CODA - CERVA

Surveillance of Wildlife diseases: a new goal of the OIE as part of the « One Health « program

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CODA - CERVA

Workshop for OIE National Focal Points on Wildlife

Bulgaria, 23-25 January 2012

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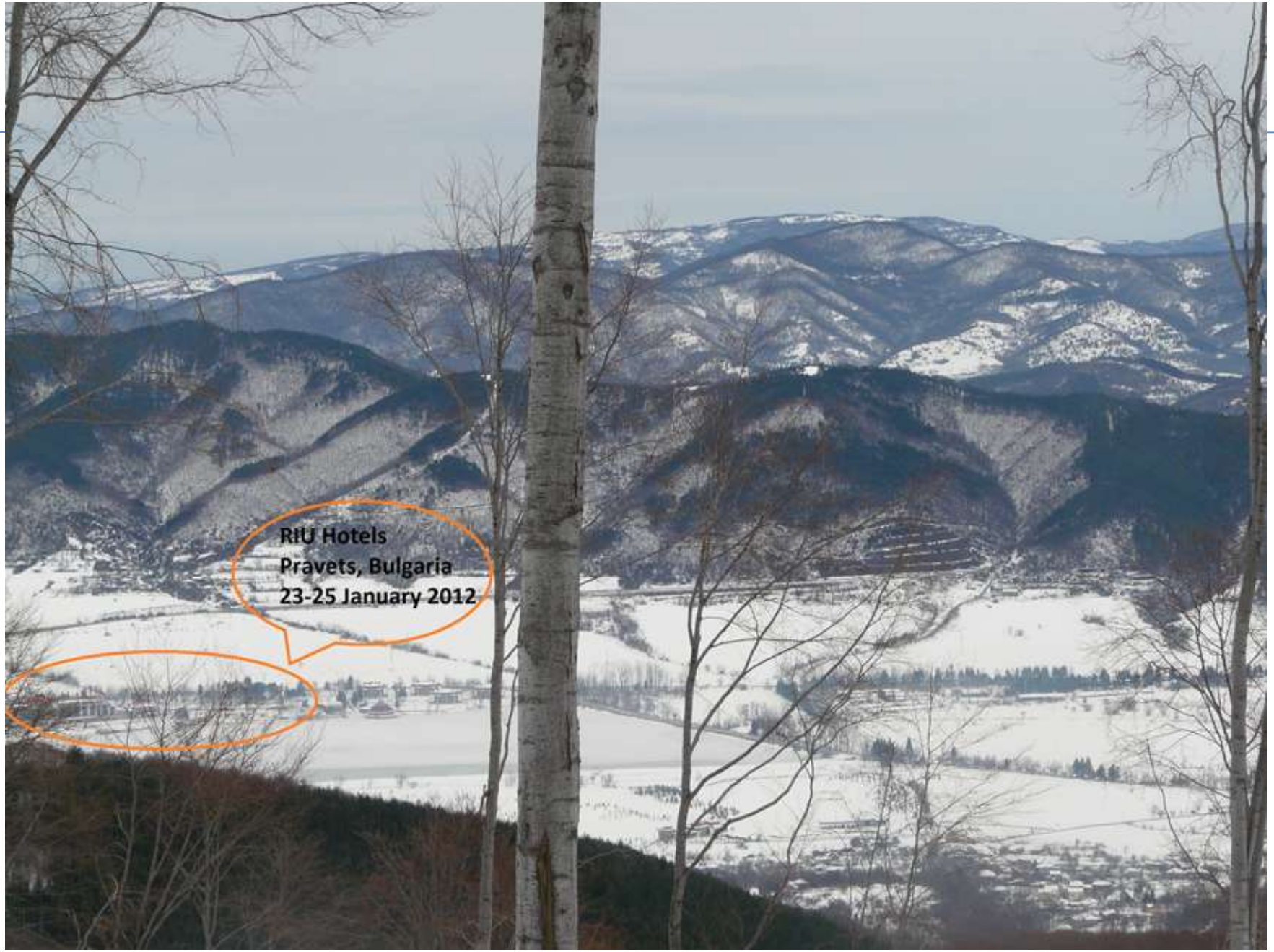

RIU Hotels
Pravets, Bulgaria
23-25 January 2012

Purpose of the Workshop

To provide the OIE focal points for Wildlife with some practical knowledge and skills associated with surveillance for, and reporting of, diseases and pathogens in wild animals

Main sections

General Wildlife Disease Surveillance (passive)

Targeted Wildlife Disease Surveillance (active)

Pathogen or Disease Surveillance

- **Disease : identify actual clinical disease or death in animals and the causes of such diseases and death**
- **Pathogen : gather evidence about the presence of a particular pathogen in a population of animals (eg serological surveys)**

It is important to clarify wether the surveillance program is designed to detect disease or just the pathogen !

„Wildlife“ Defined

Wildlife

Means different things (plants & animals) to different people ! The OIE is only concerned with animals and Wildlife focal points currently are asked to concern themselves with pathogens and diseases in ‘terrestrial animals’, which the OIE defines as ‘a mammal, bird or bee’ (no fish → aquatic focal point)

		Phenotype Selected by Humans	
		YES	NO
Animals live under Human Supervision and Control	YES	Domestic Animal	Captive Wildlife
	NO	Feral Animal	Wildlife

Emerging Human infectious Diseases

- **Human Pathogens World-wide :**
  → 1407 known infectious pathogens
  → 58 % (800) Transmitted from Animals (zoonotic)

- **Emerging Infectious Diseases 1940-2004**
  → 335 Emerging Diseases (25 % of known pathogens)
  → 60 % Zoonotoc (202 pathogens)
  → 43 % from Wildlife (144 pathogens)

General Wildlife Disease Surveillance

Definition : a form of surveillance that identifies *sick or dead wild animals* in their native habitat and determines *the causes* of the illness and death. It is based on the diagnostic examination of wild animals found sick or dead in the wild.

For each surveillance a purpose needs to be defined (design !)

Reasons :

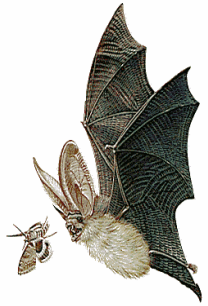
- → To learn what pathogens and diseases are **present** in wild animal populations in a country, their host species and their geographical distribution, including pathogens and diseases important to domestic animals, to public health and to wild animal population themselves.
- → To detect **new** pathogens and diseases, or unusual epidemiological events that may indicate an emerging disease, as early as possible
- → To detect **changes** in patterns of disease occurrence over time




The different components of General Wildlife Disease surveillance

*Disease surveillance thus depends most importantly on **a network of people** who know their capacities and responsibilities within the surveillance system and who **communicate** with each other easily and regularly*

Surveillance Wild versus Domestic Animals



- Wild animals have no owners or attending veterinarians to recognize illness
- The routine diagnostic tests for pathogens and diseases developed for domestic animals may or may not be valid for wild animal species (validation of tests is needed)!
- Wildlife biologists and ecologists are needed to provide data on populations and other aspects of wildlife biology

Targeted Wildlife Disease Surveillance

Definition : focuses surveillance efforts on one or more particular *pathogens* (viruses, bacteria, fungi, protozoa, …) in one or more wild animal species. In contrast to general, it usually focuses on **detection of the target pathogen(s) or infection**, not diseases(sick animals).

For each surveillance a purpose needs to be defined (design !)

Reasons :

- → To demonstrate **freedom** from a particular pathogen or infection
- → To determine if particular pathogens of concern are **present**
- → To identify **trends/patterns** in the distribution and occurrence of the pathogen




Diagnostic Tests for Use on Wild Animal Species

In wildlife disease surveillance, it is best to use diagnostic tests which are unlikely to be affected significantly by the host animal species !

Some very general guidelines regarding choice of diagnostic tests for wildlife disease surveillance

	LESS likely to be affected by host species	Intermediate	MORE likely to be affected by host species
Tests for **Pathogens**	• Direct identification • Culture (bact, …) • PCR • IHC • Chemical analysis (Tox)	• Culture for viruses	
Tests for **antibodies** or Immune response	• Virus neutralization • Blocking (competitive) ELISA		• Most standard serology tests (ELISA) • Antigen skin tests (TB)
Other		Brain Cholinesterase	

Diagnostic Tests : attributes & characteristics

		True pathogen status		Total	Predictive values
		+	-		
Diagnostic test result	+	400	2	402	400/402 = 99.5 %
	-	100	498	598	498/598 = 83.3 %
Total		500	500	1000	
		SENSITIVITY	**SPECIFICITY**		

Apparent prevalence = 402/1000 = 40.2 %

Calculating sample size: how many animals need to be included ?

General remarks

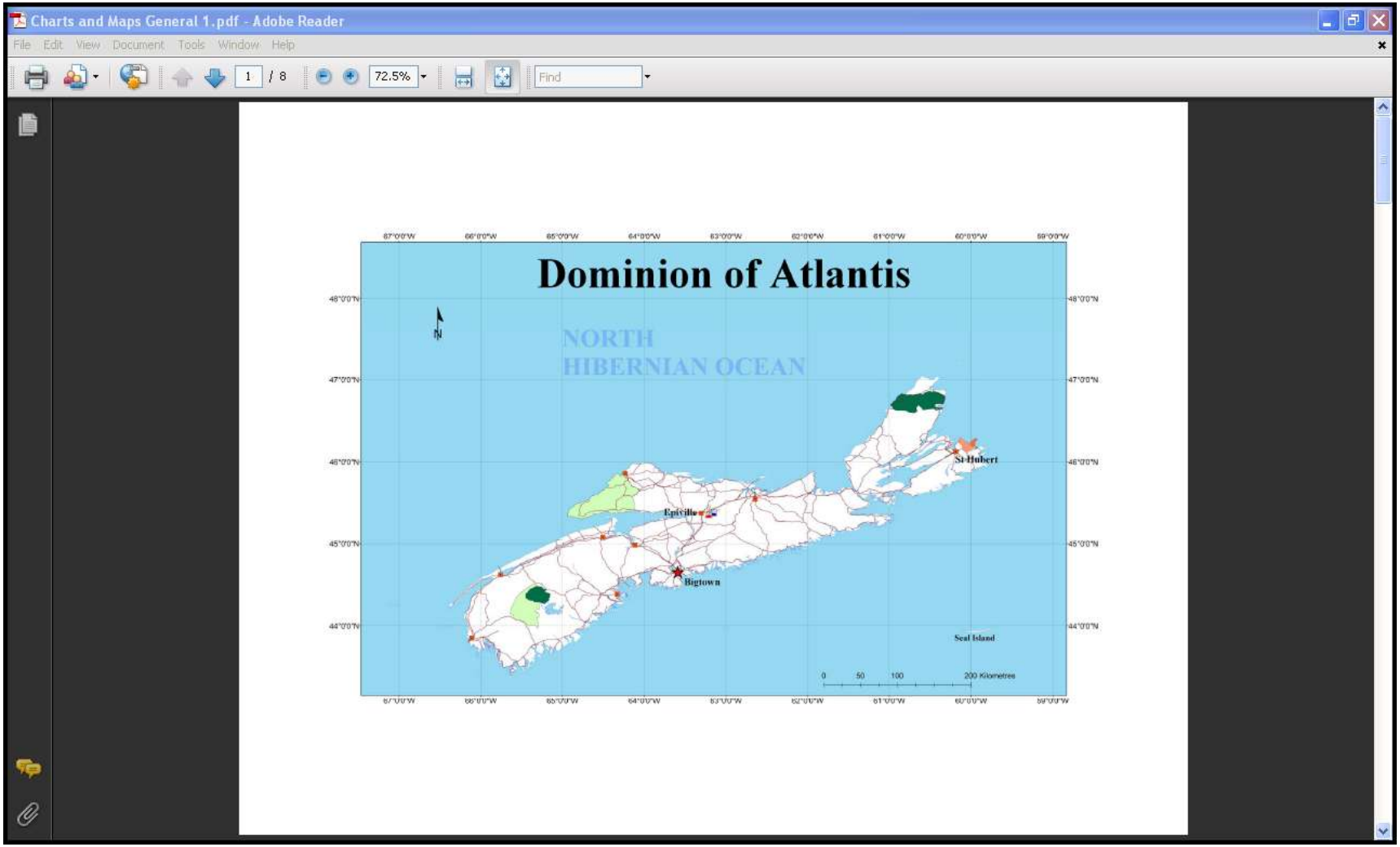
- *Most surveillance programs, regardless of their purpose, aim to achieve **95 % to 99 % confidence***
- *Most wild populations are fairly large & so **the size** of the population of interest **does not have a large impact** on the number of animals included in the surveillance (if small : see below).*
- ***Diagnostic tests** used are rarely perfect (under or over estimating)*

Population size	Estimated pathogen prevalence			
	1 %	5%	10 %	50 %
100	95	45	25	5
1000	258	58	29	5
10000	294	59	29	5

Take home messages :

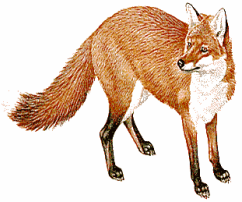
*The **rarer** you expect the infection to be, the **greater the number** of animals that will need to be tested*
*The **bigger** the population of interest, the **greater the number** (but the smaller the proportion) of animals that will need to be tested*

Atlantis : an imaginary country



WAHIS : The World Animal Health Information System

Access to this application allows users from Member Countries, namely Delegates or their nominees, to **electronically submit standard notification reports** (immediate notification and follow-up reports, six-monthly reports and annual reports) **to the OIE**.
This system not only provides countries with a simpler and quicker method of sending notifications and reports on disease information but also allows them to benefit from the new analysis capabilities put in place to produce essential and useful information without delays



For the Wildlife, a special application has been created, namely **"WAHIS WILDLIFE".**
Normally, it should be operational for 2012.
However, during the workshop it was shown that it **still** contained a lot of bugs and **needed some adaptation**.
Nevertheless, if operational, the **use of questionnaires will remain** in order to collect the data before it can be filled in the reporting system.

The quality of the yearly report for then OIE on Wildlife diseases
in the country depends largely on your collaboration.
So please fill in the questionnaire
(http://www.oie.int/international-standard-setting/specialists-commissions-groups/working-groups-reports/working-group-on-wildlife-diseases/)
as completely as you can
And send them asap to your focal point (a.linden@ulg.ac.be (S) & stefan.roels@coda-cerva.be (N))