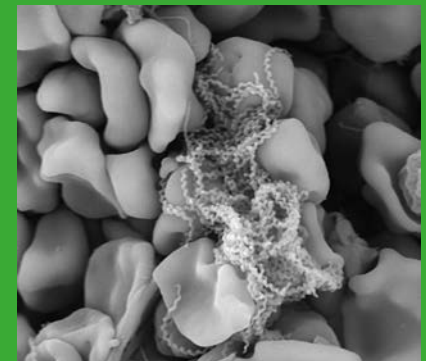
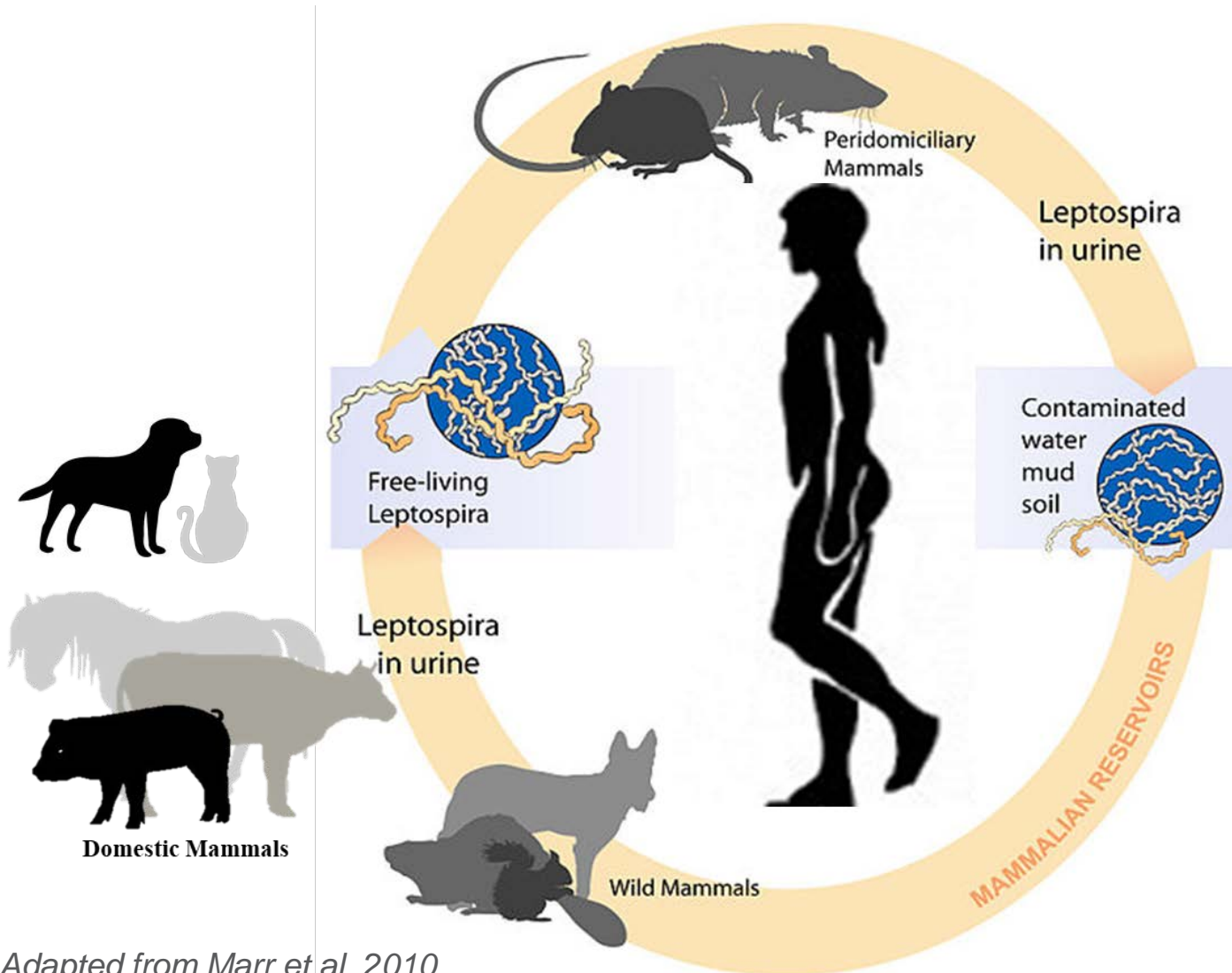


# PASSIVE (SEROLOGICAL) SURVEILLANCE OF LEPTOSPIROSIS IN BELGIUM: NATIONAL DATA 2006-2020

Marcella Mori

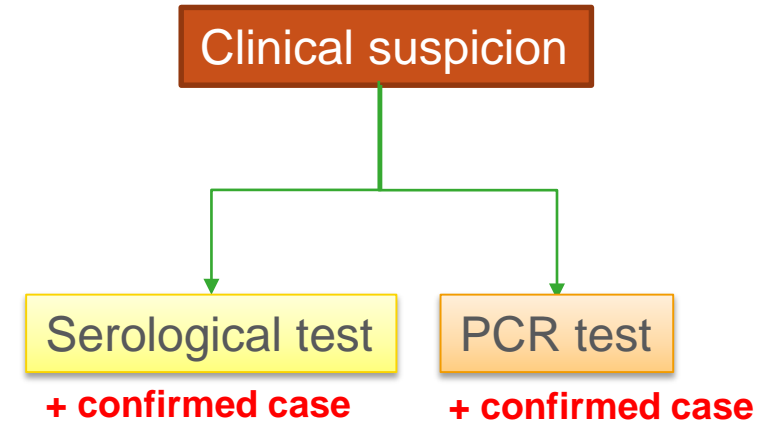


# Leptospirosis-the zoonotic cycle and the diagnosis



Adapted from Marr et al. 2010

## Diagnosis



Delooz et al., 2015  
Gregoire et al. 2020

Presence of one of these lesions at the necropsy of the fetus?	Result of the MAT on dam's serum	n positive MAT/N performed MAT (% positivity)	Result of PCR performed on fetal organs	n positive PCR/N performed PCR (% positivity)	Abortion due to Leptospira?
yes (n = 63)	≥ 1/300	39/63 (61.9%)	POS	22/27 (81.48%)	→ yes
			NEG or NT		→ yes
	1/10 - 1/100	14/63 (22.22%)	POS	3/9 (33.33%)	→ yes
			NEG or NT		→ doubtful
			POS	1/8 (12.5%)	→ yes
Icterus Splenomegaly Coppery liver Haemorrhagic pattern	NEG		NEG or NT		→ doubtful
			TOTAL PCR	26/44 (59.09%)	
			POS		
	≥ 1/300	6/41 (14.63%)	POS	1/3 (33.33%)	→ yes
			NEG or NT		→ doubtful
no (n = 41)	1/10 - 1/100	14/41 (34.15%)	POS	0/3 (0.00%)	→ *
			NEG or NT		→ doubtful
			POS	0/13 (0.00%)	→ *
	NEG		NEG or NT		→ no
			TOTAL PCR	1/19 (5.26%)	
		POS			

# Sample-type received at the LNR and data curation

## Sample type

- Serum collected from routine analyses (>>symptomatic, >export/certification) excluded research samples (i.e. scout outbreak, pet rat contamination..)
- All species (except laboratory animals)
- Timeframe: 2006-2020
- N=20,504, MAT on 12 serogroups
- Cut-off: 1/100 (except for cat and rodents where the cut-off is 1/10)

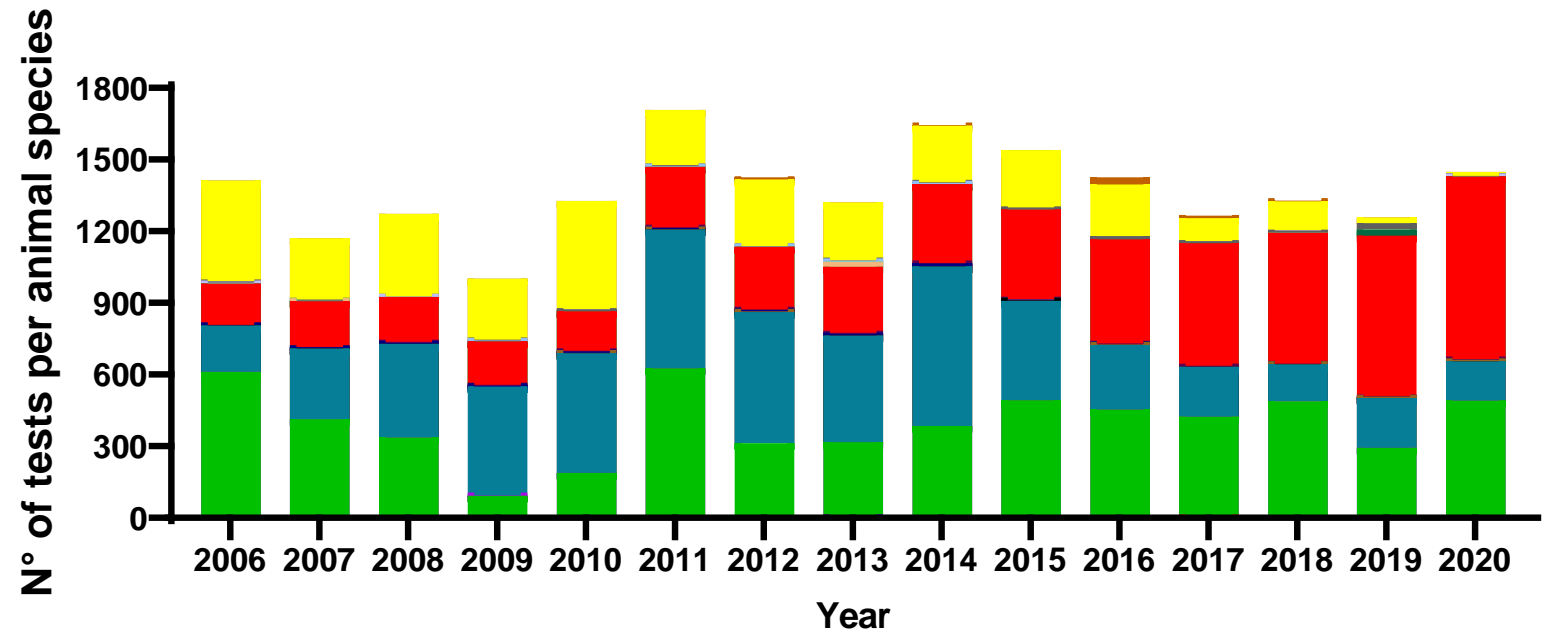
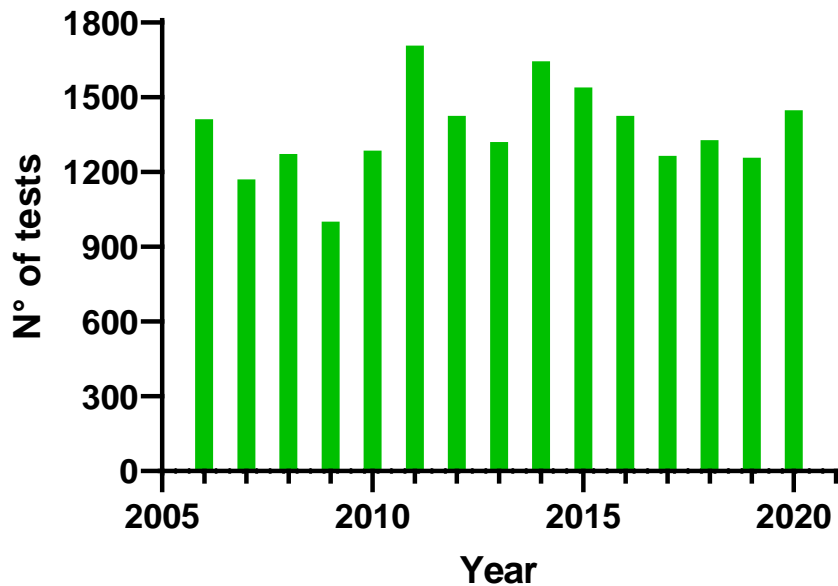
## Data curation

- LIMS extraction from 2006 to 2020
- Verification of hits with raw data on paper (2011-2020)
- Selection/exclusion of double hits
- Statistical analyses

# Passive surveillance of leptospirosis at the LNR: yearly number of tests per animal species



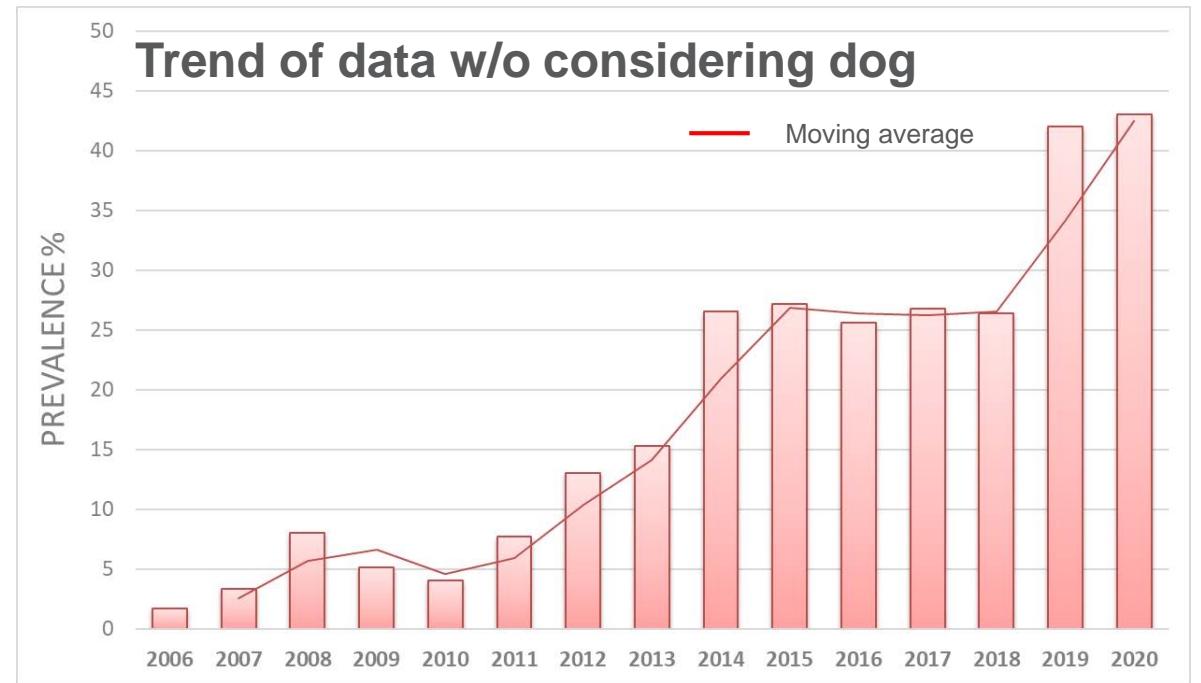
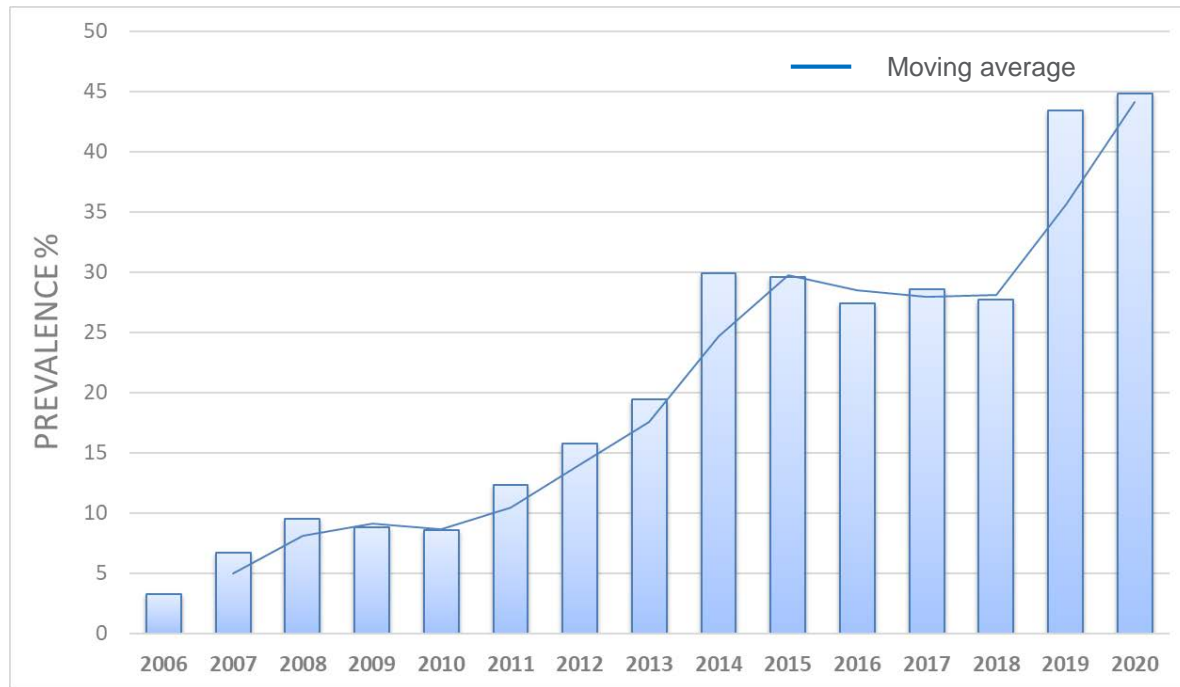
$\bar{x} = 1367$



# Overall leptospirosis seroprevalence and 2006-2020 trend

Number of observation = 15

Spearman's rho = 0.9250 (very strong relationship)



L2

Canicola  
Icterohaemorrhagiae

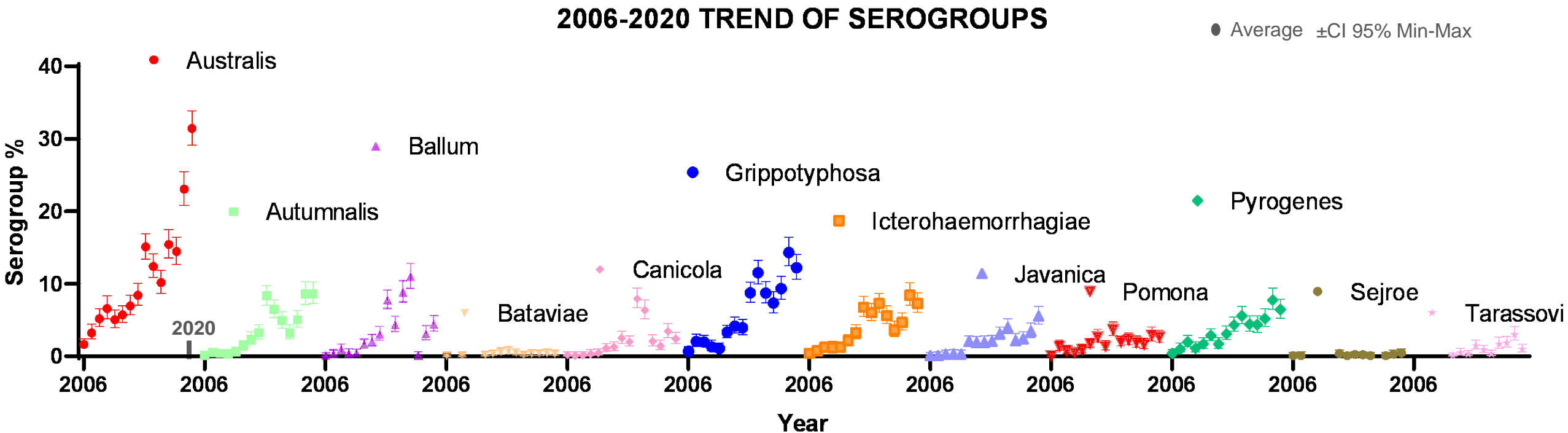
L4

Canicola  
Icterohaemorrhagiae  
Australis  
Grippityphosa



# Sero-prevalence of leptospirosis per animal species

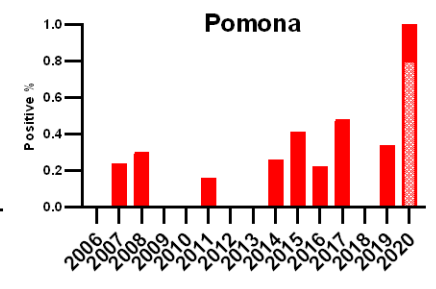
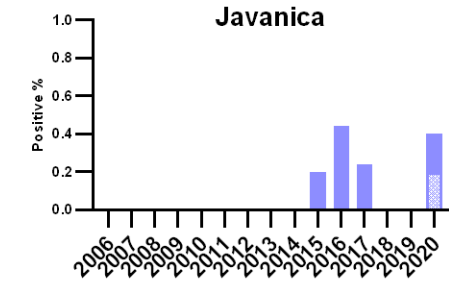
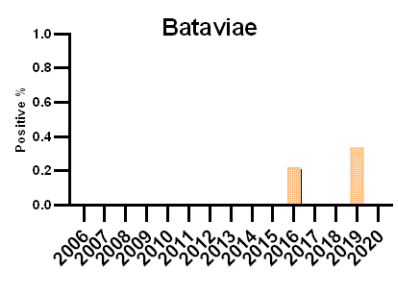
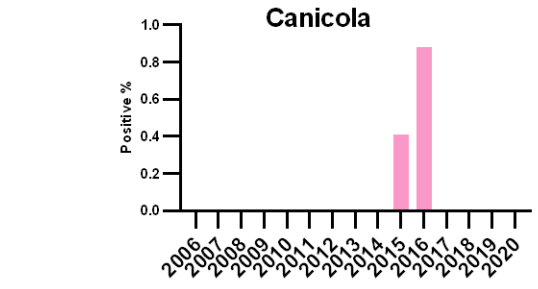
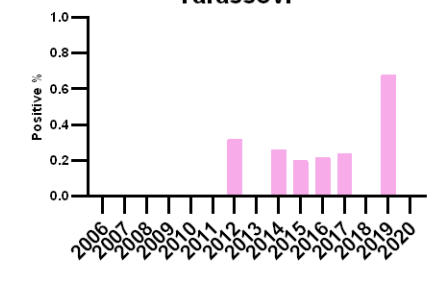
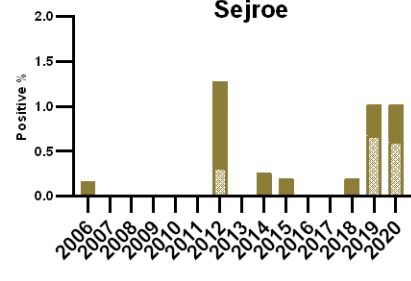
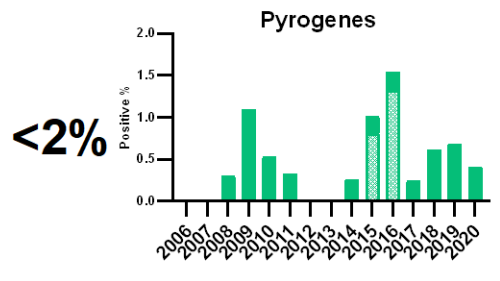
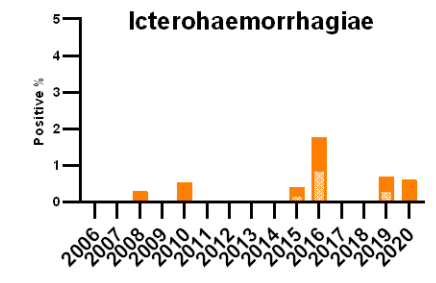
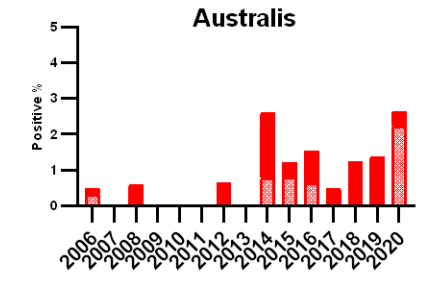
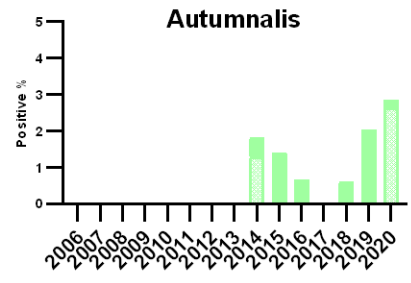
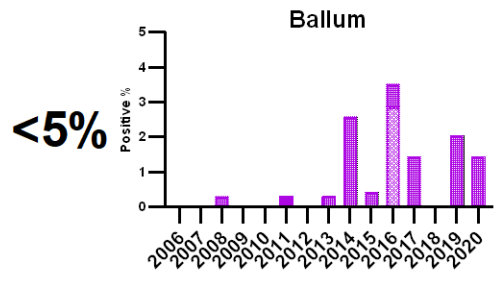
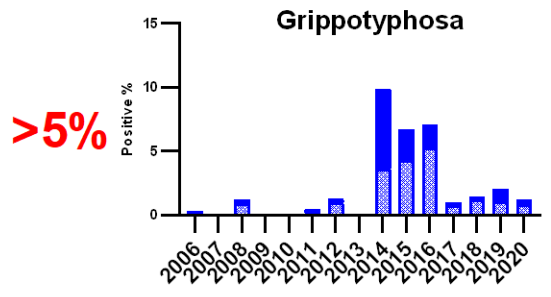
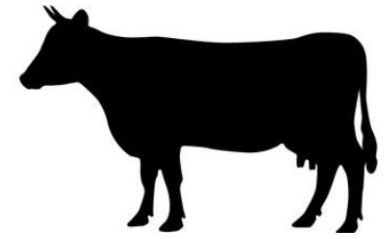
	Titers						
	Examined	Positive ≥100	Positive ≥100 (%)	Positive ≥500	Positive ≥500 (%)	Positive to more serovars	Positive to more serovars (%)
ALPACA	4	1	25,00	1	25,00	0	0
BIRD	4	1	25,00	0	0	0	0
CATTLE	<b>5913</b>	309	<b>5,23</b>	93	<b>1,57</b>	6	<b>0,10</b>
DEER	2	0	0,00	0	0	0	0
DOG	<b>5503</b>	1437	<b>26,11</b>	657	<b>11,94</b>	238	<b>4,32</b>
DONKEY	3	0	0,00	0	0	0	0
EXOTIC MAMMALS	19	5	26,32	1	5,26	0	0
FELINE (CAT)	<b>58</b>	18	<b>31,03</b>	2	3,45	0	0
GOAT	33	1	3,03	0	0	0	0
HORSE	<b>5334</b>	2487	<b>46,63</b>	626	<b>11,74</b>	100	<b>1,87</b>
LAMA	26	6	23,08	1	3,85	0	0
MUSTELIDAE	21	0	0,00	0	0	0	0
OSTRICH	1	0	0,00	0	0	0	0
RAT	14	3	21,43	0	0	0	0
RODENT	8	0	0,00	0	0	0	0
SHEEP	<b>108</b>	21	<b>19,44</b>	1	<b>0,93</b>	0	0
SWINE	<b>3397</b>	93	<b>2,74</b>	12	<b>0,35</b>	7	<b>0,21</b>
WILDBOAR	<b>56</b>	15	<b>26,79</b>	1	<b>1,79</b>	0	0

# Global serogroups' 2006-2020 trend





# SEROVARS' TREND IN CATTLE

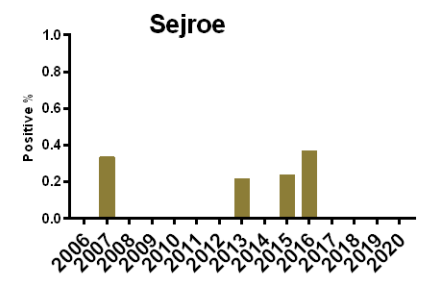
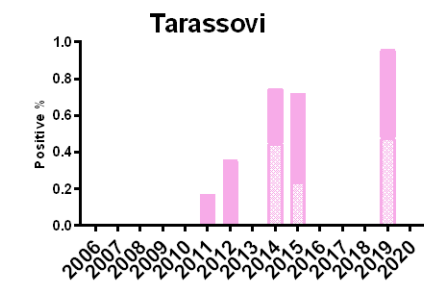
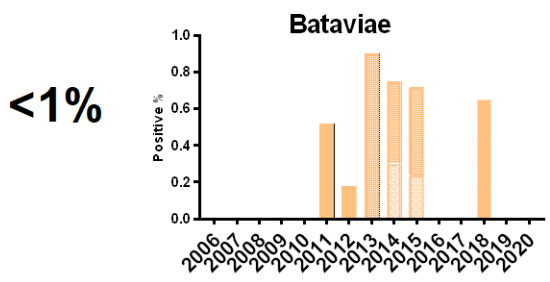
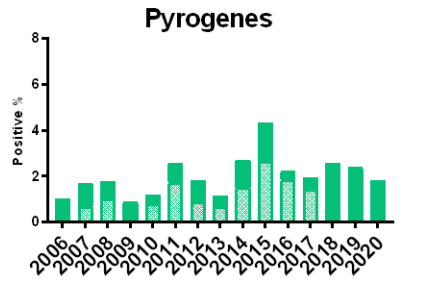
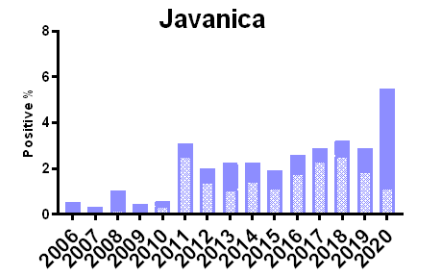
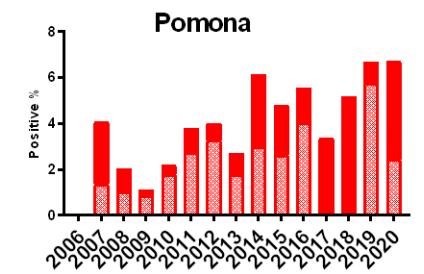
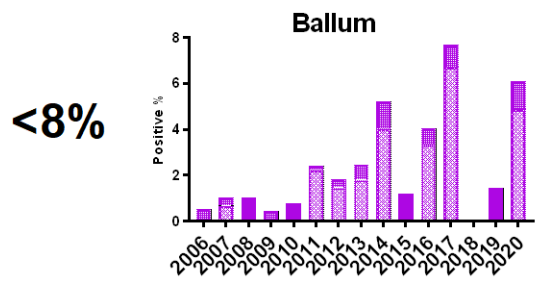
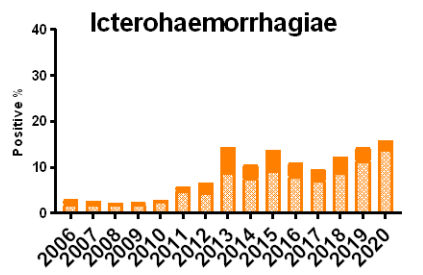
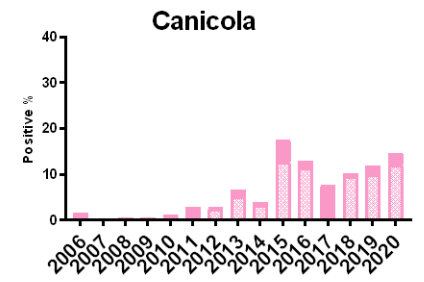
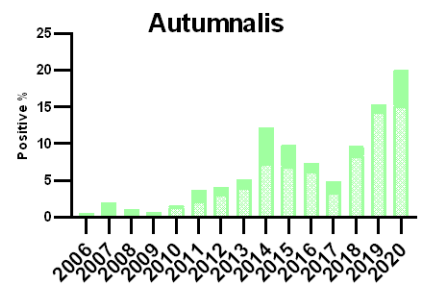
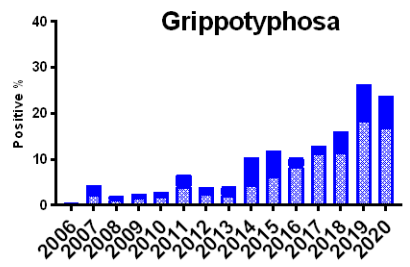
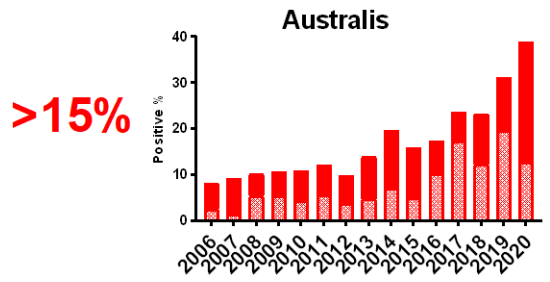
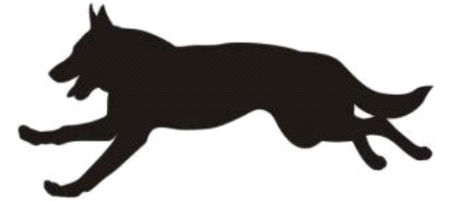
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 POS>100







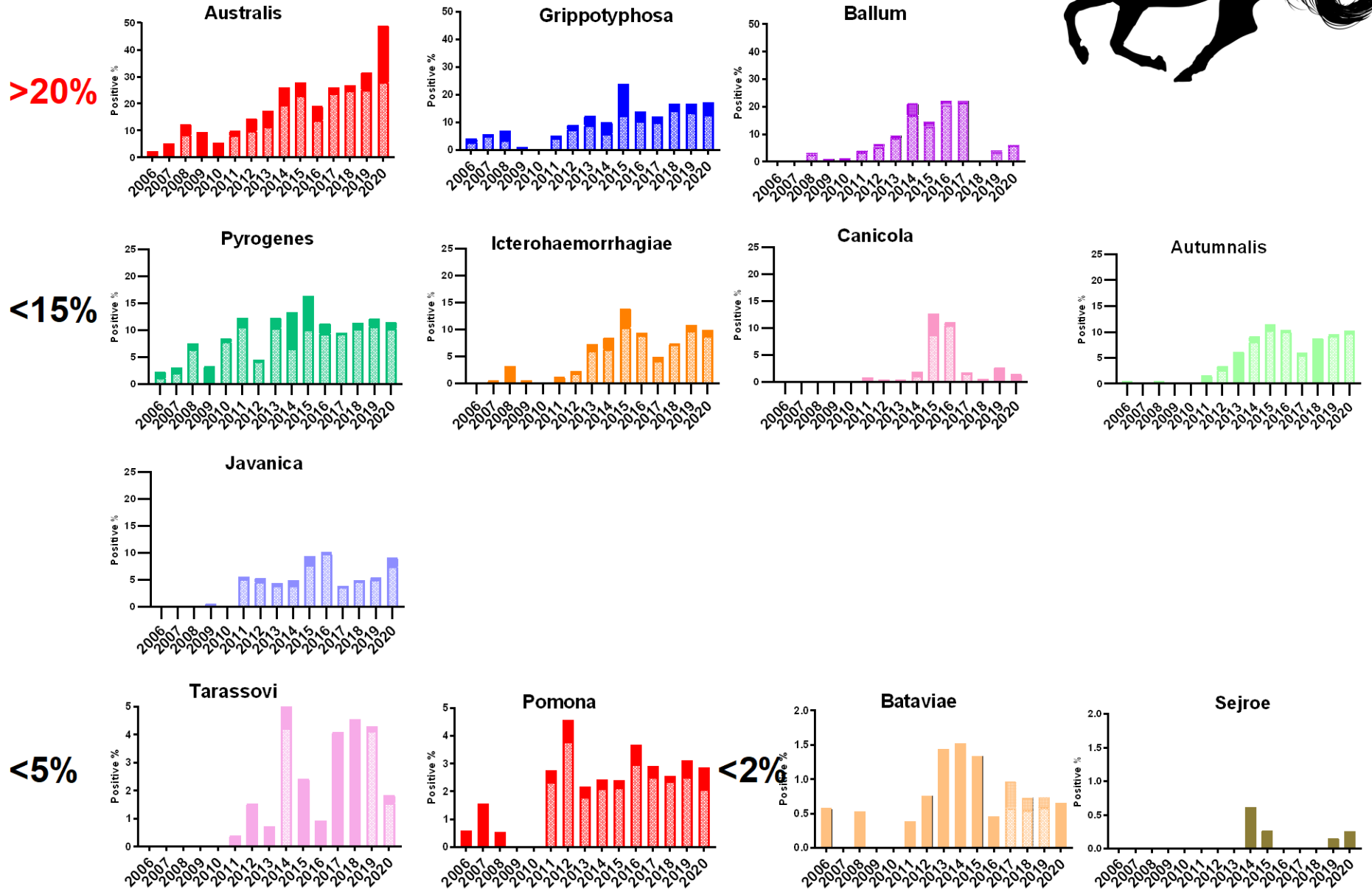
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 POS>100

# SEROVARS' TREND IN DOG



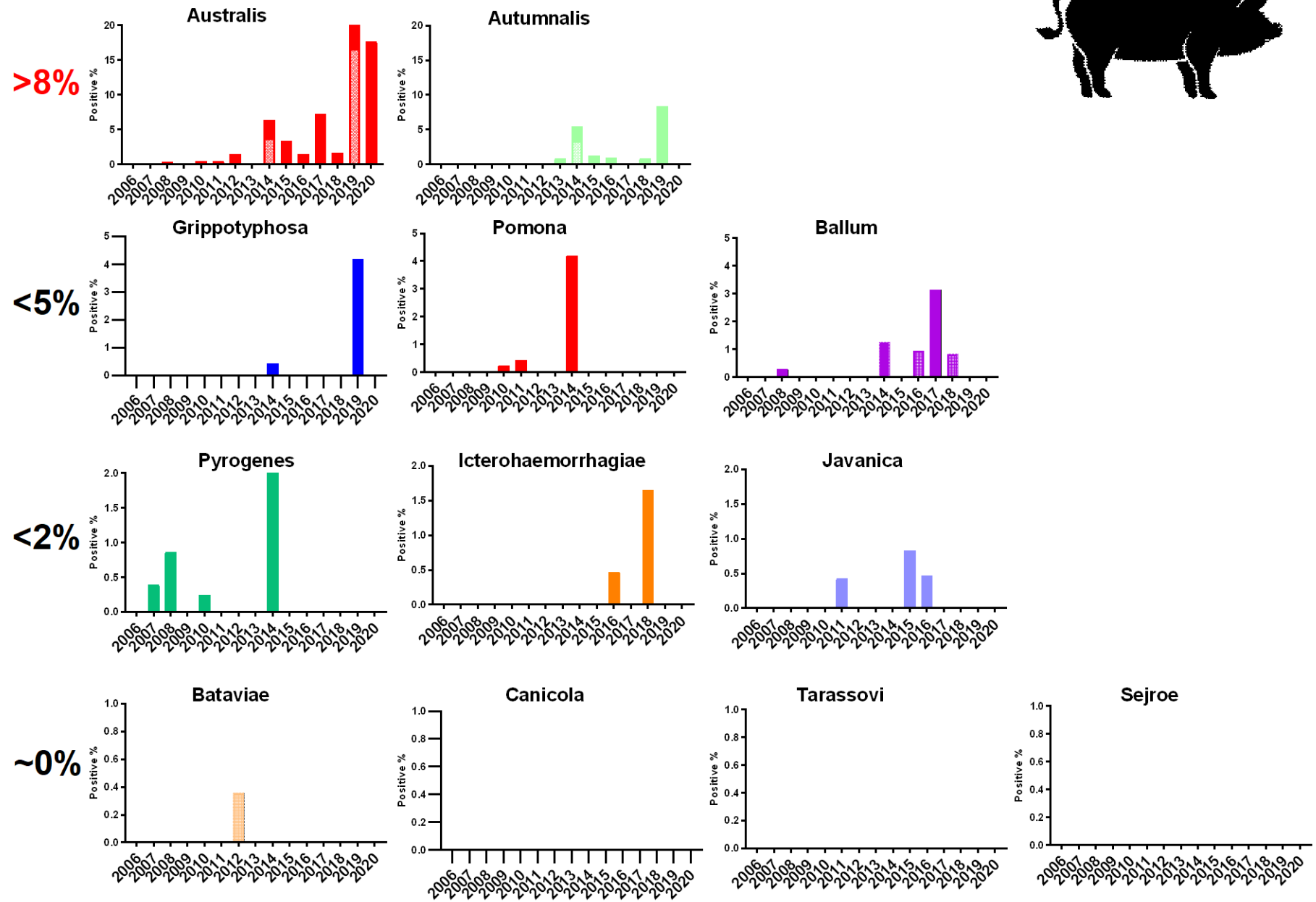
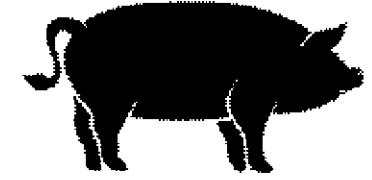
 POS>500  
 POS>100

# SEROVARS' TREND IN HORSE



- POS>500
- POS>100

# SEROVARS' TREND IN SWINE



# Other animal species

- Alpaca: N=4, one positive to 1/1000 Pomona
- Lama: N=26, Australis, Grippotyphosa, Icterohaemorrhagiae, Tarassovi and Pomona
- Bird: N=4, one positive to 1/100 Australis
- Cat: N=58, all serogroups detected except Bataviae, Tarassovi and Sejroe
- Sheep and goats: N=141, Australis, Grippotyphosa, Icterohaemorrhagiae, Pyrogenes and Tarassovi
- Rat: N=22, Icterohaemorrhagiae
- Wildboar: N=56, >>Australis >Grippotyphosa

# Take-home message

- A significant correlation is observed between time and increase of leptospirosis seroprevalence in animals
- The increase appears to follow a discontinuous increase on a short-term time scale (but with an epidemic increase over a long-term time scale)
- Serogroups requiring attention in the future (and improved diagnosis at large scale): >>> Australis (cattle, dog, horse, swine), Grippotyphosa (cattle, dog, horse)  
> Autumnalis, Icterohaemorrhagiae, Ballum, Javanica, Pyrogenes, Tarassovi
- Serogroup Sejroe: minor problem in Belgium (positive effect of the cattle purchase protocol?)

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Els Goossens (resp.)

Wiebke Jansen (resp.)

Carole Kowalewicz

and the rest of the staff

VETEPI

Mickael Cargnel

## **European Leptospirosis Society**

<https://www.euroleptosociety.org/>

# (Suggested) Readings on leptospirosis in the Belgian epidemiological context

- Laboratory Diagnosis of Bovine Abortions Caused by Non-Maintenance Pathogenic *Leptospira* spp.: Necropsy, Serology and Molecular Study Out of a Belgian Experience. Grégoire F *et al.*, *Pathogens*. 2020 May 26;9(6):413. doi: 10.3390/pathogens9060413.
- Serogroups and genotypes of *Leptospira* spp. strains from bovine aborted fetuses. Delooz L, Czaplicki G, Gregoire F, Dal Pozzo F, Pez F, Kodjo A, Saegerman C. *Transbound Emerg Dis*. 2018 Feb;65(1):158-165.
- Reproductive Disorders and Leptospirosis: A Case Study in a Mixed-Species Farm (Cattle and Swine). Mori M, *et al.* *Vet Sci*. 2017 Dec 1;4(4). pii: E64. doi: 10.3390/vetsci4040064.
- Pet rodents as possible risk for leptospirosis, Belgium and France, 2009 to 2016. Mori M, *et al.* *Euro Surveill*. 2017 Oct;22(43). doi: 10.2807/1560-7917.ES.2017.22.43.16-00792.
- Congenital jaundice in bovine aborted fetuses: an emerging syndrome in Southern Belgium. Delooz Laurent, *et al.* *Transboundary and Emerging Diseases* 2015 Apr;62(2):124-6.
- Outbreak of leptospirosis during a scout camp in the Luxembourg Belgian province, Belgium, summer 2012. Mori *et al.*, *Epidemiol Infect*. 2014 Oct 14:1-6.
- Evolution of leptospirosis in Belgian dogs from 2002 to 2009. Behaeghel I. *et al.* (2011) BSAVA Congress, Abstracts. <https://biblio.ugent.be/publication/1201756>
- Clustered case-control study on leptospirosis in dogs and cats. Behaeghel I. *et al.* (2010). <https://biblio.ugent.be/publication/948092/file/948100>
- Isolation of a leptospira serogroup Grippotyphosa from an ondatra in Belgium. Desmecht, M.*et al.*, 1988. *Annales de Medecine Veterinaire (Belgium)*. ISSN : 0003-4118
- Importance of leptospirosis in Belgium. Desmecht, M. 1986. *Current topics in veterinary medicine and animal science*
- Leptospirose bij in het wild levende dieren. Desmecht M. Nationaal Instituut voor Diergeneeskundig Onderzoek. *Activiteitenverslag 1990-1991*: 106-7
- Isolatie in België van *Leptospira interrogans* serotypen saxkoebing, grippotyphosa en copenhageni uit muskusratten. Desmecht M, *et al.*. *Vlaams Diergeneeskd Tijdschr* 1991; 60: 59-63.

# THANK YOU FOR YOUR ATTENTION

