Wildlife Disease Surveillance - Nepal

Dr. Bijaya K Shrestha CNP



Wildlife Disease Surveillance

- Stage of Prioritization of Disease and Species
- Testing protocol and in country and abroad diagnostic ability for priority diseases

Species and Disease

see Notes and References at bottom of chart

x indicates potential for infection; z indicates zoonotic (risk to humans);

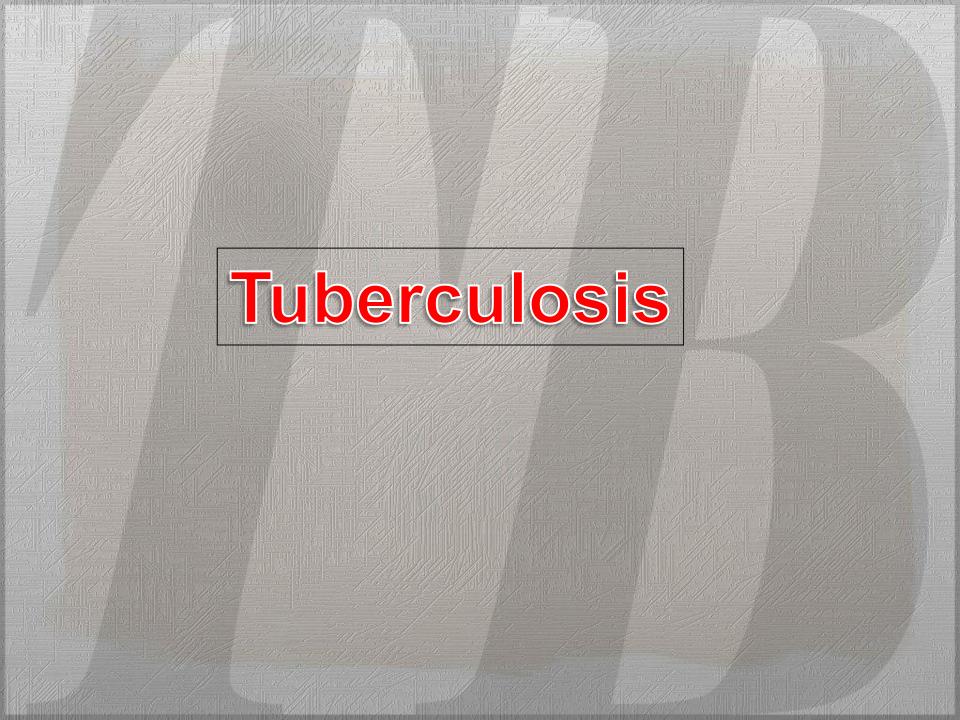
Bold indicates priority identified by survey; due to limited literature, especially on wildlife, these diseases may not have been confirmed in Nepal, or in a given species

Highlighted species/diseases have been prioritized

rightighted species/diseases have been phontized																				
SPECIES 🎩	Latin Name	:	STATUS		DISEASES															
		CITES1	IUCN Red List2	Nepal3	Rabies	Canine Distemp er	Parvovir us (canine/f	FIV	FELV	Feline Cornoavir us (FIP)	Feline calicivirus	FVR	SARS Coronavir us	Foot and mouth	Malignant catarrhal fever1	Sheep/Go at Pox	PPR	Blueton gue EHDY	Hog Cholera	Avian Influenza 1 2
WILD MAMMALS																				
Carnivores																				
Grey wolf	Canis Iupus	Appendix I	LC	CR	XZ	X	X													
Himalayan wolf					XZ	X	X													
Golden jackal	Canis aureus	Appendix III	LC	LC	XZ	X	X													
Red Fox	Vulpes vulpes	Appendix III	LC		XZ	X	X													
Bengal Fox	Vulpes bengalensis	Appendix III	LC	VU	XZ	X	X													
Tibetan sand fox	Vulpes ferrilata	not listed	LC		XZ	X	X													
Asiatic wild dog, Dhole,	Cuon alinus	Appendix II	EN	EN	XZ	X	X													
Sloth Bear	Melursus ursinus	Appendix I	VU	EN	XZ	Х	X													
. Asiatic black bear	Ursus thibetanus	Appendix I	VU	EN	XZ	Х	X													
Brown Bear	Ursus arctos	Appendix I	LC	VU(P)	XZ	Х	X													
Red Panda	Ailurus fulgens	Appendix I	VU	EN(P)	XZ	Х	X													
Steppe pole cat	Mustela eversmanii	not listed	LC	?																
Ermine/stoat	Mustela erminea	Appendix III	LC		XZ	Х	X													
Siberian weasel	Mustela sibirica	Appendix III	LC	LC	XZ	Х	X													XZ
Mountain weasel	Mustela altaica	Appendix III	NT		XZ	Х	X													XZ
Yellow-bellied weasel	Mustela kathiah	Appendix III	LC		XZ	Х	X													XZ
Black striped weasel	Mustela strigidorsa	not listed	LC		XZ	х	X													XZ
Stone Marten	Martes foina	Appendix III	LC	LC	XZ	х	х													
. Yellow throated Marten	Martes flavigula	Appendix III	LC	LC	XZ	х	х													
. Hog badger	Arctonyx collaris	not listed	NT		XZ	Х	Х													
Honey badger, Ratel	Mellivora capensis	Appendix III	LC	EN	XZ	Х	Х													

Diagnostics

S. C. A.		V/MARKEZMANIANIANIA								
	A	В	С	D	Е	F	G			
1	Diagnostic protocols for	r priority disease	es	* Tests under development						
2										
	Viral diseases	Target species	Diagnostic tests	Sample type	NTNC Lab	Nepal	Preferred			
3		(from table)	(*indicate OIE pref)	required	available	available (list lab)	outside Lab			
	Foot and Mouth Disease	Ungulates,	ELISA	Tissue, Oesophageal -	Yes	AFU				
		Elephant,		pharyngeal fluid			25			
		Rhinocerous, all								
4		porcine								
5			CFT		No					
6			PCR		Yes*					
7	Canine Distemper	All Carnivore	Virus Neutralization	Serum	No					
			Rapid antibody test	Serum	Yes (if accurate kit					
8					available)					
			RT - PCR	Smear of conjunctival,	Yes		9			
				vaginal,tracheal or other			3			
				epithelium, buffy coat of						
9				blood. urine sediment						
			Antigen Rapid test		Yes (if kit available					
10				nasal, buccal mucosa	- Vetall/Senspert)					
	Canine Parvovirus	All Canid species	Antigen Rapid test	Serum	Yes (if kit available					
11					- Vetall/Senspert)					
12			ELISA	Feces	No	No				
13			PCR		Yes*					
	Blue Tongue	Ruminants	Virus Isolation	Tissue, blood in heparin,	No		8			
				aborted and congenitally			3			
14	▶ ► Species and Diseases	Diagnostics (post)	*	infacted now horne						
	Species and Diseases Diagnostics (post) Call Call									



TB: A One-Health Disease



Humans

Domestic

One Health

Wildlife





Ecosystem





Elephant Tuberculosis in Nepal

History

02-04

1st TB case - patrol bull

2nd TB case

2005

 Trunk Wash Testing done on TB (9.25% Positive)

2008

Treatment started



Nepal TB Case: Airabat Gaj





2006: Stat-Pak + MAPIA – DPP – 2007: DPP + died

Tuberculosis surveillance in Elephant

Population identified: 279 elephants

Tested: 254 (91%)

· Annual Surveillance with DPP kit

(Chembio)



Summary of Treated Elephants

Total # elephants treated:61

- Government: 17

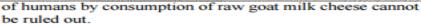
- Private: 41

- NTNC: 3



Tuberculosis in Wildlife





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- I II..... DC I I C D. al .. WD C ... II. II



Mycobacterium orygis-Associated Tuberculosis in Free-Ranging Rhinoceros, Nepal, 2015

Jeewan Thapa,¹ Sarad Paudel,¹ Amir Sadaula, Yogendra Shah, Bhagwan Maharjan, Gretchen E. Kaufman, Deborah McCauley, Kamal P. Gairhe, Toshio Tsubota, Yasuhiko Suzuki, Chie Nakajima

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DOI: http://dx.doi.org/10.3201/eid2203.151929

Canine Distemper (CDV)

CDV Surveillance in Tiger

- · Serum from rescued, tissue from Dead
- 11 serum sample from tiger exported to Cornell University for 8 panel of disease.



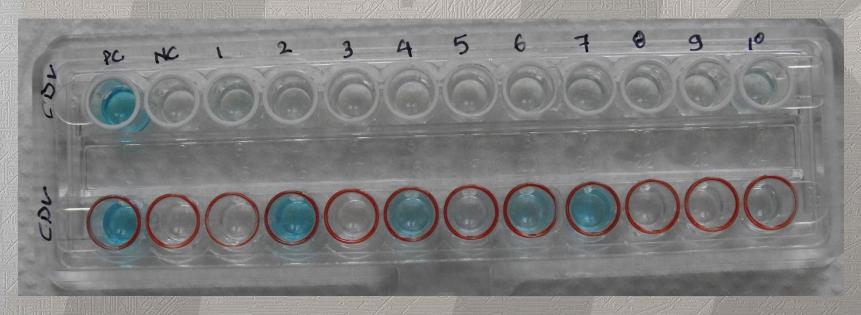


 11 Serum sample from rescued Tiger (2011-2016) sample exported to Cornell University and tested for 8 diseases and results:

Disease	Number of positive
Feline Coronavirus (FCOV)	1
Feline Immunodeficiency virus (FIV)	0
Feline Leukemia (FeLV)	0
Feline Herpesvirus (FVR)	5
Canine Distemper Virus (CDV)	0
Canine Parvovirus – 2 (CPV-2)	8
Leptospirosis (7 Serovars)	6
Toxoplasmosis	10

Disease of Wild Carnivore

- Canine Distemper and Canine Parvovirus in all rescued tiger
- · Disease study in Feral dog and its role of disease transmission in wild carnivore



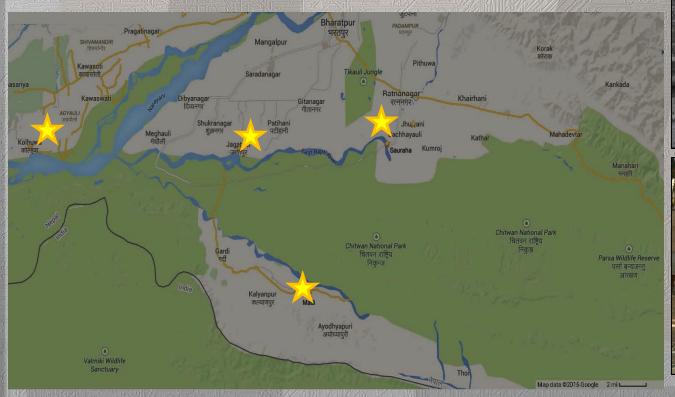
CDV and CPV testing in wild Tiger

Sero survey of CDV in rescued carnivores

- Serum Virus Neutralization Assay in collaboration with AFU (Agricultural and Forestry University), Cornell University
- · Royal Bengal Tiger 29
- · Common Leopard 24
- · Sloth Bear 2
- · Snow Leopard 3
- · Jungle Cat 1

CDV surveillance in stay dogs

Design: Sample dogs in 4 selected communities in the buffer zone of CNP









- Analysis
 - 100 serum samples
 - Serum virus neutralization assay for CDV

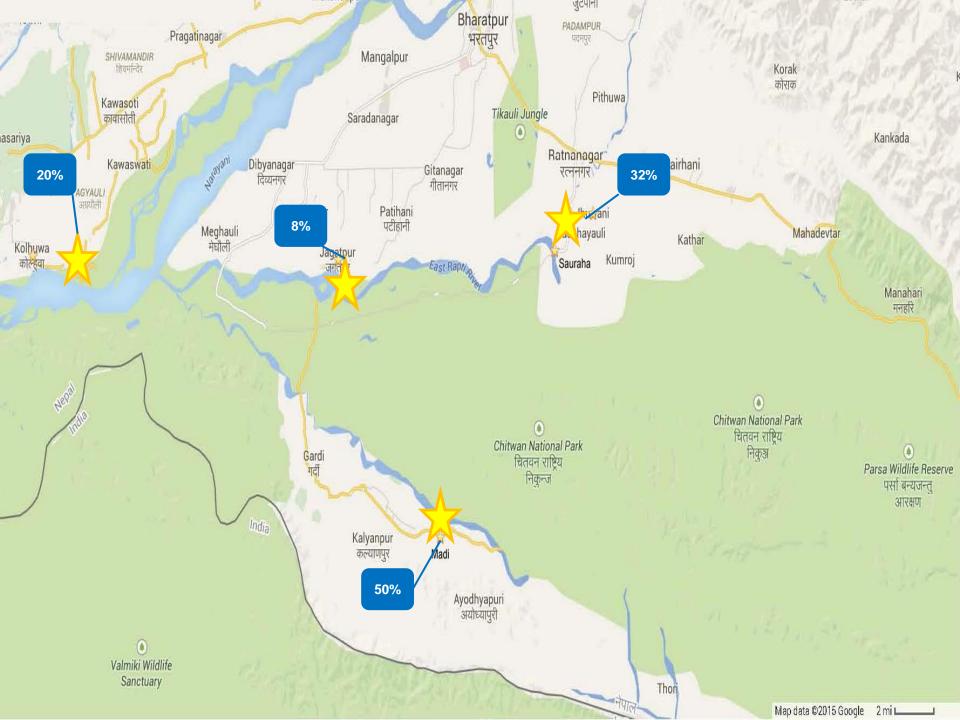






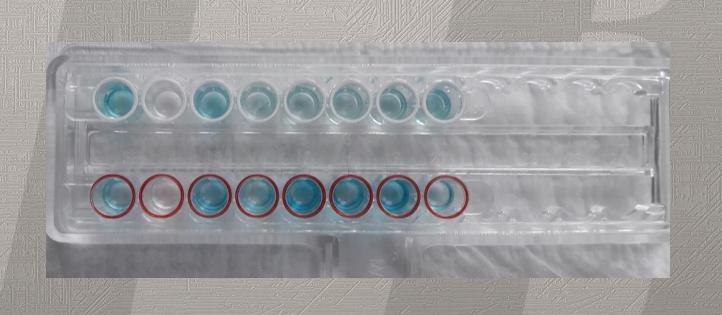
Results

- 27% of dogs sampled POSITIVE for CDV antibody (range 8-50% in 4 sectors we selected)
- · No dogs were symptomatic for disease
- · No dogs had previous CDV vaccination
- · 43% had previous Rabies vaccination
- Age and titer: 88% of dogs with + titer were age 3 or older
- Sex and titer: 34% of the males were positive ; 27% of the females were positive



Recent Surveillance

Sectors	Number of Animal	CDV	CPV
Madi	113	19	41
Kasara	50	13	10
Total	163	32	51





Introduction

- Biggest threats to the captive Asian elephant (Elephas maximus) breeding programmes worldwide.
- First diagnosed in 1995, over 90 cases with 90 % mortality.
- EEHV belongs to the subfamily Betaherpesvirinae and the newly designated genus *Proboscivirus*.
- Currently, six EEHV have been identified as EEHV-1 to EEHV-6 (Latimer and others 2011).
- EEHV-1 commonly isolated and most pathogenic (Fickel and others 2001).

Name	Sex	DOD	Age at infection	Location	
Unnamed	M	09.09.2009	11 month	CNP	
Narayangaj ^{#*}	M	Survived	2 years	SNP	
Anarkali	F	11.25.2012	1.5 yrs.	CNP	
Ganendra Gaj*	M	09.15.2002	1.5 yrs	CNP/NTNC	
Hem gaj*	M	07.09.2015	3 yrs.	CNP/NTNC	
Bhadra gaj [*]	M	06.19.2011	16 month	CNP/Gaida R.	
Samrat Gaj#*	M	Survived	2 yrs	CNP/ Sapana R.	
Prem prasad*	M	08.17.2016	2.5 yrs	Bardia NP	
Kumar Gaj	M	Survived	10.5 Yrs	Bardiya NP	
UN	M		3 Yrs	Bardiya NP	
Ambekali	F	Survived		CNP	
RajaGaj	M	Survived		CNP/NTNC	
Karnali Kali	F			Bardiya NP	



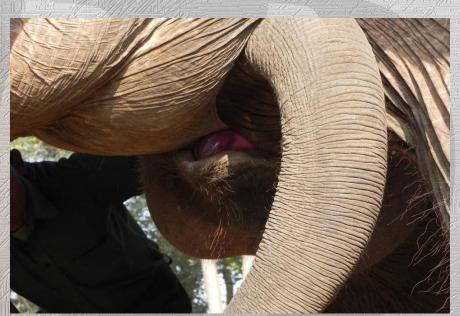




1st Day







2nd Day



Foot and Mouth Disease

- · Livestock of buffer zone
- · Madi, Jagatpur, Padampur
- · Impact on Prey population



	1	2	3	4	5	6	7	8	9	10	11	12
А	0.058	0.845	0.847	0.988	1.295	0.926	1.186	0.928	1.391	1.012	0.15	1.26
В	0.045	0.953	1.186	0.962	1.191	0.133	0.859	1.05	0.809	1.287	1.203	1.068
С	1.207	0.99	0.058	0.802	1.191	0.644	0.776	0.952	0.918	0.829	1.016	0.823
D	1.041	0.045	0.806	0.956	0.976	1.011	1.178	1.145	0.713	0.963	0.856	0.923
Е	0.708	0.824	1.084	1.044	1.072	0.862	0.899	0.935	0.794	0.705	0.845	0.714
F	0.787	0.914	0.452	0.862	1.055	0.801	1.14	0.959	1.032	0.631	1.07	0.921
G	0.357	0.989	0.253	1.154	1.144	0.947	1.05	0.807	0.923	0.332	1.121	0.959
Н	0.966	1.023	0.934	1.004	1.037	0.935	1.179	1.04	0.998	0.987	1.027	1.093

ELISA reading of FMD ELISA test

Tick and tick borne pathogen

- · Tick collected from rescued wildlife
- Molecular study of tick species and pathogens.
- Genetic diversity of tick and tick borne pathogen
- Collaboration of Hokkaido University Japan.

