

# Even in epidemiology, a little zoology cannot do no arm

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## Abstract

A real difference may be seen in published papers concerning the precision given to pathogens identification compared to the precision given to the animal species identification, be they vectors, hosts or reservoir. This could lead to error in controlling some diseases and in mistakes In understanding their epidemiology.

## Introduction

For many a zoonose, the existence of one or different wild reservoir species, as well as one or different possible vector species, makes it necessary to realise a real multidisciplinary work in the study of their epidemiological cycles. Strangely, the published scientific papers, be they reviews or more specialised works, show a real difference in the level of precision given to the parts dealing with pathogens when compared to those dealing with host, reservoir or vector species. Viruses, bacteria and parasites are quite often treated with the more recent and up to date information including molecular biotechnology methods. Their genomes are presented, phylogenetical trees compare them to each other and identifications are really accurate. As soon as the animal species are concerned, host, vector or reservoir, it looks like if the larger scale and other discipline were similar to an other attitude. In the case of invertebrates, it is admitted that the situation is complex. For this reason, the species are often mentioned with their scientific names as, quite often, they don't have any common names. Indeed, one of the main point may be to be able to find, when needed, enough systematians of the concerned group.

## Examples

When blue tongue appeared in Corsica island, France, in 1999, every one new that the virus had 24 known serotypes, but no one knew if the main vector, an insect, *Culicoides imicola*, was present on the island or not. Certainly, virology and entomology look quite different but when facing such a sanitary hazard, both are needed.

Sometimes mistakes come from a erroneous use of vernacular names. In a North-American review dealing with new developments in terms of vaccine against SARS virus, it is mentioned that European works suggested that the domestic ferret (*Mustela furo*) could play an interesting role as a laboratory animal (Marshall & Enserink 2004). However the paper shows a picture of a black-footed ferret (*M. nigripes*), a real rare and endangered North-American wild mammal species, certainly not to be seen as a candidate for any medical research project. It can be mentioned that the British English word « polecat » usually used to name some wild *Mustela* species in Europe and Asia is quite often translated by « ferret » in North American English where « polecat » is more often used for local skunks (*Spilogale sp.* for instance).

An other example shows again that even within the same language there can be some understanding difficulties (Wilson & Cole 2000, Wilson & Reeder 1993). Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy (TSE) mainly known from three

North American deer species : mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*) and North American red deer (*Cervus elpahus*). This last species is called « elk » in North America, the same word used in British English for *Alces alces*, which is called “moose” in the New World. Translations mistakes are many, specially when scientific names are not used (Moutou 2005).

The following example is even more compelling. The increase of rabies incidence in Lithuania is really of concern at the very beginning of the XXI<sup>th</sup> century. This explains that two recent reviews on animal rabies in this country are accessible from the internet, both presenting partly the same figures and written in English (Anonymous 2004, Razmuviene 2004). The main point is that, clearly, the same species are not identified the same way, which could lead to real epidemiological discrepancies. How could it be possible to organise field campaign against a zoonose if the animal reservoirs are not identified, or even worse, if a wrong species is designated ? Here are the main points in this case.

- An *Eurosurveillance Weekly* paper (Anonymous 2004) mentions on different occasion a « mongoose » species, which looks very improbable in a Baltic country. Indeed, mongooses (*Herpestidae*) are small to medium tropical carnivores, either from Africa, either from Asia. The few populations found today in Europe have all been introduced and only survived in Mediterranean countries (Mitchell-Jones *et al.* 1999). The word « mongoose » is not mentioned in the tables of this same paper.

- The two papers give a list of mammals in which a positive rabies diagnosis was given. Only wild species are presented here, ranked by decreasing importance. The comparison of the two lists is rather demonstrative as only English names are used, not scientific names (table I).

| <i>Reference (A)</i> | <i>Reference (B)</i> |
|----------------------|----------------------|
| Fox                  | Fox                  |
| <b>Racoon</b>        | <b>racoon-dog</b>    |
| Marten               | marten               |
| <b>Ferret</b>        | <b>polecat</b>       |
| Badger               | badger               |
| <b>Roe</b>           | <b>reindeer</b>      |
| Lynx                 | <i>not mentioned</i> |
| <b>Mink</b>          | <i>not mentioned</i> |
| Beaver               | beaver               |
| Otter                | Otter                |
| <i>not mentioned</i> | Wolf                 |
| Hamster              | <i>not mentioned</i> |
| Bat                  | <i>not mentioned</i> |

**Table I For two references, English names are compared. Names in bold characters pinpoint the discrepancies. The ranking is linked to rabies prevalence. In each case the red fox (*Vulpes vulpes*) is the first ranking species (A : Anonymous 2004, B : Razmuviene 2004).**

Figures for each species are not presented as they correspond to the year 2003 for reference (A) and to the year 2002 for reference (B) but the ranking is the same. The second most important species is the racoon dog (*Nyctereutes procyonoides*), an Asian representative of the dog family (*Canidae*), introduced in European Russia at the beginning of the XX<sup>th</sup>

century for fur industry. Since then, it expended its new range to the North and to the West and became a new rabies reservoir. The racoon (*Procyon lotor*, *Procyonidae*) is from North America. Their “common” English names look alike.

The word “marten” could mean either the pine marten (*Martes martes*), either the beech or stone marten (*M. foina*). They represent two different species, native in a large part of Europe, but with different ecologies. The stone marten is often found in villages or even cities, living close to human, which is not the case of the pine marten, a real forest species.

The ferret (*Mustela furo*) is the domestic counterpart of the European polecat (*M. putorius*).

The deer species is not clear. In reference 7 names look more accurate than in reference 1. However, reindeer (*Rangifer tarandus*) is not present in Lithuania, when the roe deer (*Capreolus capreolus*) is present (Mitchell-Jones *et al.* 1999).

Lastly, Baltic countries harbour one of the very last populations of the endangered European mink (*Mustela lutreola*), but also American mink (*M. vison*) escaped from fur farms. The word “mink” is not enough to know which species is concerned.

The last examples are linked to the contemporary world avian Influenza crisis. How many times were the scientific names of the wild or even domestic bird species concerned mentioned ? How will it be possible to consider the epidemiology of this highly pathogenic H5N1 strain through movements of wild (*i.e.* migrations) or domestic (*i.e.* international and local trade) birds if they species are not known ? It may be lost for good when it is certainly much more easier to identify a bird species than a virus strain.

## Conclusion

The use of scientific names to present host, reservoir or vector species could prevent such errors or mistakes. The consequences of such errors could be seen as important when eradication programmes are set up, whatever the disease and the country of concern. Epidemiologists, working together with microbiologists and zoologists, could make each of them aware of the importance of accurate species identification. A world reference checklist for each discipline could be of interest as it will be unique.

## References

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