

Research on tropical theileriosis : past, present and future

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Ecole Nationale de Médecine Vétérinaire de Sidi Thabet, 2020 Sidi Thabet, Tunisia

Tunisia (37°N, 30°N) has a Mediterranean climate

Five bioclimatic stratus :

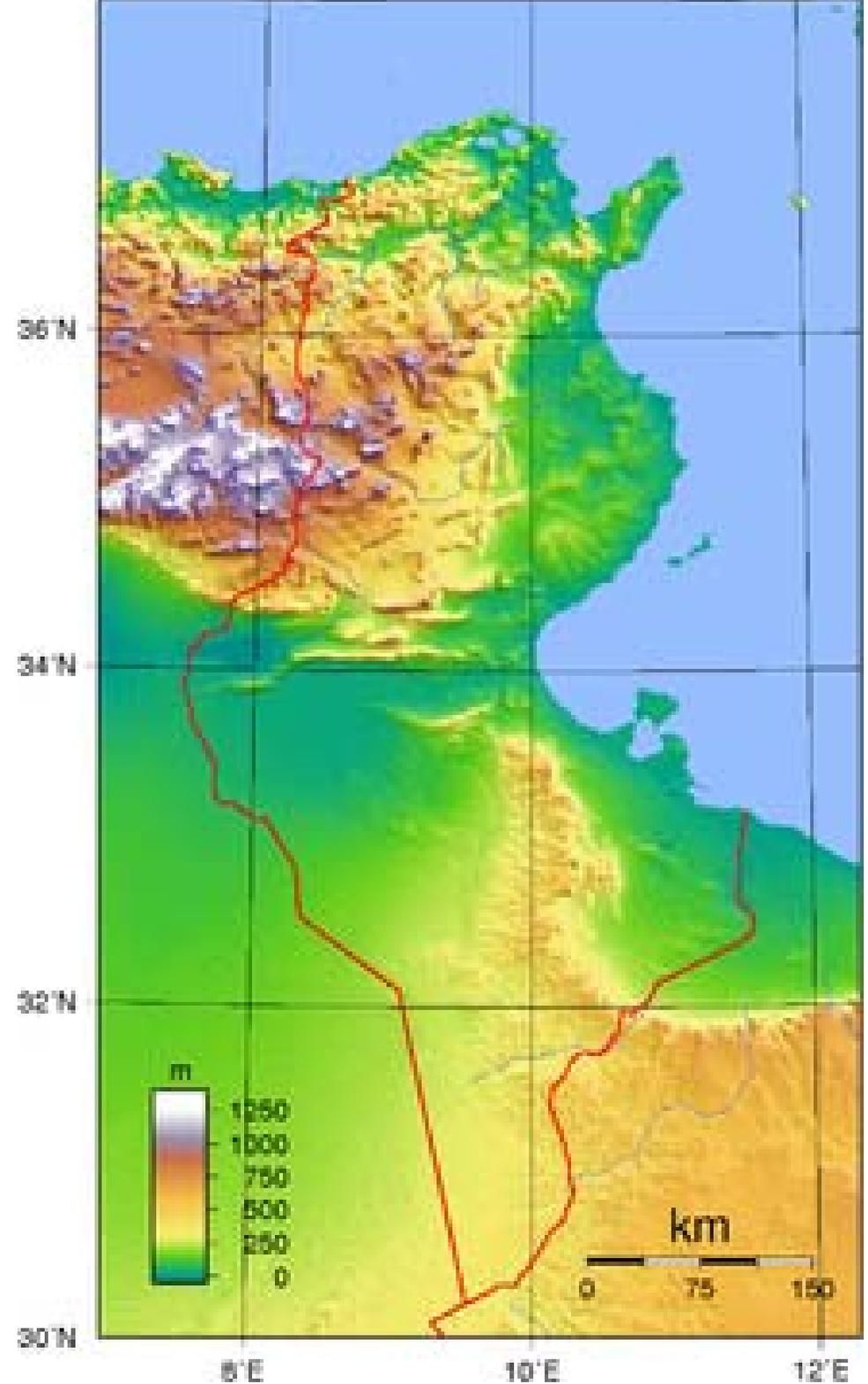
humid,

sub-humid,

semi-arid

arid

Saharan (30% of the total surface)



Food animal population in Tunisia (Ministry of agriculture, 2006)

Species	Population
Sheep	6 955 000
Goats	1 412 000
Cattle	660 000

Ixodid fauna in Tunisia (Bouattour et al., 1999)

1. *Hyalomma* (*detritum*, *excavatum*, *m. marginatum*, *m. rufipes*, *dromedarii*, *anatolicum*, *impeltatum*)
2. *Rhipicephalus* (*sanguineus*, *annulatus*, *bursa*, *turanicus*)
3. *Haemaphysalis* (*punctata*, *sulcata*)
4. *Dermacentor marginatus*
5. *Ixodes ricinus*

Tick-borne pathogens in Tunisia (Gharbi and Darghouth, 2007)

Cattle

Tick	Pathogen	Location
<i>Hyalomma detritum</i>	<i>Theileria annulata</i> <i>Anaplasma phagocytophilum</i>	North, Centre
<i>Hyalomma dromedarii</i>	<i>Theileria annulata</i>	South
<i>Hyalomma sp.</i>	<i>Ehrlichia bovis</i>	
<i>Boophilus sp.</i>	<i>Babesia bovis</i>	North
<i>Boophilus sp. Other Ixodid species</i>	<i>Anaplasma marginale</i>	Toute la Tunisie
<i>Rhipicephalus bursa</i>	<i>Babesia bigemina</i> <i>Babesia bovis</i>	North
<i>Ixodes ricinus</i>	<i>Babesia divergens</i>	North
<i>Haemaphysalis sp.</i>	<i>Theileria buffeli</i>	North
Different species	<i>Coxiella burneti</i>	Tunisia

Tick-borne pathogens in Tunisia

Different species

Tick	Pathogen
<i>Ixodes ricinus</i>	<i>Borrelia burgdorferi sensu lato</i> <i>Bartonella spp.</i>

Since the 30ies

Sergent, Donatien Lestoquard, Parrot

Vaccination with “Kouba” strain

Farmers in Tunisia have false information about tropical theileriosis

- 50 p. cent : TT due to *R. sanguineus*
- Due to hot wind (simoum)
- Animals collect ticks from the grass

Tick vector of tropical theileriosis (Darghouth et al., 1996)

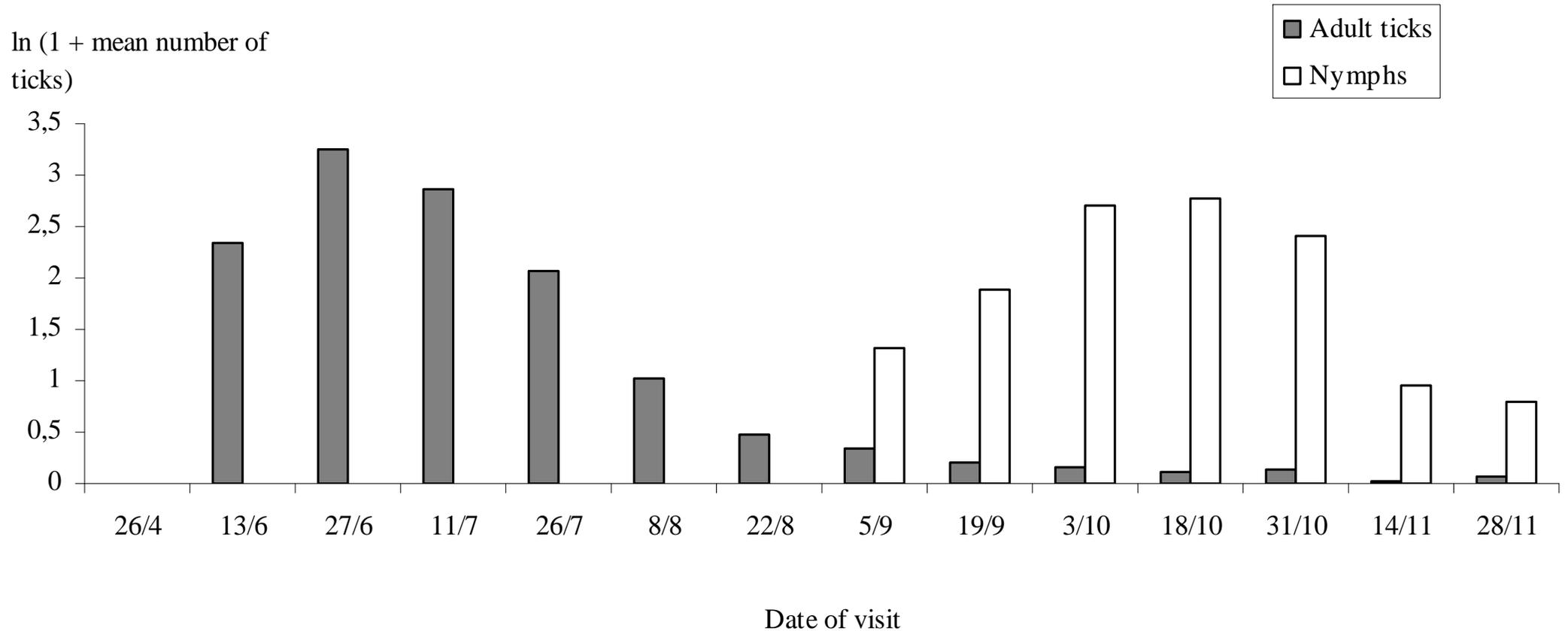
Hyalomma detritum is the vector tick of *T. annulata* in Tunisia

High infection rate of ticks

20% female ticks

10% male ticks

Hyalomma detritum dynamics in Tunisia (Gharbi et al., submitted)



Spring

Summer

Autumn

Three endemic stability states in Tunisia (Darghouth et al., 1996)

1. High endemic instability (76 to 81% of the farms)
2. Low endemic stability (19 to 20%)
3. Endemic stability (less than 5%)

Vaccination with a live attenuated vaccine (Darghouth et al., 2004)

Béja strain at passage 280

Stage III, clinical trial ; very high effectiveness (76%)

Very low and benign adverse reactions

But :

Not effective against carrier state :-)

Resistance clinical cases to Buparvaquone reported in Tunisia (Mhadhbi et al., 2011)

Single point mutation in the cytochrome b1 gene

Incidence of clinical cases with resistance is now increasing in Tunisia.

Control options against tropical theileriosis (Darghouth et al., 2010)

1. Treating clinical cases with buparvaquone
2. Acaricide application
3. Vaccinating animals
4. Roughcasting the inner and outer surfaces of the walls.

Financial analysis of different control option (Gharbi et al., 2006)

Calves in endemic stability farms

Major costs : subclinical cases

Benefit cost ratio of vaccination : 28

Indifferent decision point: 100 US\$

In endemic instability farms (Gharbi et al., 2011)

Major costs : subclinical infection in cows (milk losses)

Benefit cost ratio of roughcasting : 4

Future

Study of resistance mechanisms

Extension programmes to the farmers

New vaccines strategies (anti-transmission vaccines)

Better investigation of immunity mechanisms

Acknowledgments

To the staff of the laboratory of parasitology of Sidi Thabet

Mohamed Jedidi

Tawfik Lahmar

Bechir Guessmi

Tarek Drissi

To all the farmers

The study on tick dynamics and milk losses in carrier animals have been partially funded by Supported in part by the DFG German-African Cooperation Projects in Infectiology "Molecular epidemiology network for promotion and support of delivery of live vaccines against Theileria parva and Theileria annulata infection in Eastern and Northern Africa" (DFG AH 41/7 1)