Hyalomma Ticks and CCHF: Predicting Disease Expansion Through Vector Ecology – Spanish and Turkish experiences

Hyalomma Ticks in Türkiye: Their Role in the Eco-epidemiology of CCHF

Dr. Gürkan AKYILDIZ

Marmara University, Faculty of Health Sciences

MARMARA ÜNİVERSİTESİ

KUISCID

Tick Fauna of Türkiye

- With the latest publications of **Keskin & Doi 2025**, and **Ozsemir et al 2026, 57 tick species** were reported in Türkiye.
- Based on consolidated and reliable records, **approximately 40 species** are currently recognized as established.
- Monitoring studies indicate that some species are relatively abundant, including *Hyalomma marginatum*, *Ixodes ricinus* s.l., *Haemaphysalis parva*, *Rhipicephalus sanguineus* s.l., and *Dermacentor marginatus*.
- In contrast, species such as *Hyalomma rufipes*, *Dermacentor*

Experimental and Applied Acarology (2025) 94:47
https://doi.org/10.1007/s10493-025-01015-9

RESEARCH

Discovery of the potentially invasive Asian longhorned tick, *Haemaphysalis longicornis* Neumann (Acari: Ixodidae) in Türkiye: an unexpected finding through citizen science

Adem Keskin[1] · Kandai Doi[2]

Received: 19 January 2025 / Accepted: 17 March 2025 / Published online: 9 April 2025

Experimental and Applied Acarology (2026) 96:17
https://doi.org/10.1007/s10493-026-01112-3

RESEARCH

First record and molecular detection of *Ornithodoros maritimus* Vermeil & Marguet, 1967 in Türkiye with notes on other tick species collected on the Gull Island, Sinop

Arif Cemal Ozsemir[1] · Evrim Sonmez[2] · Salar Zarrabi-Ahrabi[3] · Aysen Gargili-Keles[3] · Gurkan Akyildiz[3]

Received: 29 September 2025 / Accepted: 26 January 2026

Hyalomma Species Reported in Türkiye

- The genus *Hyalomma* comprises approximately 30 species.
- Species of this genus are distributed across the Palaearctic, Indo-Malayan, and Afrotropical regions.
- In Türkiye 10 *Hyalomma* spp. have been reported.
- ***Hy. marginatum***, ***Hy. aegyptium***, *Hy. anatolicum*, *Hy. excavatum* are considered well established.
- The established status of ***Hy. rufipes*** remains uncertain.

Hyalomma Ticks Relevant to CCHF

Hy. marginatum

- Life cycle: 2-host

Hosts

- Adult: Cattle
- Immatures: Hares, insectivores, birds

Human interest: High

Host seeking behaviour: Hunter

Active season

- Adults: May-July
- Immatures: June-July

Key message: *Hy. marginatum* is the *Hyalomma* species of greatest epidemiological relevance for CCHF in Türkiye

Contents lists available at ScienceDirect

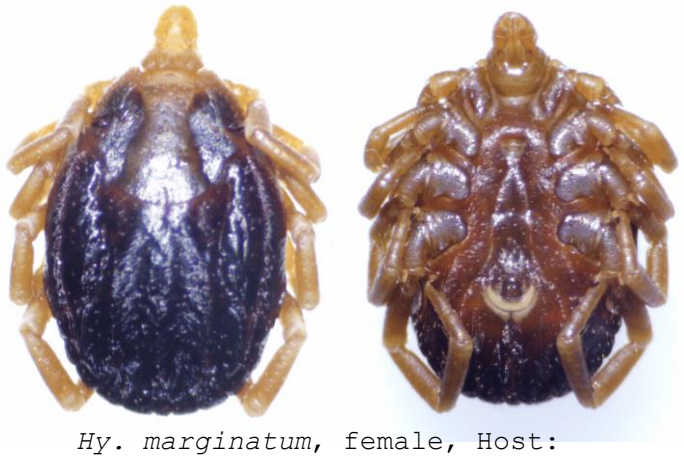
Ticks and Tick-borne Diseases

journal homepage: www.elsevier.com/locate/ttbdis

Original article

High prevalence and different genotypes of Crimean-Congo hemorrhagic fever virus genome in questing unfed adult *Hyalomma marginatum* in Thrace, Turkey

Gurkan Akyildiz [a], Dennis Bente [b], Aysen Gargili Keles [c], Zati Vatansever [d], Sirri Kar [a,b,*]



Hy. marginatum, female, Host: *Luscinia luscinia*

Hy. marginatum, male, Host: *Luscinia luscinia*

Hyalomma Ticks Relevant to CCHF

Hy. rufipes

- Life cycle: 2-host

Hosts

- Aduts: Cattle, elands, sheep, goats, horses, camels, buffaloes, giraffes and rhinoceroses
- Immatures: Birds and hares

Human interest: Moderate to high

Host seeking behaviour: Hunter

Active season

- Adults: Summer
- Immatures: Spring

Key message: Although epidemiologically relevant, its established status in Türkiye remains uncertain

Hy. rufipes, female, Host: *Sylvia atricapilla*

Hy. rufipes, male, Host: *Iduna pallida*

Hyalomma Ticks Relevant to CCHF

Hy. aegyptium

- Life cycle: 3

Hosts

- Adults: Tortoise
- Immatures: Birds, hedgehogs, lizards

Human interest: High (immatures)

Host seeking behaviour: Hunter

Active season

- Adults: February-August (Peak in May and June)
- Nymphs: July-November (Peak in September)
- Larvae: May-September (Peak in July)

Key message: This species may

LETTER ▸ Emerg Infect Dis. 2016 Feb;22(2):354–356. doi: 10.3201/eid2202.151528

AP92-like Crimean-Congo Hemorrhagic Fever Virus in *Hyalomma aegyptium* Ticks, Algeria

Matej Kautman [1,2,3,4], Ghoulem Tiar [1,2,3,4], Anna Papa [1,2,3,4], Pavel Široký [1,2,3,4]✉

▸ Author information ▸ Article notes ▸ Copyright and License information

PMCID: PMC4734512 PMID: 26812469

Parasites & Vectors

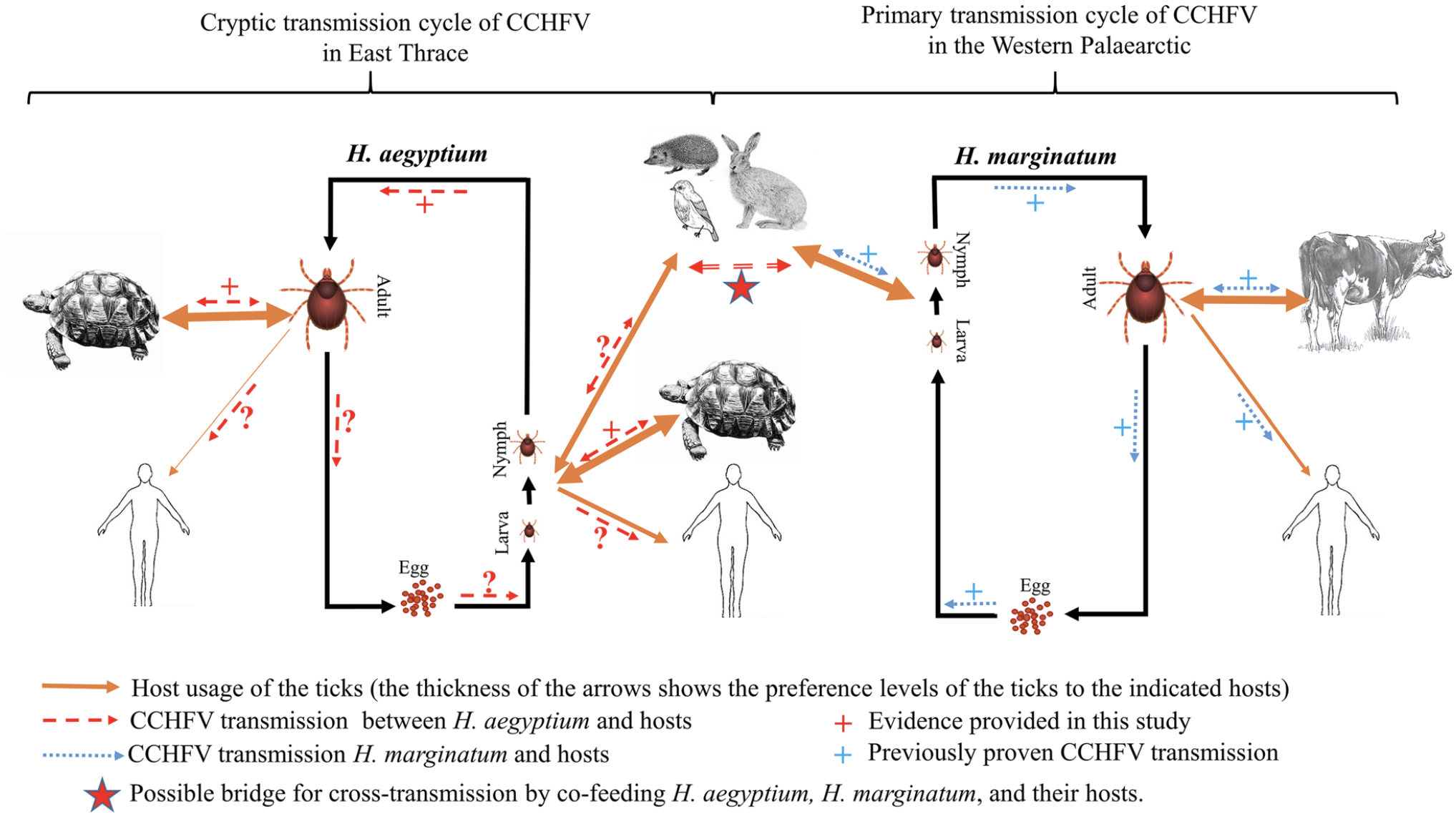
RESEARCH Open Access

Crimean-Congo hemorrhagic fever virus in tortoises and *Hyalomma aegyptium* ticks in East Thrace, Turkey: potential of a cryptic transmission cycle

Sirri Kar[1,2], Sergio E. Rodriguez[1], Gurkan Akyildiz[2], Maria N. B. Cajimat[1,3], Rifat Bircan[2], Megan C. Mears[3], Dennis A. Bente[1*] and Aysen G. Keles[4]

Hy. aegyptium, female, Host: *Passer*

Hy. aegyptium, male, Host: *Passer*



Kar, S., Rodriguez, S. E., Akyildiz, G., Cajimat, M. N., Bircan, R., Mears, M. C., ... & Keles, A. G. (2020). Crimean-Congo hemorrhagic fever virus in tortoises and Hyalomma aegyptium ticks in East Thrace, Turkey: potential of a cryptic transmission cycle. *Parasites & Vectors*, *13*(1), 201.

Hyalomma Ticks Relevant to CCHF

Hy. anatolicum

- Life cycle: 3-host

Hosts

- Adult and immatures: Cattle, Sheep, Goats

Human interest: Low

Host seeking behaviour: Endophilic

Active season

- Adults and immatures: Summer

Key message: This species may be locally important, but its direct relevance to human exposure appears lower than that of *H. marginatum*

Army Public Health Center (Provisional), Entomological Sciences Program / COM 410-436-3613 / DSN 312-584-3613 / Website: http://phc.amedd.army.mil / Approved for Public Release, Distribution Unlimited

Non-Hyalomma Ticks Potentially Relevant to CCH

VECTOR-BORNE AND ZOONOTIC DISEASES
Volume 23, Number 10, 2023

DOI: 10.1089/vbz.2023.0023

Detection of the Crimean–Congo Hemorrhagic Fever Virus Genome in Questing *Ixodes* spp. and *Haemaphysalis* spp. in the Periurban Forestry Areas of Istanbul: Has a New Biorisk Emerged?

Salar Zarrabi Ahrabi,[1] Gurkan Akyildiz,[1] Sirri Kar,[2] and Aysen Gargili Keles[1]

Ixodes ricinus

- Life cycle: 3-host

Hosts

- Adults: Larger mammals, such as cattle and deer
- Immatures: Small mammals, birds and lizards

Human interest: High

Host seeking behaviour: Ambush

Active season

- Adults and nymphs: Peaking in spring and autumn, adults active most of the year
- Larvae: Early summer

Key message: Although it is not regarded as a major CCHFV vector, its ecology remains relevant to broader discussions of virus

Ix. ricinus, female, Host: *Larus michahellis*

Ix. ricinus, male, Host: *Turdus merula*

Non-Hyalomma Ticks Potentially Relevant to CCHF

Isolation of Crimean-Congo haemorrhagic fever (CCHF) virus from *Rhipicephalus bursa* ticks in Greece.

Journal article: Acta Microbiologica Hellenica, 1978, Vol. 23, No. 1, 20-28
Authors: O. Papadopoulos, G. Koptopoulos

Rhipicephalus bursa

- Life cycle: 2-host

Hosts

- Adults and immatures : Sheep, Goats

Human interest: Low

Host seeking behaviour: Ambush

Active season

- Immatures: End of September
- Adults: Summer (when the average day and night temperatures reach 18 °C and 12 °C, respectively)

Key message: Although its role in human CCHFV transmission appears limited, *Rh. bursa* remains relevant because of its association with the AP92 strain.

Carlos Pradera, Barcelona, 13-07-2024

Non-Hyalomma Ticks Potentially Relevant to CCHF

Dermacentor marginatus

- Life cycle:

Hosts

- Adults: Cattle, goats, medium sized insectivores
- Immatures: insectivores, lagomorphs and carnivores

Human interest: Low

Host seeking behaviour: Ambush

Active season

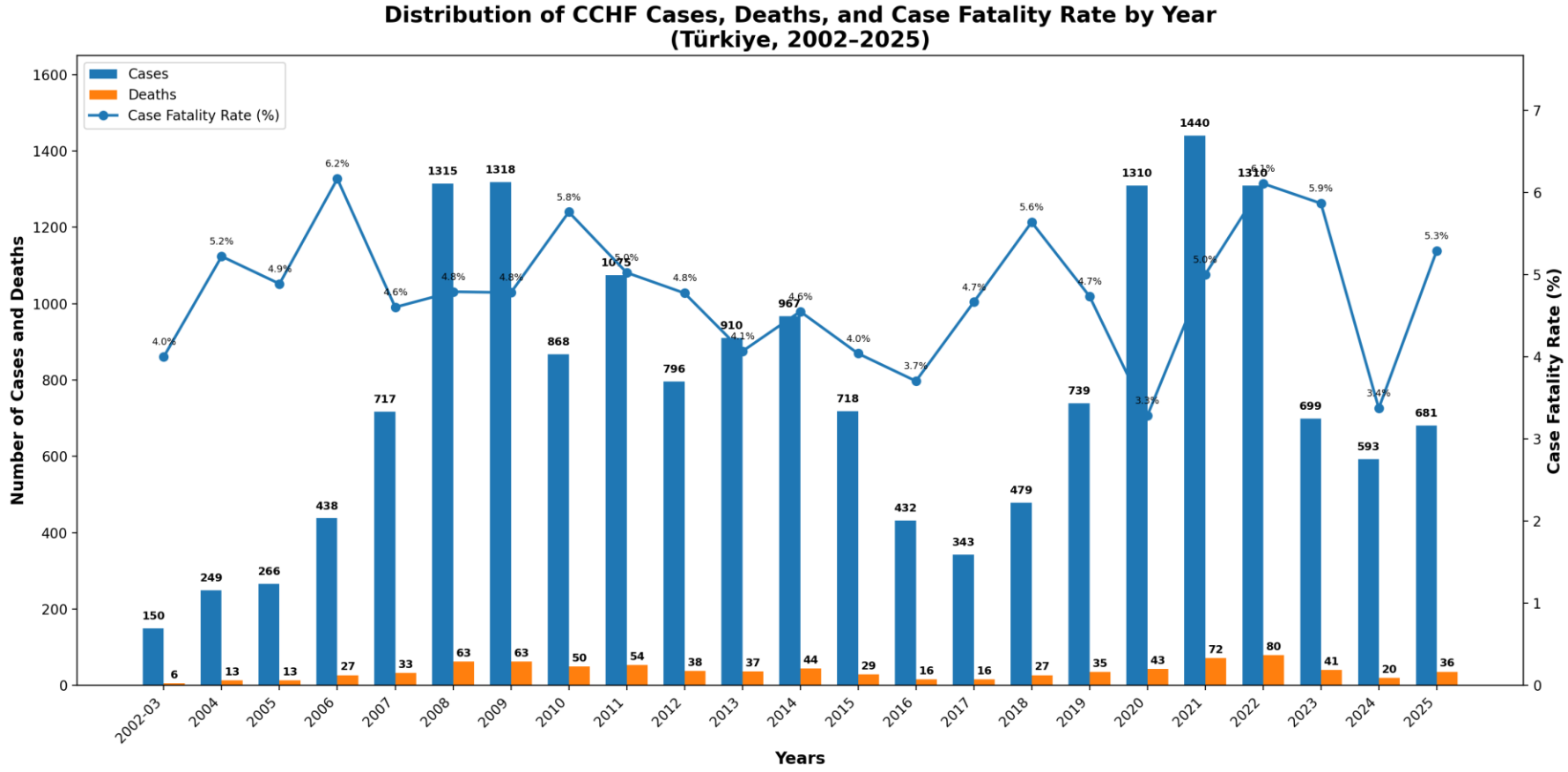
- Immatures: Summer
- Adults: Late August-May (even in winter)

Key message: This species may contribute to CCHFV circulation at the local level, particularly during

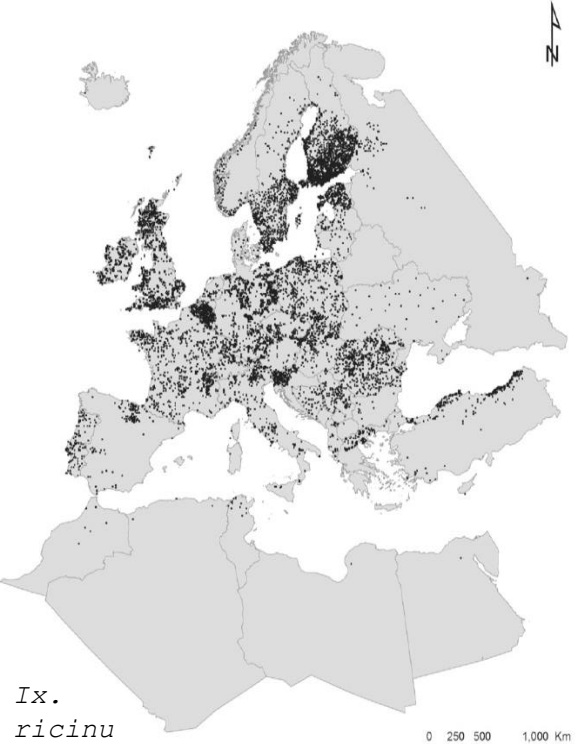
C. Pradera, Barcelona, 03-10-2022

Kolarova, Nevena & Gradinarov, Denis & Petrova, Yana. (2024). Hard ticks (Acari: Ixodida) in Sakar Mountains, SE Bulgaria. 2024.

CCHF Burden in Türkiye

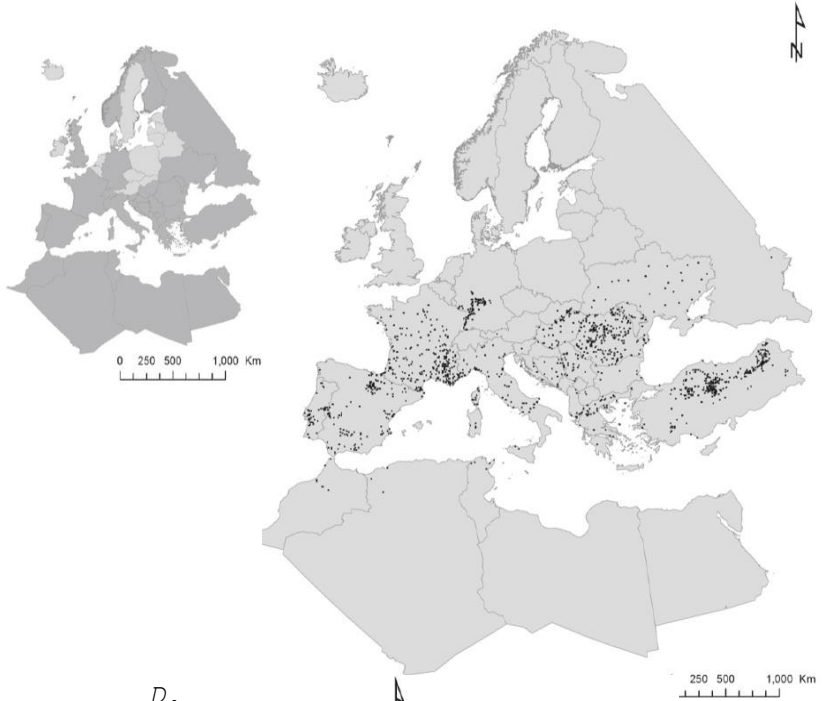


- Between 2002 and 2025, Türkiye reported 17,813 CCHF cases and 856 deaths, corresponding to an overall case fatality rate of 4.81%.
- The burden remains substantial, with marked interannual fluctuations in both case numbers and



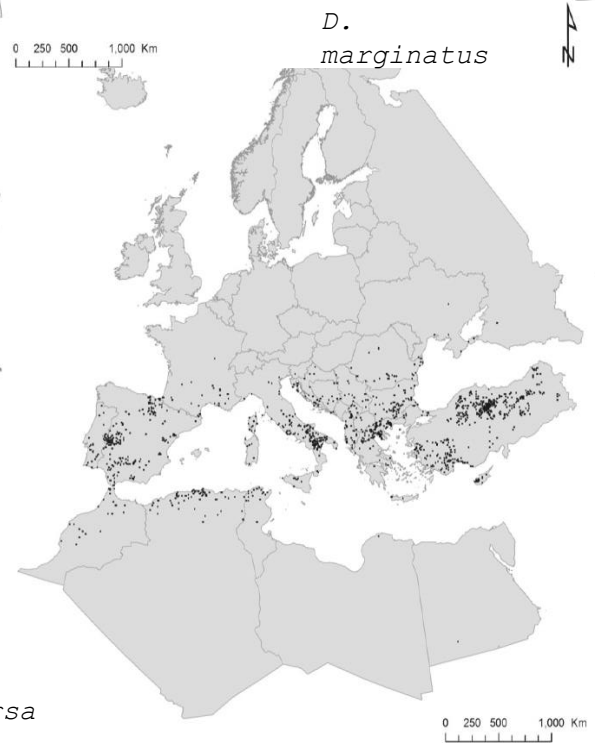
Ix. ricinus

Hy. marginatum



D. marginatus

Hy. aegyptium



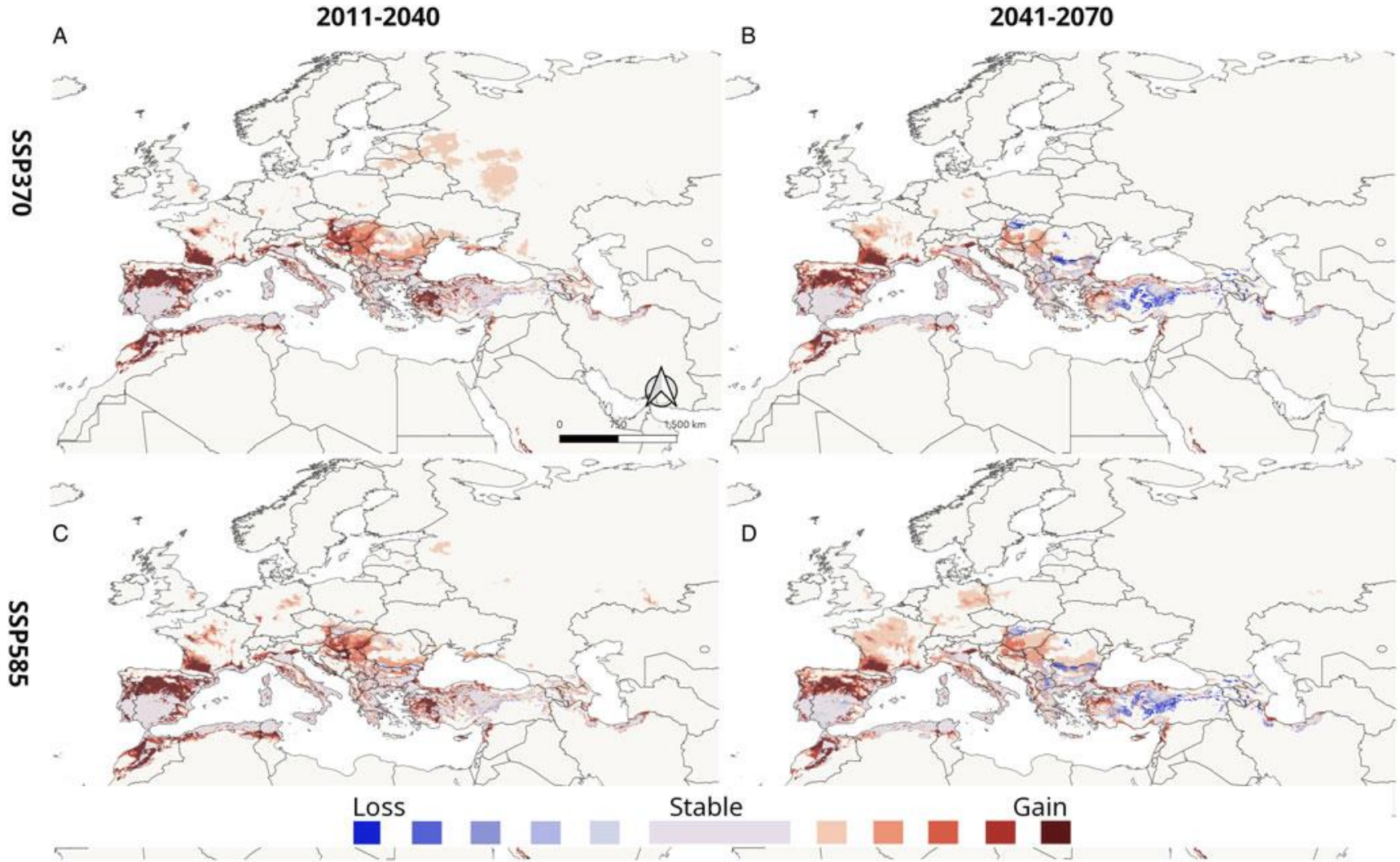
Rh. bursa

Estrada-Peña A, Mihalca A, Petney T (2017) Ticks of Europe and North Africa. A Guide to Species Identification. Springer: Cham, Switzerland

Predictive Models for *Hy. marginatum*

Current prediction models mainly rely on abiotic factors; however, more accurate future forecasting requires the integration of biotic variables, including the natural circulation of the virus.

- climate and microclimate
- vegetation and habitat suitability
- host availability
- host movement and dispersal
- tick–host associations by developmental stage
- natural circulation of CCHFV, including cryptic cycles



Hekimoglu, O., Elverici, C., & Kuyucu, A. C. (2023). Predicting climate-driven distribution shifts in Hyalomma marginatum (Ixodidae). *Parasitology*, *150*(10), 963–973.

Key Take-Home Messages

1. Future CCHF forecasting requires the joint evaluation of abiotic and biotic drivers.
2. Vector relevance differs among tick species, developmental stages, and host associations.
3. Virus circulation in nature, including potential cryptic cycles, should be integrated into predictive models.
4. Host movement may facilitate tick dispersal and reshape local transmission patterns.

Thank you for your attention..