Epidémiol. santé anim., 1997, 31-32

LIMITS OF EPIDEMIOLOGICAL TOOLS TO INVESTIGATE THE RELATIONSHIP BETWEEN *YERSINIA ENTEROCOLITICA* O:9 AND FALSE POSITIVE SEROLOGICAL REACTIONS IN BOVINE BRUCELLOSIS

Gerbier G.[1], Garin-Bastuji B.[2], Dufour B.[3], Pouillot R.[1], Moutou F.[1]

*Cette communication montre les difficultés de l'étude des réactions sérologiques faussement positives (RSFP) dans le dépistage de la brucellose bovine. Deux problèmes majeurs sont rencontrés. D'une part la prévalence individuelle est faible, d'autre part la réaction est transitoire. Le recrutement d'un nombre suffisant de cas et de contrôles est d'autant plus aléatoire que le phénomène varie dans le temps. Il est de plus difficile de mettre en évidence un lien statistique entre la présence de l'agent causal présumé (*Yersinia enterocolitica *O:9) et les RSFP car la méthode actuelle de détection de cet agent semble peu sensible et l'excrétion par les bovins est faible, temporaire et vraisemblablement décalée dans le temps par rapport aux RSFP.*

False positive serological reactions (FPSR) have always been observed in brucellosis surveillance, but since 1990, their prevalence has significatively increased. This was first observed in UK, but it has also been reported mainly in France and Belgium, and at a lesser degree in Italy, the Netherlands and New Zealand. In most countries, it was possible to isolate *Yersinia enterocolitica* O:9 (YO9), a micro-organism sharing epitopes with *Brucella*, either from ruminants (cattle, sheep, goats or deer) or pigs in some affected herds.The aim of this communication is to present the use and the limits of epidemiological tools in this particular context.

The first tool used was the analysis of the results obtained through the national annual compulsory surveillance of bovine brucellosis which permitted to detect the so-called FPSR phenomenon in France [1]. Then an epidemiosurveillance network was set up. The resulting descriptive studies showed that FPSR are transient (70% of the animals become seronegative within one month), with a low individual prevalence (< 0.6 %) compared to a high herd prevalence (12% of the herds in some areas in 1992-1993) [2]. With a low intra-herd prevalence (one or two FPSR animals in more than 81 % of the FPSR herds), the recruitment of cases is uneasy. Then, should the study be done at the herd or at the individual level ? As new serological reactions might occur all along the year, sampling should be done on many occasions to avoid a misclassification of controls [3]. For a cohort study, exposed animals have to be defined. No isolation of known other cross-reacting organisms or link with a previous *Brucella* infection or vaccination has been found. Therefore the most probable risk factor (presumably the cause of FPSR) appears to be YO9 infection but no clear statistical link between FPSR and YO9 has been found [3]. To date, YO9 infection can only be detected specifically by faeces culture. The sensitivity of this method is not really known but obviously depends largely on the bacteriological procedure used [3]. Moreover, one out of 8 animals experimentally infected with high doses of YO9 shed only once the organism [4]. The major problem encountered in studying the FPSR phenomenon is its low duration. Even with the most sensitive method to detect YO9, *ie* ELISA, the serological positive window often does not exceed two weeks. Thus, seronegative animals can be either free of YO9 infection or sampled after the serological response. Moreover, excretion is also transient and might not be concomitant with the serological reaction. Thus the sampling date might play a major role.

In conclusion, up to date, classical explicative epidemiological tools are not usable to clarify the relationship between FPSR and YO9 mainly because both the expression of the effect (FPSR) and the detecting time of the presumed cause (YO9) are very brief. The development of new diagnostic tools, either more specific or more sensitive, is necessary to discriminate brucellosis and FPSR and to enhance the estimation of the incidence of FPSR and the estimation of the real number of animals at risk (that is in contact with YO9). Nevertheless, the informations already gathered by the epidemiological network should be used to adapt the management policy of bovine brucellosis surveillance.

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[1] Unité Epidémiologie, CNEVA Alfort, 94703 Maisons-Alfort cedex, France
[2] Laboratoire de Référence OIE pour la Brucellose, CNEVA Alfort, 94703 Maisons-Alfort cedex, France
[3] Mission Epidémiologie, CNEVA DG, 94703 Maisons-Alfort cedex, France