BWDS NEWSLETTER

2014/01 20 AUGUST 2014

Website : www.bwds.be

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First 2014 BWDS general meeting, April 24th 2014, Faculté de Médecine Vétérinaire, Sart-Tilman, Université de Liège

Photo: Paul Heyman

1. Editorial

In the last decennia numerous projects have been focusing on the transmission of infectious diseases between wildlife, man and domestic animals. In the same period profound changes in the human-nature interface created new opportunities for infectious agents to spread. Increased travelling and worldwide trade in exotic species enhanced the probability of contacts with exotic pathogens. Diverse outdoor activities multiplied the human incursions into wild animal habitats.

The exponential increase of the human world population (which is currently doubling every 50 years) causes growing conflicts between wildlife and man. Intensified land use, scale enlargement and monoculture reversed animal biodiversity towards the domination of "culture following" species, adapting themselves perfectly to a man-designed environment. Simultaneously, many less adaptive species disappeared, in the first place those with specialized alimentary and environmental needs. Although not proven, the loss in biodiversity could be related to the emergence of diseases (Keesing et al., 2010).

In spite of all these observations, conservative orientated consultants still consider biodiversity as non-relevant in food safety and disease emergence matters. They ignore the anthropogenic impact on the environment and its role in the emergence of wildlife-borne diseases. Believing that increased contacts between wildlife and the human society are not proven, indicates a "non-believer" positioning, downgrading the overwhelming evidence of profound environmental and demographic changes in the last half century to "non-relevant" and subordinate to production goals. Calling the industrial food production in question is a taboo: the need to feed the world population is used to advocate mass food production techniques. But this argument can hardly be taken seriously, observing that the largest part of the world population has absolutely no access to the food produced, and observing that food related welfare diseases are so frequent in the western world. Every day an excess of food products of animal origin is sent to destruction plants in large quantities because they are perished: is this not morally questionable ?

It looks like an amazing anachronism to see that some tendencies within the scientific world refuse to see what is happening to our environment since about fifty years. And how we are trying hard to find ever further going artificial solutions for the worldwide problems that we created ourselves, while the correct logic would be to return on our steps, and consider animals as living beings and not as production machines driven to absurd performances. If we want to meet future solutions for food safety and availability and for the prevention of infectious diseases, many of which originate from wildlife, we have to take hold as soon as possible of the huge task of looking to these challenges with an ecological pair of glasses. This means including biodiversity and scale reduction as new priorities into health and food safety risk assessments.

Text: Paul Tavernier

Keesing, F., Belden, L.K., Daszak, P., et al. (2010). Impacts of biodiversity on the emergence and transmission of infectious diseases. *Nature.* 468: 647–652.

2. Meeting Report General Assembly Liège, May 24th 2014, Liège

On May 24th the first general BWDS meeting of 2014 was held at the Sart-Tilman Veterinary Faculty of the Liège University. It was the first meeting fitting into the new "study day" concept that was adopted recently by the BWDS board for our general meetings taking place minimum 2 times a year. This study day was organized in association with the **"Réséau de Surveillance Sanitaire de la Faune Sauvage"** (Wallonie), led by Prof. Annick Linden.

In a short introduction **Annick Linden** explained the organisation and functioning of the Walloon network for wildlife disease surveillance. In the first presentation **Rosario Volpe** showed results of the post-mortem examination of 34 red deer with paratuberculosis and compared the sensitivity of direct methods for diagnosis: macroscopic and microscopic examination, histopathology, PCR and culturing the bacterium which is slow and fastidious. By culture, nearly one third of the cases were found to be mixed infections between *Mycobacterium avium* subsp. *paratuberculosis* and *M.avium avium.* Histopathology together with PCR is advocated as the most practical diagnostic method because it is faster than culture.

Damien Thiry gave an overview of the knowledge about hepatitis E virus in large game species in Belgium. The zoonotic virus is widely seroprevalent in asymptomatic domestic swine while the same genotype 3 is found in humans. Transmission is foodborne or by direct contact. In wild boar in southern Belgium a high seroprevalence was found (33%), while in red deer and roe deer it was very low (respectively 1 and 3%), indicating that wild cervids are not a reservoir in southern Belgium. The third presentation by **Alain Licoppe** (Département de l'Etude du Milieu Naturel et Agricole, DEMNA) highlighted the home range and movements of wild boar and red deer in south Belgium. The methods to investigate the population dynamics in these game species were explained. The data obtained are important for epidemiological studies. Please find the abstracts of the presentations below.

After the lunch in the faculty restaurant, we could assist to the demonstration of a post-mortem examination of a red deer hind and a badger. This was accompanied by extensive background information about the surveillance network.

The BWDS board thanks the team of the Réseau de Surveillance Sanitaire de la Faune Sauvage en Wallonie, and especially Prof . A.Linden and the presenters, for the organisation of this very interesting study day.

Report : P. Tavernier

Rosario Volpe : Comparison of direct diagnostic tools for detection of *Mycobacterium avium* subsp. *paratuberculosis* in wild red deer (*Cervus elaphus*)

Abstract: R.Volpe

Paratuberculosis is a chronic granulomatous enteritis of ruminants responsible for important economic losses in cattle industry. The disease is reported in wild ruminants but many questions remain on the pathology in wild species. The purposes of this study were (1) to fully describe 34 true cases of paratuberculosis in red deer and (2) to determine the sensitivity of direct diagnostic tests compared to the results of mycobacterial (*Mycobacterium avium paratuberculosis* - *Map* - and *Mycobacterium avium avium* - *Maa*) cultures.

The 34 cases were selected *a posteriori*, all were *Map/Maa* positive in culture. In the group, single (*Map*) and mixed (*Map/Maa*) infections were detected in 70% and 30 % of cases, respectively. These animals were either killed for sanitary reasons or found dead. A complete necropsy was conducted and direct diagnostic tests were performed.

Unlike in cattle, paratuberculosis concerned both young and adult cervids. All but 2 were emaciated but signs of diarrhea and *Map* excretion were not always observed. At necropsy, 82 % of cases presented mesenteric lymphadenitis and intestinal lesions were observed in 42 % of cases. Disseminated mixed infection with lesions in the lung was observed in 2 animals. Microscopic examination revealed multibacillary (80%) and paucibacillary (20%) forms. Different direct diagnostic tests were compared. The sensitivity of PCR IS900 was 100 % if tests were carried out on lymphs nodes and small intestine. Histopathology yielded excellent results provided that examination is thorough.

In conclusion, paratuberculosis in red deer concerns both young and adults and mixed mycobacterial infections are not uncommon. If monitoring program must be implemented in wild cervids, mesenteric lymph nodes are top-grade organs for direct diagnosis and PCR associated with histopathology could be used instead of fastidious mycobacterial cultures.

Damien Thiry : Hepatitis E virus infection in suids and cervids in southern Belgium

Abstract: Thiry D. , Mauroy A. ,Saegerman C., Fett T., Linden A., Thiry E.

Hepatitis E virus (HEV) belonging to the family *Hepeviridae,* genus *Hepevirus*, is a small, non-enveloped virus with a single-stranded, positive sense RNA genome of approximately 7.2 kb. In Europe, genotype 3 mainly circulates and its route of transmission is highly suspected to be zoonotic. Direct zoonotic transmission of symptomatic HEV from infected meats to human beings was documented only two times

(Li et al., 2005; Tei et al., 2003). However, numerous indirect evidences of zoonotic transmission of HEV exist and transmission between pigs, wild boar or deer and humans is of particular concern (Meng, 2011; Teo, 2010).The aims of this study were to obtain data on apparent viroprevalence and seroprevalence in pigs, wild boar and cervids and to compare the different strains identified in Belgium.

Domestic pig (*Sus scrofa*): A study performed on 420 pigs sampled throughout Belgium in 2010 showed an individual seroprevalence of 73% (±4; 308/420). The individual seroprevalence was significantly different between the two regions (Chi2 = 4.83; 1 degree of freedom; P = 0.03): 66% (±8; 79/120) in the Walloon Region and 76% (±5; 229/300) in the Flemish Region. Moreover, 93% of the tested herds were found to contain at least one seropositive pig. Four out of 420 pig sera were detected positive for HEV RNA by conventional nested RT-PCR. These 4 sera came from pigs aged between 3 and 4 months. All sequences from the 4 positive sera belonged to genotype 3, subtype f (Thiry et al., 2014).

These results are in agreement with the major findings in other European countries, except for one genotype 4 virus found in Belgium (Hakze-van der Honing et al., 2011). The relative low detection of HEV RNA (4 out of 420 pig sera) can be explained by the age of the sampled pigs which were less than 6 months but probably older than 2 to 4 months old when the peak of viraemia is usually observed. This study shows that the pig population in the Flemish Region was more exposed to HEV than in the Walloon Region. Nevertheless, it is not possible to know whether the higher HEV seroprevalence observed in swine in the Flemish Region could be related to a higher incidence in humans (project SPF HEVEA).

Wild boar (*Sus scrofa scrofa*): An apparent seroprevalence of 33% (±4.6; 125/383) was obtained on a sample of 383 wild boar sera in 2010 in Wallonia. Five out of 61 livers and 4 out of 69 sera of young wild boars were detected viropositive and the sequences obtained belonged to genotype 3f. Therefore, these data are in agreement with the situation observed in other European countries and the links between HEV infection in pigs, wild boars and humans need to be further analyzed to support the hypothesis of a zoonotic transmission in Belgium (project SPF HEVEA).

Red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*): A sampling of the deer population was conducted in Wallonia during the hunting season 2012: 189 sera from roe deer and 235 sera from red deer were devoted to the serology; 84 sera from red deer and 68 sera from roe deer aged of more than one year were used for virology. An apparent seroprevalence of 1% (± 1.4, 2/189) and 3% (± 2.2, 7/235) was obtained in red deer and roe deer respectively. Both positive red deer detected were between 1 and 2 years and among HEV-positive roe deer, there were 3 less than 1 year and 4 over 1 year. No serum was detected viropositive. Contrarily to the prevalence detected in wild boars (33%) (± 4.6, 125/383) and pigs (66%) (± 8.4, 79/120) in the same region (Wallonia), deer does not seem to represent an epidemiologically significant reservoir host.

Alain Licoppe: Home range and movement of red and wild boar in South Belgium, an overview

Abstract: Alain Licoppe, Isabelle Hanneuse, Céline Prévot, Julien Lievens

In order to improve the wildlife management in Wallonia some individuals of red deer and wild boar populations have been captured, tagged , released and tracked in some experimental areas (mainly on the territories of the Hunts of the Crown). These data providing spatiotemporal information of wildlife might be also of major interest to consider the movement patterns and distances of possible associated diseases. According to the life stage of the captured animal, different kinds of tags are used from the small plastic ear-tag to the large GPS collar. Marking juveniles will help studying natal dispersal while permanently tracking adults will provide very accurate information about its home range and the 'every day movement' within its habitat. The median size of the annual home range (MCP ha) of females and males are 378 (n=146) and 476 (n=70) for red deer and 469 (n=49) and 667 (n=43) for wild boar. But the variability is high specifically in males according to their age, because some young males disperse when they are sub-adult (natal dispersal) and most of the adults range on a large area during the mating period (reproduction dispersal). The other variables that seem to explain the home range size variation are the proximity of food and cover resources, human disturbance and seasons (winter harshness). Most of our home range results concern ungulates living in large forests of Ardenne and Famenne. Some wild boars have been radio-tracked in more agricultural landscapes and they showed much larger home ranges than in forested areas. An important number of piglets (>3000, from 2005 to 2013) have been tagged on many sites well distributed in Wallonia with plastic ear-tag in order to calculate the distance between capture and recovery places. Around 40 % of them were recovered, mainly by hunting. The 'best dispersers' are the sub-adult males. Whatever the sex class, around 85 % of them were recovered within 5 km, more than 95 % within 10 km, suggesting that wild boar is a sedentary species. Nevertheless, thanks to our large sample, some exceptional distances have been observed despite the high fragmentation (highways) of our landscape. Some wild boar even crossed the borders of Germany, Luxemburg and France. The current longest distances travelled by wild boar are 38 km for a female and 66 km for a male. Based on a lower sample (n=200), red deer showed a very similar dispersal pattern with lower maximum values and some rare observations of stags (no hinds) crossing highways.

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4. 11th Symposium of the Dutch Society for Wildlife Health

The yearly Symposium of the Dutch Society for Wildlife Health (DSWH) took place on May 8th, 2014 at the Veterinary Faculty, Utrecht. The theme was "Bats, Birds and Bugs". In the following short overview of presentations we highlight some of the many very interesting communications.

Bats: (**F.Drexler**, Institut für Virologie, Universitätsklinik Bonn, Germany) An increasing number of zoonotic viruses are found in bats . They include lyssaviruses, SARS virus (in *Rhinolopus* species; the

intermediate hosts being Asian civets namely *Paradoxurus hermaphroditus* and *Paguma larvata***)** and the closely related MERS virus (the intermediary host being most probably the dromedary camel), human coronaviruses, hepaciviruses (hepatitis B and C virus, also found in new-world capucin monkeys predating on bats, and in bank voles *Myodes glareolus*), and also EBOLA virus.

Bart Kooi (CVI Wageningen): In the Netherlands, bat lyssavirus EBLV1 is found in 22 % of *Eptesicus serotinus* (the serotine bat), corresponding to a west-east European distribution pattern, while EBLV2 is found in 4% of *Myotes dasycneme* (the pond bat) corresponding to a north-south European distribution. All other bat species proved free of lyssaviruses in a systematic surveillance of found-dead bats in the Netherlands (since 1985 and using fluorescence antibody testing and RT-PCR)

(Wilma Hazeleger) Bacteria ("bugs") found in the feces of bats include the food-borne pathogens *Campylobacter jejuni* and *Salmonella enteritidis* (bats could be a reservoir by contaminating pigs ?), next to *Enterococcus* spp., *Serratia* , *Carnobacterium* a.o.

The above information highlights the importance of wearing gloves when manipulating bats, and to wash fruits and vegetables before consumption.

Birds : **Thijs Kuiken** (Erasmus Medical Centre, Rotterdam) reported about LP avian influenza strains found in black-headed gulls (*Chroicocephalus ridibundus*). Many variables determine avian influenza epidemics in wild birds including migration, population size and structure, fecal-oral transmission rate and herd immunity. A survey by Ursula Höffle between 2006-2010 showed for the most important breeding colonies in the Netherlands a yearly epidemic peak of H13 strains followed by a second peak by H16 strains in young black-headed gulls which did not experience any noticeable adverse impact. This stood in contrast to adult gulls in the same period in which only very low epidemics with various AI viruses were found.

Bees: **Coby van Dooremalen** (Wageningen University) focused on the current threats to domesticated honeybees (1/10 colonies dies) and possible disease transmission between honeybees and wild living bumble bees. An example is DWV (Deformed Wing Virus) which is transmitted by *Nosema apis*, a pathogenic protozoan parasite sucking haemolymph and present in nearly all bee colonies.

The European hamster (*Cricetus cricetus*) is nowadays a very threatened species in western Europe, in Belgium it was extinct around 2007. Rotterdam Zoo (Blijdorp) breeds hamsters in captivity for reintroduction into the wild, which proved succesfull in the Netherlands, but not in Belgium (**Willem Schaftenaar,** Rotterdam Zoo"Blijdorp").

The contents and style of this meeting again illustrated that health and biodiversity are not opposed to each other and should be addressed together. The concern at all scientific and management levels for nature conservation of our northern neighbours is exemplary in contrast to the approach of other countries including Belgium. We can only regret the poor Belgian attendance (one) to this very well organized and informative 11th Symposium of our Dutch sister society.

Report: Paul Tavernier

5. Diclofenac and vultures

Non-steroid anti-inflammatory drugs (NSAID's) are used widely in veterinary medicine. An important side effect is nefrotoxicity which may induce acute renal failure dependent on the dose and animal species. Vultures have been found to be extremely sensible. Since the early nineties, diclofenac has caused dramatic declines up to 99% in vultures in the Indian subcontinent, mainly in India and Pakistan. Vultures are scavengers and ingest the drug from carcasses of cattle threated with diclofenac. Recently the same drug has been approved in the EU for use in cattle, which allows to fear the worst for the European vulture populations.

In Europe, vultures have been exposed to different threats in the past. About ten years ago, mad cow disease regulations (EU regulation CE/1774/2002) prohibited the feeding of cattle offal to scavenging birds of prey. This posed a serious threat to the survival of these birds, for which winter feeding in their southern European habitats, mainly in Spain, is an essential part of the conservation strategy. Later on the EU regulations CE/1069/2009 and CE/142/2011 were released, recalling the prohibition, by which winter feeding of carrion-eating birds became legal again. Animals that died in the field can be left for the vultures.

In the meantime, the illegal poisoning of birds of prey continued, a long-standing problem in large parts of the world including Europe, inspired by ignorance and traditional aversion. By their scavenging nature, vultures are the first victims of these irresponsible acts. The recent reintroduction of vultures in southern France was followed by stirring up campaigns claiming that vultures kill livestock, which is in contradiction with the broad knowledge about these birds. Only in exceptional circumstances they will attack weak or dying animals. In contrast, vultures are the natural way to clean up and recycle animal carcasses which are often difficult to access in the mountains and in areas of extensive farming. The costs charged by private carriers for collecting carcasses are usually high. Moreover, the recovery, transport and destruction of carcasses are energy-consuming and produce greenhouse gasses.

With the recent approval of diclofenac we face a new crisis for the European vultures. Following EU directive 2001/82/CE, art.35, diclofenac was approved for veterinary use by the EU. The commercially available specialities Dolofenac and Diclovet, each contain 50 mg/ml of diclofenac, for use in cattle and pigs. Italy and Spain have implemented recently the approval in their national legislation. Spain is the bulwark country for European vultures, accomodating about 95 % of the European vulture populations. The species of concern are the Griffon vulture (Vale gier, Vautour griffon, *Gyps fulvus*), the Monk vulture (Monniksgier, Vautour moine, *Aegypius monachus*), the Egyptian vulture (Aasgier, Vautour percnoptère, *Neophron percnopterus)* and the Bearded vulture (Lammergier, Gypaëte barbu, *Gypaetus barbatus*). Other member states could approve diclofenac in the nearby future, as the drug is cheaper than alternative products.

Apparently the risk assessment procedures for the registration of new drugs do not include the impact on scavenging birds. Yet the effects of diclofenac are very well known since the well documented vulture die-offs in southern Asia. Moreover, an alternative NSAID, non-toxic to vultures, is available in many countries, namely meloxicam. In the Indian subcontinent the marketing of diclofenac was successfully stopped, and it was replaced by meloxicam.

The Vulture Conservation Foundation (VCF) and BirdLife International sent an official demand to the European Union and a number of member states, to start a recall procedure in order to withdraw the registration of diclofenac for use in domestic animals. Such a procedure is possible in case of presumed risks to the environment or to human health. A petition was launched by the two organizations to support their demand : *https://www.change.org/petitions/european-union-diclofenac-the-vulture-killing-drug-is-now-available-on-eu-market*

The references below are given as background information but are only a small part of the many scientific and vulgarizing publications about this subject.

References (Indian subcontinent):

- Green et al .(2004). Diclofenac poisoning as a cause of vulture population declines across the Indian subcontinent. Journal of Applied Ecology 41,793-800

- Meteyer C.U., Rideout B.A., Gilbert M., Shivaprasad H.L., Oaks J.L. (2005). Pathology and proposed pathophysiology of diclofenac poisoning in free-living and experimentally exposed oriental white-backed vultures (*Gyps bengalensis*). Journal of wildlife research 41(4),707–716 http://www.jwildlifedis.org/doi/pdf/10.7589/0090-3558-41.4.707

- Oaks et al. (2004): Diclofenac sodium residues as the cause of population declines of vultures in Pakistan. Nature 427,630-633.

References (Europe):

- Gilbert M. (2014). Diclofenac and vulture populations, Veterinary Record 174, p 562 *http://www.4vultures.org/app/download/8190631685/Veterinary+Record-2014-Gilbert-562.pdf?t=1402563707*

- Stanford M. (2014). Diclofenac and vulture populations,Veterinary Record 174, p 562 *http://www.4vultures.org/app/download/8190631885/Veterinary+Record-2014-Stanford-562.pdf?t=1402563707*

Some links:

- Vulture Conservation Foundation (VCF): http://www.4vultures.org/news

- Society for Conservation Biology: http://www.conbio.org/policy/scb-europe-warns-that-diclofenac-approval-threatens-european-vultures-and-e

Text (compilation): Paul Tavernier

Griffon vultures harassed by carrion rows (Spanish Pyrenees) *Photo: P.Tavernier*

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6. Workshop “Ecology and evolution of parasites and infection” , UA

From 17-19 September 2014, the Evolutionary Ecology Group at the Department of Biology, University of Antwerp organizes again the annual 3-day Summer workshop **" Ecology and Evolution of Parasites and Infections: from data to theory".** This workshop is open to **Ph.D.-students and young post-doctoral researchers** with an interest in the subject. Participation is **free of charge** and includes hand-outs, refreshments during breaks and lunch. The number of participants is limited to 15. For **registration** (obligatory), send an email with a brief motivation (max. 10 lines) and CV to herwig.leirs@uantwerpen.be
The **program** of the workshop consists of two different activities:
1) Renowned international scientists will give lectures, at PhD-student level, about recent developments related to the workshop theme in their discipline. These include (titles still to be specified more):

- Sandra Telfer (University of Aberdeen): *The importance of empirical studies to test and develop theoretical models of disease transmission.*
- Niel Hens (University of Hasselt): *Vaccination as an experiment to test epidemiological theory* (+hands-on session on epidemiological modelling in software R)
- Philippe Lemey (KU Leuven): *Integrating molecular data and computational biology to investigate virus evolution: from data to theory* (+ demonstration of software for such work)

2) All participating PhD-students and post-docs briefly present their research project and have ample time to discuss it with the other participants and the international scientists. The aim is to stimulate networking within Flanders and receive fresh input from top experts in the field.
The exact planning of the three days will depend on the background of the participating students/postdocs, since the lectures and the participant presentations will be grouped thematically.

Background: Since about two decades there is a strong and growing interest in the ecology and evolution of parasites and infections. This interest is stimulated from two sides. In Biology it is well accepted that parasitism is a very common ecological relationship of co-existence between species and it is estimated that there are at least as many parasitic as non-parasitic species; moreover parasitism is one of the major driving forces of evolution and the interactions between hosts and parasites provide insights in the different mechanisms of evolution. Secondly, there is a growing concern for so-called new and (re)emerging infectious diseases, most of which are of zoonotic origin or make an evolutionary species jump to become established in humans or livestock. Changing ecological conditions (e.g. due to climate change, invasion of humans in new habitats) are altering the transmission and distribution patterns of such diseases.

Several research groups in Flanders are studying the above broad topic. The diversity of background disciplines (biology, medicine, veterinary medicine), taxonomic groups of hosts or parasites (viruses, bacteria, Protista, Metazoa), different approaches (microbiology, evolutionary genetics, transmission ecology, disease control, modelling…), a focus on different geographic regions,…. make that these groups often are not very familiar with each other. This same diversity could, however, be most enriching and stimulating for students and researchers working in these groups.
The activity is part of a series of annually organized workshops on the general theme of "Ecology and Evolution of Parasites and Infections" but each year with a different more specific theme.

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7. Next General Assembly (Study Day)

For our next general meeting, the second of 2014, we go eastward again. This meeting will be organized on Wednesday 15 October at the **Natuurhulpcentrum** in **Opglabbeek**, province of Limburg. This is the largest wildlife rehabilitation center in Belgium. The program will include 3 or 4 presentations of which the subjects will be communicated to you later on, as well as the names of the speakers (not yet known for sure at this moment). Next to the presentations there will be a guided tour of the facilities. At noon a sandwich lunch will be offered. The BWDS is looking forward to meeting you there.