

Obihiro is a cattle country.

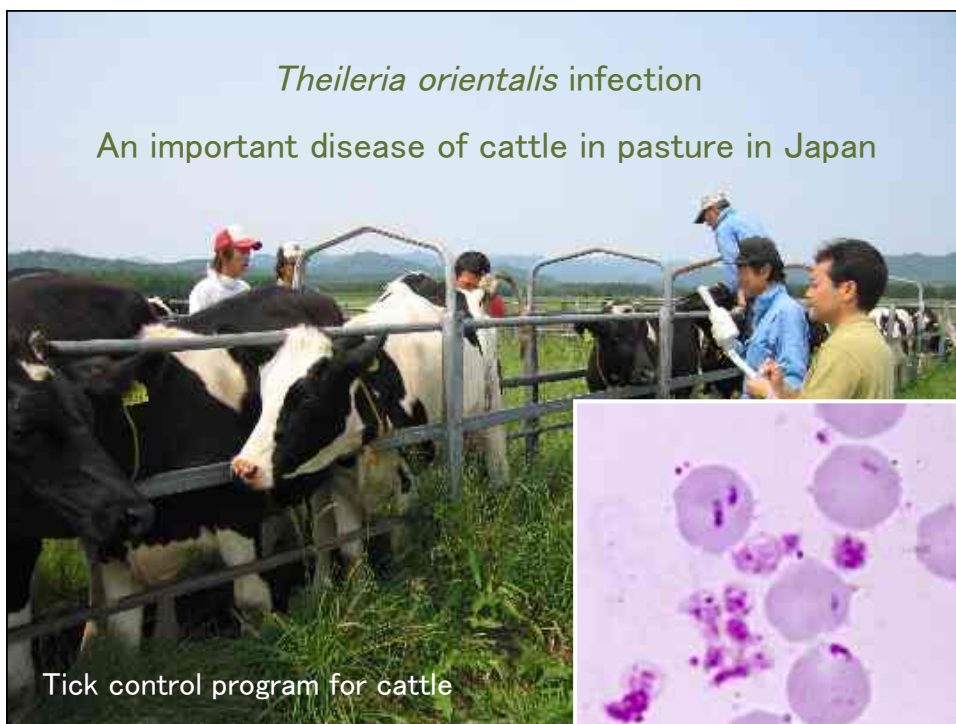
400,000 cattle in Obihiro

(20% of Japan)



*Theileria orientalis* infection

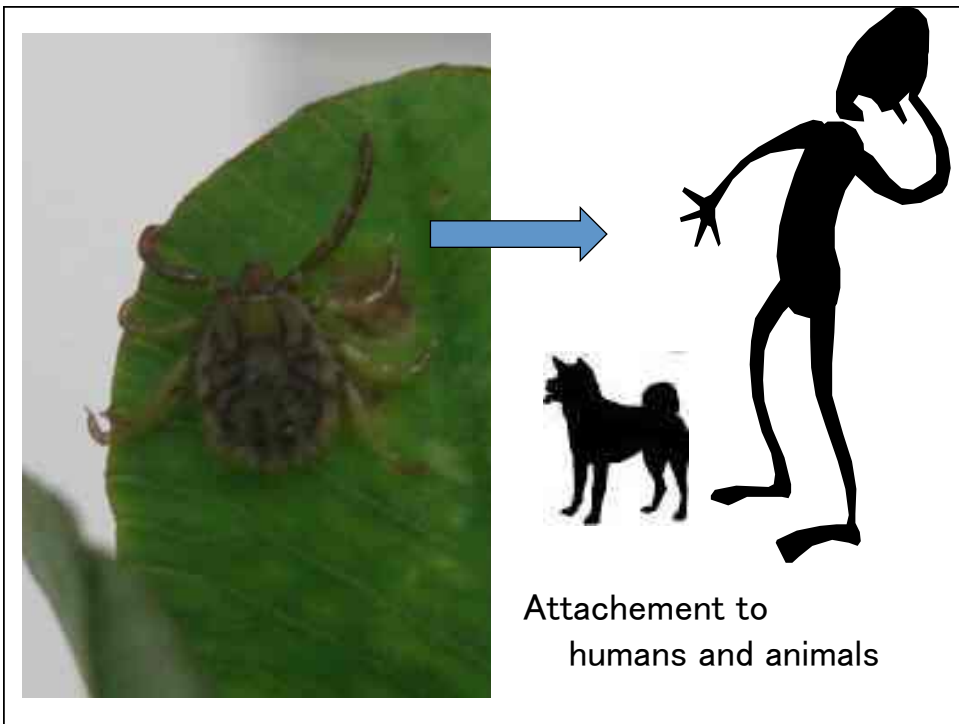
An important disease of cattle in pasture in Japan

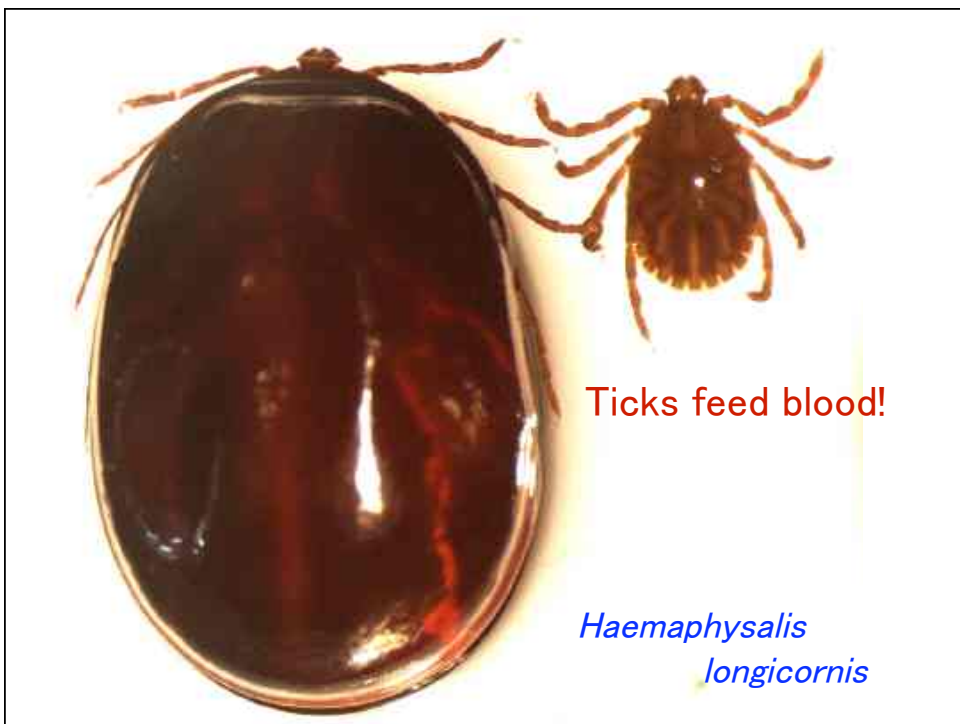


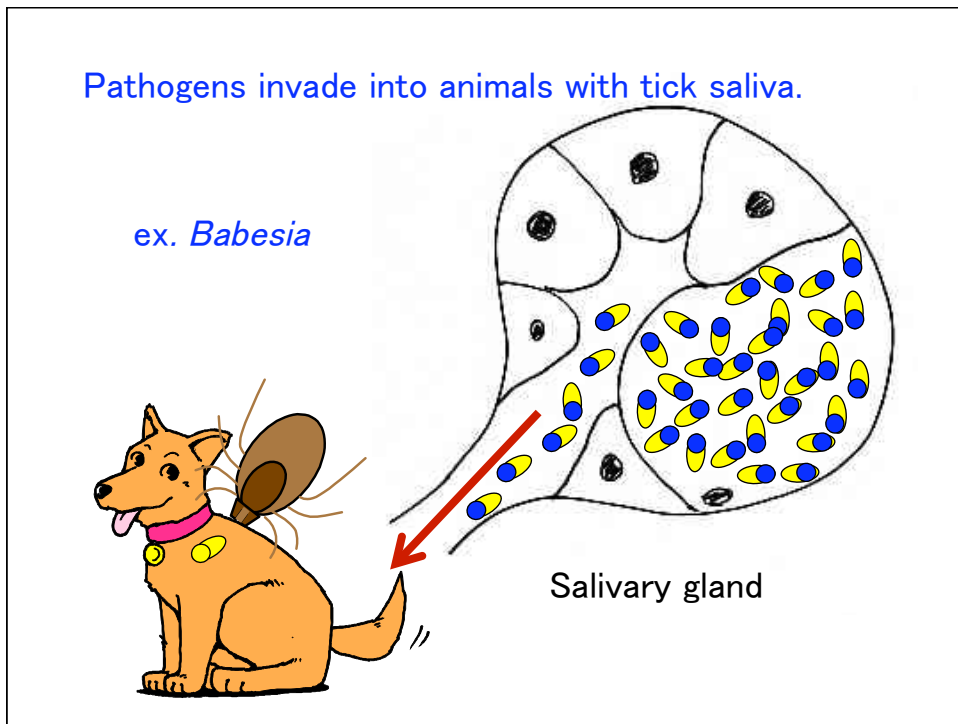
Tick control program for cattle













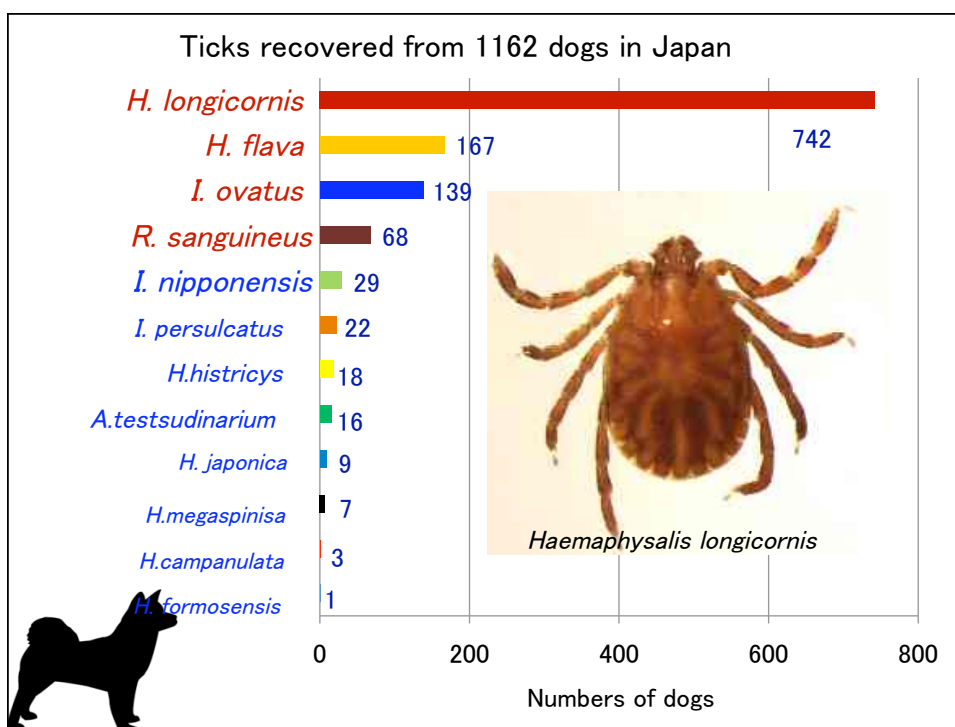


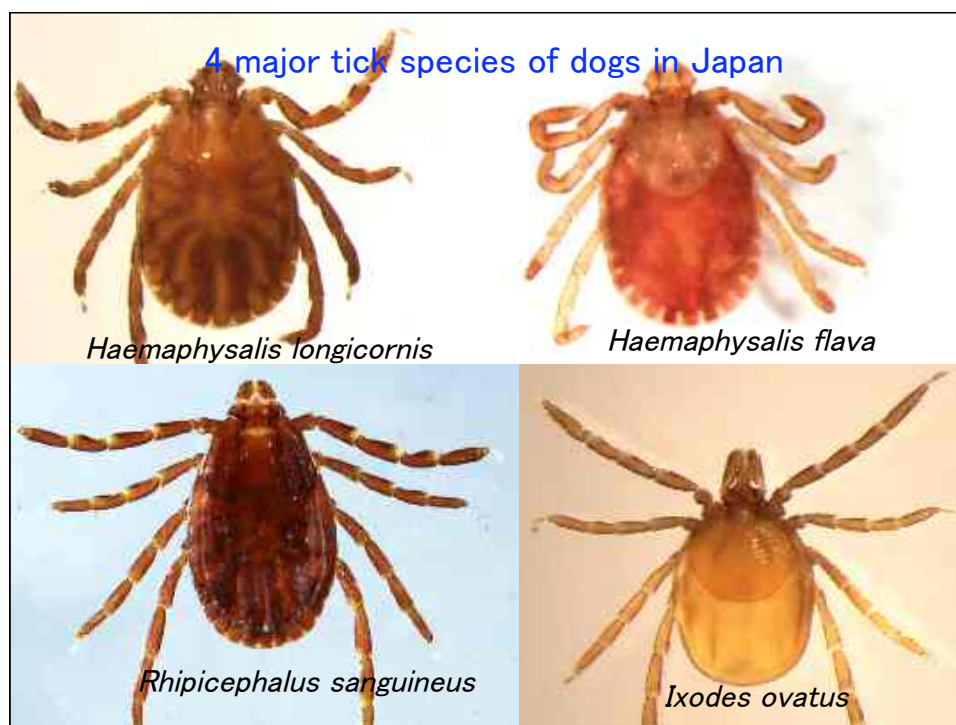
**What kind of ticks we have in Japan?**

Tick species in Japan

6 Genus 43 species

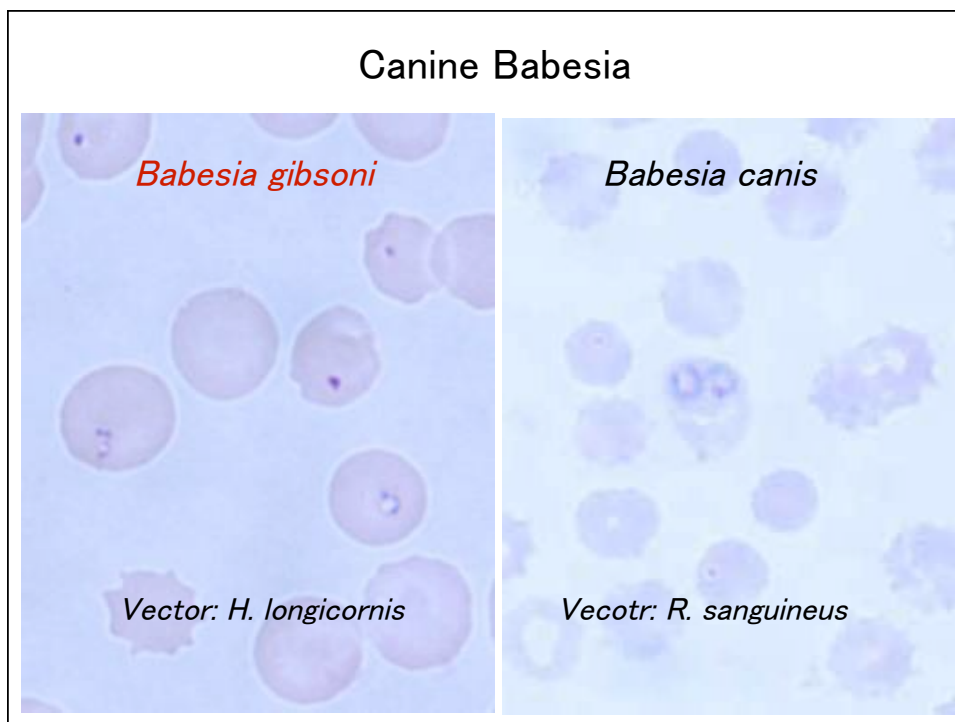
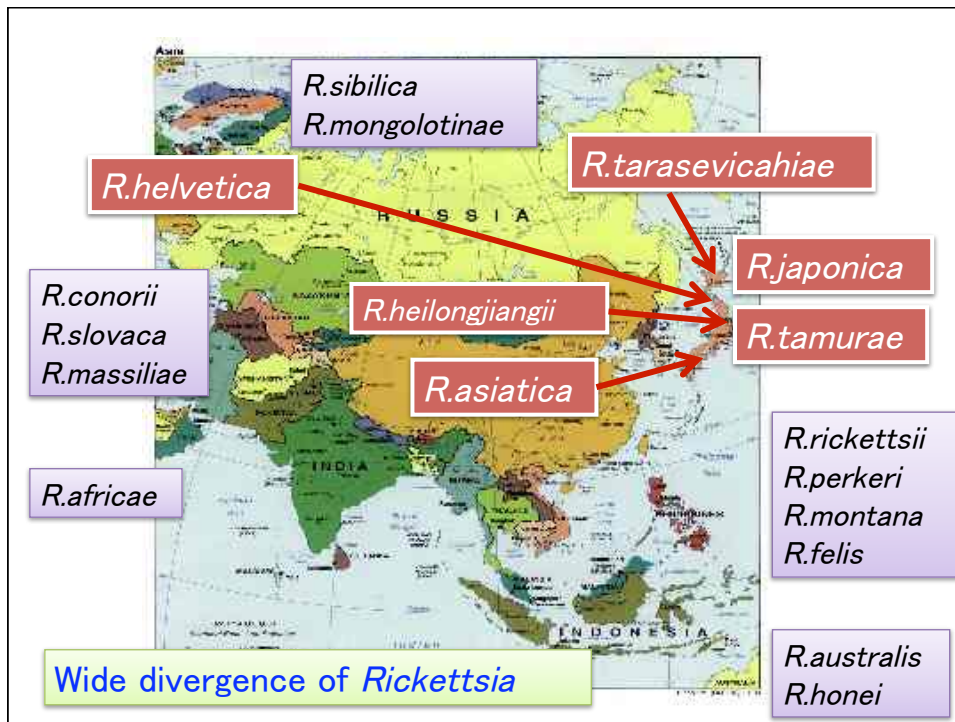




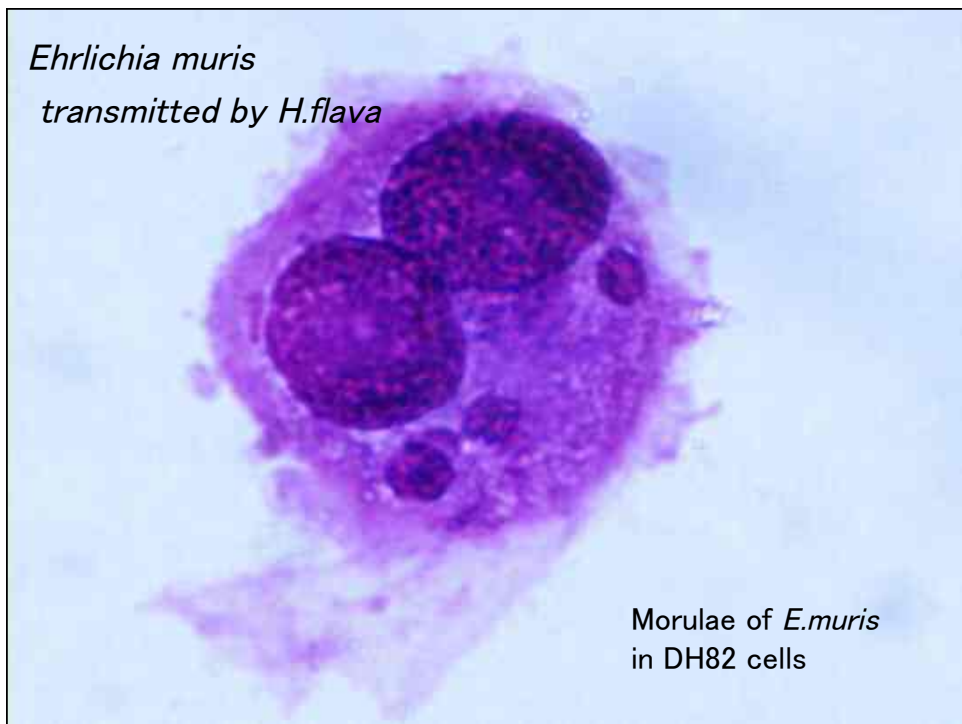


Pathogens transmitted by the major ticks of dogs	
Tick speices	Pathogens
<i>H. longicornis</i>	<i>B.gibsoni</i> , <i>B. ovata</i> , <i>T.orientalis</i> , <i>R.japonica</i>
<i>H. flava</i>	<i>R.japonica</i> , <i>E.muris</i> , <i>Francisella</i>
<i>I. ovatus</i>	<i>Borrelia</i> spp., TBE virus <i>Ehrlichia</i> sp. detected from <i>I.ovatus</i> , <i>R.japonica</i> , <i>R.asiatica</i>
<i>R. sanguineus</i>	<i>B.gibsoni</i> , <i>B.canis</i> , <i>Hepatozoon canis</i> , <i>Rickettsia conorii</i> , <i>Rickettsia rickettsii</i> , <i>Bartonella vinsonii</i> , <i>E.canis</i> , <i>A.platys</i>

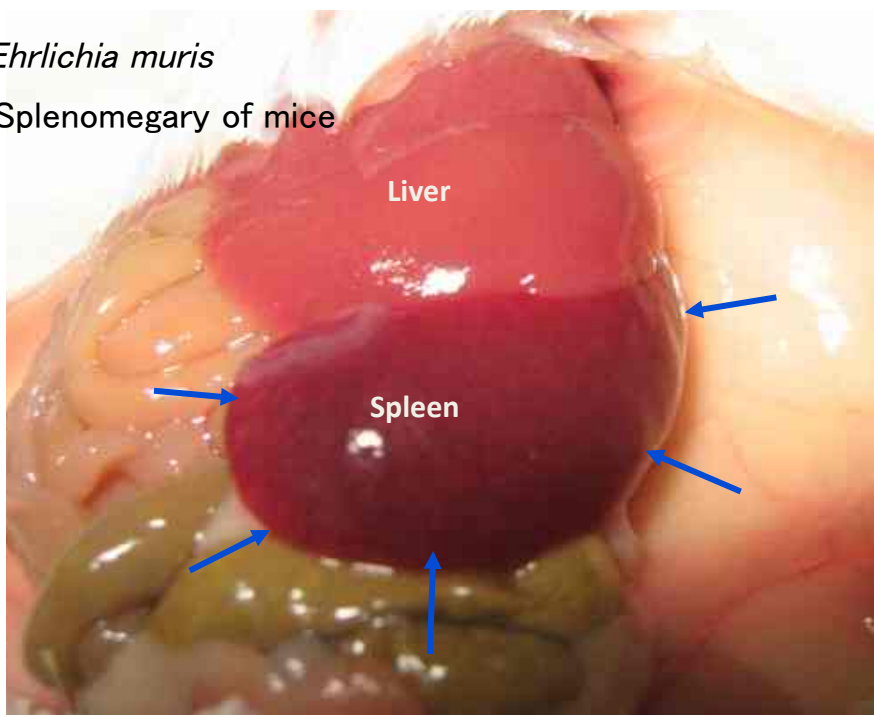








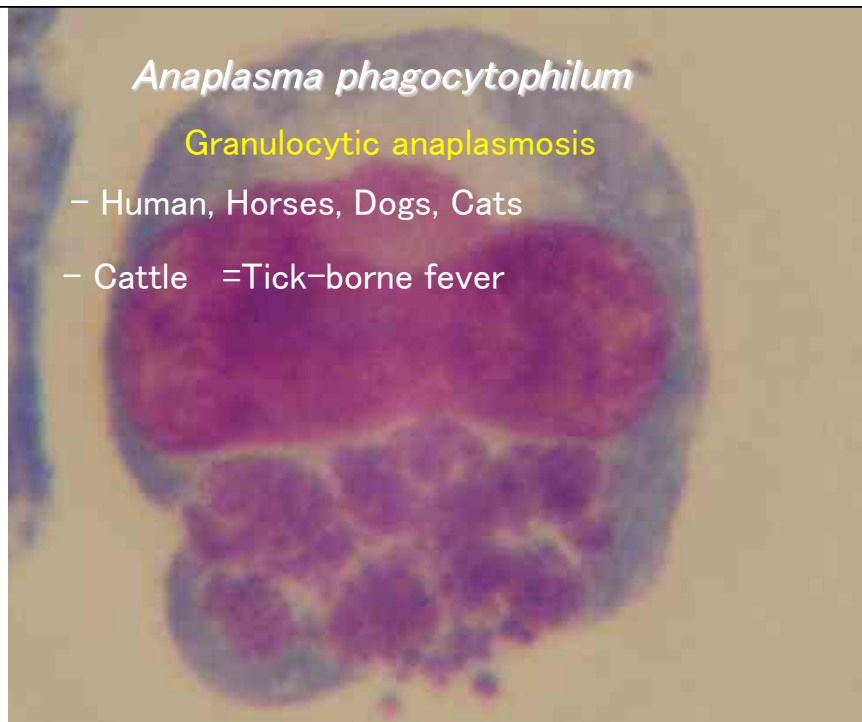
*Ehrlichia muris*  
Spleno-megaly of mice

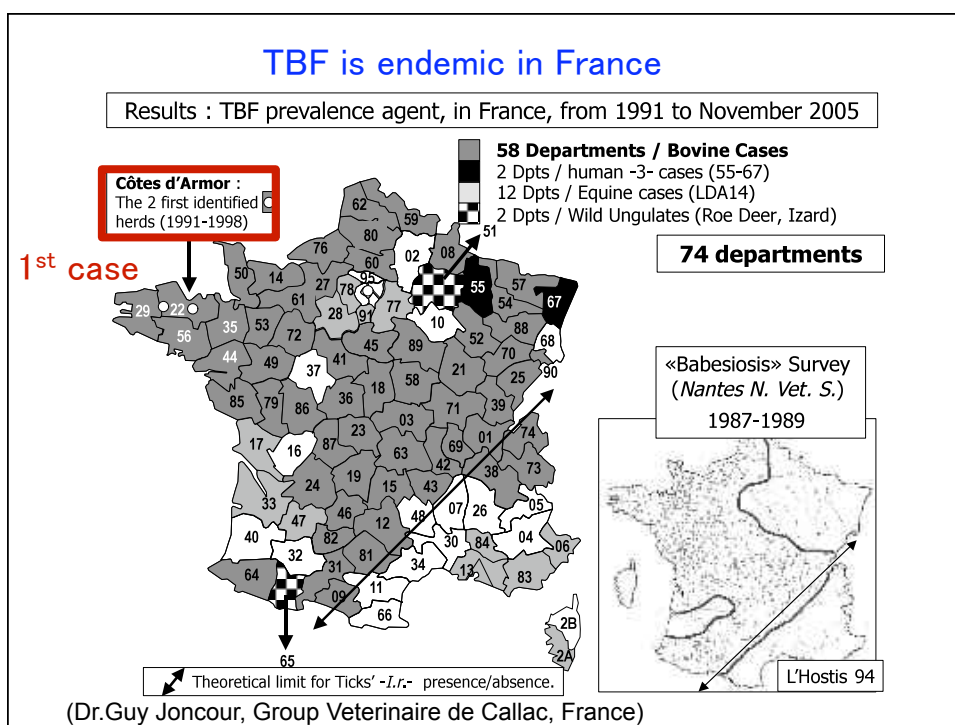


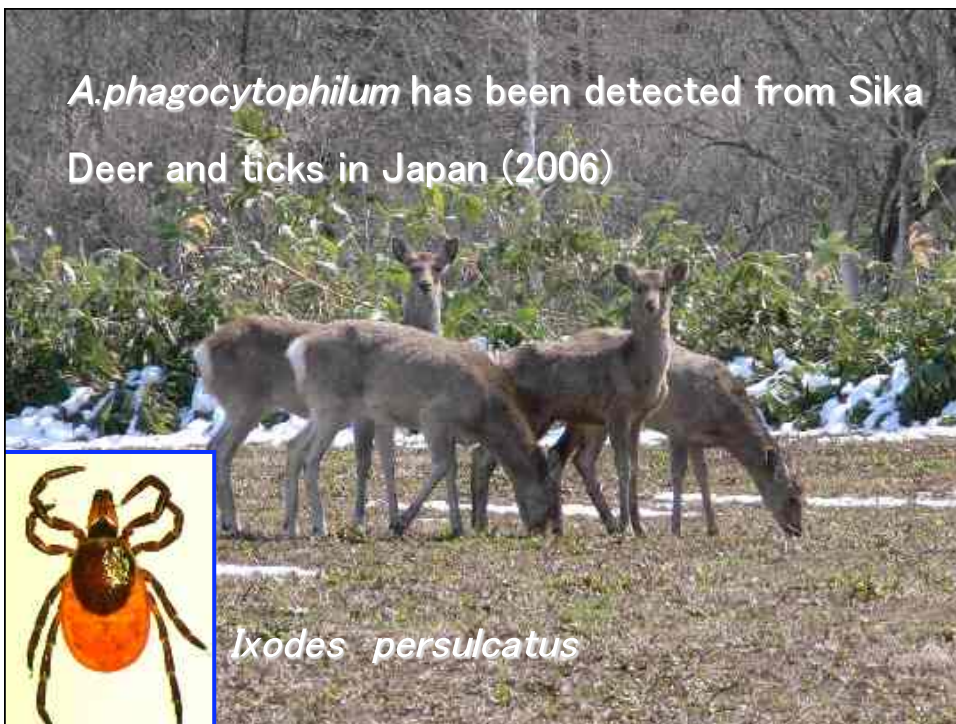
*Anaplasma phagocytophilum*

Granulocytic anaplasmosis

- Human, Horses, Dogs, Cats
- Cattle = Tick-borne fever

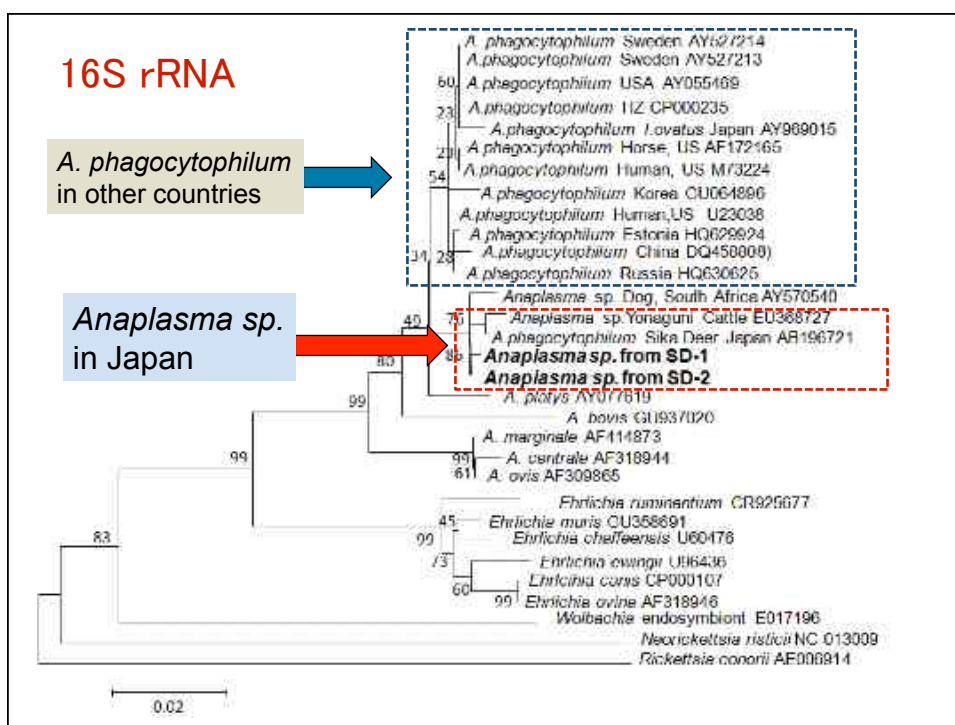
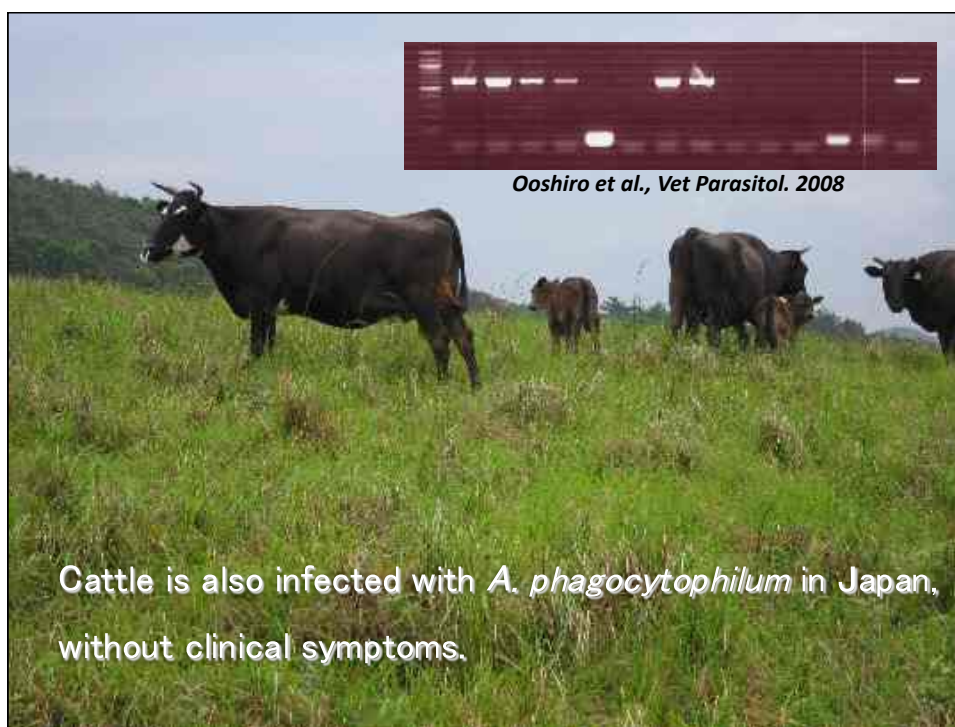


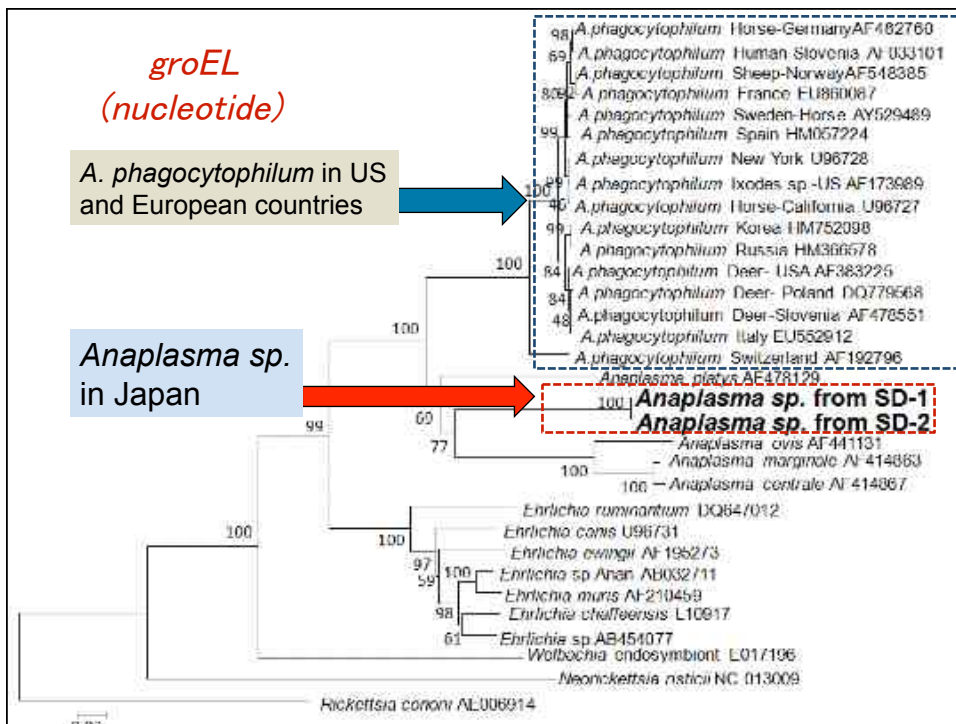
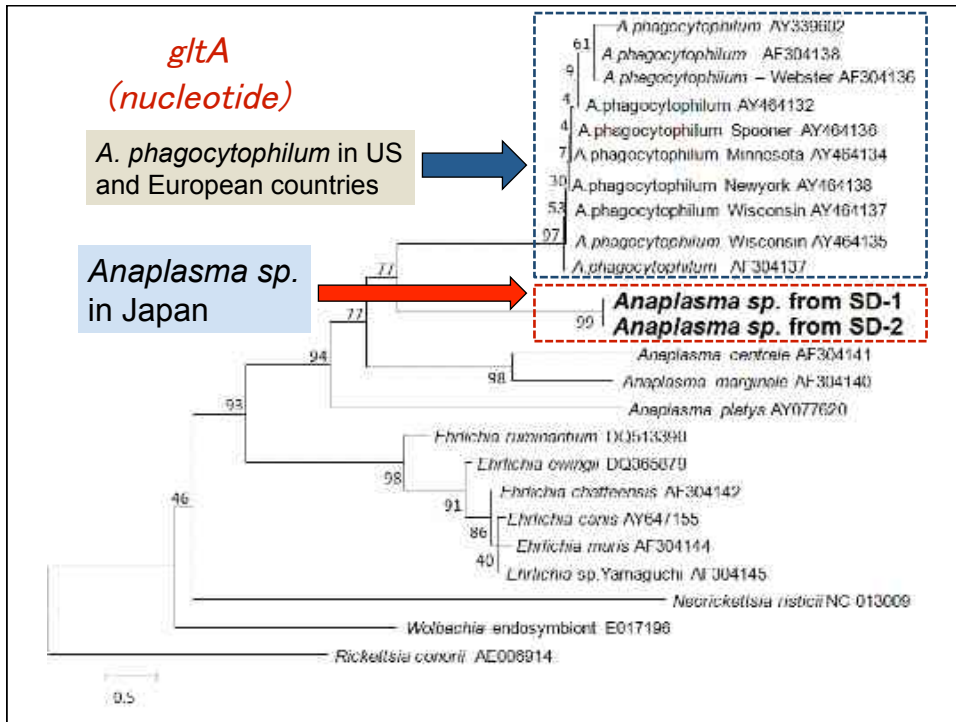












Sequence similarity of Japanese strain with others (%)

Organism	16S	<i>gltA</i>		<i>groEL</i>	
		Nuc	A.A.	Nuc	A.A.
<i>A. phagocytophilum</i> (Franch strain)	98.6	76.5	66.7	80.3	94.9
<i>A. platys</i>	97.7	72.9	61.1	79.3	93.9
<i>A. marginale</i>	96.3	73.1	63.4	77.2	83.9

– Japanese *Anaplasma* sp. closely related to *A. phagocytophilum* has phylogenetic divergence from any other known *Anaplasma* species.

### Conclusion & Future studies

This *Anaplasma* sp. detected in Japan can be a potentially a novel species.

Adrian et al., Veterinary Microbiology 2012

1. Pathogenicity and epidemiology of the novel *Anaplasma* sp. in Japan.
2. Geographic divergence of *A. phagocytophilum*
3. Vaccine development for pasture fever by using the new pathogens?



Thank all local staff for the field studies of tick-borne diseases.

