Abstracts N°2/2007

Public veterinary health and codification (2): from the French Restoration period until today

By P. Le Bail (lecture, pp. 69-78).

*This paper describes how French law on veterinary issues has developed since the French Restoration period. Clearly changes in the legislation are closely related to the historical context and to changes in ideas, organisation of public authorities, scientific progress, and more recently to the expectations of the general public. This long process has lead to the creation of an autonomous legislative concept, known as "**public veterinary health**", voted by the French Parliament in June 2000.*

Key words**: **rural Code, History, Public veterinary health.

Genetic variability of HPA axis function in pigs: molecular mechanisms and consequences on meat production

ByP. Mormède (lecture, pp.79-84).

Cortisol, released by the adrenal cortex in response to the pituitary hormone ACTH, is a typical glucocorticoid hormone, i.e. it induces peripheral catabolism, particularly of tissue proteins and stimulates the synthesis of glycogen (neoglucogenesis) in the liver. Therefore, high HPA (hypothalamic-pituitary-adrenocortical) axis activity increases fat deposition at the expense of tissue proteins. The HPA axis activity is subject to a wide genetic variability affecting its different levels of organisation, the amount of cortisol secreted (mainly dependent upon the adrenal cortex sensitivity to ACTH), its bioavailability (transport and metabolic processes), and its tissue action based on the efficacy of the receptors and their signalling pathways. This paper illustrates the genetic variability of cortisol production in pigs and its relationships with adiposity and meat quality. In a second part, we describe the different approaches used to identify the genes whose polymorphisms explains this genetic variability. These polymorphisms may be used to select animals with an optimal corticotrophic phenotype based on production objectives.

Key words: HPA axis, cortisol, genetics, obesity, carcass composition, meat quality, QTL, genomics, systems genetics, pig.

Fasciolosis of Ruminants: immunity, immunomodulation and control strategie

Par A. Chauvin, W. Zhang and E. Moreau (lecture, pp.85-92).

The first part of this article describes the differences in immune response against the liver fluke found in its various ruminant hosts. It shows that sensitivity to F. hepatica and F. gigantica infestation and the development of a resistance against these parasites vary widely from host to host.

These host-specific responses of against the parasite, and especially the cellular response, are described. Lesions form around a necrotic area with inflammatory cells organised into a granuloma. These cells are mainly macrophages, lymphocytes and eosinophil granulocytes;

the excretion-secretion products of F. hepatica or F. gigantica trigger early on a proliferative response from lymphocytes, as well as a secretion of cytokines, which vary depending on the ruminant host. The elimination of Fasciola spp. during its peritoneal or hepatic migration involves two mechanisms: destruction by macrophages activated by interferon gamma, which produces nitrogen monoxide (NO) toxic for the parasite, and antibody-dependent cell-mediated cytotoxicity (ADCC). These mechanisms are dependent on either Th1 cytokines, particularly IFNγ for the induction of NO, or Th2 cytokines for ADCC. We describe how the parasites defeat these two mechanisms. This phenomenon could explain why ruminant resistance to reinfestation is only limited and why there is no premunition against flukes.
Consequently, the anti-fasciolosis strategy is directed at the parasite, using agronomic measures to prevent animal infestation. Given the type of immunity animals develop against fasciolosis, the efficacy of vaccines is limited to reducing the parasite load.

Key words: Fasciola hepatica, Fasciola gigantica, sensitivity, acquired immunity, cytokines, immunomodulation, prevention, vaccination, agronomical measures.

Reemergence of cattle paramphistomiasis in France: current review of epidemiology, pathophysiology and diagnosis

By J. ~P. Alzieu and Ph. Dorchies (communication, pp.93-100).

The prevalence of cattle paramphistomiasis is growing in France. This recent reemergence may be related to several factors: limited number of specific anthelmintics available, longevity and high prolificity of adult worms, decreasing prevalence liver fluke which increases the availability of the snails which act as intermediate hosts for paramphistomids, and extensification of cattle farming.
Although clinical signs are not very typical, the pathogenicity of paramphistomiasis cannot be ignored, due to the risk of acute form due to immature worms (difficult to identify) and of recurrent bloating due to the mechanical effect of adult worms. However, the pathogenicity of paramphistomids is much milder than that of Fasciola hepatica.
There is currently no immunological method available for this diagnosis; a clinical suspicion is confirmed by faecal egg counts (epg), but there is no formal correlation between their numbers and the parasite load.

Key words: **Paramphistomum daubneyi,** ***cattle, epidemiology, pathogenesis, diagnosis.***

« The Liver Fluke Watchdog »: evaluation of control measures required in farm herds to control fasciolosis and initial results

By G. Bosquet, J. ~P. Alzieu, A. Chauvin, Ph. Camuset, Ph. Dorchies and B. Heskia (xcommunication, pp. 101-106)

The initial results obtained by the « Observatoire de la grande douve », or *Liver Fluke Watchdog, in France offer an interesting platform for veterinary practitioners to set up formal programs to fight endemic diseases (parasitism, mastitis, neonatal gastroenteritis…). This experience has shown that breeders are indeed coming round to the idea of paying a consultancy fee, provided the advice is relevant and profitable.*
These therapeutic and prevention protocols, HACCP compliant, provide some insight on the health policy of the future. The example of fluke control illustrates the actions to promote: screening, risk factor identification, prescription of therapeutic and agronomic measures, and

finally, control of the program's efficacy. The initial results obtained in animal husbandry confirm the major benefits of this approach.

Key words: liver fluke, epidemiology, prevalence, serology, coproscopy, quality assurance, therapeutic and agronomic measures, Lymnaeid snail habitat, intermediate hosts.

Q fever: problems and health risks

By E Rousset, V. Duquesne, P. Russo and R. Thiéry *(communication, pp.107-114).*

Q fever is a zoonosis caused by Coxiella burnetii. *Domestic ruminants are the main for human contamination, as infected female ruminants shed the bacteria in parturition products, milk and faeces. Numerous studies provide to describe the natural evolution of bacterial shedding by domestic ruminants. AFSSA presented a review of Q fever and of reasoned measures applicable to infected sheep, cattle, and goat herds (Rodolakis et al. 2004). Veterinary researches for the disease is designed to limit the contamination of the environment and of the population. The major challenge is to determine the best diagnostic strategies and to implement control programs. Vaccination appears to be the best way to combat Q fever. A phase I inactivated vaccine, whose preventive efficacy has been experimentally demonstrated, is authorised in France since 2004. Several research teams and professional organisations are currently evaluating the benefit of this vaccine in herds.*

Key words: Q fever,* Coxiella burnetii*, ruminant, public health.

Observations, lesions and symptoms in wild avifauna in the East of France (Ain) during the 2006 H5N1 HP bird flu outbreak

By D. Baroux, M. Neyron, J.Hars, S. Ruette, F. Vernet, F. Darbon, A. Legouge and G.Lombard *(communication, pp.115-124).*

Between February and August 2006, 490 wild birds grouped into 302 lots were collected in the East of France (Ain department). Virological tests were performed by the Departemental Laboratory. The M gene, common to all type A avian influenza viruses and detected by PCR on tracheal and cloacal swabs, was present in 41 lots, of which 39 originated from the Dombes area. The National Reference Laboratory (AFSSA Ploufragan) confirmed the presence of the highly pathogenic (HP) strain of H5N1 virus. Nervous signs were detected upon clinical examination in some of the birds. The autopsy showed predominantly congestive and hemorrhagic lesions (thoraco-abdominal cavity, heart, and kidneys), often associated in mute swans with pulmonary emphysema, pancreatitis and encephalitis. Some of the birds with macroscopic or histological lesions had a negative PCR. The virus, probably introduced by the common pochard, Aythya ferina, affected mainly swans but also other aquatic or predatory birds. The outbreak lasted from February to April, and was limited to a few villages. Evidence of H5N1-HP excretion was found only in a small number of wild birds and disappeared as the weather stared to warm up.

Key words : ***avian flu, wild avifauna, mute swan (Cygnus olor), common pochard (Aythia ferina), birds, Ain, symptoms, lesions, epidemiology, H5N1.***

Bluetongue in the North of Europe

by E. Bréard, C. Sailleau, K. Gorna, L. Bounaadja, C. Bahuon and S. Zientara (communication, pp.124—132).

Bluetongue is a non-contagious viral disease transmitted by the hematophagous midge Culicoides. Bluetongue causes a generalised and serious infection affecting mainly sheep. Since its reemergence in Europe in 1998, 5 out the 24 serotypes (1, 2, 4, 9 and 16) were isolated in numerous Mediterranean countries. In France, only Corsica has suffered four epizootics involving serotypes 2, 4 and 16. In 2006, the bluetongue virus serotype 8 emerged unexpectedly in Belgium, Germany, the Netherlands, France, and Luxemburg. This bluetongue epizootic was atypical, as it affected cattle as well, a species only very rarely affected by the bluetongue virus, with varying degrees of severity. The characteristics of this epizooty, the diagnostic methods, and the prophylactic measures are described in this article.

Key words**: **bluetongue, prophylaxis measures, diagnosis, vaccine.

Artificial insemination in dogs: what's new?

By C. Dumon (communication, pp.133-142).

The growing interest of dog breeders and dog owners for assisted reproduction techniques is fuelled by its good results. The outcome of the procedures has improved consistently over the past twenty years, based on more detailed understanding of canine reproductive physiology and improved clinical investigations of the male and female genital tract using hormone assays, ultrasound examinations, and fibroscopy.

This article reviews past and current data, describing the indications, implementation, results and limits of the three insemination techniques used in dogs, i.e. with fresh, chilled or frozen semen.

Future prospects are also described.

Key words: fresh, chilled and frozen semen, ovulation timing, fertility, vaginal and intrauterine insemination.

Feline artificial insemination

By A. Fontbonne, X. Lévy, E.Fontaine and J. ~Y. Routie (communication, pp.143-152).

Artificial insemination in the domestic cat and in wild felids has several indications. In the cat, it may replace natural reproduction when matings are unsuccessful or difficult, and it may help to perform geographical exchanges of semen and therefore enhance genetic improvement. In wild felids, it plays a complementary role inside conservation programs. However, its use is complex. First, oestrus and ovulation have to be induced. This is most often obtained using gonadotrophins, which unfortunately may induce undesirable effects, like ovarian hyperstimulation. In males, the semen is generally collected by electro-ejaculation. It may be frozen. However, teratospermia, which is the production of numerous spermatozoa showing morphological abnormalities, is a specific problem affecting felids. Intrauterine inseminations give better results. For a long period, laparoscopy was recommended in felids to perform intrauterine inseminations. Recently, new techniques consisting of catheterizing the cervix through a vaginal access have been developed in the cat

as in some wild felids species. Altogether, the rate of success of artificial insemination in felids remains moderate.

Key words: cat, queen, felids, artificial insemination.

Embryo biotechnologies in dogs

By S. Chastant-Maillard, A. Fontbonne, M. Saint-Dizier and K. Reynaud (communication, pp.153-162).

There is very little data available on the specificities of oocyte and embryo biology in bitches. The main difference with other mammals is the time of meiosis resumption: it does not occur before ovulation, but in the oviduct 48 to 60 hours later. The factors responsible for this delay are not known, which may explain why current in vitro *maturation rates are so low (10 to 30%). Oocyte harvesting is also a major limiting factor, as there is no effective protocol for the induction of cycles and superovulation.* In vitro *fertilisation rates are equally low (10%), with a high rate of polyspermia. No puppy has yet been born from an embryo produced* in vitro*. As for embryos produced* in vivo*, their collection is difficult due to anatomical reasons and to the fact that superovulation cannot be induced. Embryo transfer to donor bitches is also hindered by difficulties to synchronise ovulations between donor and recipient bitches. Only 6 such trials have been reported in the literature, resulting in the birth of 45 puppies.* In vitro *cultures are very rarely used, and only four puppies were born from somatic cell cloning with only few hours of* in vitro *culture. Canine reproductive biotechnologies have thus largely fallen behind, due to a lack of fundamental research to improve our understanding of its specific physiological mechanisms. This deficit is all the more damaging that dogs are increasingly used as relevant biomedical models.*

Key-words : oocyte, embryo, in vitro, cloning, meiosis.