

CYCLE OF WEBINARS
TOWARDS HARMONISED AND INTEGRATED WILDLIFE DISEASE SURVEILLANCE IN EUROPE
Approaches, opportunities and Citizen Science tools

WILDLIFE DISEASES IN 50 YEARS OF PUBLICATION DATABASES

The say of the scientific community

Rachele Vada, Stefania Zanet, Ezio Ferroglio &
EW consortium



@enetwild



ENETWILD

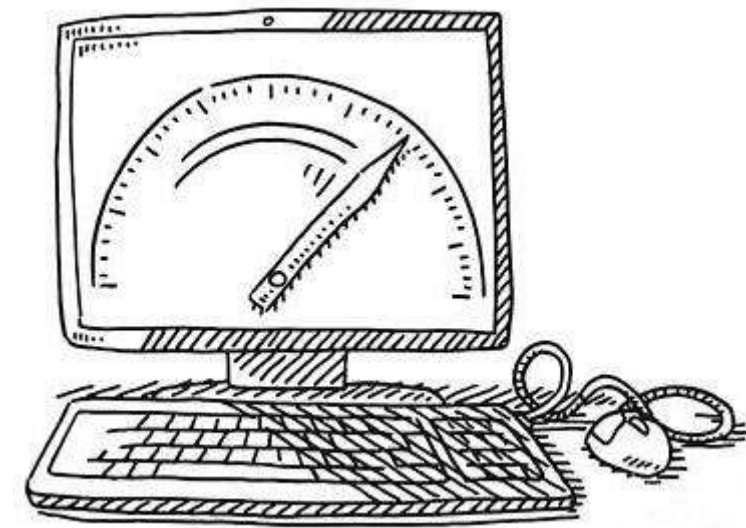
Focusing the question



Focusing the question



...to know where
are we going

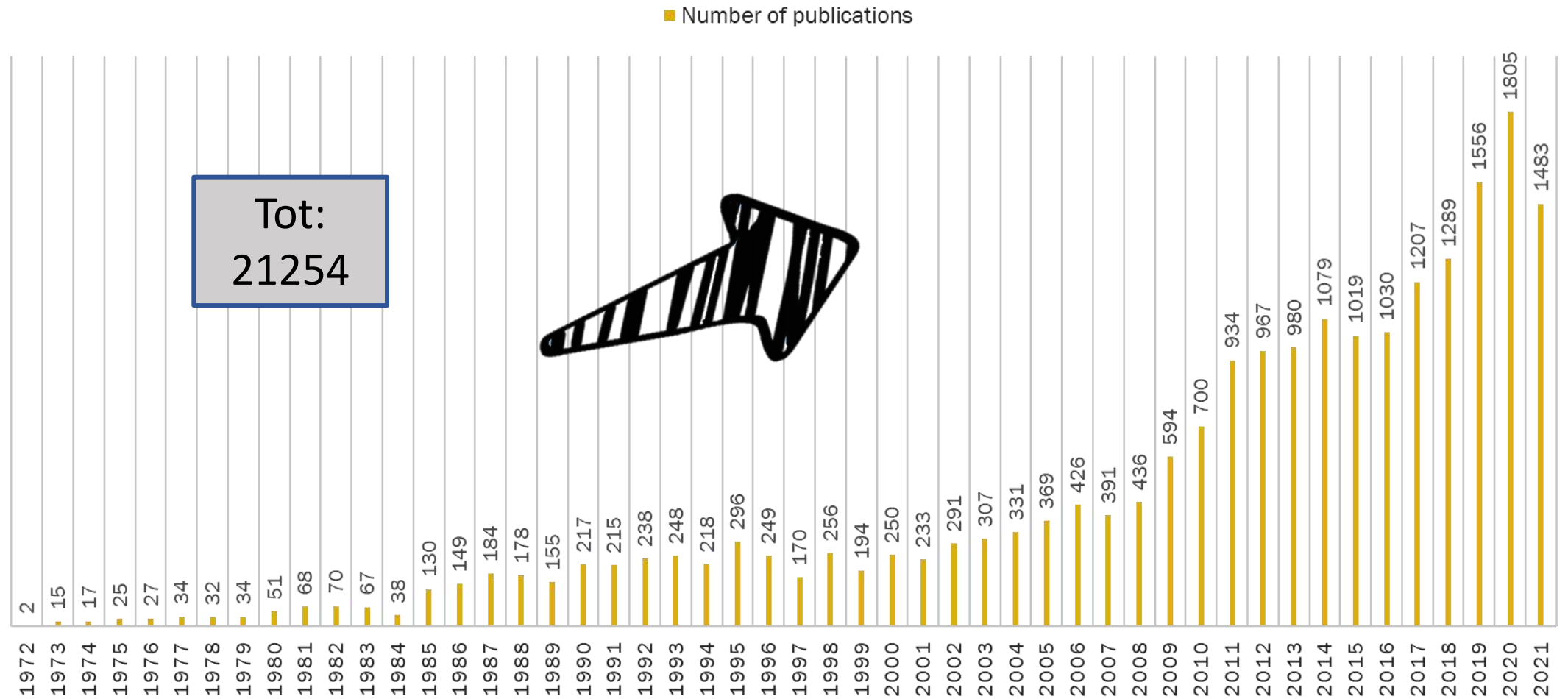


«Wildlife»
AND
«Disease»

+ Europe filter



Publications in Europe about wildlife diseases – 50 years trend



- All databases and collections
- Topic fields



Disease aspect:

- Epidemiology
- Diagnostic
- Characterization
- Therapy
- Surveillance
- Economic impact

Disease type:

- Vector borne
- Zoonotic
- Emerging disease
- Livestock interest
- Biodiversity conservation

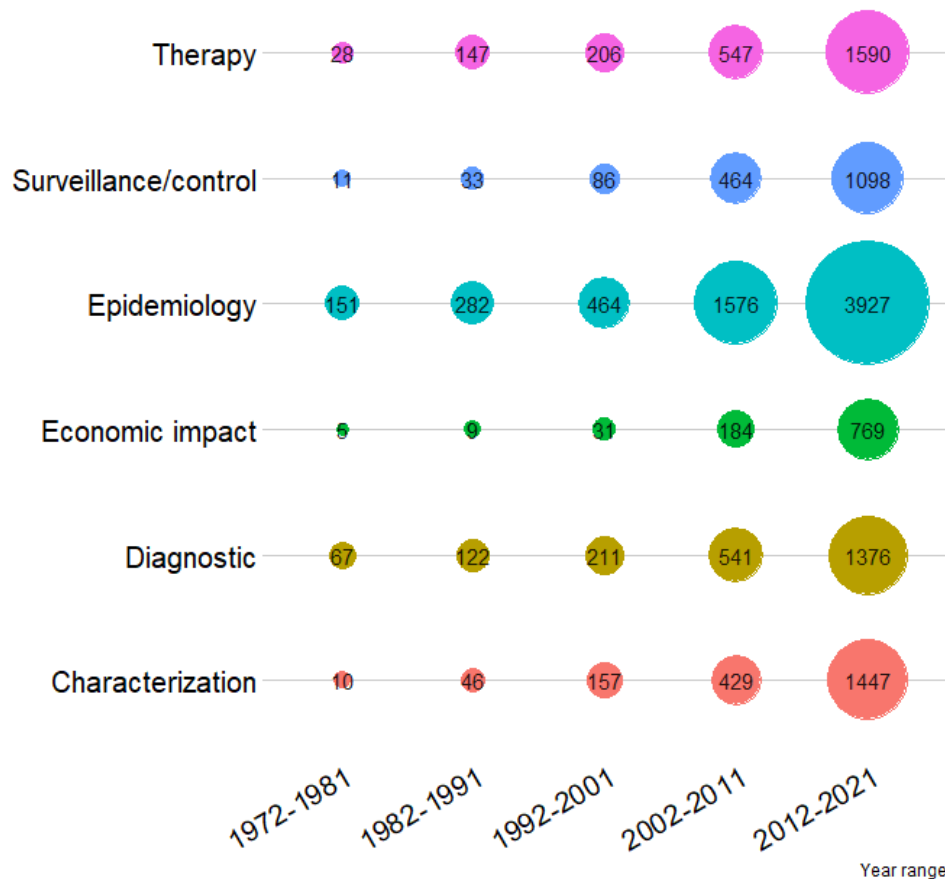
Target species:

- Carnivores
- Wild ruminants
- Wild boar
- Lagomorphs
- Rodents
- Birds
- Insectivores
- Bats

- N° publications/decade
- Linear regression (log n° publications – year) -> coefficient
- Relative H index cumulative of the whole period



Disease aspect

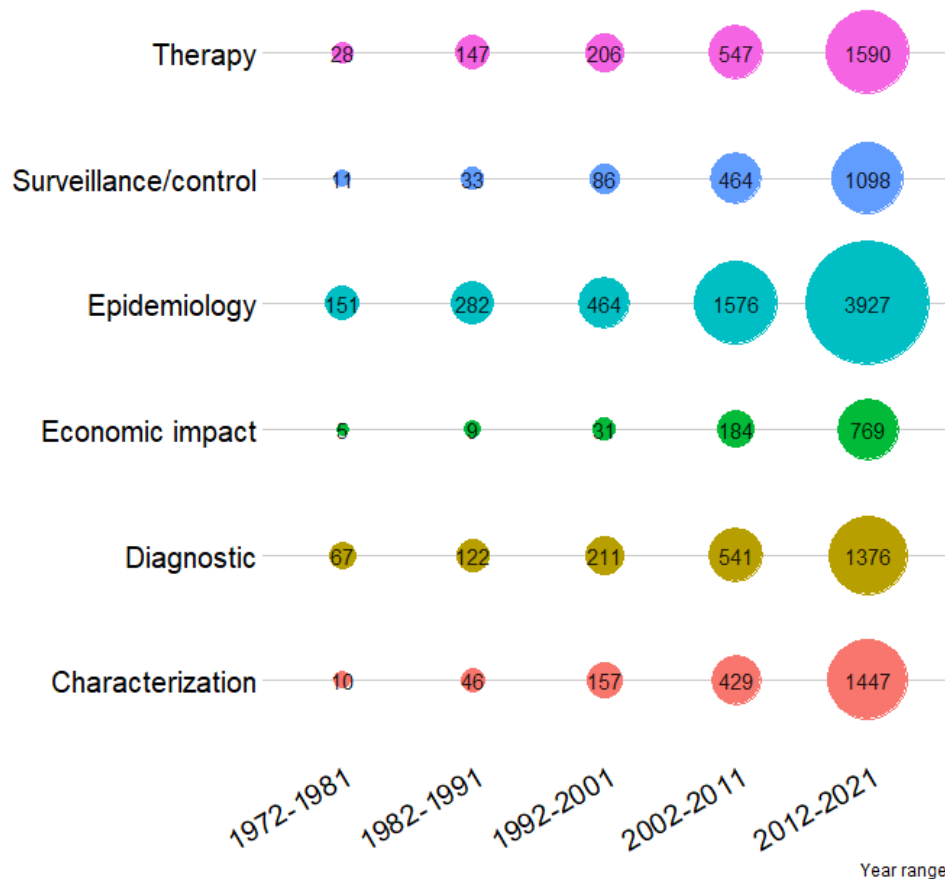


Total	Coefficient	Hindex
2518	0.042	4.13%
1692	0.051	4.79%
6400	0.038	2.3%
998	0.047	9.42%
2317	0.035	3.93%
2089	0.051	4.07%

Coefficient: linear regression
(log n° publications – year) slope
Hindex: relative to publications,
cumulative of the whole period



Disease aspect

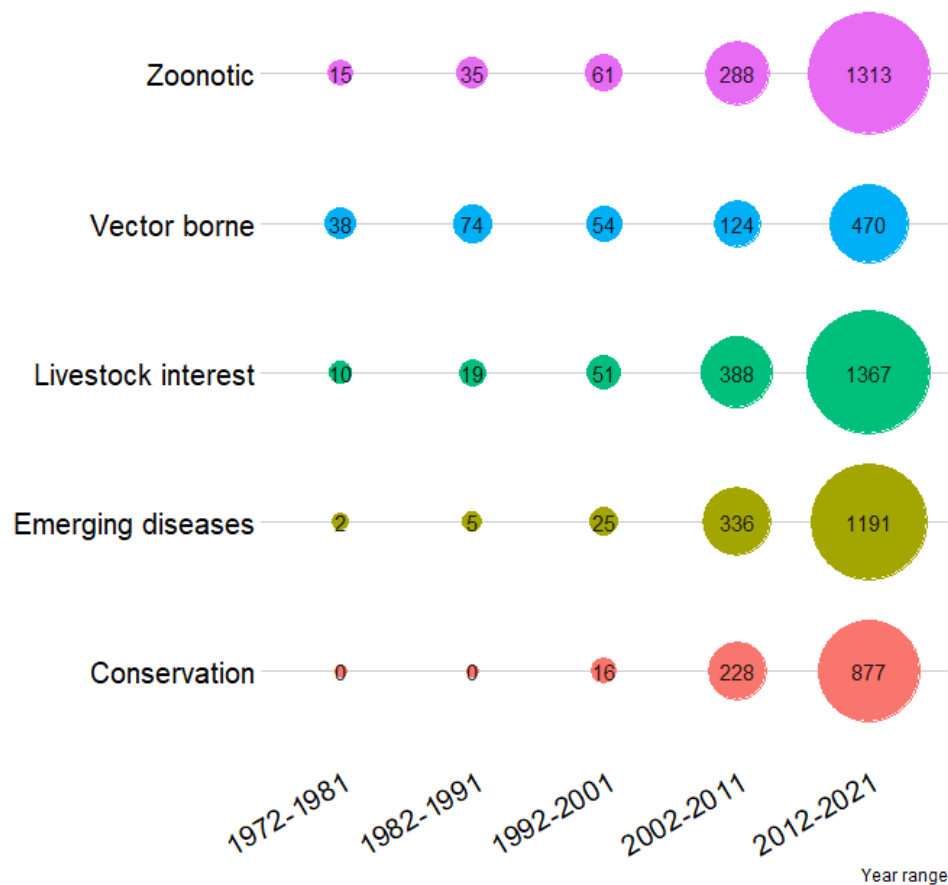


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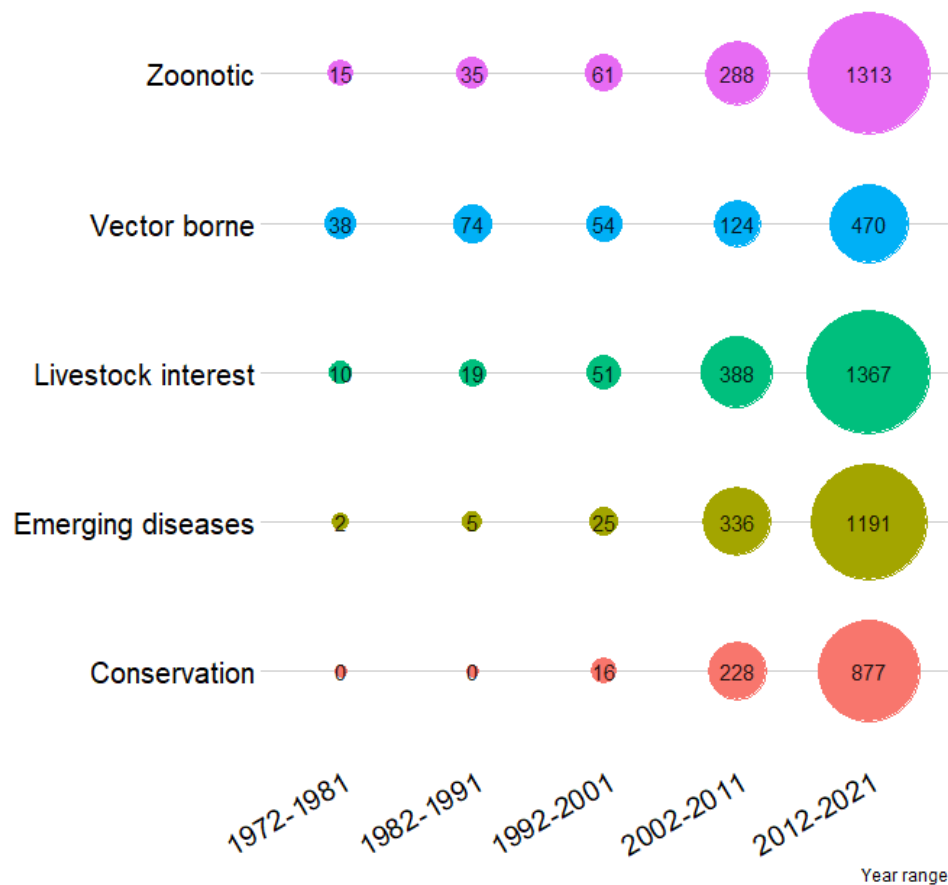


Total	Coefficient	Hindex
1712	0.047	5.37%
760	0.024	8.03%
1835	0.053	5.45%
1559	0.054	7.06%
1121	0.050	8.56%

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Disease type

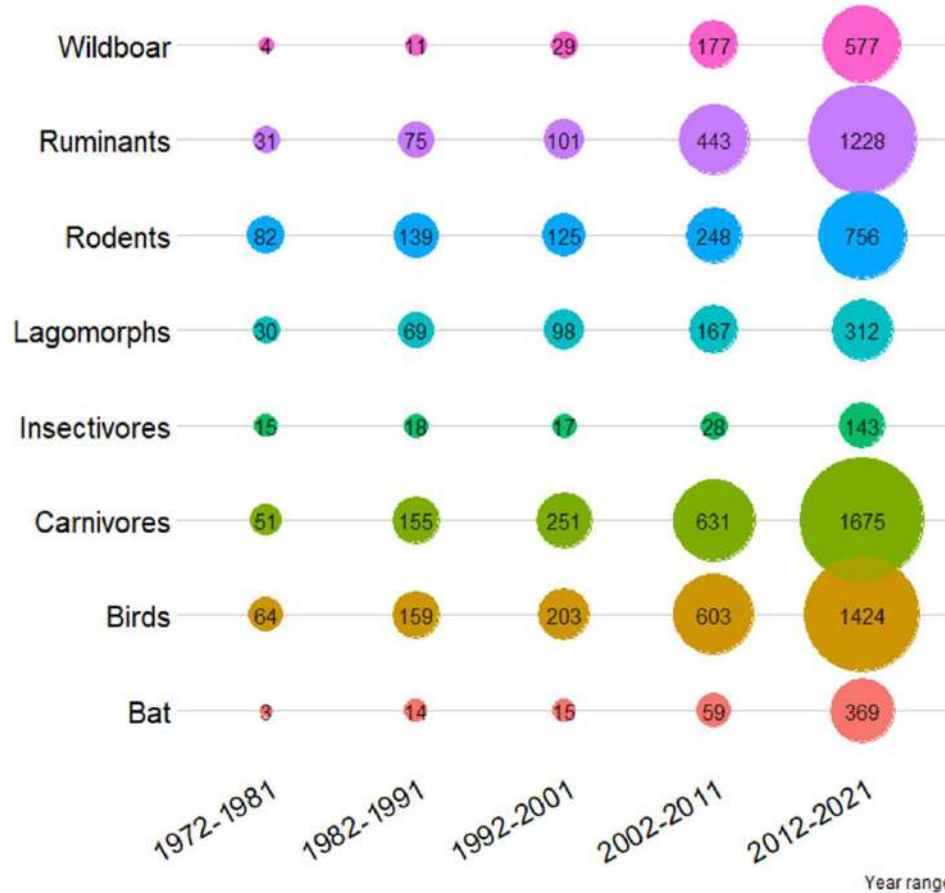


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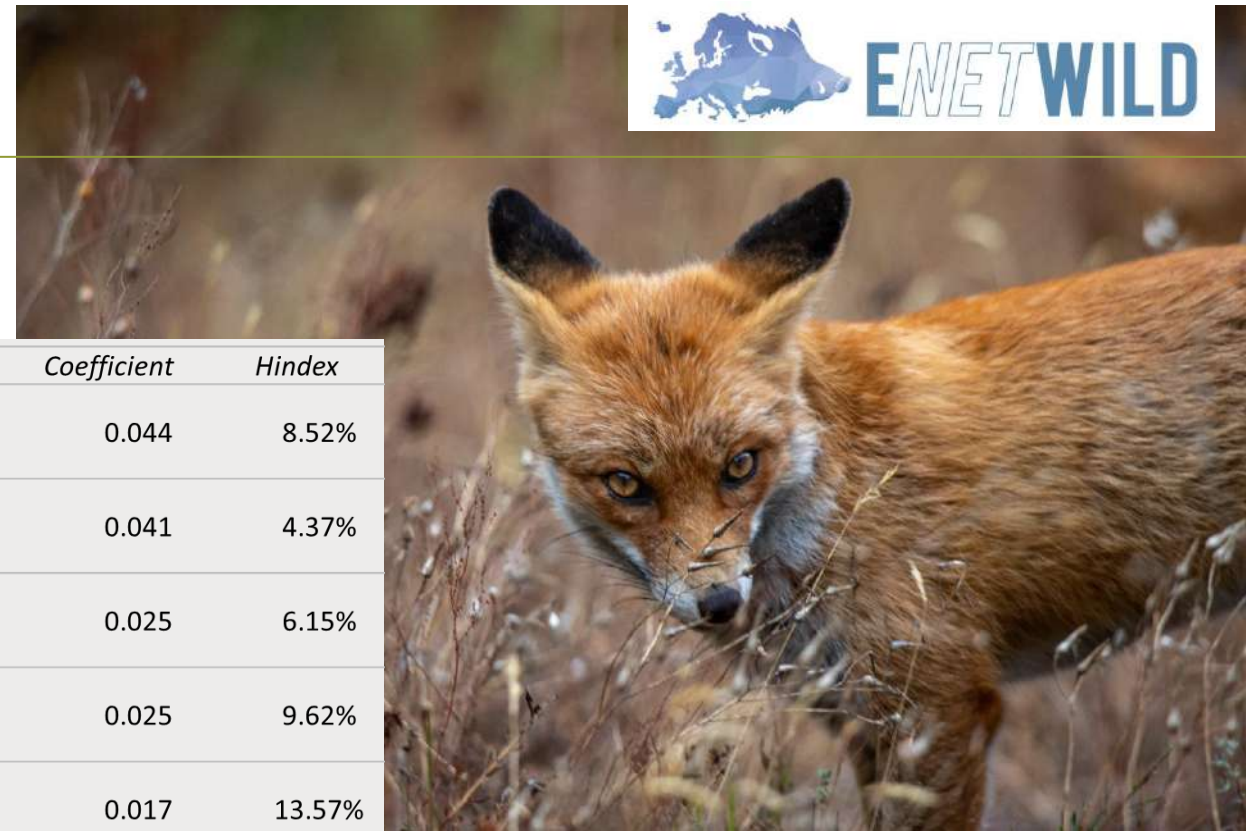


Species group



Total	Coefficient	Hindex
798	0.044	8.52%
1878	0.041	4.37%
1350	0.025	6.15%
676	0.025	9.62%
120	0.017	13.57%
2763	0.040	3.80%
2453	0.035	4.32%
460	0.035	12.17%

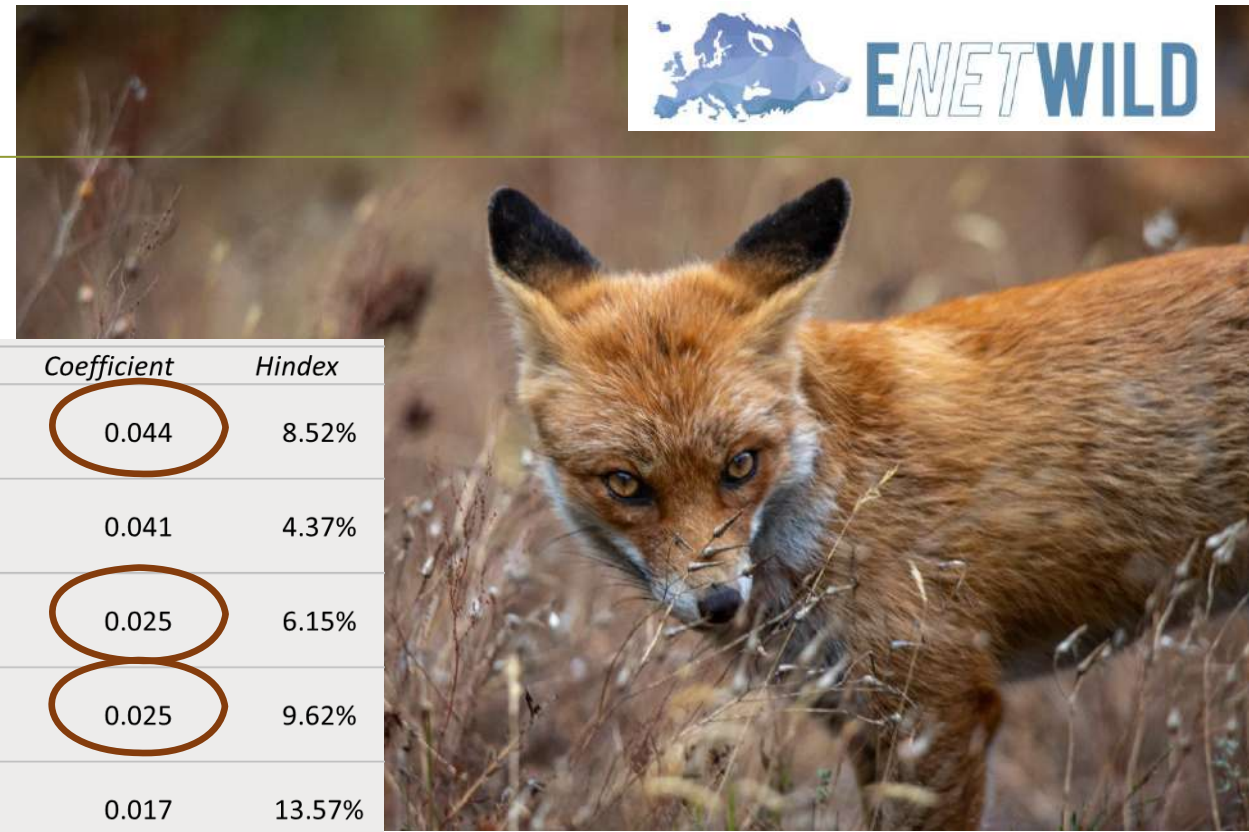
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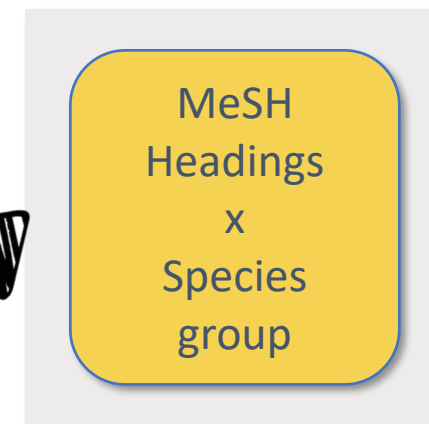
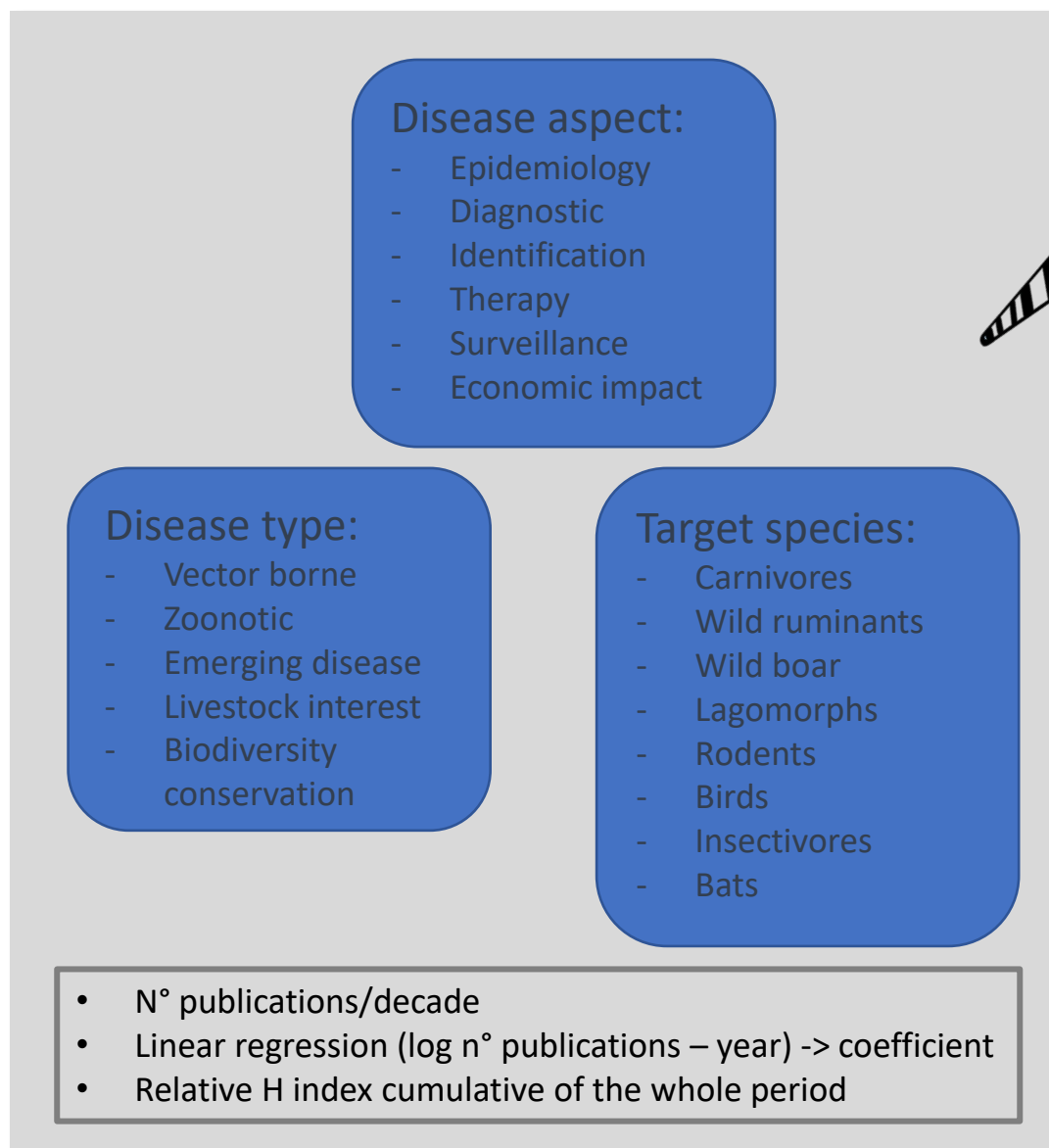
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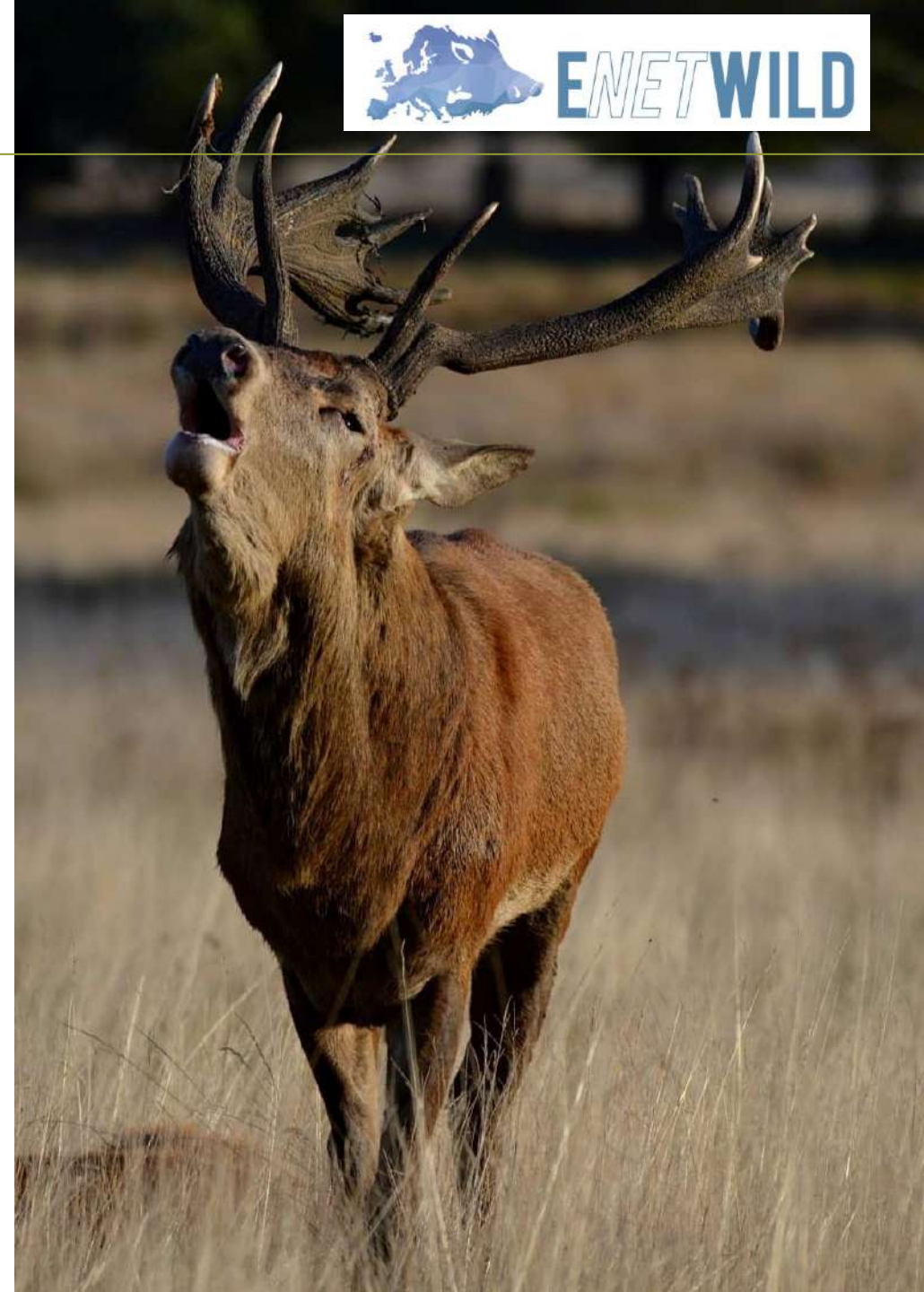


- Rank by frequency



Trends of pathogens – Wild ruminants

- ✓ Polarization
- ✓ **TBC** leading since 40 years
- ✓ **Foot and Mouth Disease** since the 70s but decreasing frequency
- ✓ Rising frequency for **Brucellosis**
- ✓ **Peste des Petits Ruminants** and **Toxoplasmosis** appear in this last decade

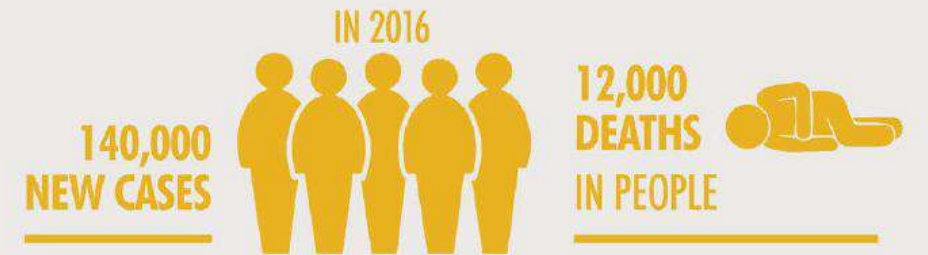


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ZOONOTIC TUBERCULOSIS IS A MAJOR PUBLIC HEALTH THREAT



POOR
HEALTH
AND
WELFARE



REDUCED
ECONOMIC
PRODUCTIVITY
OF LIVESTOCK

TO SAVE LIVES AND SECURE LIVELIHOODS

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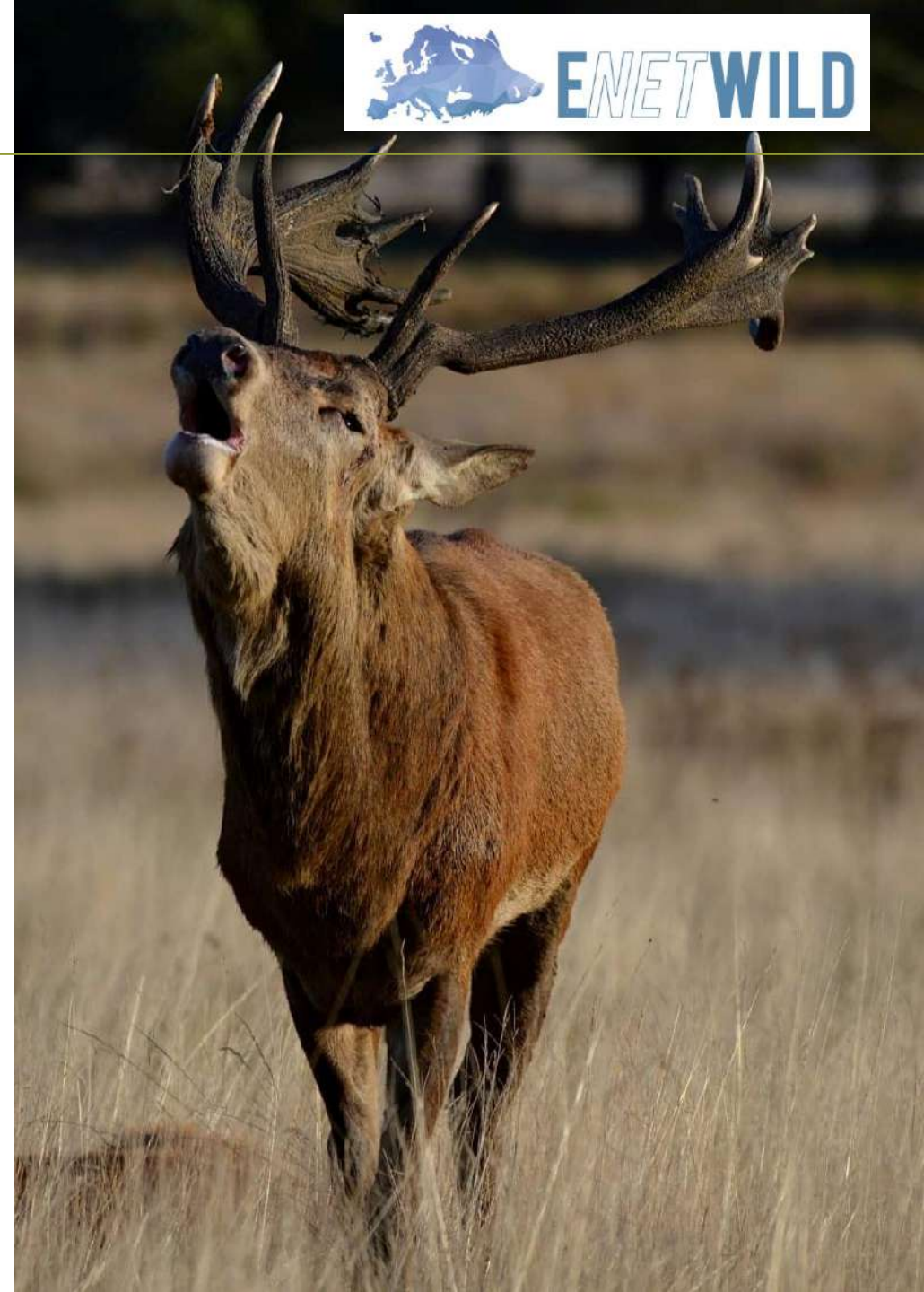
OIE Members' official FMD status map

Last update May 2022



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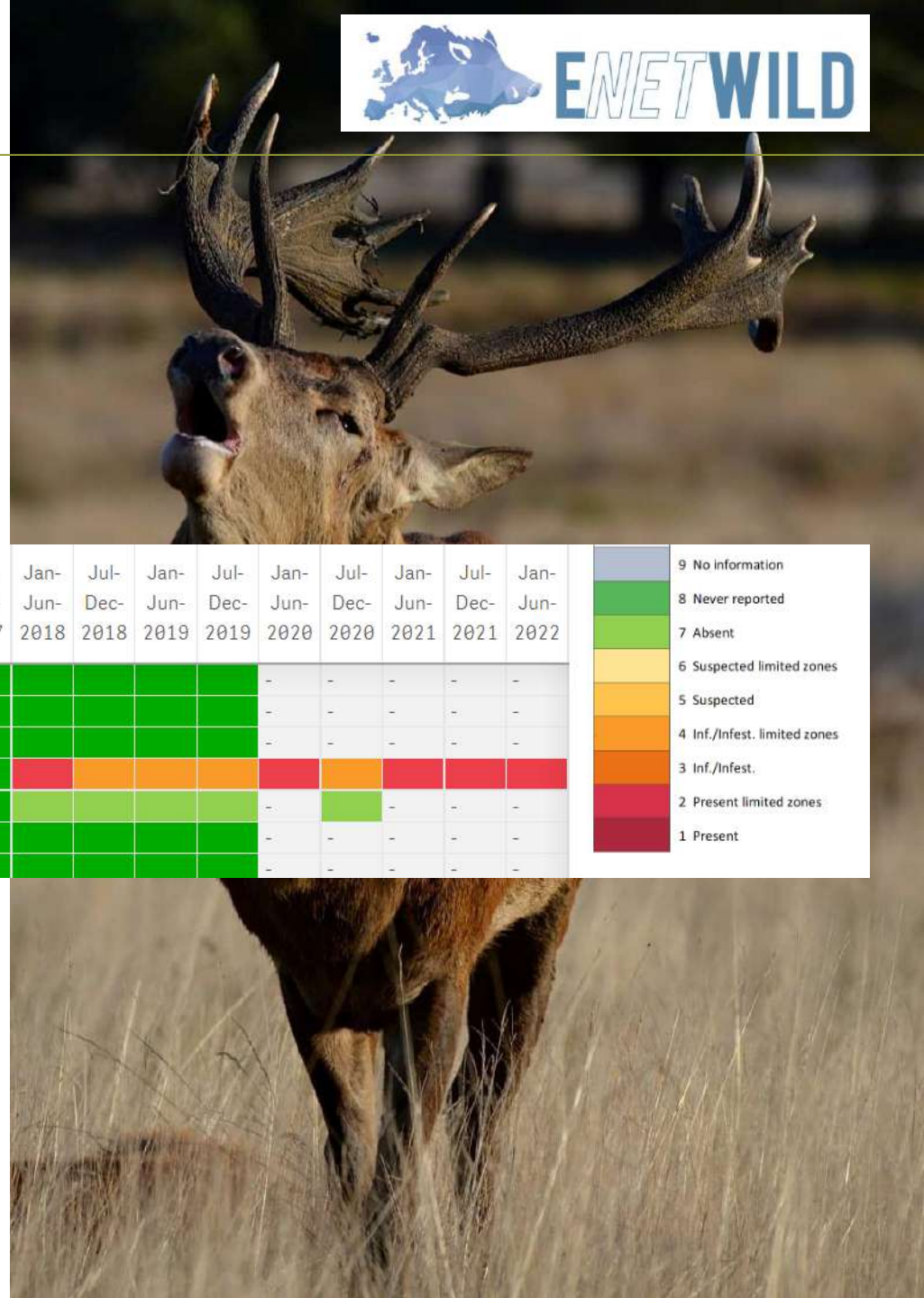


Trends of pathogens – Wild ruminants

✓ Polarization

			Jul-Dec-2011	Jan-Jun-2012	Jul-Dec-2012	Jan-Jun-2013	Jul-Dec-2013	Jan-Jun-2014	Jul-Dec-2014	Jan-Jun-2015	Jul-Dec-2015	Jan-Jun-2016	Jul-Dec-2016	Jan-Jun-2017	Jul-Dec-2017	Jan-Jun-2018	Jul-Dec-2018	Jan-Jun-2019	Jul-Dec-2019	Jan-Jun-2020	Jul-Dec-2020	Jan-Jun-2021	Jul-Dec-2021	Jan-Jun-2022	
Peste des petits ruminants	Belgium	Wild																		-	-	-	-	-	9 No information
	Bosnia and Herzegovina	Domes...																		-	-	-	-	-	8 Never reported
		Wild																		-	-	-	-	-	7 Absent
	Bulgaria	Domes...																		-	-	-	-	-	6 Suspected limited zones
		Wild																		-	-	-	-	-	5 Suspected
	Croatia	Domes...																		-	-	-	-	-	4 Inf./Infest. limited zones
		Wild																		-	-	-	-	-	3 Inf./Infest.
		Wild																		-	-	-	-	-	2 Present limited zones
																				-	-	-	-	-	1 Present

✓ **Peste des Petits Ruminants** and **Toxoplasmosis** appear in this last decade



Trends of pathogens – Wild boar

- ✓ Increase of pathogen complexity
- ✓ **Trichinellosis** consistent, but decreasing to **ASF** and **TBC**
- ✓ Consistent **TBD** and **Brucellosis** since 40 years
- ✓ Importance of **E Hepatitis** in last decade
- ✓ **CSF** since 30 years but decreasing frequency



Trends of pathogen W

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- ✓ Importance of **E Hepatitis** in last decade
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SCIENTIFIC OPINION

Scientific Opinion on African swine fever¹

EFSA Panel on Animal Health and Welfare (AHAW)^{2, 3}

European Food Safety Authority (EFSA), Parma, Italy

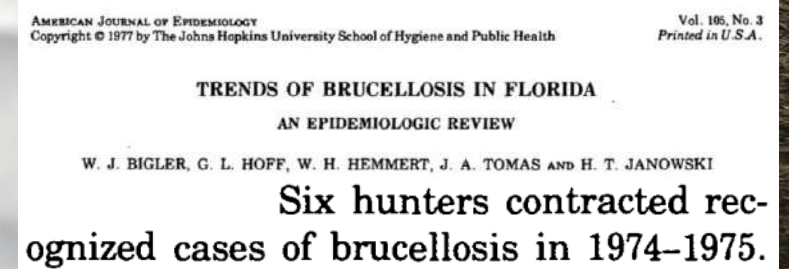
This scientific opinion, published on 4 July 2014, replaces the earlier version published on 7 April 2014*.

ABSTRACT

The risk for endemicity of ASF in the eastern neighbouring countries of the EU and spread of ASFV to unaffected areas was updated until 31/01/2014. The assessment was based on a literature review and expert knowledge elicitation. The risk that ASF is endemic in Georgia, Armenia and the Russian Federation has increased from moderate to high, particularly due to challenges in outbreak control in the backyard production sector. The risk that ASFV will spread further into unaffected areas from these countries, mainly through movement of contaminated pork, infected pigs or contaminated vehicles, has remained high. In Ukraine and Belarus, the risk for ASF endemicity was considered moderate. Although only few outbreaks have been reported, which have been stamped out, only limited activities are ongoing to facilitate early detection of secondary spread. Further, there is a continuous risk of ASFV re-introduction from the Russian Federation, due to transboundary movements of people, pork or infected wild boar. The number of backyard farms is greatest in the west of Ukraine and westwards spread of ASFV could result in an infected area near the EU border, difficult to control. In Georgia, Armenia and the Russian Federation, the risk for endemicity of ASF in the wild boar population is considered moderate, mainly due to spill-over from the domestic pig population, whereas in Ukraine and Belarus this was considered to be low. In those areas in the Russian Federation where wild boar density is high, this risk may be higher. Intensive hunting pressure in affected wild boar populations may increase the risk for spread, possibly with severe implications across international borders. The risk for different matrices to be infected/contaminated and maintain infectious ASFV at the moment of transportation into the EU was assessed and ranged from very high for frozen meat, to very low for crops.

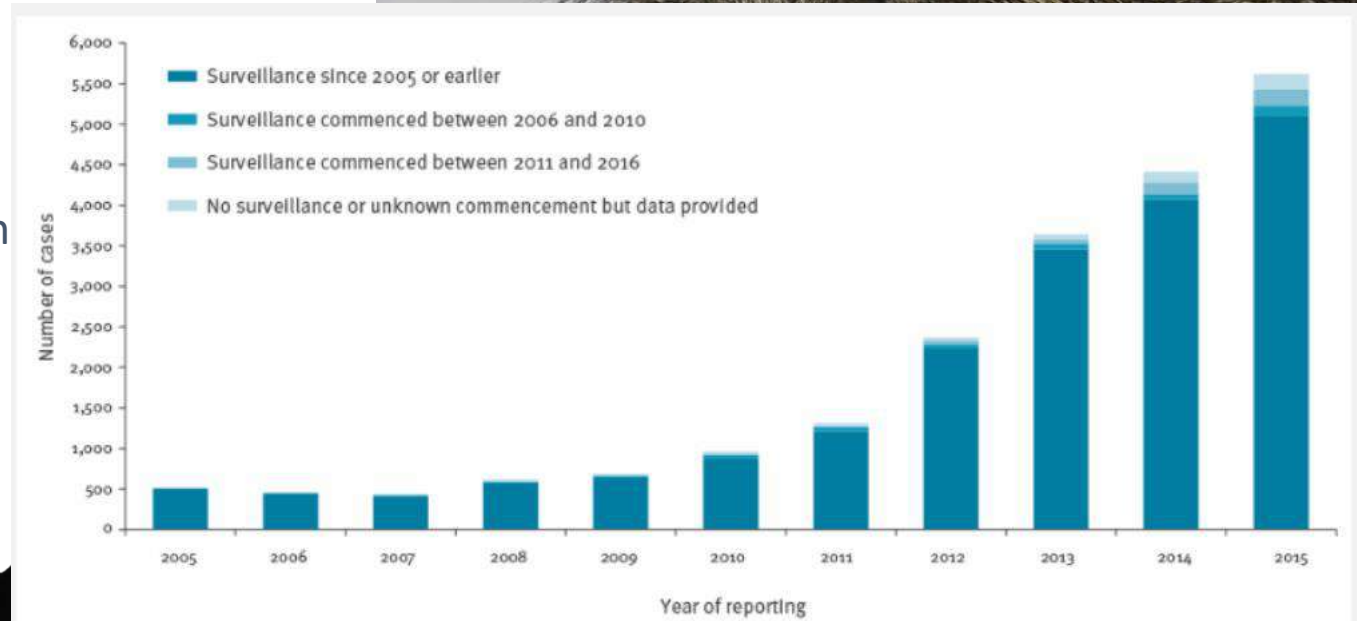
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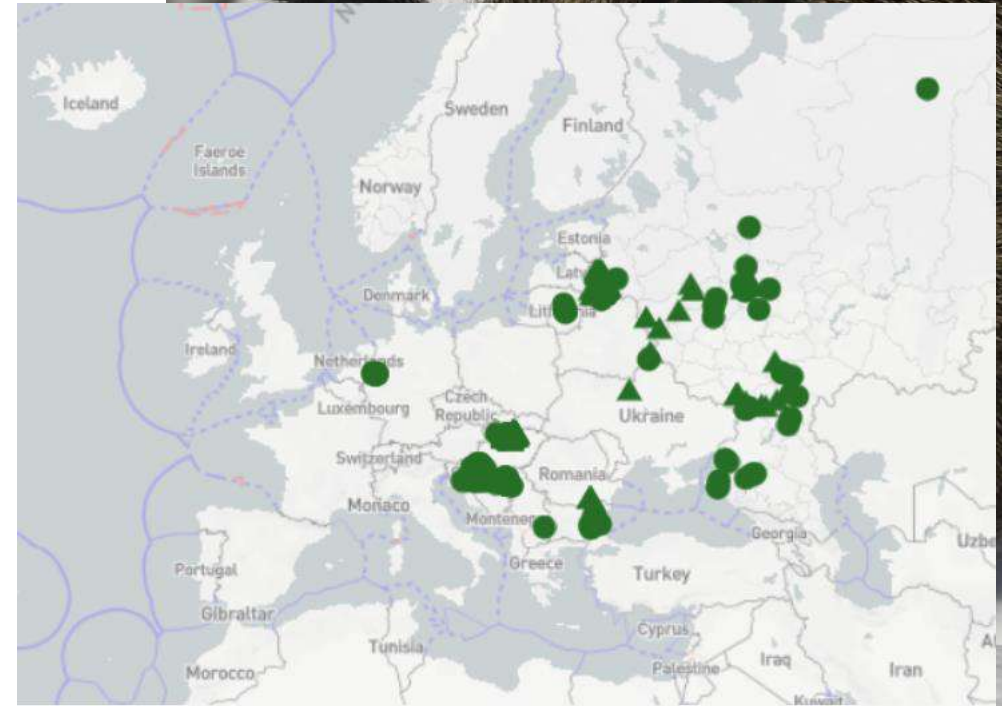
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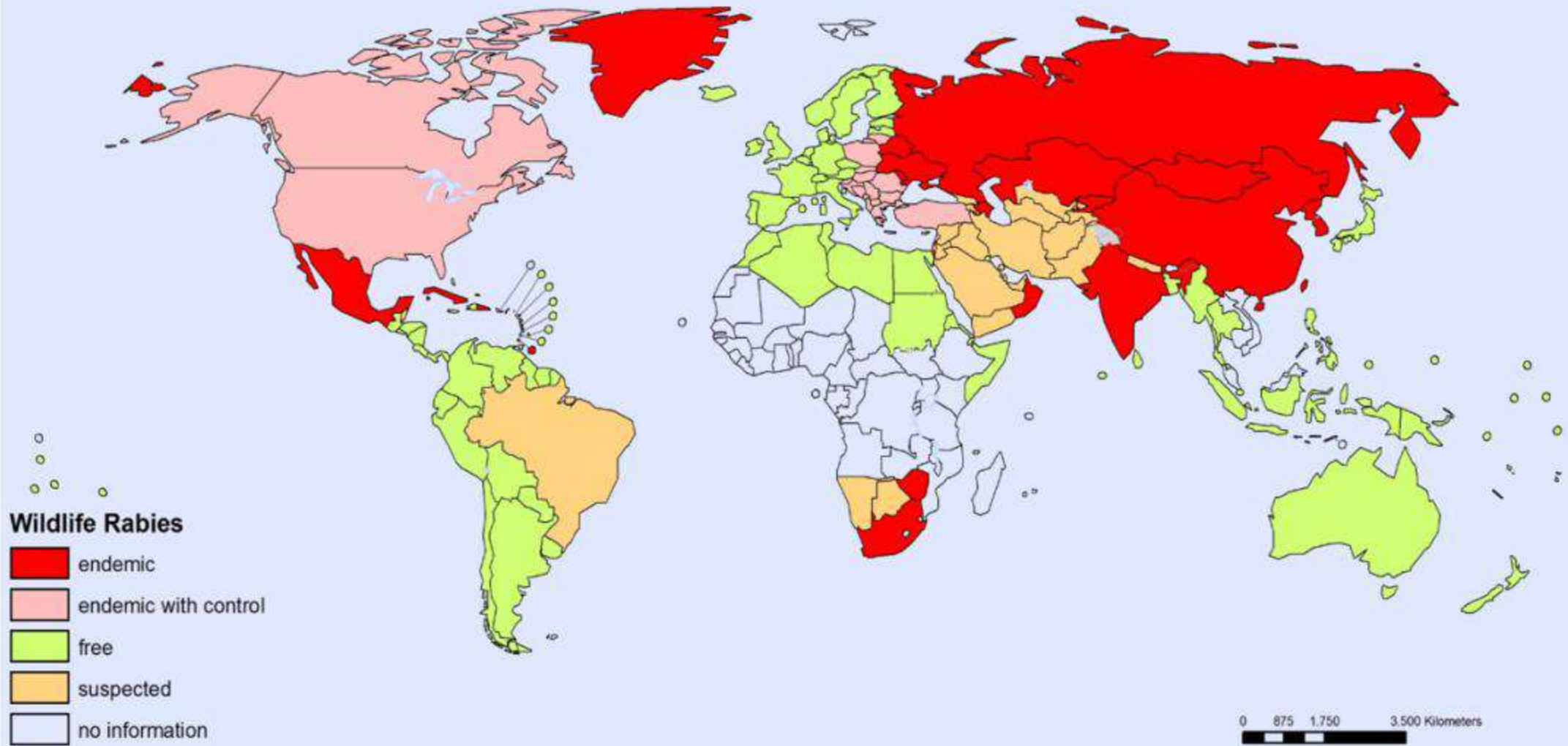
WAHIS CSF outbreaks (2020)



Trends of pathogens – Carnivores

- ✓ **Rabies** and **TBC** all decades but opposite trends
- ✓ **Distemper** and **Echinococcosis** since 80s, **Trichinellosis** since the 70s
- ✓ **TBD** decreasing frequency
- ✓ Appearing of **Toxoplasmosis**





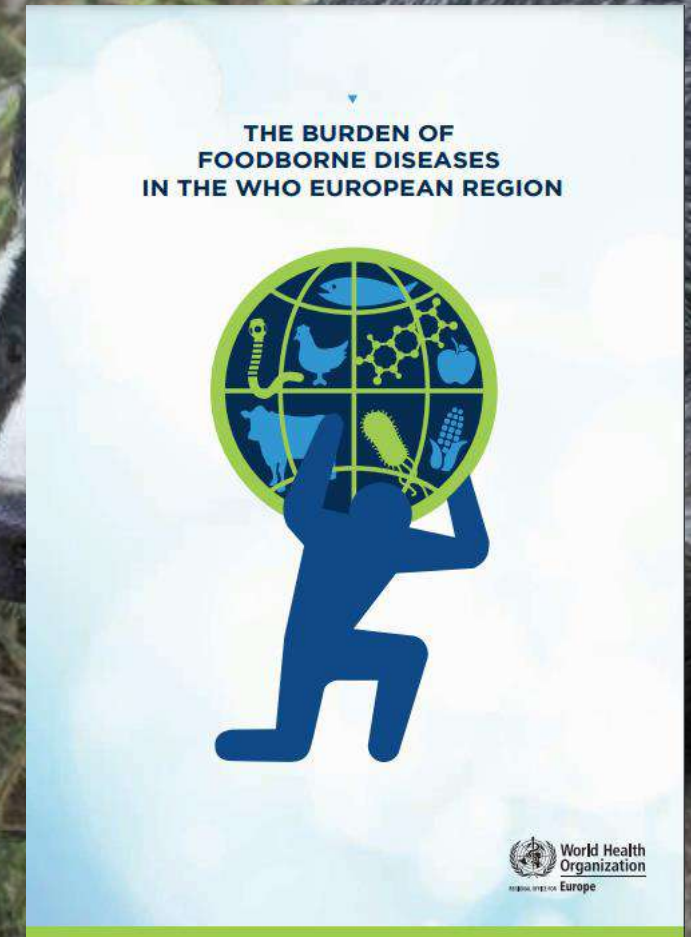
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Trends of pathogens – Lagomorphs

- ✓ High complexity
- ✓ Consistent **Tularemia**
- ✓ Since 90s, relevance of **RHD**
- ✓ Decrease in **Mixomatosis** and **Brucellosis**
- ✓ Appearing **Leishmaniosis**



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ECDC: Surveillance Atlas of Infectious Diseases –
Tularemia (2020)

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Rev. sci. tech. Off. int. Epiz., 1991, 10 (2), 409-422

Epidemiology and current situation of viral haemorrhagic disease of rabbits and the European brown hare syndrome in Italy

F.M. CANCELLOTTI and M. RENZI *

Summary: Rabbit production is of considerable economic importance in Italy. In the last thirty years, meat production has risen and the number of intensive husbandry establishments has grown. The major region of production (about 60%) lies in the northern part of the country. In addition, approximately one million live animals and more than 14,000 tons of meat are imported yearly. More than 150,000 hares are also imported for restocking and hunting purposes. During the second half of the 1980s a "new" disease (X disease), characterised by haemorrhagic and degenerative lesions and high mortality, was observed on traditional farms in some regions. This form spread throughout the country between 1986 and 1988. In 1988, diagnostic research led to identification of a viral agent. Because of its morphology, the virus was at first considered a picornavirus. More recent research has included the virus in the Caliciviridae family. This agent reproduces the disease experimentally. Between 1988 and 1989, many intensive establishments in several regions were affected by the disease, known as viral haemorrhagic disease (VHD); the losses were always very high. In 1989, after mortality among free-living hares had been observed in the northern part of Italy for some years, the agent of the European brown hare syndrome (EBHS) was identified as being morphologically similar to the VHD virus. The antigenic relationship between VHD and EBHS and the possibility of cross-infection between rabbits and hares are currently being studied. Hygienic measures and vaccination are the most reliable methods of control. International cooperation has greatly helped in the study of the disease and in the adoption of control measures.

KEYWORDS: Captive hares - Disease control - Epidemiology - Free-living hares - Haemorrhagic syndrome of lagomorphs (VHD and EBHS) - Italy - *Lepus europaeus* - Rabbits - Vaccination.

Trends of pathogens – Lagomorphs

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RESEARCH ARTICLES

Leishmania infantum in free-ranging hares, Spain, 2004-2010

F Ruiz-Fons (josefrancisco.ruiz@uclm.es)¹, E Ferroglio², C Gortázar¹

1. Instituto de Investigación en Recursos Cinegéticos, Animal Health and Biotechnology (SaBio) Group, Ciudad Real, Spain
2. Dipartimento di Produzioni Animali, Epidemiologia ed Ecologia, Facoltà di Medicina Veterinaria, Università degli Studi di Torino, Grugliasco, Italy

Citation style for this article:

Ruiz-Fons F, Ferroglio E, Gortázar C. *Leishmania infantum* in free-ranging hares, Spain, 2004-2010. Euro Surveill. 2013;18(30):pii=20541. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20541>

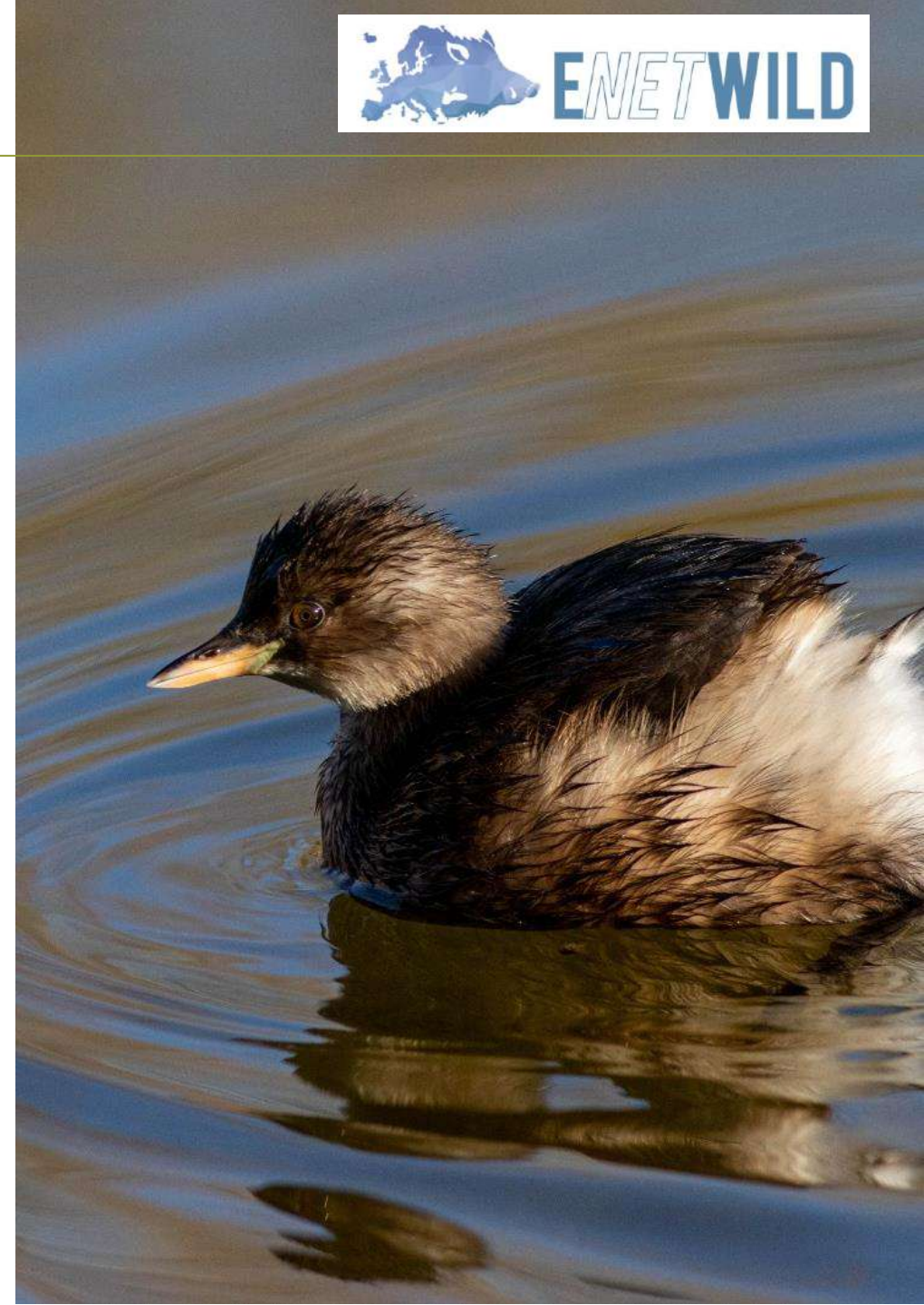
Article submitted on 25 August 2012 / published on 25 July 2013

Iberian hares (*Lepus granatensis*) were recently deemed responsible for an outbreak of human leishmaniasis affecting metropolitan Madrid, Spain. However, the reservoir potential of hares in Europe is poorly known. We conducted a retrospective survey on *Leishmania infantum*, the causal agent of zoonotic endemic leishmaniasis in the



Trends of pathogens – Wild birds

- ✓ Predominance of **Avian Influenza** all decades
- ✓ High frequency of **Salmonella** and **Campylobacter**
- ✓ On the side but always present, **West Nile Virus**
- ✓ **Malaria** since 2000



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4. Avian malaria in Europe: an emerging infectious disease?

Silvie Huijben, Willem Schaftenaar, Adriaan Wijsman, Krijn Paaijmans and Willem Takken

Abstract

Emerging infectious diseases have had, and likely will have, a great impact on human and animal populations, and on biodiversity. Avian malaria is one such disease, which reached epidemic levels soon after its introduction in Hawaii and contributed to a massive decrease of avian biodiversity on the island group. Avian malaria is also a common infection amongst endemic and migratory birds in Europe, but appears to cause little harm among the native birds. However, frequent deaths of non-indigenous birds due to avian malaria are being reported. In this chapter, we consider whether avian malaria can reach epidemic proportions in Europe as an emerging infectious disease and as a result of climate change. In an ecological field study, we investigated the occurrence of avian malaria in Rotterdam zoo in the Netherlands during the summer of 2003. In a longitudinal approach mosquito dynamics were studied and a cross-sectional study was undertaken to estimate parasite prevalence in exotic birds kept in the zoo. Adult mosquitoes were caught throughout the study period and were examined for parasite infections. Of the 575 adult mosquitoes caught in traps, 61 percent was *Culex pipiens pipiens*. Six mosquitoes of this species were infected with malaria. Nine birds, belonging to eight different species, were infected with malaria, out of 81 birds that were examined. Twelve other birds died later that summer and were diagnosed with avian malaria, most of them being black-footed penguins. The peak in mortality occurred in the third week of August, two weeks after the peak in larval mosquito densities. It appeared that there is annual seasonal malaria transmission within Rotterdam zoo. We suggest that these infections result from a reservoir of parasites living within less susceptible exotic birds that are kept in the zoo and in endemic birds living within or near the zoo. These field data support our view that an outbreak of avian malaria among the endemic bird population of Europe is unlikely to happen under the current circumstances. Avian malaria is a common parasitic infection in the endemic and migratory bird populations, and after a long history of co-evolution, the parasites are causing what appears to be little harm. However, a change of climate or parasite mutational events could alter the equilibrium between parasite and host, potentially resulting in an epidemic. Frequent screening of the endemic and migratory bird populations should therefore be employed to prevent an outbreak such as happened in Hawaii.

Keywords: avian malaria, *Plasmodium*, bird, mosquito, Europe, emerging infectious disease

Wrap-up message

Interest in wildlife diseases seems to have increased in the past half century, revealing a scenario which is every decade getting more complex.

Wildlife disease surveillance systems should be prepared to face this.



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Approaches, opportunities and Citizen Science tools

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FOR YOUR
ATTENTION!**



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