

Bacterial and Protozoal Pathogens Found in Ticks Collected from Humans in Corum Province of Turkey

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Objectives

- Ticks are important vectors of diseases
- in Corum, tick-borne disease outbreaks such as CCHF are being reported in an increasing space
- The aim of this study was to determine bacterial and protozoan pathogens in ticks infesting humans in the Corum region



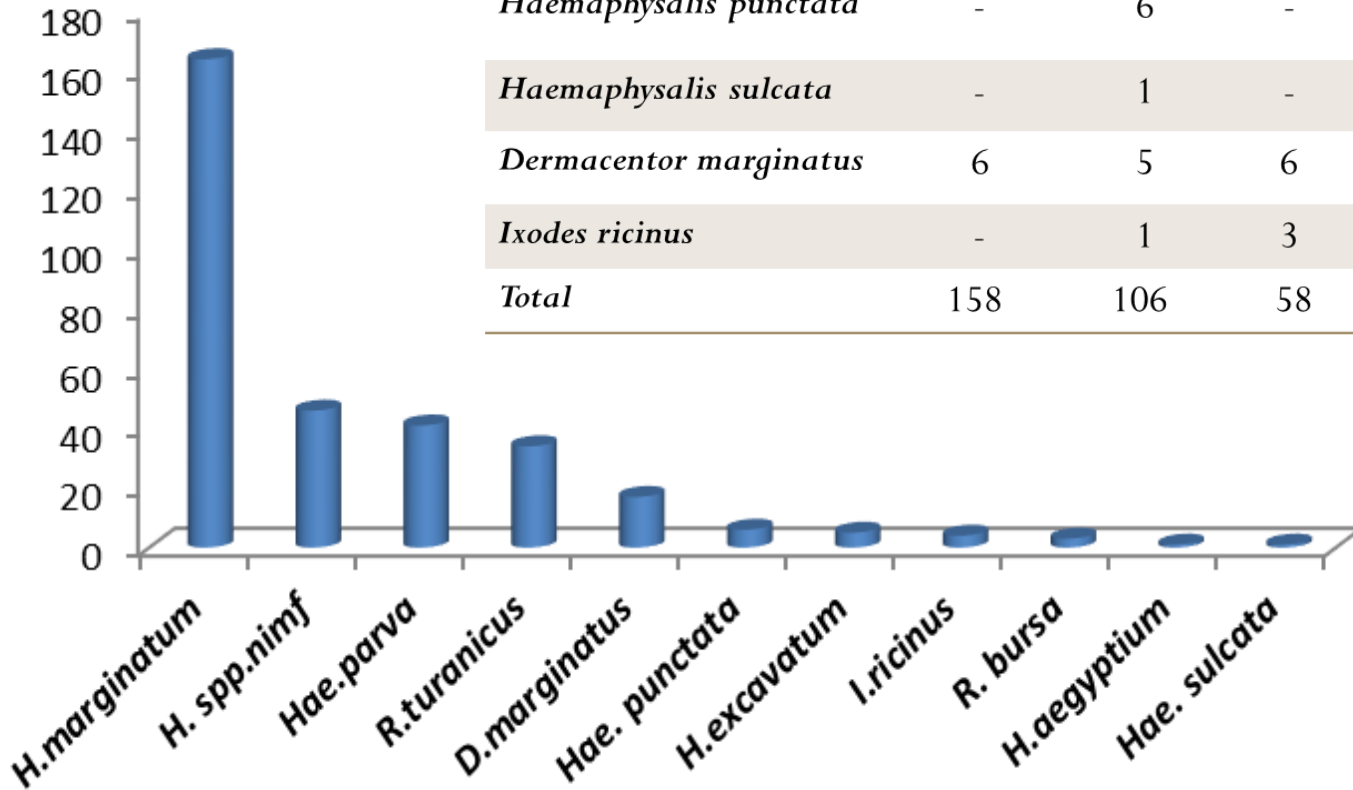
Material & Method

- March 2014 to November 2014
- 322 ticks isolated from humans in Corum
 - Ticks
 - ✓ Morphologically screened
 - ✓ Individually homogenized by crushing with liquid nitrogen for DNA extraction
 - ✓ Molecularly screened for pathogens by realtime-PCR using Evagreen master mix
 - Suspected samples were subjected to PCR and obtained bands were sequenced



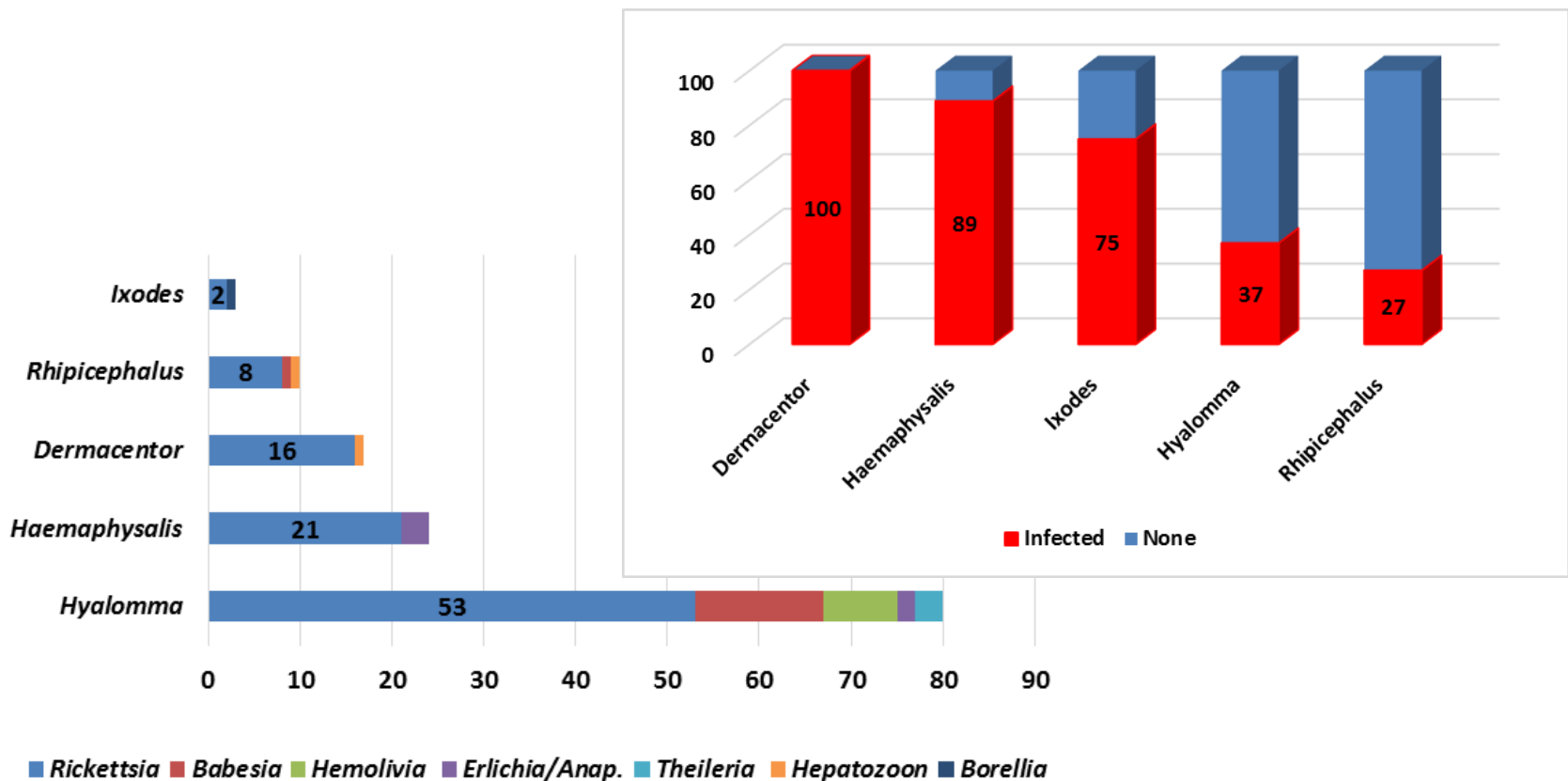
Tick species	Male	Female	Nimf	Total
<i>Hyalomma marginatum</i>	107	57	-	164
<i>Hyalomma spp</i>	-	-	46	46
<i>Hyalomma excavatum</i>	3	2	-	5
<i>Hyalomma aegyptium</i>	-	1	-	1
<i>Rhipicephalus turanicus</i>	14	20	-	34
<i>Rhipicephalus bursa</i>	2	1	-	3
<i>Haemaphysalis parva</i>	26	12	3	41
<i>Haemaphysalis punctata</i>	-	6	-	6
<i>Haemaphysalis sulcata</i>	-	1	-	1
<i>Dermacentor marginatus</i>	6	5	6	17
<i>Ixodes ricinus</i>	-	1	3	4
Total	158	106	58	322

70%



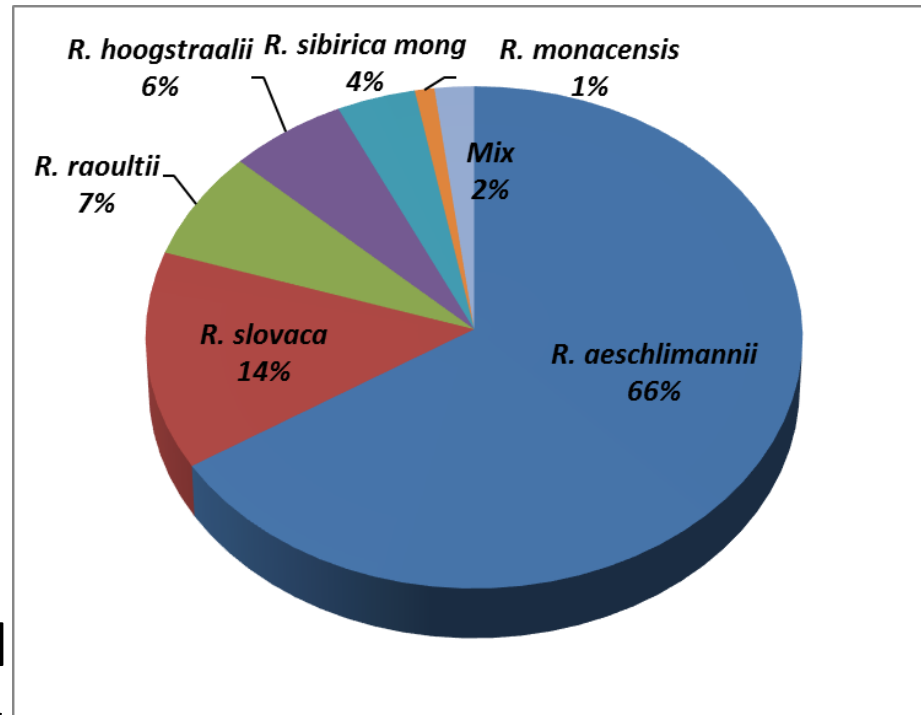
Results

- The infection rate in the collected ticks was 37.2%
- 3.7% of ticks were infected with two pathogens



Results

- 31% of ticks had *Rickettsia* spp. DNA
- Increase in prevalence of SFG (*R. aeschlimannii*, *R. slovaca* and *R. hoogstraalii*) compared to 2009
- *R. aeschlimannii* was found in all genera of ticks except in *R.bursa* and *H.aegyptium*
- *R. slovaca* was found predominantly in *D.marginatus*
- *R. hoogstraalii* was detected in *Haemaphysalis*
- *R. raoultii* was found in *Hyalomma* and *Dermacentor*
- *R.sibirica* subsp. *mongolitimonae* which can cause lymphangitis was detected in *Hyalomma*, *Hae.parva* and *Rh.bursa*



Results

- *E. ewingii* was detected for the first time in Turkey in *H.marginatum* and *Hae.parva*
- *Ehrlichia spp.* was detected in *Hyalomma spp.* nymphs
- *A. phagocytophilum* was detected in *Hae. parva* nymphs
- *Borrelia afzelii* was detected in *Ixodes ricinus*

Pathogens in Ticks	n/%
<i>Rickettsia spp</i>	100/31
<i>Ehrlichia spp</i>	1/0.3
<i>Ehrlichia ewingii</i>	2/0.6
<i>Anaplasma phagosytolicum</i>	1/0.3
<i>Borrelia afzelii</i>	1/0.3
<i>Babesia occultans</i>	11/3.4
<i>Babesia microti</i>	3/0.9
<i>Babesia ovis</i>	1/0.3
<i>Theileria youngi</i>	3/0.9
<i>Hepatozoon canis</i>	1/0.3
<i>Hepatozoon felis</i>	1/0.3
<i>Hemolivia mauritanica</i>	8/2.5
<i>Francisella tularensis</i>	0
<i>Coxiella burnetti</i>	0
<i>Bartonella spp</i>	0

Results

- *Babesia* spp. were found exclusively in *H. marginatum*
- *B. microti* was for the first time detected in *H. marginatum*
- *B. occultans* was found in *Hyalomma* spp.
- *B. ovis* was found in *Rh. turanicus*

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<i>Hemolivia mauritanica</i>	8/2.5
<i>Francisella tularensis</i>	0
<i>Coxiella burnetti</i>	0
<i>Bartonella</i> spp	0

Results

- *H. canis* was found in *D. marginatus*
- *H. felis* was detected in *Rh. turanicus*
- *H. mauritanica* was found in *Hyalomma spp.* nymphs
- *T. youngi* was found in *Hyalomma spp* nymphs and *H. marginatum*
- *Francisella*, *Coxiella* and *Bartonella* were not detected

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<i>Coxiella burnetti</i>	0
<i>Bartonella spp</i>	0



Conclusion

- SFG rickettsial diseases have increased in recent years
- The pathogens of human babesiosis, anaplasmosis and ehrlichiosis were detected in the region
- Tick-borne diseases are more prevalent in the region than previously thought
- In addition to CCHF, other pathogens of medical and veterinary importance should be taken into consideration, especially in patients with a tick bite history

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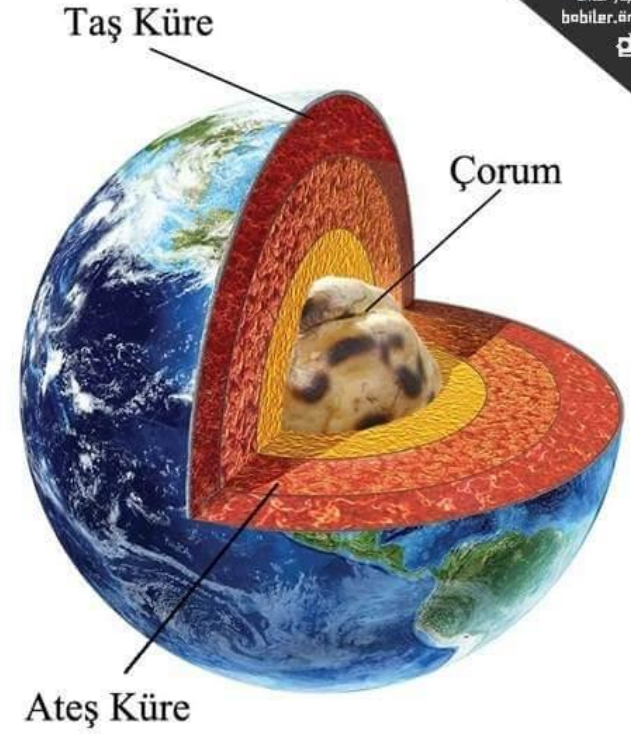


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