

Seroprevalence of specific *Leptospira* serovars in pigs from five provinces in Vietnam

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Outline

- Introduction of leptospirosis
- Materials and methods
- Results
- Discussion
- Future direction

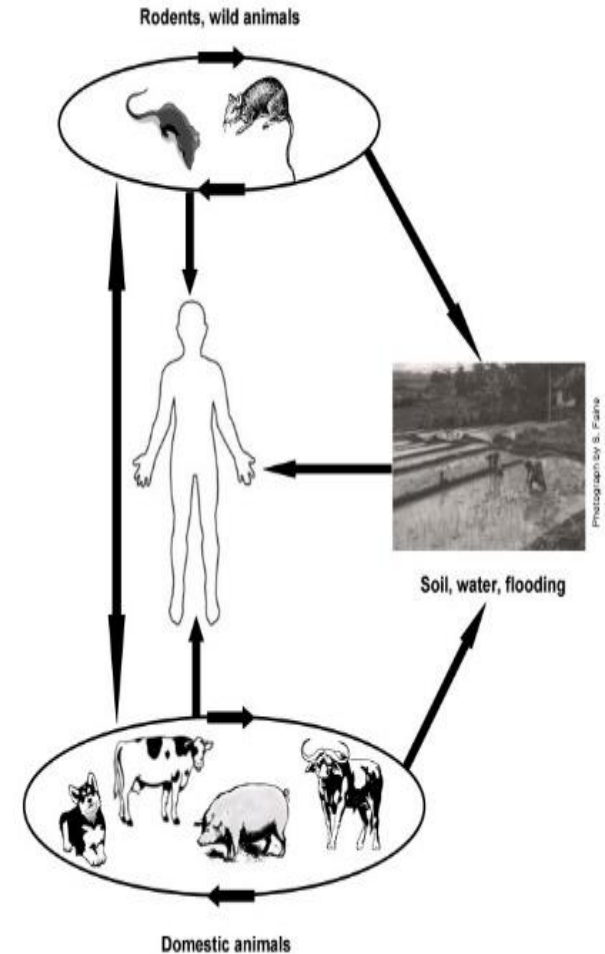
Leptospirosis

- A bacterial zoonotic disease caused by the spirochetes of the genus *Leptospira*
- Pathogenic:
 - *L. interrogans* and *L. kirschneri*
 - More than 200 serovars



Epidemiology

- Zoonotic disease
 - Transmitted to humans from a variety of wild domesticated animal hosts
 - Most common reservoirs: rodents, wild animals (raccoon) and farm animals
 - Occupational disease of animal handling
- Transmitted through the damaged skin or mucus membranes of exposed humans and animals
- Indirect contact (water, soil and feed) with infected urine from an animal with leptospirosis



Host animals

Species	Common infections	Possible others
Dogs	Canicola, Icterohemorrhagiae, Grippotyphosa, Pomona	Bratislava, Autumnalis
Cats		rarely identified
Cattle (and deer)	Hardjobovis, Pomona, Grippotyphosa, Icterohemorrhagiae	Australis, Autumnalis, Canicola, Bataviae, Hebdomadis, Krematosis, Tarassovi, Sejroe, Bratislava
Pigs	Pomona, Bratislava, Canicola, Tarassovi, Icterohemorrhagiae	Grippotyphosa, Sejroe
Sheep	Pomona, Grippotyphosa, Bratislava, Hardjo	
Horses	Pomona, Bratislava, Canicola, Icterohemorrhagiae, Sejroe	

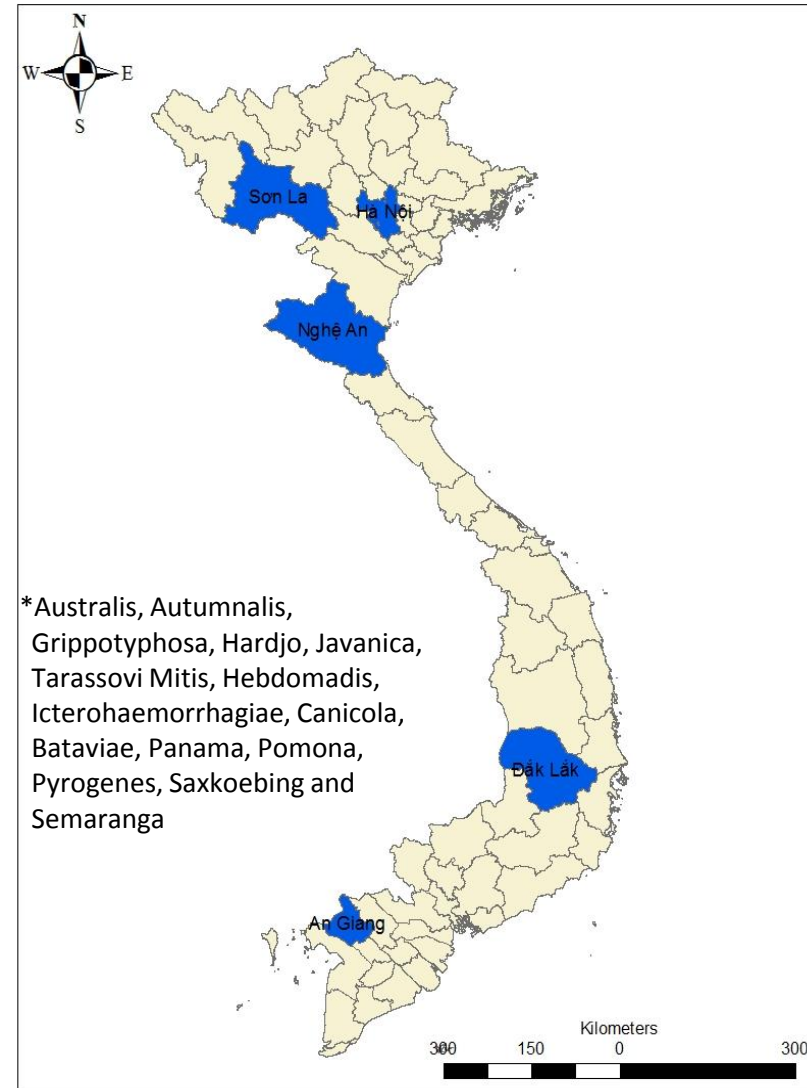
Reference: Bharti, A.R., Nally, J.E., Ricaldi, J.N., Matthias, M.A., Diaz, M.M., Lovett, M.A., Levett, P.N., Gilman, R.H., Willig, M.R., Gotuzzo, E., 2003. Leptospirosis: a zoonotic disease of global importance. *Lancet Infect. Dis.* 3, 757-771.

Materials and methods

Sampling: January to early June 2016

- National Institute of Veterinary Research (NIVR) – Hanoi, Vietnam
- Swine serum samples from 5 provinces
 - Fattening pigs (6-9 months & 60-120kg)
 - At least 385 samples+ / province
 - Multi-stage sampling (province-district-commune)
 - Slaughterhouses
 - Sampling information
- Microscopic agglutination test (MAT)
 - 15 serovars*
 - starting from 1:100 up to 1:800
 - Positive sample \geq 1:100

†Sample size (each province): 50% prevalence, 95% CI, precision 5%



Sampling - Slaughterhouses



Sampling - Slaughterhouse



Sampling – meeting and lab analysis

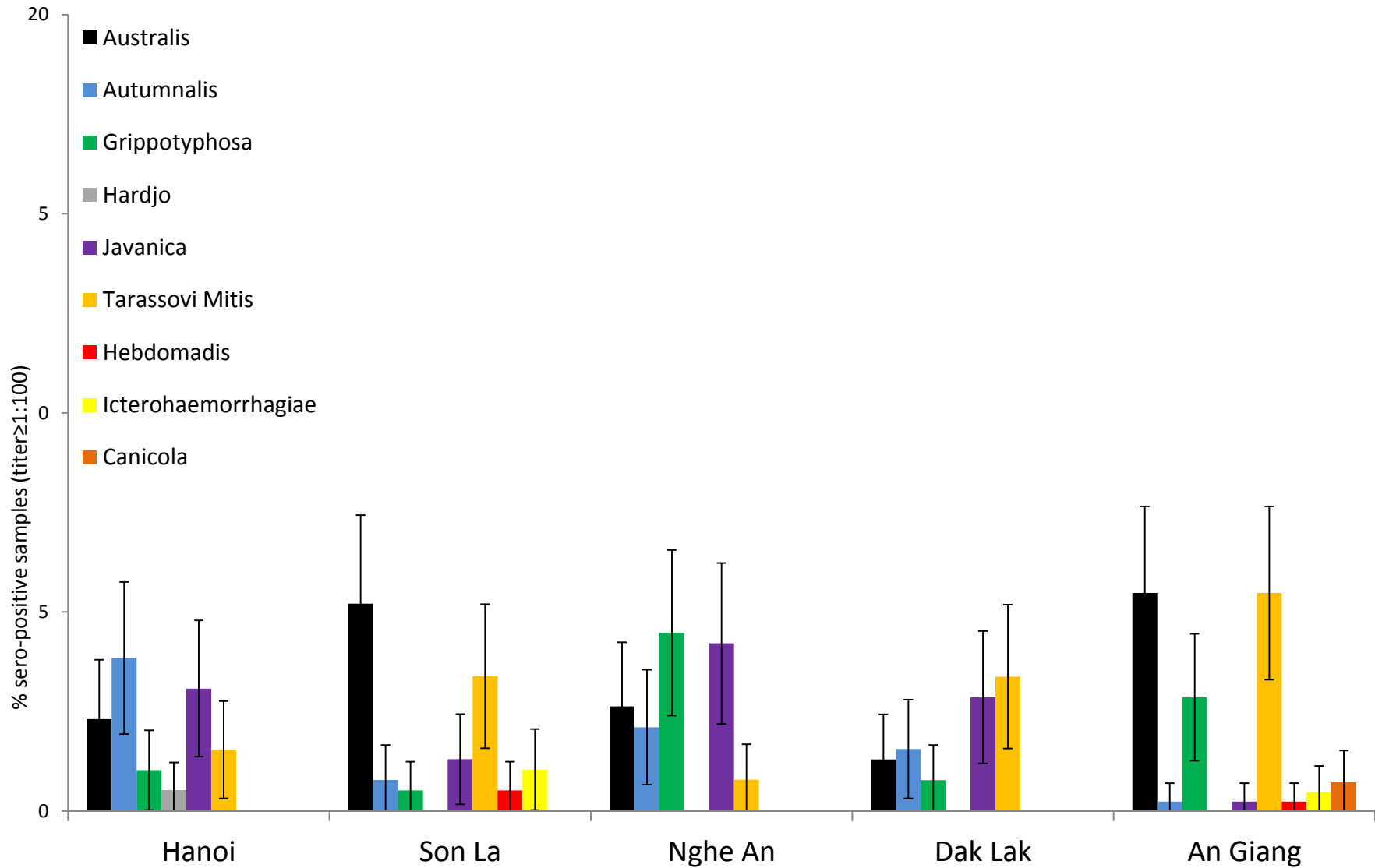


Results

By each province

	Total tested samples	Seropositive samples (a titer \geq 1:100 for any serovars)	Seropositive (%) with 95% CI
Hanoi	390	37	9.49 (6.77-12.84)
Son La	384	27	7.03 (4.68-10.07)
Nghe An	380	33	8.68 (6.05-11.98)
Dak Lak	385	27	7.01 (4.67-10.04)
An Giang	420	36	8.57 (6.08-11.67)
Total	1,959	160	8.17 (6.99-9.47)

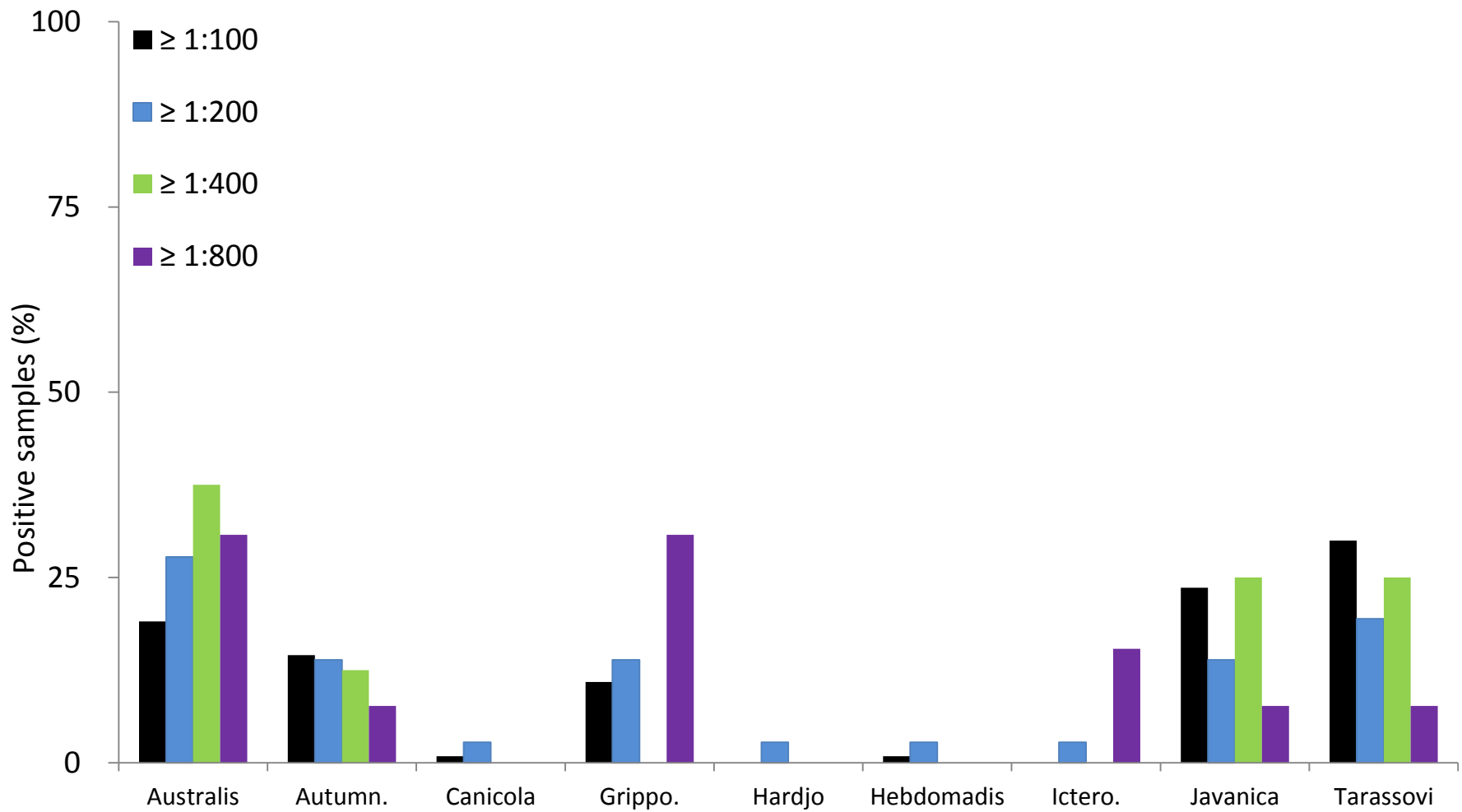
Serovars by each province



Serovars by using 4 cutoff titers

Sero-positive results									
		≥ 1:100		≥ 1:200		≥ 1:400		≥ 1:800	
Seorvar	Total tested samples (n)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Australis	1,959	38	1.94 (1.37-2.65)	16	0.82 (0.42-1.22)	7	0.36 (0.09-0.62)	4	0.20 (0.001-0.40)
Autumnalis	1,959	23	1.17 (0.75-1.76)	7	0.36 (0.09-0.62)	2	0.10 (0-0.24)	1	0.05 (0-0.15)
Canicola	1,959	2	0.10 (0-0.24)	1	0.05 (0-0.15)	0	Null	0	Null
Grippotyphosa	1,959	21	1.07 (0.62-1.53)	9	0.46 (0.16-0.76)	4	0.20 (0.001-0.40)	4	0.20 (0.001-0.40)
Hardjo	1,959	1	0.05 (0-0.15)	1	0.05 (0-0.15)	0	Null	0	Null
Hebdomadis	1,959	2	0.10 (0-0.24)	1	0.05 (0-0.15)	0	Null	0	Null
Icterohaemorrhagiae	1,959	2	0.10 (0-0.24)	2	0.10 (0-0.24)	2	0.10 (0-0.24)	1	0.05 (0-0.15)
Javanica	1,959	33	1.68 (1.11-2.25)	8	0.41 (0.13-0.69)	3	0.15 (0-0.33)	1	0.05 (0-0.15)
Tarassovi Mitis	1,959	43	2.20 (1.55-2.84)	11	0.56 (0.23-0.89)	3	0.15 (0-0.33)	1	0.05 (0-0.15)

Proportion of positive MAT by *Leptospira* serovar using 4 different cutoff titers



Discussion

- Seropositive rate is relatively lower compared to previous studies in Vietnam
 - Samples were collected at slaughterhouses during dry season
 - Older pigs were more likely to be exposed to organisms
 - Animals sent for slaughter may be less likely to be visibly ill
- Tarassovi Mitis, Australis, Javanica and Autumnalis showed relatively high positive rates
 - Tarassovi Mitis and Autumnalis: pig
 - Australis, Tarassovi Mitis: Wild boar – further study required
 - Javanica and Icterohaemorrhagiae: Rat – further study required
- Human cases (underreported) – further study required
 - 48 cases have been reported last 5 years (annually, 0.011 per 100,000)

Future directions

- Pig samples will be collected during rainy season in 2017 (June-October)
 - To make a comparison between dry and rainy seasons
 - To identify potential risk factors
- Human samples will be collected at hospitals/community levels across the country
 - To identify circulating serovars in Vietnam
 - To identify potential risk factors
- Survey: awareness/perception of zoonotic diseases

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