocco (1989-199I), the hypothesis of two independent epizootics was suggested, when identity of the two virus strains looked highly probable. The sequences of the Spanish and Moroccan strains showed only 0.7% of divergence. Analytical epidemiology: In the field of analytical epidemiology, molecular tools can bring a help that virological and/or serological may not allow.

Radiographic survey of juvenile osteo-articular lesions in French breed horses

Valette (JP), Degien (C) & Denoix (JM)

The purpose of this paper is to present the results of a study designed to establish the prevalence and anatomical repartition of developmental orthopaedic lesions in French breeds. Foots, fetlocks of both thoracic and pelvic limbs, carpus and tarsus and stifles were examined radio graphically in 1180 3-year old horses. Data about places of breeding and training were collected on 616 horses. For the 15 anatomical sites identified in these areas, radiographic findings were classified in 5 indexes of severity according to the possible clinical significance. Radiographic score for a horse is the summation of indexes of severity of all findings found in al1 site or areas. Results were analysed by analysis of variance (GLM procedure). Horses born in May or later have more abnormalities than those born during the first quarter, especially in the stifles. Horses born in Normandy presented less osteo-articular lesions in the pelvic limbs than others.

Molecular diagnosis assay of bovine *Theileri*a and *Babesia*

Sparagano (O), Gubbels (JM), de Vos (A) & Jongejan (F)

A molecular diagnosis assay was developed to specifically identify six *Theileria* species (*T. annulata, **T.**parva, T. mutans, **T.** velifera, **T.** taurotragi and **T.** orientalis/buffeli*) and three Babesia species (B. bovis, B. bigemina, B. divergens). No cross-reactivity was observed between these species or with other haemoparasites, such as *Anaplasma marginale, A. centrale, A. ovis, Cowdria ruminantium, Trypanosoma brucei, **T.** congolense* and ***T.** vivax*. The method was successfully applied in the Apuglia and Sicily regions (Italy) on blood samples and ticks. It was shown that *Babesia* and *Theileria* species co-exist in the same host.

Study of equine morphological congenital defects in Normandy: incidence (1994-1998) and risk factors

Puyalto-Moussu (C), Collobert (C), Tariel (G) & Foucher (N)

In a four years survey performed in Normandy from 1994 to 1998, 359 foetuses and 317 foals under one month of age submitted for routine necropsy, were examined for presence of morphological congenital defects. Study population included 116 deformed cases and 560 normal foetuses or foals. Incidence of congenital defects in foals and foetuses population submitted for examination during the survey period, was respectively equal to 28.4 and 7.2%. The majority of al1 horses examined were Thoroughbreds (46%). Standardbreds (42%) or Saddlebreds (13.2%). There was no relation between breed and congenital defects. The following congenital anomalies were described: craniofacial malformations (14%), contracted foal syndrome (14%), valgus and varus (27%). serious tendons deformities (11%), digestive and respiratory systems defects (13 and 7%), urinary tract defects (9%). microphtalmia (5%), heart defects (5%), meningocoele, cerebrum agenesia, hydrocephalus (5%) and hernias (6%).

Voluntary herd certification programmes for IBR and BVD in Portugal

Ameilda (VS) & Ribeiro (JN)

This paper presents the results obtained during three surveys oriented towards the evaluation of prevalence of dairy cattle herds infected by IBR and BVD virus in Portugal. It also brings elements for voluntary actions against these two diseases.

Use of hierarchical models for the study of dairy cattle reproduction on Reunion islands

Tillard (E), Dohoo (IR), Lancelot (R) & Faye (B)

Infertility of dairy cattle on Reunion Island was quantified using reproduction data collected between 1993 and 1996 in about 50 herds. The risk factors are still badly known. Former data, collected before, were analysed in another way to study the splitting of parameters variability following different levels of aggregation (lactation, animal, herd area) and to identify those on which most of future work should be oriented. Different hierarchic models were used under MLWIN software to model period between calving-first insemination (V-II) variability and period between calving-fecundity insemination (V-If) variability, taking into account different co-factors (year, season, age, origin, breed, kind of insemination). Variation factors at herd or animal level are useful to study only if they have an impact on the period between calving and first insemination. Most of total variance of V-II and of V-If is located close to first lactation. The main research effort must be oriented towards risk factors linked to this observation scale, like post-partum pathology or length and importance of nutritional disorders.

Model of BSE dynamics in infected French herds

Durand (B), Calavas (D), Philippe (S) & Ducrot (C)

French regulation against BSE is based upon the stamping out of affected herds. During the slaughter operations, the brain was taken from several healthy animals, in order to build up a sample bank. The aim of this study is to quantify the probability to detect incubating animals among these samples, using laboratory diagnostic tests based upon the PrPres detection. A model of BSE dynamics in a cohort of animals of the same age is proposed assuming that some of these animals were contaminated when they were one year old. The parameters taken into account in this model are the incubation distribution, the individual contamination probability and the duration of the ante-clinical detectability period. Results show that the key parameter of the model is the individual contamination probability. The probability to detect an incubating animal is only significant when the individual contamination probability is medium (0.5) or high (0.9). Comparing with British data, it seems reasonable to think that this individual contamination probability has always been low in France. Therefore, results show that the detection probability is low, and is only slightly increased if the duration of the ante-clinical detectability period is improved.

BOOK NEWS

Applied Veterinary Epidemiology and the Control of Diseases in Populations

Toma (B), Dufour (B), Sanaa (M), Benet (JJ), Moutou (F), Louza (A) & Ellis (P)

Dictionary of Veterinary Epidemiology

Toma (B), Vaillancourt (JP), Dufour (B), Eloit (M), Moutou (F), Marsch (W), Benet (JJ), Sanaa (M) & Michel (P)

Veterinary aspects of meat production, processing and inspection, an update of recent developments in Europe

Anonymous