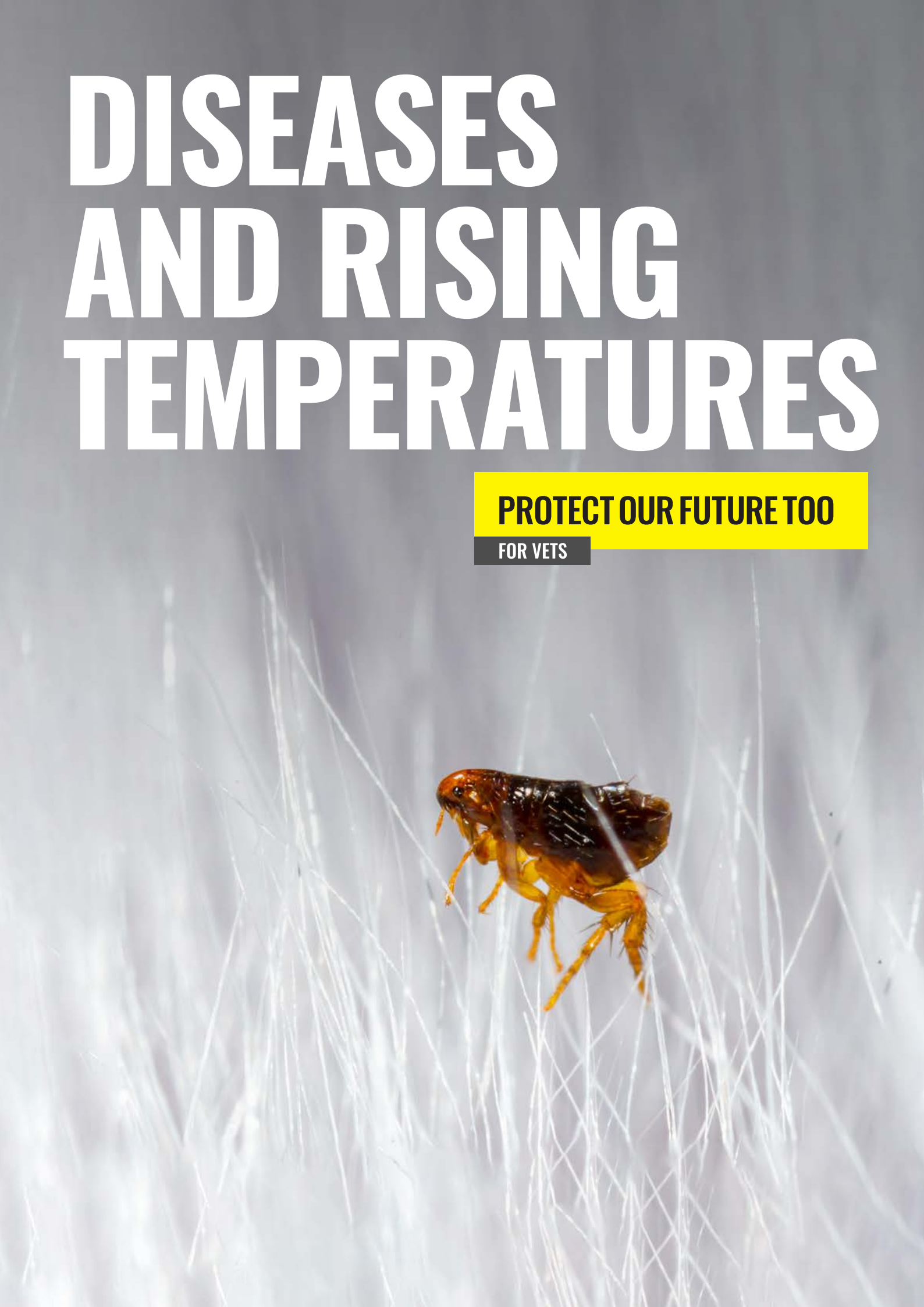
DISEASES AND RISING TEMPERATURES

PROTECT OUR FUTURE TOO

FOR VETS



DUE TO RISING TEMPERATURES...

disease vectors are increasing their activity period throughout the year and their geographical range. This means that vector-borne diseases are appearing in previously free areas, or in endemic areas at times when pets are unprotected.

Many of these vector-borne diseases are a serious threat to your patients, and some pose an important public health risk as well. Stay curious, stay vigilant... You might have to face these pathogens soon!

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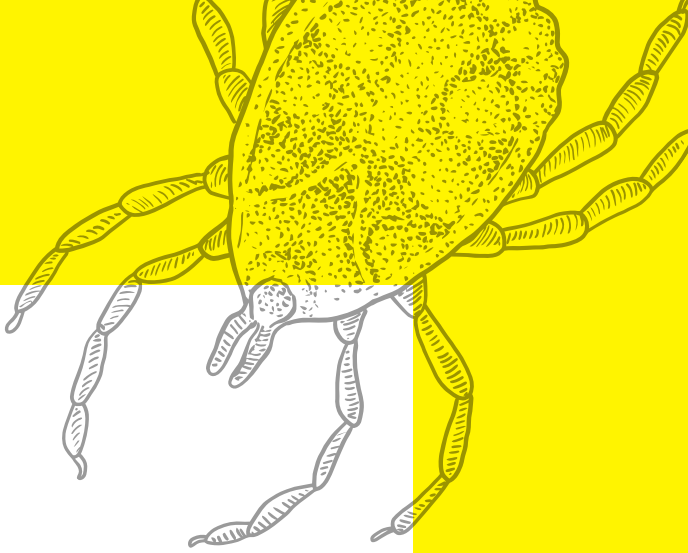
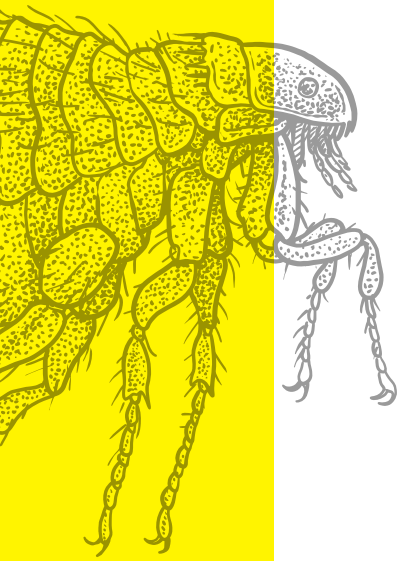
CLIMATE CHANGE INVOLVES TWO IMPORTANT PHENOMENA IN EUROPE; THE FIRST IS RISING TEMPERATURE, PARTICULARLY IN WINTER MONTHS. THIS MEANS OUR PATIENTS HAVE TO EXPECT TO SEE CORRESPONDING PARASITE EXPOSURE AND THUS A RISK OF INFECTION, EVEN AT UNEXPECTED TIMES. THE SECOND PHENOMENON MIGHT BE WEATHER EXTREMES, SUCH AS FLOODING. THIS LEADS TO A SIGNIFICANT AND MASSIVE INCREASE IN MOSQUITOES, AND THUS THE RISK OF FILARIAL INFECTIONS.

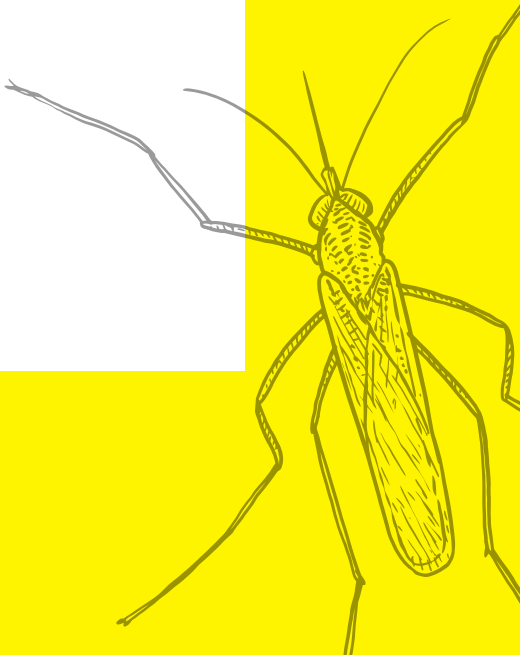
Dr. Michael Leschnik
Professor at the University of Veterinary Medicine in Vienna, Austria.



KEY TAKEAWAYS

- As external parasites **increase their distribution and activity due to rising temperatures**, we are seeing the diseases they carry spread.
- These emerging diseases are **not always recognised by human health services.**
- Travel and **pet movements may amplify the spread of a disease,** especially if there is a viable vector already present in the area.
- A preventive approach to vector-borne diseases, such as **year-round parasite protection,** is preferable to a therapeutic one.
- Vets play a crucial role in educating about the **complexities of parasite-borne diseases and the need for year-round protection.**





DISEASES SUMMARY TABLE

DISEASE* (AETIOLOGY)	VECTOR (VECTOR SPECIES)	POSSIBLE CLINICAL SIGNS
Babesiosis* ("Big Babesia", such as *B. canis* and *B. vogeli* are more pathogenic than "small Babesia" e.g. *B. vulpes*)	**Ticks** (Mainly *Rhipicephalus sanguineus* and *Dermacentor reticulatus*.)	**Anaemia, jaundice, swollen lymph nodes, fever, haemoglobinuria, diarrhoea and epistaxis.**
Dirofilariosis* (*Dirofilaria immitis* is the causative agent of heartworm disease, *Dirofilaria repens* causes cutaneous dirofilariosis.)	**Mosquitoes** (*Aedes*, Anopheles, and Culex species have vector capacity for dilofilariasis.)	**Weakness, breathing difficulties, weight loss, cardiorespiratory abnormalities and depression.**
Leishmaniosis* (*Leishmania infantum* is the most prevalent in Europe, though other Leishmania are frequently imported.)	**Sandflies** (Phlebotomus is the only extant genus in Europe.)	**Alopecia, non-healing skin lesions, onychogryphosis, blindness, ulcers and renal failure.**
Anaplasmosis* (Domestic cycle: *Anaplasma platys*. Sylvatic cycle: *A. phagocytophilum*.)	**Ticks** (Domestic cycle: *Rhipicephalus sanguineus*. Sylvatic cycle: *Ixodes* spp.)	**Vomiting, diarrhoea, occasional seizures and neck pain.**
Lyme disease* (*Borrelia burgdorferi*)	**Ticks** (Mainly *Ixodes* spp.)	**Swollen lymph nodes, acute arthritis, heart abnormalities, nervous system complications, depression.**
Ehrlichiosis* (*Ehrlichia canis*).	**Ticks** (Mainly *Rhipicephalus sanguineus*.)	**Anaemia, bleeding abnormalities, lymph node swelling and lameness.**
Rickettsiosis* (*Rickettsia conorii*, *R. massiliae*.)	**Ticks** (Mainly *Rhipicephalus sanguineus* and *Ixodes* spp.)	**Muscle pain, facial swelling, bleeding.**
Bartonellosis* (Mainly *Bartonella henselae*.)	**Ticks** (*Ctenocephalides* spp. but it has also been isolated —though rarely— in *Ixodes* ticks.)	**Nervous system inflammation, chronic pain, joint swelling**

*Zoonotic Disease

THE BIG 5 INTRODUCTION

THE DISEASES

There are dozens of vector-borne diseases (VBDs). However, the following are the most impactful to animal health: the Big 5. Most importantly, you might face them soon, that is, if you haven't yet!

> **IN JUST ONE SMALL AREA IN THE NORTHWEST OF ITALY, WE HAVE DISCOVERED 35 NEW PATHOGENS IN WILDLIFE IN THE LAST 20 YEARS, AND IN SOME CASES, THESE WILD HOSTS CAN ACT AS A RESERVOIR.**

Prof. Ezio Ferroglio
Professor of parasitology and parasitic diseases at Turin University.

BABESIOSIS (PIROPLASMOSIS)

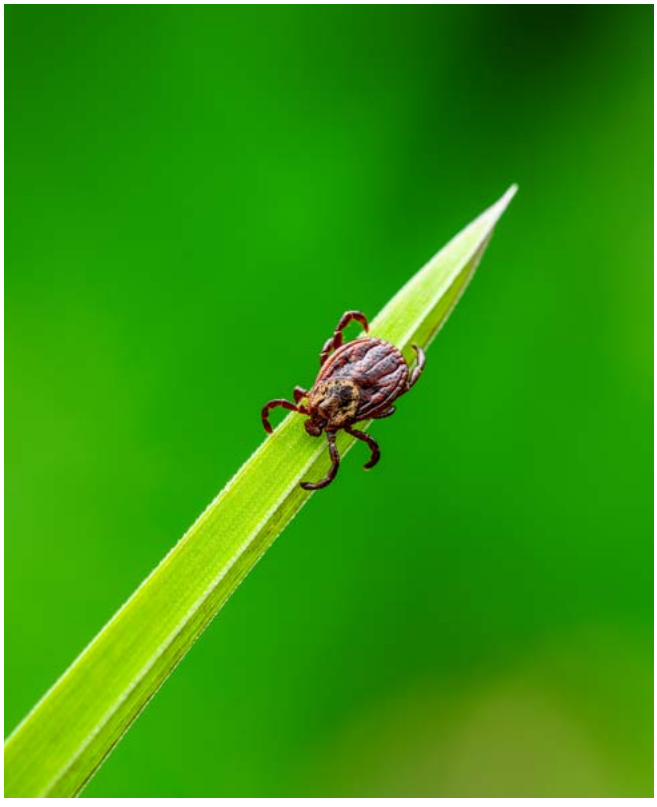
Babesiosis is the most common vector-borne disease in dogs. It is an haemotropic disease that is gaining ground in Europe.

(Drehmann et al., 2020).

The severity of babesiosis ranges from subclinical infections to widespread organ failure and death. The manifestation of disease depends mainly on the health status of the dog, and the infecting species.

In recent years, **more and more cases of babesiosis in dogs have been reported in Europe**, and it appears that canine babesiosis is an emerging infectious disease. The parasite is transmitted by ticks, and migration of ticks to hither to uninfested geographical areas could explain the increasing incidence of clinical cases in Europe.

The clinical presentation of canine babesiosis is diverse and ranges from transient anorexia to a complex syndrome in which multiple organ systems are affected. Several factors play a role in the development and outcome of the infection; these include the abundance of the tick vector, the percentage of ticks that are infected, and the Babesia species involved. (Matijatko et al., 2012)



Vector: Ticks

Distribution: Found in all continents except Antarctica.

Status: The disease is spreading, alongside its vectors, throughout Europe.

Pathogen: *Babesia* spp. (protozoan)

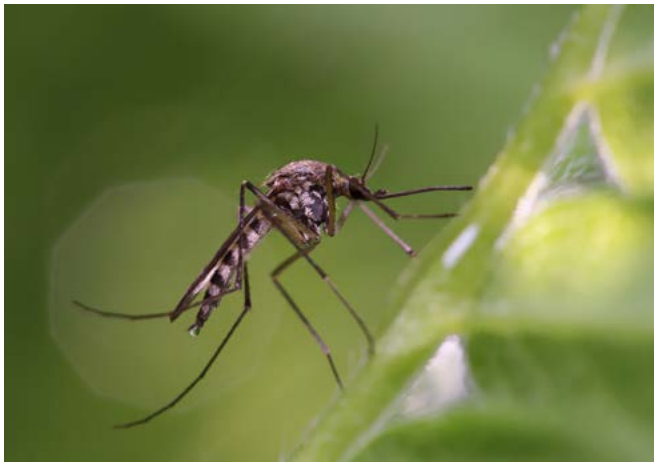
DIROFILARIOSIS

As the range and activity of mosquitoes increase due to rising temperatures, so do the incidence and prevalence of dirofilarial infections.

(Genchi et al. 2009).

With warmer temperatures, **chances for transmission increase significantly**. Though *D. immitis* (heartworm) is confined to Southern Europe, **imported cases are of grave concern,** because pets are not routinely screened and heartworm can remain asymptomatic until it is too late.

D. repens causes a subcutaneous infestation in people and dogs. It is widespread in the Mediterranean Basin, though it has been documented in Northern Europe, and its range is expanding. **There is the fear among experts that dirofilariases could become endemic if there is a viable vector in the area.**

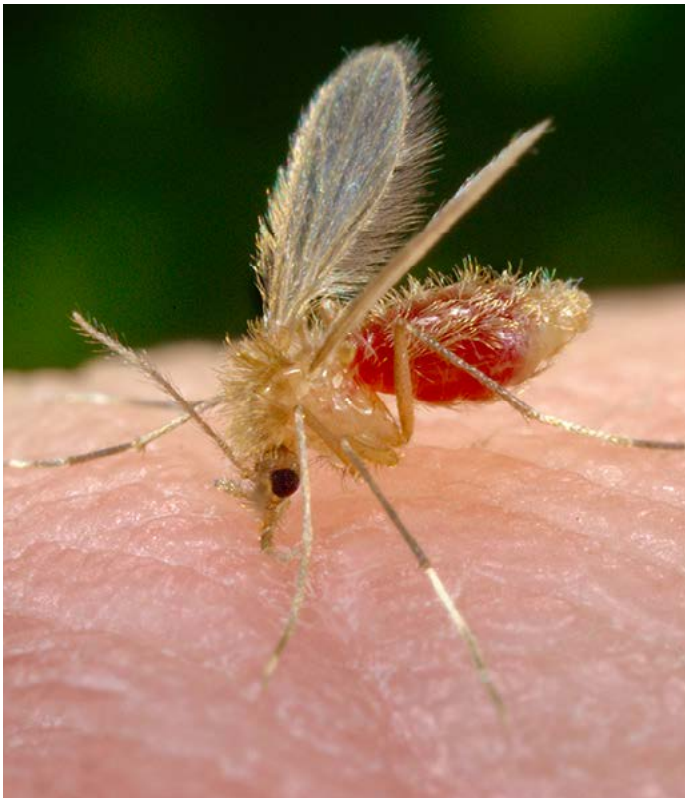


Vector: Mosquitoes

Distribution: In Europe, *D. immitis* is mainly found in the south, whereas *D. repens* can be found in many northern countries.

Status: *D. repens* is expanding northward and has been documented as far north as Finland.

Pathogen: *Dirofilaria* spp. (nematodes)



Content provider: CDC/ Frank Collins. Photo credit: James Gathany

Vector: Sandflies

Distribution: A tropical disease worldwide, it is endemic in Southern Europe.

Status: still confined to Southern Europe, even though sporadic cases have been imported to other European countries.

Pathogen: *Leishmania* spp. (Protozoan)

LEISHMANIOSIS

Once considered confined to the southern parts of Europe, leishmaniosis is making a push northward.

(Maroli et al., 2008; Maia & Cardoso, 2015).

In humans, *Leishmania* spp. can cause two syndromes, visceral and cutaneous leishmaniosis. The visceral form can cause severe systemic disease. **Leishmaniosis is a zoonosis and dogs are one of the main reservoirs.** Because in dogs skin and internal organs are simultaneously affected, leishmaniosis is known as canine leishmaniosis in this species.

The progression of canine leishmaniosis depends on the dog's type of immune response and immune-mediated mechanisms are responsible for much of the pathology in canine leishmaniosis. **Signs in the early stages range from lethargy to mild skin lesions such as periorbital alopecia.** More advanced stages are characterized by vasculitis, polyarthritis, eye lesions, glomerulonephritis and ultimately nephrotic syndrome (Solano-Gallego et al., 2009).

Cases in Northern and Central Europe are almost always imported from endemic regions. **However, leishmaniosis has already spread to higher latitudes and altitudes in countries like Italy and Spain.** In Southern France, new endemic areas have emerged, continuous to pre-existing endemic foci (Lachaud et al., 2013).

LYME DISEASE (BORRELIOSIS)

With less freezing days in Europe, ticks are staying active for longer, increasing the risk of Lyme disease transmission.

(Gray et al., 2009)

Many pets are caught unprotected because **no one thinks to check for ticks during the winter months**. During this season, many pet owners **fail to provide parasite protection to their pets.**

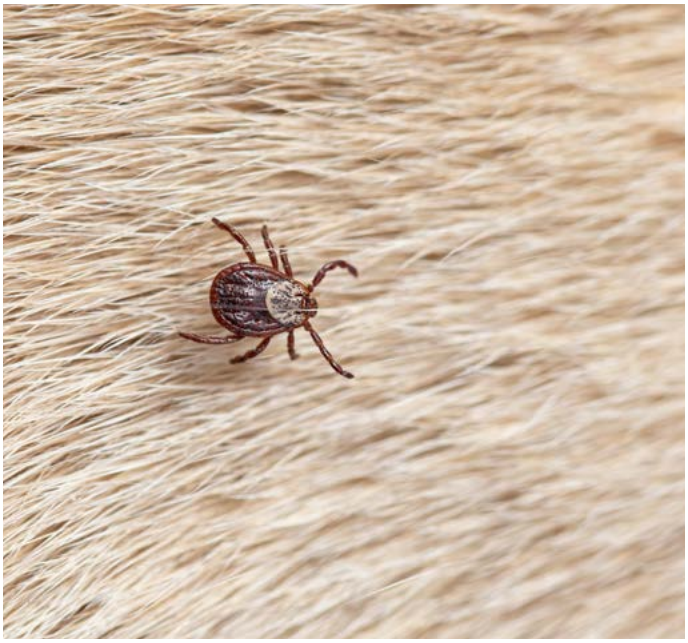
Most cases are subclinical, with only 5-10% of dogs showing signs. (Armstrong et al., 2020). Infected dogs and cats pose minimal threat to man, but do provide a means by which infected ticks can be carried into the domestic environment. There is also a risk of human infection should ticks be crushed during removal from a pet animal and tick salivary gland material be exposed to wounds on the hands of an owner. The dog in particular might be employed as a 'sentinel' for monitoring the risk of human disease in an endemic area (Hamer et al., 2009).

Vector: Ticks

Distribution: Widespread across the temperate regions of North America, Asia and Europe.

Status: Increasing incidence in Central and Northern Europe, more data is needed in Southern Europe.

Pathogen: *Borrelia burgdorferi* (spirochetal bacteria)



Vector: Ticks

Distribution: Worldwide. Rickettsial diseases are spreading in Europe.

Status: Increasing incidence in Central and Northern Europe, more data is needed in the south.

Pathogens: *Rickettsia* spp., *Anaplasma* spp., and *Ehrlichia* spp.

RICKETTSIAL DISEASES

Rickettsial infections have either a sylvatic cycle or a domestic cycle that is maintained in dog populations through the brown dog tick.

(Armstrong et al., 2020).

Infected dogs exhibit fever, lethargy and anorexia. More specific signs depend on the infecting agent and can range from vasculitis to leukopenia.

Surveys have shown that more than 50% of dogs are seropositive for *R. conorii* in Southern Europe. The prevalence of rickettsial diseases is lower in northern countries (10% to 20%), but can also exceed 50% in some regions for *Anaplasma phagocytophilum* (Armstrong et al., 2020).

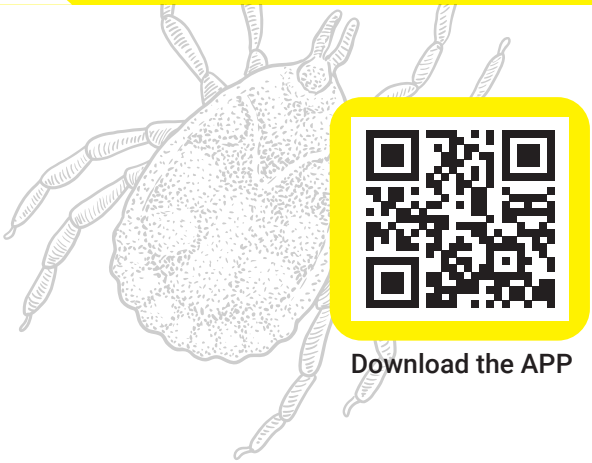
A decade-long surveillance study in Germany detected almost double the rate of ticks infected with *Rickettsia* spp., which places both dogs and people at a higher risk (Blazejak et al. 2017).

WHEN WE PERFORMED MOLECULAR GENETIC TESTING OF TICKS IN RUSSIA, THE MAIN DISCOVERY WAS THAT APPROXIMATELY EVERY FOURTH TICK CARRIES SOME INFECTION. IN ADDITION TO BABESIA, BORRELIA WAS ALSO FOUND TO BE WIDESPREAD. MOST PEOPLE DO NOT THINK ABOUT THE DANGER OF TICKS.

Dr. Sergey Konyaev
A parasitology specialist at the Institute of Systematics and Ecology of Animals in Novosibirsk.

IXODES OR DERMACENTOR? STOP THE GUESSWORK, TICK IT WITH TICKIT APP.

Every day there is more information that can help us fill the gaps in our knowledge of tick distribution and activity. Use Tickit App to help experts get the data they need.



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