

An overview of Lyme disease in the UK

Search strategy

Database: CAB Abstracts <1973 to 2018 Week 41>

-
- 1 (spirochaete or burgdorferi or ricinus or lyme or borreli*).mp. or exp lyme disease/
 - 2 (UK or "United Kingdom" or GB or "Great Britain" or Britain or British or "British Isles" or England or Wales or Scotland or "Northern Ireland" or Ireland).mp.
 - 3 1 and 2
 - 4 limit 3 to yr="2007 -Current"

[mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

Results retrieved from a search on CAB Abstracts on the OVID interface

<1>

Accession Number

20183283792

Author

Abdullah, S.; Helps, C.; Tasker, S.; Newbury, H.; Wall, R.

Title

Prevalence and distribution of Borrelia and Babesia species in ticks feeding on dogs in the U.K.

Source

Medical and Veterinary Entomology; 2018. 32(1):14-22. many ref.

Publisher

Wiley

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Ticks were collected during March-July 2015 from dogs by veterinarians throughout the U.K. and used to estimate current prevalences and distributions of pathogens. DNA was extracted from 4750 ticks and subjected to polymerase chain reaction and sequence analysis to identify *Borrelia burgdorferi* sensu lato (Spirochaetales: Spirochaetaceae) and *Babesia* (Piroplasmida: Babesiidae) species. Of 4737 ticks [predominantly *Ixodes ricinus* Linnaeus (Ixodida: Ixodidae)], *B. burgdorferi* s.l. was detected in 94 (2.0%). Four *Borrelia* genospecies were identified: *Borrelia garinii* (41.5%); *Borrelia afzelli* (31.9%); *Borrelia burgdorferi* sensu stricto (25.5%), and *Borrelia spielmanii* (1.1%). One *Rhipicephalus sanguineus* Latreille (Ixodida: Ixodidae), collected from a dog with a history of travel outside the U.K., was positive for *B. garinii*. Seventy ticks (1.5%) were positive for *Babesia* spp. Of these, 84.3% were positive for *Babesia venatorum*, 10.0% for *Babesia vulpes* sp. nov., 2.9% for *Babesia divergens*/*Babesia capreoli* and 1.4% for *Babesia microti*. One isolate of *Babesia canis* was detected in a *Dermacentor reticulatus* (Ixodida: Ixodidae) tick collected from a dog that had recently travelled to France. Prevalences of *B. burgdorferi* s.l. and *Babesia* spp. did not differ significantly between different regions of the U.K. The results map the widespread distribution of *B. burgdorferi* s.l. and *Babesia* spp. in ticks in the U.K. and highlight the potential for the introduction and establishment of exotic ticks and tick-borne pathogens.

Publication Type

Journal article.

<2>

Accession Number

20183251606

Author

Layzell, S. J.; Bailey, D.; Peacey, M.; Nuttall, P. A.

Title

Prevalence of *Borrelia burgdorferi* and *Borrelia miyamotoi* in questing *Ixodes ricinus* ticks from four sites in the UK.

Source

Ticks and Tick-borne Diseases; 2018. 9(2):217-224.

Publisher

Elsevier GmbH

Location of Publisher

Munich

Country of Publication

Germany

Abstract

Borrelia miyamotoi is a spirochete bacterium related to *Borrelia burgdorferi sensu lato*, the cause of Lyme borreliosis, and vectored by ticks. In 2014, *B. miyamotoi* was identified in three questing *Ixodes ricinus* collected in the UK. We sought to confirm the presence of *B. miyamotoi* in the UK. Ticks were collected from four locations not previously investigated for *B. miyamotoi* or *B. burgdorferi s.l.* and of which two are considered as Lyme borreliosis "hotspots" based on hospital records of the disease. We independently confirm that *B. miyamotoi* is present in the UK and support the view that *B. miyamotoi* is likely to have a broad geographic distribution, at low levels. Our study also adds to the existing data on the distribution of *B. burgdorferi s.l.* in the UK and demonstrates that although the two "hotspots" had relatively high tick densities, they did not have the highest proportion of infected ticks.

Publication Type

Journal article.

<3>

Accession Number

20183248656

Author

Cull, B.; Pietzsch, M. E.; Hansford, K. M.; Gillingham, E. L.; Medlock, J. M.

Title

Surveillance of British ticks: an overview of species records, host associations, and new records of *Ixodes ricinus* distribution.

Source

Ticks and Tick-borne Diseases; 2018. 9(3):605-614.

Publisher

Elsevier GmbH

Location of Publisher

Munchen

Country of Publication

Germany

Abstract

Public Health England's passive Tick Surveillance Scheme (TSS) records the distribution, seasonality and host associations of ticks submitted from across the United Kingdom (UK), and helps to inform the UK government on emerging tick-borne disease risks. Here we summarise data collected through surveillance during 2010-2016, and compare with previous TSS data from 2005 to 2009, particularly in relation to the primary Lyme borreliosis vector *Ixodes ricinus*. 4173 records were submitted, constituting >14,000 ticks; 97% were endemic tick records (13,833 ticks of 11 species), with an additional 97 records of imported ticks (438 ticks of 17 species). Tick submissions were mainly from veterinary professionals (n=1954; 46.8%) and members of the public and amateur entomologists (n=1600; 38.3%), as well as from academic institutions (n=249; 6.0%), wildlife groups (n=239; 5.7%) and health professionals (n=131; 3.1%). The most commonly reported hosts of endemic ticks were dogs (n=1593; 39.1% of all records), humans (n=835; 20.5%) and cats (n=569; 14%). New host associations were recorded for a number of tick species. *Ixodes ricinus* was the most frequently recorded endemic tick species (n=2413; 59.2% of all records), followed by *I. hexagonus* (n=1355; 33.2%), *I. canisuga* (n=132; 3.2%) and *I. frontalis* (n=56; 1.4%), with other species each making up

<1% total records. 81% of *I. ricinus* recorded from humans were nymphs, whereas 93.4% of *I. ricinus* from companion animals were adults. Recent TSS records of *I. ricinus* in the UK add a considerable amount of new presence data for this species, particularly in the southern regions of England, and confirm that this species is widespread across the UK. The scheme remains a valuable method of collecting continuous national distribution data on ticks from a variety of host species.

Publication Type

Journal article.

<4>

Accession Number

20183183234

Author

Rocchi, M.; Dagleish, M.; McInnes, C.

Title

Tick bites and tick-transmitted diseases.

Source

Veterinary Record; 2018. 182(21):609. 3 ref.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Publication Type

Correspondence.

<5>

Accession Number

20183138417

Author

Coleman, S.

Title

Ticks and lyme borreliosis.

Source

Veterinary Ireland Journal; 2018. 8(4):202...205.

Publisher

Veterinary Ireland

Location of Publisher

Dublin

Country of Publication

Irish Republic

Publication Type

Journal article.

<6>

Accession Number

20183151086

Author

Browning, L.; Hawkins, G.

Title

Zoonotic disease in Scotland.

Source

HPS Weekly Report; 2017. 51(42):374-376.

Publisher

Health Protection Scotland

Location of Publisher

Glasgow

Country of Publication

UK

Abstract

This report summarizes the number of laboratory-confirmed cases of selected zoonoses reported in Scotland, UK during 2012-2016. During 2016, cases of Lyme disease, pasteurellosis, toxoplasmosis and taeniasis accounted for around 95% of the reports. A detailed discussion of these cases is presented.

Publication Type

Journal article.

<7>

Accession Number

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20183125483

Author

Baylis, M.

Title

Potential impact of climate change on emerging vector-borne and other infections in the UK. (Special issue on the impact of climate change on health in the UK.)

Source

Environmental Health; 2017. 16(Suppl. 1):112. 56 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Climate is one of several causes of disease emergence. Although half or more of infectious diseases are affected by climate it appears to be a relatively infrequent cause of human disease emergence. Climate mostly affects diseases caused by pathogens that spend part of their lifecycle outside of the host, exposed to the environment. The most important routes of transmission of climate sensitive diseases are by arthropod (insect and tick) vectors, in water and in food. Given the sensitivity of many diseases to climate, it is very likely that at least some will respond to future climate change. In the case of vector-borne diseases this response will include spread to new areas. Several vector-borne diseases have emerged in Europe in recent years; these include vivax malaria, West Nile fever, dengue fever, Chikungunya fever, leishmaniasis, Lyme disease and tick-borne encephalitis. The vectors of these diseases are mosquitoes, sand flies and ticks. The UK has endemic mosquito species capable of transmitting malaria and probably other pathogens, and ticks that transmit Lyme disease. The UK is also threatened by invasive mosquito species known to be able to transmit West Nile, dengue, chikungunya and Zika, and sand flies that spread leishmaniasis. Warmer temperatures in the future will increase the suitability of the UK's climate for these invasive species, and increase the risk that they may spread disease. While much attention is on invasive species, it is important to recognize the threat presented by native species too. Proposed actions to reduce the future impact of emerging vector-borne diseases in the UK include insect control activity at points of entry of vehicles and certain goods, wider surveillance for mosquitoes and sand flies, research into the threat posed by native species, increased awareness of the medical profession of the threat posed by specific diseases, regular risk assessments, and increased preparedness for the occurrence of a disease emergency.

Publication Type

Journal article.

<8>

Accession Number

20183121836

Author

Wright, I.; Davies, S. E. F.; Wall, R.

Title

Ticks and tick-borne pathogens of cats in the UK.

Source

Companion Animal; 2018. 23(3):130-135. many ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Ticks parasitising cats are widely distributed throughout the UK, and awareness of the risk presented by ticks and the pathogens they may transmit is of importance. Higher tick numbers and year-round biting activity could pose a significantly increased threat to cats and their owners. The most frequently recorded tick on cats is *Ixodes ricinus*, but the hedgehog tick *Ixodes hexagonus* is also common particularly for cats in urban areas and is considerably more prevalent on cats than on dogs. Ticks transmit a wide range of pathogens to cats, although usually with relatively low prevalence in the UK. However, of note is that, in a recent study of the pathogens present in ticks feeding on cats, *Babesia vulpes* was detected in *I. hexagonus* and *B. venatorum* was detected in *I. ricinus*; both are agents of potentially fatal diseases and in the latter case the pathogen is zoonotic. Tick control is therefore important in cats, not only for the health of parasitised individuals, but also to prevent cats acting as transport hosts for ticks carrying a wide range of pathogens of both veterinary and zoonotic significance.

Publication Type

Journal article.

<9>

Accession Number

20173173617

Author

Millins, C.; Gilbert, L.; Medlock, J.; Hansford, K.; Thompson, D. B. A.; Biek, R.

Title

Effects of conservation management of landscapes and vertebrate communities on Lyme borreliosis risk in the United Kingdom. (Special Issue: Conservation, biodiversity and infectious disease: scientific evidence and policy implications.)

Source

Philosophical Transactions of the Royal Society B. Biological Sciences; 2017. 372(1722):20160123. 143 ref.

Publisher

Royal Society

Location of Publisher

London

Country of Publication

UK

Abstract

Landscape change and altered host abundance are major drivers of zoonotic pathogen emergence. Conservation and biodiversity management of landscapes and vertebrate communities can have secondary effects on vector-borne pathogen transmission that are important to assess. Here we review the potential implications of these activities on the risk of Lyme borreliosis in the United Kingdom. Conservation management activities include woodland expansion, management and restoration, deer management, urban greening and the release and culling of non-native species. Available evidence suggests that increasing woodland extent, implementing biodiversity policies that encourage ecotonal habitat and urban greening can increase the risk of Lyme borreliosis by increasing suitable habitat for hosts and the tick vectors. However, this can depend on whether deer population management is carried out as part of these conservation activities. Exclusion fencing or culling deer to low densities can decrease tick abundance and Lyme borreliosis risk. As management actions often constitute large-scale perturbation experiments, these hold great potential to understand underlying drivers of tick and pathogen dynamics. We recommend integrating monitoring of ticks and the risk of tick-borne pathogens with conservation management activities. This would help fill knowledge gaps and the production of best practice guidelines to reduce risks.

Publication Type

Journal article.

<10>

Accession Number

20163245190

Author

Abdullah, S.; Helps, C.; Tasker, S.; Newbury, H.; Wall, R.

Title

Ticks infesting domestic dogs in the UK: a large-scale surveillance programme.

Source

Parasites and Vectors; 2016. 9(391):(7 July 2016). 39 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: Recent changes in the distribution of tick vectors and the incidence of tick-borne disease, driven variously by factors such as climate change, habitat modification, increasing host abundance and the increased movement of people and animals, highlight the importance of ongoing, active surveillance. This paper documents the results of a large-scale survey of tick abundance on dogs presented to veterinary practices in the UK, using a participatory approach that allows relatively cost- and time-effective extensive data collection. Methods: Over a period of 16 weeks (April-July 2015), 1094 veterinary practices were recruited to monitor tick attachment to dogs and provided with a tick collection and submission protocol. Recruitment was encouraged through a national publicity and communication initiative. Participating practices were asked to select five dogs at random each week and undertake a thorough, standardized examination of each dog for ticks. The clinical history and any ticks were then sent to the investigators for identification. Results: A total of 12,000 and 96 dogs were examined and 6555 tick samples from infested dogs were received. *Ixodes ricinus* (Linnaeus) was identified on 5265 dogs (89%), *Ixodes hexagonus* Leach on 577 (9.8%) and *Ixodes canisuga* Johnston on 46 (0.8%). Ten dogs had *Dermacentor reticulatus* (Fabricius), one had *Dermacentor variabilis* (Say), three had *Haemaphysalis punctata* Canestini & Fanzago and 13 had *Rhipicephalus sanguineus* Latreille. 640 ticks were too damaged for identification. All the *R. sanguineus* and the single *D. variabilis* were on dogs with a recent history of travel outside the UK. The overall prevalence of tick attachment was 30% (range 28-32%). The relatively high prevalence recorded is likely to have been inflated by the method of participant recruitment. Conclusion: The data presented provide a comprehensive spatial understanding of tick distribution and species abundance in the UK against which future changes can be compared. Relative prevalence maps show the highest rates in Scotland and south west England providing a valuable guide to tick-bite risk in the UK.

Publication Type

Journal article.

<11>

Accession Number

20143242471

Author

Jeffries, C. L.; Mansfield, K. L.; Phipps, L. P.; Wakeley, P. R.; Mearns, R.; Schock, A.; Bell, S.; Breed, A. C.; Fooks, A. R.; Johnson, N.

Title

Louping ill virus: an endemic tick-borne disease of Great Britain.

Source

Journal of General Virology; 2014. 95(5):1005-1014. many ref.

Publisher

Society for General Microbiology

Location of Publisher

London

Country of Publication

UK

Abstract

In Europe and Asia, Ixodid ticks transmit tick-borne encephalitis virus (TBEV), a flavivirus that causes severe encephalitis in humans but appears to show no virulence for livestock and wildlife. In the British Isles, where TBEV is absent, a closely related tick-borne flavivirus, named louping ill virus (LIV), is present. However, unlike TBEV, LIV causes a febrile illness in sheep, cattle, grouse and some other species, that can progress to fatal encephalitis. The disease is detected predominantly in animals from upland areas of the UK and Ireland. This distribution is closely associated with the presence of its arthropod vector, the hard tick *Ixodes ricinus*. The virus is a positive-strand RNA virus belonging to the genus *Flavivirus*, exhibiting a high degree of genetic homology to TBEV and other mammalian tick-borne viruses. In addition to causing acute encephalomyelitis in sheep, other mammals and some avian species, the virus is recognized as a zoonotic agent with occasional reports of seropositive individuals, particularly those whose occupation involves contact with sheep. Preventative vaccination in sheep is effective although there is no treatment for disease. Surveillance for LIV in Great Britain is limited despite an increased awareness of emerging arthropod-borne diseases and potential changes in distribution and epidemiology. This review provides an overview of LIV and highlights areas where further effort is needed to control this disease.

Publication Type

Journal article.

<12>

Accession Number

20113228515

Author

Quine, C. P.; Barnett, J.; Dobson, A. D. M.; Marcu, A.; Marzano, M.; Moseley, D.; O'Brien, L.; Randolph, S. E.; Taylor, J. L.; Uzzell, D.

Title

Frameworks for risk communication and disease management: the case of Lyme disease and countryside users. (Special Issue: Interdisciplinary perspectives on the management of infectious animal and plant diseases.)

Source

Philosophical Transactions of the Royal Society B. Biological Sciences; 2011. 366(1573):2010-2022. 60 ref.

Publisher

Royal Society

Location of Publisher

London

Country of Publication

UK

Abstract

Management of zoonotic disease is necessary if countryside users are to gain benefit rather than suffer harm from their activities, and to avoid disproportionate reaction to novel threats. We introduce a conceptual framework based on the pressure-state-response model with five broad responses to disease incidence. Influencing public behaviour is one response and requires risk communication based on an integration of knowledge about the disease with an understanding of how publics respond to precautionary advice. A second framework emphasizes how risk communication involves more than information provision and should address dimensions including points-of-intervention over time, place and audience. The

frameworks are developed by reference to tick-borne Lyme borreliosis (also known as Lyme disease), for which informed precautionary behaviour is particularly relevant. Interventions to influence behaviour can be directed by knowledge of spatial and temporal variation of tick abundance, what constitutes risky behaviour, how people respond to information of varying content, and an understanding of the social practices related to countryside use. The frameworks clarify the response options and help identify who is responsible for risk communication. These aspects are not consistently understood, and may result in an underestimation of the role of land-based organizations in facilitating appropriate precautionary behaviour.

Publication Type

Journal article.

<13>

Accession Number

20183080650

Author

Mendonca, P. G. de

Title

Tick infestation in bank voles from East Anglia.

Source

Systematic and Applied Acarology; 2017. 22(10/12):1795-1799. 25 ref.

Publisher

Systematic and Applied Acarology Society

Location of Publisher

London

Country of Publication

UK

Abstract

Bank voles (*Clethrionomys glareolus*) are widespread and abundant in the western half of Eurasia, including Great Britain. These small rodents often come into contact with domestic animals and/or humans, either directly or indirectly, and thus are an interface between sylvatic and domestic cycles for zoonotic organisms. Bank voles were live-trapped and inspected for ticks in Cambridgeshire, Essex and Suffolk from June 1999 to April 2000. Infested voles hosted between 1 and 10 ticks. Larvae were the most frequent stage. Overall prevalence estimate of tick infestation was 14.5% (95% C.I.: 8.3% to 20.7%). Prevalence estimates fluctuated with seasons. Two tick species were identified: *Ixodes ricinus* (larvae only) and *Ixodes trianguliceps* (all three stages). The aggregated distribution of ticks on their hosts suggests that co-feeding transmission of tick-borne pathogens may happen in British bank voles. Further investigations are required to improve our knowledge and understanding of the epidemiology of tick-borne diseases in East Anglia.

Publication Type

Journal article.

<14>

Accession Number

20183051030

Author

Helm, J.

Title

Lyme disease.

Source

Veterinary Times; 2018. 48(6):10, 12. 11 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<15>

Accession Number

20183060774

Author

Rousseau, R.; McGrath, G.; McMahon, B. J.; Vanwambeke, S. O.

Title

Multi-criteria decision analysis to model Ixodes ricinus habitat suitability.

Source

EcoHealth; 2017. 14(3):591-602. 58 ref.

Publisher

Springer

Location of Publisher

New York

Country of Publication

USA

Abstract

Tick-borne diseases present a major threat to both human and livestock health throughout Europe. The risk of infection is directly related to the presence of its vector. Thereby it is important to know their distribution, which is strongly associated with environmental factors: the presence and availability of a suitable habitat, of a suitable climate and of hosts. The present study models the habitat suitability for *Ixodes ricinus* in Ireland, where data on tick distribution are scarce. Tick habitat suitability was estimated at a coarse scale (10 km) with a multi-criteria decision analysis (MCDA) method according to four different scenarios (depending on the variables used and on the weights granted to each of them). The western part of Ireland and the Wicklow mountains in the East were estimated to be the most suitable areas for *I. ricinus* in the island. There was a good level of agreement between results from the MCDA and recorded tick presence. The different scenarios did not affect the spatial outputs substantially. The current study suggests that tick habitat suitability can be mapped accurately at a coarse scale in a data-scarce context using knowledge-based methods. It can serve as a guideline for future countrywide sampling that would help to determine local risk of tick presence and refining knowledge on tick habitat suitability in Ireland.

Publication Type

Journal article.

<16>

Accession Number

20173325780

Author

Davies, S.; Abdullah, S.; Helps, C.; Tasker, S.; Newbury, H.; Wall, R.

Title

Prevalence of ticks and tick-borne pathogens: *Babesia* and *Borrelia* species in ticks infesting cats of Great Britain.

Source

Veterinary Parasitology; 2017. 244:129-135. 50 ref.

Publisher

Elsevier B. V.

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

In a study of tick and tick-borne pathogen prevalence, between May and October 2016, 278 veterinary practices in Great Britain examined 1855 cats. Six-hundred and one cats were found to have attached ticks. The most frequently recorded tick species was *Ixodes ricinus* (57.1%), followed by *Ixodes hexagonus* (41.4%) and *Ixodes trianguliceps* (1.5%). Male cats, 4-6 years of age living in rural areas were most likely to be carrying a tick; hair length and tick treatment history had no significant association with attachment. For cats that were parasitized by ticks in large urban areas, *I. hexagonus* was the most frequent species recorded. Molecular analysis was possible for 541 individual tick samples, others were too damaged for analysis; *Babesia* spp., and *Borrelia burgdorferi sensu lato* were identified in 1.1% (n=6) and 1.8% (n=10) of these, respectively. *Babesia* spp. included *Babesia vulpes* sp. nov./*Babesia microti*-like (n=4) in *I. hexagonus*

and *Babesia venatorum* (n=2) in *I. ricinus*. *Borrelia burgdorferi* s.l. species included *Borrelia garinii* (n=6) and *Borrelia afzelii* (n=4). The majority of *B. burgdorferi* s.l. cases were found in *I. ricinus*, with *B. afzelii* in one *I. hexagonus* nymph. No *Borrelia* or *Babesia* spp. were present in *I. trianguliceps*. To determine a true prevalence for ticks on cats, practices that only submitted questionnaires from cats with ticks and practices that submitted fewer than 5 returns per week were removed; amongst those considered to have adhered strictly to the collection protocol, feline tick prevalence amongst cats that had access to the outdoors was 6.6%. These results show that ticks can be found on cats throughout Great Britain, which harbour a range of species of *Babesia* and *B. burgdorferi* s.l. and that cats, particularly in green spaces within urban areas, may form an important host for *I. hexagonus*, a known vector of pathogens.

Publication Type

Journal article.

<17>

Accession Number

20173289794

Author

Cull, B.; Vaux, A. G. C.; Ottowell, L. J.; Gillingham, E. L.; Medlock, J. M.

Title

Tick infestation of small mammals in an English woodland.

Source

Journal of Vector Ecology; 2017. 42(1):74-83. many ref.

Publisher

Wiley

Location of Publisher

Boston

Country of Publication

USA

Abstract

Tick infestations on small mammals were studied from April to November, 2010, in deciduous woodland in southern England in order to determine whether co-infestations with tick stages occurred on small mammals, a key requirement for endemic transmission of tick-borne encephalitis virus (TBEV). A total of 217 small mammals was trapped over 1,760 trap nights. Yellow-necked mice (*Apodemus flavicollis*) made up the majority (52.5%) of animals, followed by wood mice (*A. sylvaticus*) 35.5% and bank voles (*Myodes glareolus*) 12%. A total of 970 ticks was collected from 169 infested animals; 96% of ticks were *Ixodes ricinus* and 3% *I. trianguliceps*. Over 98% of ticks were larval stages. Mean infestation intensities of *I. ricinus* were significantly higher on *A. flavicollis* (6.53+or-0.67) than on *A. sylvaticus* (4.96+or-0.92) and *M. glareolus* (3.25+or-0.53). Infestations with *I. ricinus* were significantly higher in August than in any other month. Co-infestations with *I. ricinus* nymphs and larvae were observed on six (3.6%) infested individuals, and fifteen small mammals (8.9%) supported *I. ricinus* - *I. trianguliceps* co-infestations. This work contributes further to our understanding of European small mammal hosts that maintain tick populations and their associated pathogens, and indicates that co-infestation of larvae and nymph ticks does occur in

lowland UK. The possible implications for transmission of tick-borne encephalitis virus between UK ticks and small mammals are discussed.

Publication Type

Journal article.

<18>

Accession Number

20173289714

Title

Zoonoses Report: UK 2015.

Source

Zoonoses Report: UK 2015; 2017. :98 pp. 2 ref.

Publisher

Public Health England

Location of Publisher

London

Country of Publication

UK

Abstract

This year's UK Zoonoses Report continues to include feature articles which highlight human and animal incidents and issues of public health significance which occurred during 2015 which includes Anthrax, Hantavirus, Bovine TB, gastrointestinal infections, and Swine Influenza. Also presented is a summary of reported cases of zoonotic infection in humans and animals. The report highlights significant trends in a number of zoonoses, and whilst these will continue to be monitored, they also emphasise the need for continued surveillance and collaboration between veterinary and human health practitioners. Interpreting trends in veterinary data in particular needs to be done with care, as the number of submissions to the various Government laboratories involved in supplying data for this report may vary from year to year for a number of reasons. These may include weather conditions, concerns about disease or financial factors, and are likely to affect the various livestock sectors and types of submissions in different ways.

Publication Type

Miscellaneous.

<19>

Accession Number

20173018988

Author

Elsheikha, H.

Title

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Tick-borne diseases in dogs.

Source

The Veterinary Nurse; 2016. 7(8):440-449.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Tick-borne diseases (TBDs) can have serious impact on the health and welfare of dogs, and have been described in all continents. The expanding number of tick-borne pathogens, the broad geographic range of many tick species, the ability of tick-borne pathogens to induce infections, and the highly zoonotic potential of some of these pathogens make TBDs the most important subcategory of canine vector-borne infectious diseases worldwide. Indeed, emerging TBDs have become a concern for pet owners and veterinary professionals. The occurrence of babesiosis in a cluster of dogs from Harlow, Essex in 2016 has raised some concerns regarding the inevitable increase in the risk of TBDs particularly after the relaxation of pet travel rules. In addition to babesiosis that has dominated recent headlines other TBDs such as Lyme borreliosis have more quietly expanded to many parts of the country. The large number of tick-borne pathogens, the diversity of tick vectors, the broad range of animal reservoir hosts, limitations associated with diagnosis and treatment, and the ecological complexity of tick-borne pathogens make effective control of TBDs a challenging task. Therefore, it is important for veterinary professionals to be able to detect TBDs early and accurately in order to minimise the morbidity and mortality of these diseases. This article provides an update on some of the most common TBDs in dogs, namely babesiosis, hepatozoonosis, borreliosis, anaplasmosis, and ehrlichiosis. The key roles that veterinary nurses can play to support pet owners in recognising and dealing with ticks and TBDs are also discussed.

Publication Type

Journal article.

<20>

Accession Number

20173065742

Author

Roed, K. H.; Kvie, K. S.; Hasle, G.; Gilbert, L.; Leinaas, H. P.

Title

Phylogenetic lineages and postglacial dispersal dynamics characterize the genetic structure of the tick, *Ixodes ricinus*, in Northwest Europe.

Source

PLoS ONE; 2016. 11(12):e0167450. 57 ref.

Publisher

Public Library of Sciences (PLOS)

Location of Publisher

San Francisco

Country of Publication

USA

Abstract

Dispersal and gene flow are important mechanisms affecting the dynamics of vectors and their pathogens. Here, patterns of genetic diversity were analyzed in many North European populations of the tick, *Ixodes ricinus*. Population sites were selected within and between areas separated by geographical barriers in order to evaluate the importance of tick transportation by birds in producing genetic connectivity across open sea and mountain ranges. The phylogenetic analyses of the mitochondrial control region and the cytochrome b gene revealed two distinct clades with supported sub-clades, with three genetic lineages: GB and WNo associated with Great Britain and western Norway respectively, and Eu with a wider distribution across continental Europe in agreement with much lower efficiency of tick dispersal by birds than by large mammals. The results suggest different ancestry of *I. ricinus* colonizing Britain and the rest of northern Europe, possibly from different glacial refuges, while ticks from western Norway and continental Europe share a more recent common ancestry. Demographic history modeling suggests a period of strong increase in tick abundance coincident with progression of the European Neolithic culture, long after their post-glacial colonization of NW Europe.

Publication Type

Journal article.

<21>

Accession Number

20173076206

Author

Millins, C.; Gilbert, L.; Johnson, P.; James, M.; Kilbride, E.; Birtles, R.; Biek, R.

Title

Heterogeneity in the abundance and distribution of *Ixodes ricinus* and *Borrelia burgdorferi* (sensu lato) in Scotland: implications for risk prediction.

Source

Parasites and Vectors; 2016. 9(595):(22 November 2016). 77 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: Cases of Lyme borreliosis, a vector-borne zoonosis caused by bacteria in the *Borrelia burgdorferi* (sensu lato) species group, have increased in recent years in Europe. Knowledge of

environmental factors associated with abundance of the tick vector *Ixodes ricinus* and the pathogen *B. burgdorferi* (s.l.) is of interest to understand responses to environmental changes, predict variation in risk and to inform management interventions. Methods: Nineteen woodland sites across Scotland were surveyed in 2012 for *B. burgdorferi* (s.l.) infection in questing *I. ricinus* nymphs (n=200 per site), deer abundance and vegetation. Climatic factors were extracted for each site. Six additional sites were surveyed for questing nymphs in both 2012 and 2013 (n=200 per site and year) to test for variation in *B. burgdorferi* (s.l.) prevalence between years. Results: The mean prevalence of *B. burgdorferi* (s.l.) across 19 sites was 1.7% (95% CI: 1.4-2.2%; range 0-6%), all four genospecies known to be present in the UK were detected: *B. garinii*, *B. afzelii*, *B. burgdorferi* (sensu stricto) and *B. valaisiana*. A higher prevalence of *B. burgdorferi* (s.l.), higher densities of nymphs and higher densities of infected nymphs were found at sites with warmer climates, estimated with growing degree-days. No association between infection prevalence in nymphs and woodland type (semi-natural mixed vs coniferous) or deer density was found. At six sites sampled in 2012 and 2013, there was a significant increase in *B. afzelii* prevalence at two sites and a decrease in *B. garinii* prevalence at one site. Conclusions: This study highlights challenges for the prediction of risk of Lyme borreliosis, reflecting the sensitivity of both pathogen and vector ecology to habitat, host and climatic factors. Significant changes in the prevalence of individual genospecies at sites monitored across time are likely to be due to variability in the host community composition between years. Our results indicate the importance of monitoring dynamic variables such as reservoir host populations as well as climate and habitat factors over multiple years, to identify environmental factors associated with Lyme borreliosis risk.

Publication Type

Journal article.

<22>

Accession Number

20173094730

Author

Zintl, A.; Moutailler, S.; Stuart, P.; Paredis, L.; Dutraive, J.; Gonzalez, E.; O'Connor, J.; Devillers, E.; Good, B.; O'Muireagain, C.; Waal, T. de; Morris, F.; Gray, J.

Title

Ticks and tick-borne diseases in Ireland.

Source

Irish Veterinary Journal; 2017. 70(4):(31 January 2017). 85 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Throughout Europe interest in tick-borne agents is increasing, particularly with regard to those that can cause human disease. The reason for this is the apparent rise in the incidence of many tick-borne diseases (TBD's). While there has never been a national survey of ticks or TBD's in Ireland, the trend here appears to

be the reverse with a decline in the incidence of some agents seemingly associated with decreasing tick numbers particularly on agricultural land. In the absence of robust baseline data, however, this development cannot be confirmed. This review collates the limited information available from several dated published records on tick species and a small number of studies focused on certain TBD's. Some pilot data on tick density and TBD agents collected in 2016 are also presented. The aim is to explore the particular situation in Ireland with regard to ticks and TBD's and to provide a reference for future workers in the field.

Publication Type

Journal article.

<23>

Accession Number

20173101697

Author

Ginsberg, H. S.; Albert, M.; Acevedo, L.; Dyer, M. C.; Arsnoe, I. M.; Tsao, J. I.; Mather, T. N.; LeBrun, R. A.

Title

Environmental factors affecting survival of immature *Ixodes scapularis* and implications for geographical distribution of lyme disease: the climate/behavior hypothesis.

Source

PLoS ONE; 2017. 12(1):e0168723. 49 ref.

Publisher

Public Library of Sciences (PLOS)

Location of Publisher

San Francisco

Country of Publication

USA

Abstract

Recent reports suggest that host-seeking nymphs in southern populations of *Ixodes scapularis* remain below the leaf litter surface, while northern nymphs seek hosts on leaves and twigs above the litter surface. This behavioral difference potentially results in decreased tick contact with humans in the south, and fewer cases of Lyme disease. We studied whether north-south differences in tick survival patterns might contribute to this phenomenon. Four month old larvae resulting from a cross between Wisconsin males and South Carolina females died faster under southern than under northern conditions in the lab, as has previously been reported for ticks from both northern and southern populations. However, newly-emerged larvae from Rhode Island parents did not differ consistently in mortality under northern and southern conditions, possibly because of their younger age. Survival is lower, and so the north-south survival difference might be greater in older ticks. Larval survival was positively related to larval size (as measured by scutal area), while survival was positively related to larval fat content in some, but not all, trials. The difference in larval survival under northern vs. southern conditions might simply result from faster metabolism under warmer southern conditions leading to shorter life spans. However, ticks consistently died faster under southern than under northern conditions in the laboratory when relative humidity was low (75%), but not under moderate (85%) or high (95%) RH. Therefore, mortality due to desiccation stress is

greater under southern than under northern conditions. We hypothesize that mortality resulting from the greater desiccation stress under southern conditions acts as a selective pressure resulting in the evolution of host-seeking behavior in which immatures remain below the leaf litter surface in southern *I. scapularis* populations, so as to avoid the desiccating conditions at the surface. If this hypothesis is correct, it has implications for the effect of climate change on the future distribution of Lyme disease.

Publication Type

Journal article.

<24>

Accession Number

20173097087

Author

Lacey, L.

Title

Managing fleas and ticks - consider together or separately?

Source

VN Times; 2017. 17(3):16, 18. 7 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Giving advice on flea control is a part of the veterinary nurse's role that is now a year-round occurrence, thanks to our desire for warm houses. Scott et al (2001a) said: "In most households, *Ctenocephalides felis* takes three to four weeks to complete its life cycle, with extremes of 12 to 174 days recorded." Many areas of the UK have only seasonal problems with ticks, so it may be less common for treatment or prevention to be discussed by the nursing team. Both fleas and ticks can have a big impact on animal health, as well as the owner-pet bond. This can be due to the fear of the risk of transmissible diseases, such as Lyme disease, or simply disgust at the thought of a pet having parasites.

Publication Type

Journal article.

<25>

Accession Number

20173140995

Author

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Wall, R.; Pearson, S.; Tasker, S.; Hansford, K.; Bourne, D.; Cull, B.; Elsheikha, H.; Fitzgerald, R.; Phipps, P.; Stokes, L.

Title

Ticks and tick-borne diseases: a roundtable discussion.

Source

Companion Animal; 2017. 22(4):197-207.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Both ticks endemic to the UK and exotic tick species are important as vectors of a variety of pathogens causing diseases in companion animals and in humans. It is generally felt that tick abundance is increasing and tick ranges expanding, but there is a lack of robust long-term data to confirm this, and more surveys such as those that have been carried out by Bristol University are needed. In the UK, most cases of clinical disease in companion animals involve dogs with babesiosis; PCR of appropriate samples is useful in diagnosis of this and other tick-borne infections. Cases involving the small Babesia species are particularly challenging to treat. Clinical disease due to tick-borne pathogens is rare in cats but can occur, particularly in immunosuppressed individuals. More studies are needed on treatment of these pathogens in companion animals. Tick-borne diseases, particularly Lyme disease, can be important zoonoses. There is still much to be learned about treatment and about detection of the Lyme borreliosis pathogen. The passive tick surveillance scheme from the Medical Entomology and Zoonoses Ecology unit of Public Health England, and other surveillance systems, have detected a wide range of ticks being imported on dogs entering or re-entering the UK, including both endemic and exotic species. There are risks of importation both of pathogens causing non-endemic diseases and of new species of ticks that might become established in the UK.

Publication Type

Journal article.

<26>

Accession Number

20173171034

Author

Irwin, P. J.; Robertson, I. D.; Westman, M. E.; Perkins, M.; Straubinger, R. K.

Title

Searching for Lyme borreliosis in Australia: results of a canine sentinel study.

Source

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: Lyme borreliosis is a common tick-borne disease of the northern hemisphere that is caused by bacterial spirochaetes of the *Borrelia burgdorferi* (*sensu lato*) (Bbsl) complex. To date, there has been no convincing evidence for locally-acquired Lyme borreliosis on the Australian continent and there is currently a national debate concerning the nature and distributions of zoonotic tick-transmitted infectious disease in Australia. In studies conducted in Europe and the United States, dogs have been used as sentinels for tick-associated illness in people since they readily contact ticks that may harbour zoonotic pathogens. Applying this principle, we used a combination of serological assays to test dogs living in tick 'hot spots' and exposed to the Australian paralysis tick, *Ixodes holocyclus*, for evidence of exposure to *B. burgdorferi* (*s.l.*) antigens and other vector-borne pathogens. **Results:** Altogether, 555 dogs from four demographic groups were recruited into this study. One dog had evidence of exposure to *Anaplasma* spp. but no other dog was positive in screening tests. A total of 122 dogs (22.0%) had a kinetic ELISA (KELA) unit value >100, and one dog with a high titre (399.9 KELA units) had been vaccinated against *B. burgdorferi* (*sensu stricto*) before travelling to Australia. Older dogs and those with a history of tick paralysis were significantly more likely to have a KELA unit value >100. Line immunoassay analysis revealed moderate-to-weak (equivocal) bands in 27 (4.9%) dogs. **Conclusions:** Except for a single dog presumed to have been exposed to *Anaplasma platys*, infection with *Anaplasma* spp. *B. burgdorferi* (*s.l.*), *Ehrlichia* spp., and *Dirofilaria immitis*, was not detected in the cohort of Australian dogs evaluated in this study. These results provide further evidence that Lyme borreliosis does not exist in Australia but that cross-reacting antibodies (false positive results) are common and may be caused by the transmission of other tick-associated organisms.

Publication Type

Journal article.

<27>

Accession Number

20173189150

Author

Hansford, K. M.; Fonville, M.; Gillingham, E. L.; Coipan, E. C.; Pietzsch, M. E.; Krawczyk, A. I.; Vaux, A. G. C.; Cull, B.; Sprong, H.; Medlock, J. M.

Title

Ticks and *Borrelia* in urban and peri-urban green space habitats in a city in southern England.

Source

Ticks and Tick-borne Diseases; 2017. 8(3):353-361.

Publisher

Elsevier GmbH

Location of Publisher

Munich

Country of Publication

Germany

Abstract

Ticks are becoming increasingly recognised as important vectors of pathogens in urban and peri-urban areas, including green space used for recreational activities. In the UK, the risk posed by ticks in such areas is largely unknown. In order to begin to assess the risk of ticks in urban/peri-urban areas in southern England, questing ticks were collected from five different habitat types (grassland, hedge, park, woodland and woodland edge) in a city during the spring, summer and autumn of 2013/2014 and screened for *Borrelia burgdorferi sensu lato*. In addition, seasonal differences in *B. burgdorferi* s.l. prevalence were also investigated at a single site during 2015. *Ixodes ricinus* presence and activity were significantly higher in woodland edge habitat and during spring surveys. DNA of *Borrelia burgdorferi* s.l. was detected in 18.1% of nymphs collected across the 25 sites during 2013 and 2014 and two nymphs also tested positive for the newly emerging tick-borne pathogen *B. miyamotoi*. *Borrelia burgdorferi* s.l. prevalence at a single site surveyed in 2015 were found to be significantly higher during spring and summer than in autumn, with *B. garinii* and *B. valaisiana* most commonly detected. These data indicate that a range of habitats within an urban area in southern England support ticks and that urban *Borrelia* transmission cycles may exist in some of the urban green spaces included in this study. Sites surveyed were frequently used by humans for recreational activities, providing opportunity for exposure to *Borrelia* infected ticks in an urban/peri-urban space that might not be typically associated with tick-borne disease transmission.

Publication Type

Journal article.

<28>

Accession Number

20163022937

Title

Zoonoses summary report: UK 2014.

Source

Zoonoses summary report: UK 2014; 2015. :27 pp.

Publisher

Department for Environment, Food and Rural Affairs (DEFRA)

Location of Publisher

London

Country of Publication

UK

Abstract

This publication reports on data on zoonotic infections in animals and humans across the UK during 2014, including relevant information on avian and animal influenza, bat rabies, bovine tuberculosis, brucellosis, campylobacteriosis, cryptosporidiosis, Hantavirus infections, leptospirosis, listeriosis, Lyme borreliosis, salmonellosis and vero cytotoxin-producing Escherichia coli infections.

Publication Type

Miscellaneous.

<29>

Accession Number

20163042292

Author

Elsheikha, H.

Title

Control of fleas, ticks and worms in companion animals.

Source

Veterinary Times; 2016. 46(3):6, 8. 9 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Fleas, ticks and worms are arguably the most prevalent parasite groups in companion animals and can seriously affect their health and welfare if left untreated. Control of these parasites is essential, not only to avoid economic losses and maintain the health and welfare of the pets, but also to protect public health from zoonotic diseases. Mitigating disease threats caused by these parasites are challenging, partly because of uncertainty about disease dynamics in reservoir hosts, the complex mode of transmission and the shift in their epidemiology, which makes it difficult to identify best management approaches. Despite the existing challenges effective control of these parasites is still possible, but requires the implementation of an integrated approach, which incorporates the judicious use of antiparasitics, non-chemical control measures and informed education of responsible pet owners. Cooperation among veterinarians, parasitology experts and owners who demand the best for their pets is essential if efficient parasite control is to be achieved. This article covers the clinical impact and management of each of these parasite entities.

Publication Type

Journal article.

<30>

Accession Number

20163158980

Author

Li Sen; Gilbert, L.; Harrison, P. A.; Rounsevell, M. D. A.

Title

Modelling the seasonality of Lyme disease risk and the potential impacts of a warming climate within the heterogeneous landscapes of Scotland.

Source

Journal of the Royal Society Interface; 2016. 13(116):20160140. 62 ref.

Publisher

The Royal Society

Location of Publisher

London

Country of Publication

UK

Abstract

Lyme disease is the most prevalent vector-borne disease in the temperate Northern Hemisphere. The abundance of infected nymphal ticks is commonly used as a Lyme disease risk indicator. Temperature can influence the dynamics of disease by shaping the activity and development of ticks and, hence, altering the contact pattern and pathogen transmission between ticks and their host animals. A mechanistic, agent-based model was developed to study the temperature-driven seasonality of *Ixodes ricinus* ticks and transmission of *Borrelia burgdorferi sensu lato* across mainland Scotland. Based on 12-year averaged temperature surfaces, our model predicted that Lyme disease risk currently peaks in autumn, approximately six weeks after the temperature peak. The risk was predicted to decrease with increasing altitude. Increases in temperature were predicted to prolong the duration of the tick questing season and expand the risk area to higher altitudinal and latitudinal regions. These predicted impacts on tick population ecology may be expected to lead to greater tick-host contacts under climate warming and, hence, greater risks of pathogen transmission. The model is useful in improving understanding of the spatial determinants and system mechanisms of Lyme disease pathogen transmission and its sensitivity to temperature changes.

Publication Type

Journal article.

<31>

Accession Number

20163199859

Author

Wright, I.

Title

Lyme disease: a growing UK threat?

Source

The Veterinary Nurse; 2015. 6(7):380-387.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Lyme disease, caused by the spirochete *Borrelia burgdorferi* remains the primary tick borne pathogen affecting dogs and people in the UK. Human cases are increasing year by year and dogs have been found to be carrying ticks infected with *B.burgdorferi*. This article reviews the epidemiology of Lyme disease in the UK, zoonotic risk, diagnosis and treatment. It also discusses practical disease prevention and the role of veterinary nurses in advising pet owners in this respect.

Publication Type

Journal article.

<32>

Accession Number

20163172430

Author

Wright, I.

Title

Tick-borne diseases - treatment and prevention of growing issue.

Source

Veterinary Times; 2016. 46(20):20...24. 14 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Ticks and tick-borne diseases remain a significant risk to UK dogs, both domestically and while travelling abroad. As the incidence of Lyme disease and the frequency of pet travel increase, so do the risks of exposure to tick-borne diseases. The profiles of ticks and their pathogens have also been raised, with numerous reports on Lyme disease hitting the news in 2015, as well as an outbreak of canine babesiosis in

Essex. This article considers the ticks that pose the most significant threat to UK dogs and owners, their treatment and prevention.

Publication Type

Journal article.

<33>

Accession Number

20153429872

Author

Vikoren, T.; Hamnes, I. S.; Davidson, R.; Hamstad, A.

Title

Rare bird tick found on a migratory falcon. [Norwegian]

Source

Norsk Veterinaertidsskrift; 2012. 124(9):651-652. 3 ref.

Publisher

Den Norske Veterinaerforening

Location of Publisher

Oslo

Country of Publication

Norway

Abstract

A migratory falcon (*Falco peregrinus*) was found dead in southern Trondelag and kept for taxidermic preservation. Tissues of the bird and a sample of the numerous ticks found on its head were sent to the Veterinary Institute for examination. The bird had serious air sac inflammation caused by the nematode *Serratospiculum tendo*. The ticks were identified as the Northern bird tick (*Ixodes caledonicus*), which is relatively easy to distinguish from the more common tick, *I. ricinus*; diagrams of both are presented, with distinguishing features indicated. The rock dove (*Columba livia*) is its common host. *Ixodes caledonicus* has been reported from Sweden, Denmark and the UK, but only once previously in Norway, on a starling in Ostfold. As these falcons usually overwinter in the UK and on the west coast of Europe, it is assumed that this bird did not migrate, as it was found in Norway in May, probably having brought the ticks from abroad.

Publication Type

Journal article.

<34>

Accession Number

20163196049

Author

Wright, I.

Title

Canine and feline parasite control at home and abroad.

Source

Veterinary Times; 2016. 46(23):22, 24. 9 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

The European Scientific Counsel Companion Animal Parasites (ESCCAP) UK and Ireland is a national association of ESCCAP Europe, bringing together some of the UK and Ireland's leading experts in the field of veterinary parasitology. ESCCAP UK and Ireland works with pet owners and professionals to raise awareness of the threat from parasites and provide relevant information and advice. Part of this service is to answer questions from the public and veterinary professionals asked via www.esccapuk.org.uk This article addresses the most common questions asked that are of particular relevance to veterinary professionals.

Publication Type

Journal article.

<35>

Accession Number

20163246572

Author

Wright, I.

Title

UK Lyme disease: treatment and prevention.

Source

Companion Animal; 2016. 21(7):392-397. 12 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Lyme disease, caused by the spirochete *Borrelia burgdorferi*, remains the primary tick-borne pathogen affecting dogs and people in the UK. Confirmed human cases are increasing year by year, while dogs have been found to be carrying ticks infected with *B. burgdorferi*. The increasing risk of this disease in both dogs and owners makes prevention of exposure to *B. burgdorferi* vital for pets and people whose lifestyle puts them at particular risk of infection. This article reviews the treatment of Lyme disease and its prevention, including practical disease prevention and the role of the veterinary professional in giving accurate disease control advice.

Publication Type

Journal article.

<36>

Accession Number

20163263329

Author

Baines, D.; Taylor, L.

Title

Can acaricide-impregnated leg bands fitted to female red grouse reduce sheep tick parasitization of chicks and increase chick survival?

Source

Medical and Veterinary Entomology; 2016. 30(3):360-364. 32 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

In parts of northern England, North Wales and the Scottish Highlands, increasing numbers of sheep ticks *Ixodes ricinus* (Ixodida: Ixodidae), and the louping ill virus they can carry, are considered to be important factors that reduce red grouse *Lagopus lagopus scotica* productivity. The present study tested this hypothesis by fitting adult female grouse with leg bands impregnated with the acaricide cypermethrin to experimentally control ticks on their chicks on two managed grouse moors in northeast Scotland. The chicks of females fitted with acaricide leg bands showed reduced tick infestations and improved survival in one of the two study years, relative to chicks of control females. Acaricide leg bands constitute a potential management technique that may be adopted by grouse moor managers in circumstances of high tick infestations on grouse chicks.

Publication Type

Journal article.

<37>

Accession Number

20153071672

Author

Salona-Bordas, M. I.; Bahillo de la Puebla, P.; Diaz Martin, B.; Sumner, J.; Perotti, M. A.

Title

Ixodes ricinus (Ixodidae), an occasional phoront on necrophagous and coprophagous beetles in Europe.

Source

Experimental and Applied Acarology; 2015. 65(2):243-248. 23 ref.

Publisher

Springer

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

For ticks, phoretic behaviour using insects associated with vertebrates might offer an alternative strategy to host-seeking. Here we report for the first time the presence of immature stages of the most widespread tick species in Western Europe, *Ixodes ricinus* (Acari: Ixodidae), on three beetle species belonging to families Silphidae and Geotrupidae (Coleoptera). Specimens were collected while performing fieldwork surveys on insect diversity during the peak of tick's questing behaviour, in July and August of 2009 and 2010. The collections took place in two Natural Parks, the Aiako Harria, Guipuzcoa in Northern Spain and Wellington Country Park, Berkshire, in England. The silphid beetle *Nicrophorus vespilloides* and the geotrupid *Trypocopris pyrenaicus* were collected from pig-carcasses and both carried nymphs of *I. ricinus*; the geotrupid *Anoplotrupes stercorosus* was carrying a tick larva while feeding on red deer dung. These findings revealed an unnoticed but common relation of ticks not only with decomposed animals but also with insect scavengers. We discuss the rationale of this phenomenon.

Publication Type

Journal article.

<38>

Accession Number

20153099266

Author

Hansford, K. M.; Fonville, M.; Jahfari, S.; Sprong, H.; Medlock, J. M.

Title

Borrelia miyamotoi in host-seeking *Ixodes ricinus* ticks in England.

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Source

Epidemiology and Infection; 2015. 143(5):1079-1087. 43 ref.

Publisher

Cambridge University Press

Location of Publisher

Cambridge

Country of Publication

UK

Abstract

This paper reports the first detection of *Borrelia miyamotoi* in UK *Ixodes ricinus* ticks. It also reports on the presence and infection rates of *I. ricinus* for a number of other tick-borne pathogens of public health importance. Ticks from seven regions in southern England were screened for *B. miyamotoi*, *Borrelia burgdorferi sensu lato (s.l.)*, *Anaplasma phagocytophilum* and *Neohhrlichia mikurensis* using qPCR. A total of 954 *I. ricinus* ticks were tested, 40 were positive for *B. burgdorferi s.l.*, 22 positive for *A. phagocytophilum* and three positive for *B. miyamotoi*, with no *N. mikurensis* detected. The three positive *B. miyamotoi* ticks came from three geographically distinct areas, suggesting a widespread distribution, and from two separate years, suggesting some degree of endemicity. Understanding the prevalence of *Borrelia* and other tick-borne pathogens in ticks is crucial for locating high-risk areas of disease transmission.

Publication Type

Journal article.

<39>

Accession Number

20153215657

Author

Medlock, J. M.; Leach, S. A.

Title

Effect of climate change on vector-borne disease risk in the UK.

Source

Lancet Infectious Diseases; 2015. 15(6):721-730. 69 ref.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

During the early part of the 21st century, an unprecedented change in the status of vector-borne disease in Europe has occurred. Invasive mosquitoes have become widely established across Europe, with subsequent transmission and outbreaks of dengue and chikungunya virus. Malaria has re-emerged in Greece, and West Nile virus has emerged throughout parts of eastern Europe. Tick-borne diseases, such as Lyme disease, continue to increase, or, in the case of tick-borne encephalitis and Crimean-Congo haemorrhagic fever viruses, have changed their geographical distribution. From a veterinary perspective, the emergence of Bluetongue and Schmallenberg viruses show that northern Europe is equally susceptible to transmission of vector-borne disease. These changes are in part due to increased globalisation, with intercontinental air travel and global shipping transport creating new opportunities for invasive vectors and pathogens. However, changes in vector distributions are being driven by climatic changes and changes in land use, infrastructure, and the environment. In this Review, we summarise the risks posed by vector-borne diseases in the present and the future from a UK perspective, and assess the likely effects of climate change and, where appropriate, climate-change adaptation strategies on vector-borne disease risk in the UK. Lessons from the outbreaks of West Nile virus in North America and chikungunya in the Caribbean emphasise the need to assess future vector-borne disease risks and prepare contingencies for future outbreaks. Ensuring that adaptation strategies for climate change do not inadvertently exacerbate risks should be a primary focus for decision makers.

Publication Type

Journal article.

<40>

Accession Number

20153206230

Author

Tappin, S.

Title

Update on prevalence and risk of lyme borreliosis.

Source

Veterinary Times; 2015. 45(24):6...10. 16 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Lyme disease is a relatively new clinical entity caused by the spirochaete *Borrelia burgdorferi*. It is transmitted by a variety of tick vectors depending on the geographical location, with *Ixodes ricinus* being the most common in the UK. One study showed 10 per cent of dogs in the UK were seropositive to *Borrelia*, but only five per cent to 10 per cent of exposed dogs develop clinical signs, which classically present as fever with associated lethargy, followed by shifting limb lameness. Signs are not pathognomonic and serology to document a response to the organism C6 protein is the most effective confirmatory test for

borreliosis. Treatment with doxycycline leads to resolution of clinical signs in most cases. However, chronic, non-erosive polyarthritis and glomerular nephritis are seen in chronic infections. The aetiology of these signs is not fully understood, but are due to *Borrelia*'s ability to evade the immune system and the chronic inflammatory response this evokes. Prevention is based on acaricide treatments and prompt tick removal. Vaccination may now be considered in animals with lifestyles leading to a high chance of exposure in at-risk areas.

Publication Type

Journal article.

<41>

Accession Number

20153206280

Title

Common animal associated infections quarterly report (England and Wales) - third quarter 2014.

Source

Common animal associated infections quarterly report (England and Wales) - third quarter 2014; 2014. 8(44):5 pp. 1 ref.

Publisher

Public Health England

Location of Publisher

London

Country of Publication

UK

Abstract

This quarterly report summarizes confirmed cases of zoonoses reported in England and Wales (UK) between July and September 2014 (third quarter; weeks 27-39), which include brucellosis, hepatitis E, leptospirosis, Lyme disease, pasteurellosis, psittacosis, Q fever, and toxoplasmosis.

Publication Type

Miscellaneous.

<42>

Accession Number

20153270566

Author

Huyshe-Shires, S.

Title

Watch out, ticks about! Lyme disease - what you need to know.

Source

Quarterly Journal of Forestry; 2015. 109(3):186-191. 15 ref.

Publisher

The Royal Forestry Society

Location of Publisher

Banbury

Country of Publication

UK

Abstract

This article describes the ixodid ticks living in the UK, their life cycle and habitat, as well as the tickborne-diseases particularly Lyme disease. The risks, transmission and precautions to protect oneself and the public from Lyme disease are discussed.

Publication Type

Journal article.

<43>

Accession Number

20153247970

Author

Tappin, S.

Title

Lyme disease in the UK.

Source

BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :387-388.

Publisher

British Small Animal Veterinary Association

Location of Publisher

Quedgeley

Country of Publication

UK

Publication Type

Conference paper.

<44>

Accession Number

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20153247806

Author

Lappin, M.; Tappin, S.

Title

Lyme disease in the UK and USA.

Source

BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :191.

Publisher

British Small Animal Veterinary Association

Location of Publisher

Quedgeley

Country of Publication

UK

Publication Type

Conference paper.

<45>

Accession Number

20153247773

Author

Baylis, M.

Title

Forecasting the future: emerging diseases in a changing climate.

Source

BSAVA Congress 2015: Scientific Proceedings, Birmingham, UK, 9-12 April 2015; 2015. :152.

Publisher

British Small Animal Veterinary Association

Location of Publisher

Quedgeley

Country of Publication

UK

Publication Type

Conference paper.

<46>

Accession Number

20133411328

Author

Qousquer, G.

Title

Rabbits, companion animals and arthropod-borne diseases.

Source

VN Times; 2013. 13(12):10-11.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<47>

Accession Number

20143077149

Author

Dinnis, R. E.; Seelig, F.; Bormane, A.; Donaghy, M.; Vollmer, S. A.; Feil, E. J.; Kurtenbach, K.; Margos, G.

Title

Multilocus sequence typing using mitochondrial genes (mtMLST) reveals geographic population structure of Ixodes ricinus ticks.

Source

Ticks and Tick-borne Diseases; 2014. 5(2):152-160.

Publisher

Elsevier GmbH

Location of Publisher

Munchen

Country of Publication

Germany

Abstract

The hard tick *Ixodes ricinus* is the principal vector of Lyme borreliosis (LB) group spirochaetes in Europe, but it also transmits a large number of other microbial pathogens that are of importance to animal and human health. Here, we characterise geographically distinct populations of this important ectoparasite based on multilocus sequence typing (MLST) of multiple mitochondrial (mt) genes (mtMLST). Internal fragments of approximately 500 bp were amplified and sequenced for 6 protein-encoding and ribosomal genes (*atp6*, *coi*, *coii*, *coiii*, *cytB*, and *12s*). The samples analysed consisted of 506 questing nymphs collected in Britain and Latvia in 2006-2008 and in Latvia in 2002. Although little genetic structure has previously been observed in *I. ricinus* ticks among Europe, our data could clearly differentiate these 2 populations. Here, we argue that this novel scheme provides additional phylogenetic resolution which is important for understanding the genetic and geographic structure of *I. ricinus* populations. This in turn will benefit monitoring and management of tick-borne diseases.

Publication Type

Journal article.

<48>

Accession Number

20143094875

Author

Mappley, L. J.; Ragione, R. M. Ia; Woodward, M. J.

Title

Brachyspira and its role in avian intestinal spirochaetosis.

Source

Veterinary Microbiology; 2014. 168(2/4):245-260. many ref.

Publisher

Elsevier B. V.

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

The fastidious, anaerobic spirochaete *Brachyspira* is capable of causing enteric disease in avian, porcine and human hosts, amongst others, with a potential for zoonotic transmission. Avian intestinal spirochaetosis (AIS), the resulting disease from colonisation of the caeca and colon of poultry by *Brachyspira* leads to production losses, with an estimated annual cost of circa <pounds>18 million to the commercial layer industry in the United Kingdom. Of seven known and several proposed species of *Brachyspira*, three are currently considered pathogenic to poultry; *B. alvinipulli*, *B. intermedia* and *B. pilosicoli*. Currently, AIS is primarily prevented by strict biosecurity controls and is treated using antimicrobials, including tiamulin. Other treatment strategies have been explored, including vaccination and probiotics, but such developments have been hindered by a limited understanding of the pathobiology of *Brachyspira*. A lack of knowledge of the metabolic capabilities and little genomic information for *Brachyspira* has resulted in a limited understanding of the pathobiology. In addition to an emergence of antibiotic resistance amongst *Brachyspira*, bans on the prophylactic use of antimicrobials in livestock are

driving an urgent requirement for alternative treatment strategies for Brachyspira-related diseases, such as AIS. Advances in the molecular biology and genomics of Brachyspira heralds the potential for the development of tools for genetic manipulation to gain an improved understanding of the pathogenesis of Brachyspira.

Publication Type

Journal article.

<49>

Accession Number

20143073489

Author

Tappin, S.

Title

Canine vector-borne diseases - prevalence and prevention.

Source

Veterinary Times; 2014. 44(9):6, 8. 17 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Canine tick-borne diseases are uncommon, but their incidence and, consequently, public awareness is increasing. Many factors are involved, such as changes to tick populations and distribution, pets travelling abroad and being exposed to novel tick vectors and their associated diseases, as well as increased vigilance and more available diagnostic techniques. Warmer climates through northern Europe have allowed tick populations to expand their distribution, and milder winters have led to increased numbers in tick populations. As a result, the prevalence of endemic diseases such as Lyme disease has increased significantly in man over the past decade, and the incidence of suspected canine cases has also increased. Diseases not usually seen in the United Kingdom, such as Borrelia and Ehrlichia, have been seen as a result of travel to mainland Europe and cases of both diseases have been reported in untravelled animals, prompting concerns these diseases may become endemic in the British tick population.

Publication Type

Journal article.

<50>

Accession Number

20143082116

Author

Gerrard, E.

Title

Fleas, ticks and other nasties: ways to keep an itchy subject relevant.

Source

VN Times; 2014. 14(3):8-10. 3 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<51>

Accession Number

20143130211

Author

Wright, I.; Wall, R.

Title

Ticks and Lyme disease: a growing threat?

Source

Companion Animal; 2013. 18(10):474-477. 29 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Canine Lyme disease is a tick-borne condition caused by gram-negative spirochaetes belonging to the *Borrelia burgdorferi* group, and continues to cause concern to many members of the public, particularly those walking in high-risk areas. Both the prevalence of infection and incidence of disease in canines and

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humans appear to be increasing and this makes effective diagnosis, treatment and prevention measures vital to the veterinary practitioner. This article discusses the epidemiology, diagnosis, treatment and prevention of Lyme disease.

Publication Type

Journal article.

<52>

Accession Number

20143165084

Author

Gilbert, L.; Aungier, J.; Tomkins, J. L.

Title

Climate of origin affects tick (*Ixodes ricinus*) host-seeking behavior in response to temperature: implications for resilience to climate change?

Source

Ecology and Evolution; 2014. 4(7):1186-1198. 37 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Climate warming is changing distributions and phenologies of many organisms and may also impact on vectors of disease-causing pathogens. In Europe, the tick *Ixodes ricinus* is the primary vector of medically important pathogens (e.g., *Borrelia burgdorferi sensu lato*, the causative agent of Lyme borreliosis). How might climate change affect *I. ricinus* host-seeking behavior (questing)? We hypothesize that, in order to maximize survival, *I. ricinus* have adapted their questing in response to temperature in accordance with local climates. We predicted that ticks from cooler climates quest at cooler temperatures than those from warmer climates. This would suggest that *I. ricinus* can adapt and therefore have the potential to be resilient to climate change. *I. ricinus* were collected from a cline of climates using a latitudinal gradient (northeast Scotland, North Wales, South England, and central France). Under laboratory conditions, ticks were subjected to temperature increases of 1 degrees C per day, from 6 to 15 degrees C. The proportion of ticks questing was recorded five times per temperature (i.e., per day). The theoretical potential to quest was then estimated for each population over the year for future climate change projections. As predicted, more ticks from cooler climates quested at lower temperatures than did ticks from warmer climates. The proportion of ticks questing was strongly associated with key climate parameters from each location. Our projections, based on temperature alone, suggested that populations could advance their activity season by a month under climate change, which has implications for exposure periods of hosts to tick-borne pathogens. Our findings suggest that *I. ricinus* have adapted their behavior in response to climate, implying some potential to adapt to climate change. Predictive models of *I. ricinus* dynamics and disease risk over continental scales would benefit from knowledge of these differences between populations.

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Publication Type

Journal article.

<53>

Accession Number

20143212689

Author

Mowbray, F.; Amlot, R.; Rubin, G. J.

Title

Predictors of protective behaviour against ticks in the UK: a mixed methods study.

Source

Ticks and Tick-borne Diseases; 2014. 5(4):392-400.

Publisher

Elsevier GmbH

Location of Publisher

Munchen

Country of Publication

Germany

Abstract

The objective of this research was to determine the most appropriate protective behaviours to promote in order to protect members of the public from Lyme borreliosis, to identify the drivers and barriers for these behaviours, and to determine the strongest predictors of tick-protective behaviour. We used a mixed methods study with qualitative interviews and a quantitative web survey. Interviews with topic experts and members of the public suggested that predictors of tick checking included perceived disease likelihood and severity as well as overall awareness of ticks and tick-borne disease. Twenty-four percent of participants regularly checked for ticks after walking in a tick-endemic area. The strongest predictors of checking for ticks were greater levels of knowledge, perceived likelihood of being bitten, self-efficacy about tick removal, and lower levels of disgust about ticks. Barriers to checking included forgetfulness and lacking time. At-risk members of the UK public require information to increase awareness of ticks and protective behaviours, particularly tick checking. Information may be most effective if it focuses on increasing self-efficacy while also reducing disgust.

Publication Type

Journal article.

<54>

Accession Number

20143326554

Author

Zintl, A.; McGrath, G.; O'Grady, L.; Fanning, J.; Downing, K.; Roche, D.; Casey, M.; Gray, J. S.

Title

Changing incidence of bovine babesiosis in Ireland.

Source

Irish Veterinary Journal; 2014. 67(19):(5 September 2014). 27 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: In Ireland bovine babesiosis is caused by the tick-borne blood parasite, *Babesia divergens*. A survey of veterinary practitioners and farmers in the 1980's revealed an annual incidence of 1.7% associated with considerable economic losses. However, two subsequent surveys in the 1990's indicated a decline in clinical babesiosis. Recent evidence from continental Europe suggests that, probably due to climate change, the distribution of the tick vector of *B. divergens*, *Ixodes ricinus* is extending to more northerly regions and higher altitudes. In addition, milder winters are thought to widen the window of tick activity. In order to determine whether any such changes have affected the incidence of bovine babesiosis in Ireland, a questionnaire survey of farmers and veterinarians was carried out and compared with data from previous surveys. **Results:** Our survey indicates that while the incidence of clinical disease has continued to decline, cases can occur at any time of year. In contrast to previous surveys, affected farms were the same size as unaffected ones. There was no correlation between disease risk and the presence of deer on the land. Disease severity and mortality rates were increased because many infections were advanced by the time they were detected and treated. **Conclusion:** While the precise reasons for the decline in the incidence of redwater are unknown, changes in agricultural practice are likely to be of importance. A reversal of the trend could be devastating, as vigilance among farmers and veterinarians is flagging and the national herd is losing its protective immunity to disease.

Publication Type

Journal article.

<55>

Accession Number

20143326317

Author

Blanarova, L.; Stanko, M.; Carpi, G.; Miklisova, D.; Vichova, B.; Mosansky, L.; Bona, M.; Derdakova, M.

Title

Distinct *Anaplasma phagocytophilum* genotypes associated with *Ixodes trianguliceps* ticks and rodents in Central Europe.

Source

Ticks and Tick-borne Diseases; 2014. 5(6):928-938.

Publisher

Elsevier GmbH

Location of Publisher

Munchen

Country of Publication

Germany

Abstract

Rodents are important reservoir hosts of tick-borne pathogens. *Anaplasma phagocytophilum* is the causative agent of granulocytic anaplasmosis of both medical and veterinary importance. In Europe, this pathogen is primarily transmitted by the *Ixodes ricinus* tick among a wide range of vertebrate hosts. However, to what degree *A. phagocytophilum* exhibits host specificity and vector association is poorly understood. To assess the extent of vector association of this pathogen and to clarify its ecology in Central Europe we have analyzed and compared the genetic variability of *A. phagocytophilum* strains from questing and feeding *I. ricinus* and *Ixodes trianguliceps* ticks, as well as from rodent tissue samples. Tick collection and rodent trapping were performed during a 2-year study (2011-2012) in ecologically contrasting setting at four sites in Eastern Slovakia. Genetic variability of this pathogen was studied from the collected samples by DNA amplification and sequencing of four loci followed by Bayesian phylogenetic analyses. *A. phagocytophilum* was detected in questing *I. ricinus* ticks (0.7%) from all studied sites and in host feeding *I. trianguliceps* ticks (15.2%), as well as in rodent biopsies (ear - 1.6%, spleen - 2.2%), whereas *A. phagocytophilum* was not detected in rodents from those sites where *I. trianguliceps* ticks were absent. Moreover, Bayesian phylogenetic analyses have shown the presence of two distinct clades, and tree topologies were concordant for all four investigated loci. Importantly, the first clade contained *A. phagocytophilum* genotypes from questing *I. ricinus* and feeding *I. ricinus* from a broad array of hosts (i.e., humans, ungulates, birds and dogs). The second clade comprised solely genotypes found in rodents and feeding *I. trianguliceps*. In this study we have confirmed that *A. phagocytophilum* strains display specific host and vector associations also in Central Europe similarly to *A. phagocytophilum*' molecular ecology in United Kingdom. This study suggests that *A. phagocytophilum* genotypes associated with rodents are probably transmitted solely by *I. trianguliceps* ticks, thus implying that rodent-associated *A. phagocytophilum* strains may not pose a risk for humans.

Publication Type

Journal article.

<56>

Accession Number

20123402379

Author

Jennett, A.; Wall, R.

Title

Low temperatures won't wash for tick elimination.

Source

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Veterinary Record; 2012. 171(22):570. 4 ref.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

In this study, adult *Ixodes ricinus* ticks collected in southwest England, UK, during September-October 2012 were placed in muslin bags which were in turn placed in a washing machine. The bags were subjected to 30, 40 or 60 degrees C washes in either short (49 min) or long (2 h and 46 min) cycles with and without washing powder. It was shown that all ticks survived the 30 and 40 degrees C washes in both short and long wash cycles. All ticks died at 60 degrees C regardless of cycle length and the presence/absence of washing powder. In conclusion, clothes should be laundered in hot water at 60 degrees C to eliminate potential bites from ticks acquired on clothing.

Publication Type

Correspondence.

<57>

Accession Number

20133008741

Author

O'Brien, L.; Marcu, A.; Marzano, M.; Barnett, J.; Quine, C.; Uzzell, D.

Title

Situating risk in the context of a woodland visit: a case study on Lyme borreliosis.

Source

Scottish Forestry; 2012. 66(4):14-24. 42 ref.

Publisher

Royal Scottish Forestry Society

Location of Publisher

Canonbie

Country of Publication

UK

Abstract

Research shows that people value woodlands for relaxation and as a place to have contact with nature. Yet woodlands can also involve exposure to a variety of risks. In this study the way in which people consider issues of risk in environments generally associated with a range of positive values was explored with visitors

to a woodland in South East England. A walk through the woods taking photographs, focus group discussions and questionnaires were the methods used in this research with four groups of people from a range of ages. We focused on the positive and negative aspects of woodlands and discussed risks that might be encountered in this environment before focusing specifically on Lyme borreliosis (Lyme disease) as an example of a specific risk. Those involved in the research understood that there are potential risks that may have an impact on their use of woodlands. However, they did not passively accept information on risks but generated their own understanding based on the development of what they considered to be 'common sense' approaches to dealing with risk. The way in which people value woodlands is something they take into consideration when discussing risks that might be encountered on a woodland visit. In relation to Lyme borreliosis, participants favour taking action after their woodland visit (e.g. looking for ticks or a rash), rather than beforehand, so as not to detract from their woodland experience. Communication about these risks should be simple and concise and take into account the values, behaviours and practices that people typically undertake in these environments.

Publication Type

Journal article.

<58>

Accession Number

20133038160

Author

Wright, I.

Title

Lyme disease. If you go down to the woods today, are you in for a big surprise?

Source

Veterinary Nursing Journal; 2012. 27(3):103-105.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

There are some UK diseases with zoonotic potential that remain under the public radar; but there are others, such as toxocarosis and toxoplasmosis, that have gained a degree of fame and notoriety. Lyme disease fits very much into the latter category and this article discusses the epidemiology, diagnosis, treatment and prevention of the disease. It also highlights the zoonotic risks and misconceptions that surround it.

Publication Type

Journal article.

<59>

Accession Number

20133064128

Author

James, M. C.; Bowman, A. S.; Forbes, K. J.; Lewis, F.; McLeod, J. E.; Gilbert, L.

Title

Environmental determinants of *Ixodes ricinus* ticks and the incidence of *Borrelia burgdorferi sensu lato*, the agent of Lyme borreliosis, in Scotland.

Source

Parasitology; 2013. 140(2):237-246. many ref.

Publisher

Cambridge University Press

Location of Publisher

Cambridge

Country of Publication

UK

Abstract

Lyme borreliosis (LB) is the most common arthropod-borne disease of humans in the Northern hemisphere. In Europe, the causative agent, *Borrelia burgdorferi sensu lato* complex, is principally vectored by *Ixodes ricinus* ticks. The aim of this study was to identify environmental factors influencing questing *I. ricinus* nymph abundance and *B. burgdorferi* s.l. infection in questing nymphs using a large-scale survey across Scotland. Ticks, host dung and vegetation were surveyed at 25 woodland sites, and climatic variables from a Geographical Information System (GIS) were extracted for each site. A total of 2397 10 m² transect surveys were conducted and 13 250 *I. ricinus* nymphs counted. Questing nymphs were assayed for *B. burgdorferi* s.l. and the average infection prevalence was 5.6% (range 0.8-13.9%). More questing nymphs and higher incidence of *B. burgdorferi* s.l. infection were found in areas with higher deer abundance and in mixed/deciduous compared to coniferous forests, as well as weaker correlations with season, altitude, rainfall and ground vegetation. No correlation was found between nymph abundance and infection prevalence within the ranges encountered. An understanding of the environmental conditions associated with tick abundance and pathogen prevalence may be used to reduce risk of exposure and to predict future pathogen prevalence and distributions under environmental changes.

Publication Type

Journal article.

<60>

Accession Number

20133071210

Author

Juvet, F.

Title

Treatment and management of flea and tick-borne diseases.

Source

Veterinary Times; 2013. 43(8):8...11. 16 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

This article will focus on flea and tick transmitted diseases encountered in the UK or that should be considered in dogs and cats that have recently travelled to Europe (Table 1). Fleas and ticks are known to transmit parasites, bacteria and viruses to a variety of animals and humans. Their bite can also cause local reaction, irritation or, in case of heavy parasitism, anaemia. Although a straightforward treatment is known for most flea and tick-borne diseases, for others, no known treatment exists and prevention will be the only way to avoid a potentially life-threatening syndrome. Some of these diseases are also a threat to human health so fleas and ticks are definitely more than just a nuisance. In this article, the author gives a reminder of the clinical signs compatible with these diseases to know which individual to test and when to treat; consider how to manage and treat the animals that require treatment; and how to prevent animals from developing flea or tick-borne diseases.

Publication Type

Journal article.

<61>

Accession Number

20133129565

Author

Speck, S.; Perseke, L.; Petney, T.; Skuballa, J.; Pfaffle, M.; Taraschewski, H.; Bunnell, T.; Essbauer, S.; Dobler, G.

Title

Detection of *Rickettsia helvetica* in ticks collected from European hedgehogs (*Erinaceus europaeus*, Linnaeus, 1758).

Source

Ticks and Tick-borne Diseases; 2013. 4(3):222-226.

Publisher

Elsevier GmbH

Location of Publisher

Munchen

Country of Publication

Germany

Abstract

The role of wild mammals in the dissemination and maintenance of *Rickettsia* in nature is still under investigation. European hedgehogs (*Erinaceus europaeus*) are often heavily infested by tick and flea species that are known to harbor and transmit different *Rickettsia* spp. We investigated ixodid ticks sampled from European hedgehogs for the presence of *Rickettsia*. A total of 471 *Ixodes ricinus* and 755 *I. hexagonus* were collected from 26 German and 7 British European hedgehogs. These were tested by a genus-specific real-time PCR assay targeting the citrate synthase gene (*gltA*). The *rickettsia* minimum infection rate was 11.7% with an increase detected with each parasitic tick stage. No significant difference in *Rickettsia* prevalence in the 2 *Ixodes* species was detected. Using sequencing of partial *ompB*, *Rickettsia helvetica* was the only species identified. More than half of the hedgehogs carried *Rickettsia*-positive ticks. In addition, tissue samples from 2/5 hedgehogs (where tissue DNA was available) were PCR-positive. These results show that European hedgehogs are exposed to *R. helvetica* via infected ticks and might be involved in the natural transmission cycle of this *Rickettsia* species.

Publication Type

Journal article.

<62>

Accession Number

20133127379

Author

Bettridge, J.; Renard, M.; Zhao Fan; Bown, K. J.; Birtles, R. J.

Title

Distribution of *Borrelia burgdorferi sensu lato* in *Ixodes ricinus* populations across central Britain.

Source

Vector Borne and Zoonotic Diseases; 2013. 13(3):139-146. 43 ref.

Publisher

Mary Ann Liebert, Inc.

Location of Publisher

New Rochelle

Country of Publication

USA

Abstract

Lyme borreliosis is rapidly emerging in the United Kingdom, with over 1000 cases per annum now reported. Lyme borreliosis is caused by the *Borrelia burgdorferi sensu lato* (s.l.) group of spirochetes, which are transmitted by ixodid ticks. In the United Kingdom, *Ixodes ricinus* is recognized as the principal vector of the spirochetes, and this tick species is widely distributed across the country. However, as yet, it is unclear

whether the distribution of *B. burgdorferi* essentially mirrors that of its vector, or if there are marked differences between the 2. The aim of this survey was to investigate the prevalence of *B. burgdorferi* in *I. ricinus* populations across northern England, north Wales, and the Scottish Border region. We surveyed for questing *I. ricinus* nymphs and adults at 17 sites, encountering ticks at 12. At 8 sites, large numbers (>160) ticks were collected, and at 3 of these sites *B. burgdorferi* infection prevalence was significantly higher (>7.5%) than the other 5 (<1.0%). Habitat type was associated with *B. burgdorferi* prevalence, with ticks from deciduous and mixed woodland being significantly more likely to be infected than those from other habitat types. Identification of infecting *Borrelia* species indicated that *Borrelia valaisiana* was the most common and widespread species encountered. *B. garinii* was common at sites where infection prevalence was high, and *B. afzelii* was also occasionally encountered at these sites. The survey revealed a surprisingly uneven distribution of *B. burgdorferi* s.l. across the region, thereby indicating that the presence of ticks does not necessarily mean the presence of the pathogen. Indeed, the spirochete appears to be absent or very rare at some sites where ticks are abundant.

Publication Type

Journal article.

<63>

Accession Number

20133268903

Author

Tijssse-Klasen, E.; Hansford, K. M.; Jahfari, S.; Phipps, P.; Sprong, H.; Medlock, J. M.

Title

Spotted fever group rickettsiae in *Dermacentor reticulatus* and *Haemaphysalis punctata* ticks in the UK.

Source

Parasites and Vectors; 2013. 6(212):(19 July 2013). 17 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: Spotted fever group (SFG) rickettsiae have recently been identified for the first time in UK ticks. This included the findings of *Rickettsia helvetica* in *Ixodes ricinus* and *Rickettsia raoultii* in *Dermacentor reticulatus*. This paper further investigates the occurrence of SFG rickettsiae in additional geographically distinct populations of *D. reticulatus*, and for the first time, investigates the occurrence of SFG rickettsiae in UK populations of *Haemaphysalis punctata* ticks. **Methods:** Questing *D. reticulatus* and *H. punctata* were collected at a number of sites in England and Wales. DNA from questing ticks was extracted by alkaline lysis and detection of rickettsiae DNA was performed, in addition to detection of *A. phagocytophilum*, *N. mikurensis*, *C. burnetii* and *B. burgdorferi* sensu lato. **Results:** This paper builds on previous findings to include the detection of spotted fever *Rickettsia* which showed the highest homology to *Rickettsia massiliae* in *Haemaphysalis punctata*, as well as *R. helvetica* in *D. reticulatus*. The occurrence of

SFG rickettsiae in *D. reticulatus* in the UK appears to be confined only to Welsh and Essex populations, with no evidence so far from Devon. Similarly, the occurrence of SFG rickettsiae in *H. punctata* appears confined to one of two farms known to be infested with this tick in North Kent, with no evidence so far from the Sussex populations. *Anaplasma phagocytophilum*, *Neorhlichia mikurensis*, *Coxiella burnetii* and *Borrelia burgdorferi sensu lato* DNA was not detected in any of the ticks. Conclusion: These two tick species are highly restricted in their distribution in England and Wales, but where they do occur they can be abundant. Following detection of these SFG rickettsiae in additional UK tick species, as well as *I. ricinus*, research should now be directed towards clarifying firstly the geographic distribution of SFG rickettsiae in UK ticks, and secondly to assess the prevalence rates in ticks, wild and domesticated animals and humans to identify the drivers for disease transmission and their public health significance.

Publication Type

Journal article.

<64>

Accession Number

20133294955

Author

Porter, R.; Norman, R. A.; Gilbert, L.

Title

A model to test how ticks and louping ill virus can be controlled by treating red grouse with acaricide.

Source

Medical and Veterinary Entomology; 2013. 27(3):237-246. 33 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Ticks are the most important vectors of disease-causing pathogens in Europe. In the U.K., *Ixodes ricinus* L. (Ixodida: Ixodidae) transmits louping ill virus (LIV; Flaviviridae), which kills livestock and red grouse, *Lagopus lagopus scoticus* Lath. (Galliformes: Phasianidae), a valuable game bird. Tick burdens on grouse have been increasing. One novel method to reduce ticks and LIV in grouse may be acaricide treatment. Here, we use a mathematical model parameterized with empirical data to investigate how the acaricide treatment of grouse might theoretically control ticks and LIV in grouse. Assuming a situation in which ticks and LIV impact on the grouse population, the model predicts that grouse density will depend on deer density because deer maintain the tick population. In low deer densities, no acaricide treatment is predicted to be necessary because abundances of grouse will be high. However, at higher deer densities, the model predicts that grouse densities will increase only if high numbers of grouse are treated, and the efficacy of acaricide is high and lasts 20 weeks. The qualitative model predictions may help to guide decisions on whether to treat grouse or cull deer depending on deer densities and how many grouse can be treated. The model is discussed in terms of practical management implications.

Publication Type

Journal article.

<65>

Accession Number

20133375722

Author

Wright, I.

Title

Canine Lyme disease presenting as a forelimb lameness.

Source

Companion Animal; 2013. 18(8):372-373. 2 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Canine Lyme disease is a tick-borne disease caused by gram-negative spirochaetes belonging to the *Borrelia burgdorferi* group. A common manifestation of the disease in dogs is a shifting lameness but is often missed in practice due to the non-specific and sometimes subtle presentation of the clinical signs. This article describes a typical case of canine Lyme disease and demonstrates the importance of early diagnosis and treatment intervention, and how this can avoid some of the more serious consequences of chronic disease. Options for disease prevention are also discussed.

Publication Type

Journal article.

<66>

Accession Number

20133413506

Author

Smith, F. D.; Wall, L. E. R.

Title

Prevalence of *Babesia* and *Anaplasma* in ticks infesting dogs in Great Britain.

Source

Veterinary Parasitology; 2013. 198(1/2):18-23. 49 ref.

Publisher

Elsevier B. V.

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

Ticks are important vectors of disease in companion animals and transmit an extensive range of viral, bacterial and protozoan pathogens to dogs and cats. They may also be vectors of zoonotic pathogens which affect the health of in-contact owners. In recent years, babesiosis, and anaplasmosis have all shown signs of increased prevalence and distribution in various parts of Europe. Here, the prevalence of *Anaplasma* spp. and *Babesia* spp. pathogens in *Ixodes* ticks, collected from dogs in the UK in 2009, were evaluated using PCR and sequence analysis of the 16S rDNA or 18S rDNA regions respectively. Species identification was performed by alignment with existing sequences in GenBank. After sequencing, 5 out of 677 tick samples (0.74%) contained rDNA which shared 97-100% sequence homology with *Anaplasma phagocytophilum*. Of these, three samples came from *Ixodes ricinus* and two from *Ixodes hexagonus*. Sixteen out of 742 ticks (2.4%) were positive for *Babesia* and of these 11 showed 97-100% homology with *B. gibsoni*. All of these 11 samples were derived from *I. ricinus*. One sample, again from *I. ricinus*, showed 99% homology for *B. divergens*. Four of the *Babesia* spp. sequences were of the "venatorum" or EU1 type, three of which came from *I. ricinus* and one from an *Ixodes canisuga*. This strain has been associated with severe human cases of babesiosis. A further 246 positive results, which appeared to show the presence of *Anaplasma* following PCR, were shown by sequence analysis to be derived from the bacterium *Candidatus "Midichloria mitochondrii"*, which to date has been assumed to be non-pathogenic. The results are of interest because the presence of *B. gibsoni* in the UK further confirms the worldwide distribution of this piroplasm and supports the inference that *I. ricinus* may act as a vector for *Babesia* of the *gibsoni*-complex.

Publication Type

Journal article.

<67>

Accession Number

20123061749

Author

Newborn, D.; Baines, D.

Title

Enhanced control of sheep ticks in upland sheep flocks: repercussions for red grouse co-hosts.

Source

Medical and Veterinary Entomology; 2012. 26(1):63-69. 33 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Sheep ticks *Ixodes ricinus* (Acari: Ixodidae) and tick-borne diseases cause major economic losses in both upland sheep farming and moorland shoots of red grouse *Lagopus lagopus scoticus*. Sheep were treated with acaricide four times between March and October and double-vaccinated against louping ill virus (LIV), instead of the conventional regime of two acaricide treatments and no vaccinations, on two moors in northern England. Enhanced treatment started at Westerdale Moor in 1995 and at Danby Moor in 2000; the latter had previously represented a spatial control site. From 1992 to 2003, grouse chick condition, tick burdens, reproductive success, shooting bags and LIV seroprevalence were measured. A total of 1297 grouse chicks from 398 broods were examined for ticks. Enhanced acaricide treatment reduced tick burdens by 90%, and LIV seroprevalence decreased in relation to the number of years since treatment began. Breeding success and post-breeding densities of grouse in the current sample area remained unrelated to acaricide treatment, tick burdens or LIV seroprevalence, but 25% and 60% more grouse were shot on Westerdale and Danby, respectively, after treatment enhancement than before. By improving shooting bags, tick management schemes help to maintain the economic viability of grouse moors, which, in turn, provide upland landscape and wildlife benefits.

Publication Type

Journal article.

<68>

Accession Number

20123068984

Author

Skuballa, J.; Petney, T.; Pfaffle, M.; Oehme, R.; Hartelt, K.; Fingerle, V.; Kimmig, P.; Taraschewski, H.

Title

Occurrence of different *Borrelia burgdorferi* sensu lato genospecies including *B. afzelii*, *B. bavariensis*, and *B. spielmanii* in hedgehogs (*Erinaceus* spp.) in Europe.

Source

Ticks and Tick-borne Diseases; 2012. 3(1):8-13. 47 ref.

Publisher

Elsevier GmbH

Location of Publisher

Munchen

Country of Publication

Germany

Abstract

In order to determine whether European hedgehogs (*Erinaceus europaeus* and *E. roumanicus*) play a role in the epidemiological cycle of *Borrelia burgdorferi sensu lato* in Central Europe and Great Britain, tissue samples of hedgehogs from Germany (n=211), Austria (n=4), the Czech Republic (n=22), and the UK (n=32) were tested for the presence of these tick-borne pathogens. PCR for amplification of the *B. burgdorferi* s.l.-specific 5S-23S intergenic spacer region as well as the outer surface protein A (*ospA*) gene were used. *B. burgdorferi* s.l. DNA was detected in 35 of the 259 *E. europaeus* and in 2 of 10 *E. roumanicus*. *B. burgdorferi* prevalences in *E. europaeus* ranged from 0% (UK) to 37.5% (Czech Republic), for *E. roumanicus* from 0% (Czech Republic) to 50.0% (Austria). Sequencing revealed the occurrence of 3 different *B. burgdorferi* genospecies in *E. europaeus*: *B. afzelii* was the dominant genospecies, followed by *B. bavariensis* (previously *B. garinii* *OspA* serotype 4) and *B. spielmanii*, the latter was detected for the first time in Hamburg (Germany). *B. afzelii* and *B. bavariensis* were also found in *E. roumanicus*. Our results suggest that hedgehogs modulate the epidemiology of certain species of the *B. burgdorferi* s.l. complex, potentially affecting the distribution and abundance of individual *B. burgdorferi* s.l. genospecies in various habitats. We hypothesise that juvenile or individuals with low immune competence in particular, have a high reservoir potential for the 3 genospecies identified here.

Publication Type

Journal article.

<69>

Accession Number

20123137096

Author

Gilbert, L.; Maffey, G. L.; Ramsay, S. L.; Hester, A. J.

Title

The effect of deer management on the abundance of *Ixodes ricinus* in Scotland.

Source

Ecological Applications; 2012. 22(2):658-667. 48 ref.

Publisher

Ecological Society of America

Location of Publisher

Washington

Country of Publication

USA

Abstract

The management of wildlife hosts for controlling parasites and disease has a history of mixed success. Deer can be important hosts for ticks, such as *Ixodes ricinus*, which is the primary vector of disease-causing zoonotic pathogens in Europe. Deer are generally managed by culling and fencing for forestry protection, habitat conservation, and commercial hunting, and in this study we test whether these deer management methods can be useful for controlling ticks, with implications for tick-borne pathogens. At different spatial scales and habitats we tested the hypotheses that tick abundance is reduced by (1) culling deer and (2) deer exclusion using fencing. We compared abundance indices of hosts and questing *I. ricinus* nymphs using a combination of small-scale fencing experiments on moorland, a large-scale natural experiment of fenced and unfenced pairs of forests, and cross-sectional surveys of forest and moorland areas with varying

deer densities. As predicted, areas with fewer deer had fewer ticks, and fenced exclosures had dramatically fewer ticks in both large-scale forest and small-scale moorland plots. Fencing and reducing deer density were also associated with higher ground vegetation. The implications of these results on other hosts, pathogen prevalence, and disease risk are discussed. This study provides evidence of how traditional management methods of a keystone species can reduce a generalist parasite, with implications for disease risk mitigation.

Publication Type

Journal article.

<70>

Accession Number

20123121817

Title

Ticks and tickborne diseases: raising awareness of the risks.

Source

Veterinary Record; 2012. 170(14):351-352.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

This article describes the control of *Rhipicephalus sanguineus*, *Ixodes ricinus*, *Dermacentor reticulatus* and other ticks and the subsequent control of *Babesia*, *Anaplasma phagocytophilum*, Lyme diseases and other tickborne diseases in Europe during a symposium held in Hungary in 2011.

Publication Type

Journal article.

<71>

Accession Number

20123121711

Author

Wall, R.

Title

A ticking clock for tickborne disease?

Source

Veterinary Record; 2012. 170(13):326-328. 15 ref.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

This article describes the risk and prevention of tickborne disease transmission in pets travelling to and from the UK and other countries.

Publication Type

Journal article.

<72>

Accession Number

20123111268

Author

Morgan, E.; Smith, F.

Title

Hitching a ride: pet travel and tick risks since this year's rule changes.

Source

The Veterinary Nurse; 2012. 3(2):102...108. 11 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

On 1st January 2012, the rules for pet travel into the UK changed. Most notably, the requirement to treat against ticks on (re-)entry was removed. In this article, the authors consider what this might mean in terms of the risks of importing tickborne diseases of importance to canine and human health, and how it should affect advice to clients in the UK planning to travel abroad with their dogs. The main tick species of concern is *Rhipicephalus sanguineus*, the brown dog or kennel tick and vector of *Babesia vogeli*, canine monocytic ehrlichiosis, hepatozoonosis, and Mediterranean Spotted fever in humans. However, other ticks and diseases that are already endemic in the UK, especially *Ixodes ricinus* and *Dermacentor reticulatus* and the agent of Lyme borreliosis, also provide increasing cause for concern and should not be neglected when considering parasite control in dogs.

Publication Type

Journal article.

<73>

Accession Number

20123149174

Author

Jahfari, S.; Fonville, M.; Hengeveld, P.; Reusken, C.; Scholte, E. J.; Takken, W.; Heyman, P.; Medlock, J.; Heylen, D.; Kleve, J.; Sprong, H.

Title

Prevalence of *Neoehrlichia mikurensis* in ticks and rodents from north-west Europe.

Source

Parasites and Vectors; 2012. 5(74):(19 April 2012). 43 ref.

Publisher

BioMed Central Ltd

Location of Publisher

London

Country of Publication

UK

Abstract

Background: *Neoehrlichia mikurensis* is an emerging and vector-borne zoonosis: The first human disease cases were reported in 2010. Limited information is available about the prevalence and distribution of *Neoehrlichia mikurensis* in Europe, its natural life cycle and reservoir hosts. An Ehrlichia-like schotti variant has been described in questing *Ixodes ricinus* ticks, which could be identical to *Neoehrlichia mikurensis*. **Methods:** Three genetic markers, 16S rDNA, gltA and GroEL, of Ehrlichia schotti-positive tick lysates were amplified, sequenced and compared to sequences from *Neoehrlichia mikurensis*. Based on these DNA sequences, a multiplex real-time PCR was developed to specifically detect *Neoehrlichia mikurensis* in combination with *Anaplasma phagocytophilum* in tick lysates. Various tick species from different life-stages, particularly *Ixodes ricinus* nymphs, were collected from the vegetation or wildlife. Tick lysates and DNA derived from organs of wild rodents were tested by PCR-based methods for the presence of *Neoehrlichia mikurensis*. Prevalence of *Neoehrlichia mikurensis* was calculated together with confidence intervals using Fisher's exact test. **Results:** The three genetic markers of Ehrlichia schotti-positive field isolates were similar or identical to *Neoehrlichia mikurensis*. *Neoehrlichia mikurensis* was found to be ubiquitously spread in the Netherlands and Belgium, but was not detected in the 401 tick samples from the UK. *Neoehrlichia mikurensis* was found in nymphs and adult *Ixodes ricinus* ticks, but neither in their larvae, nor in any other tick species tested. *Neoehrlichia mikurensis* was detected in diverse organs of some rodent species. Engorging ticks from red deer, European mouflon, wild boar and sheep were found positive for *Neoehrlichia mikurensis*. **Conclusions:** Ehrlichia schotti is similar, if not identical, to *Neoehrlichia mikurensis*. *Neoehrlichia mikurensis* is present in questing *Ixodes ricinus* ticks throughout the Netherlands and Belgium. We propose that *Ixodes ricinus* can transstadially, but not transovarially, transmit this microorganism, and that different rodent species may act as reservoir hosts. These data further imply that wildlife and humans are frequently exposed to *Neoehrlichia mikurensis*-infected ticks through tick bites. Future studies should aim to investigate to what extent *Neoehrlichia mikurensis* poses a risk to public health.

Publication Type

Journal article.

<74>

Accession Number

20123137278

Author

Leslie, T.

Title

Ticks in the UK and Ireland.

Source

Veterinary Times; 2012. 42(15):15, 18. 15 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<75>

Accession Number

20123219261

Author

Alonso, S.; Marquez, F. J.; Solano-Gallego, L.

Title

Borrelia burgdorferi serosurvey in wild deer in England and Wales.

Source

Vector Borne and Zoonotic Diseases; 2012. 12(6):448-455. 37 ref.

Publisher

Mary Ann Liebert, Inc.

Location of Publisher

New Rochelle

Country of Publication

USA

Abstract

Lyme disease is the most common vector-borne disease in the United Kingdom and its incidence has been increasing in recent years. However, limited information is available on its epidemiology and dynamics in the U.K. A survey in wild deer to investigate the presence of antibodies reactive to *Borrelia burgdorferi* was conducted to obtain initial information on the distribution pattern of the spirochete in England and Wales. Samples from roe deer (n=604) and red deer (n=80) were collected in eight different locations. An ELISA protocol was developed to identify antibodies reactive to *B. burgdorferi* s.l. Seropositivity was investigated by location of sampling, over time, and in relation to the level of deer tick infestation. Twenty-three percent of animals had a positive serology. Seroprevalence varied according to location with the southern forestry districts showing higher seroprevalence rates. One northern location showed an unexpectedly high proportion of positive deer. Variations in the proportion of positive animals were also observed over time. Tick load was higher from spring through autumn, and its relation to seroprevalence was compatible with higher tick infectivity during the spring and summer months. This study represents the first assessment of distribution of *Borrelia* antibodies in deer in the U.K. and identifies areas that are potential hot spots for human Lyme borreliosis. Targeted epidemiological studies should be conducted to evaluate the actual disease risk for humans.

Publication Type

Journal article.

<76>

Accession Number

20123197841

Author

Shepherd, C.

Title

Equine tick-borne disease in the UK.

Source

Veterinary Times; 2012. 42(23):20.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

The role of climate change and more international movement in increasing the risk of tickborne diseases among horses is discussed. Focus is given on the occurrence of ticks in the UK and potential disease threats (Lyme disease, anaplasmosis, piroplasmosis and Louping ill).

Publication Type

Journal article.

<77>

Accession Number

20123270295

Author

Smith, F. D.; Ballantyne, R.; Morgan, E. R.; Wall, R.

Title

Estimating lyme disease risk using pet dogs as sentinels.

Source

Comparative Immunology, Microbiology & Infectious Diseases; 2012. 35(2):163-167.

Publisher

Elsevier Ltd

Location of Publisher

Oxford

Country of Publication

UK

Abstract

The reported number of cases of Lyme disease, *Borrelia burgdorferi sensu lato*, is thought to have increased in the UK over the past decade, but consistent surveillance data are lacking. Here the prevalence of *B. burgdorferi* in ticks attached to pet dogs was examined - using them as sentinels for human disease risk. Dogs give a good indication of the exposure of their human owners to infected ticks, since they largely share the same environment and visit the same outdoor areas. PCR was used to test 739 tick samples collected from 3534 dogs selected at random as they visited veterinary practices over a period of six months. Overall, the prevalence of infected ticks on all dogs was 0.5% giving an estimated 481 infected ticks per 100,000 dogs. The data suggest that the prevalence of *Borrelia* in the UK tick population is considerably higher than most recent estimates indicate.

Publication Type

Journal article.

<78>

Accession Number

20123237310

Author

Elsheikha, H.; Fisher, M.; McGarry, J.

Title

Protecting travelling pets from disease.

Source

Veterinary Record; 2012. 171(2):37-38. 1 ref.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

In this paper the authors discuss some of the diseases that may be encountered by pets during or while travelling with their owners and presents guidelines and information for the pet owners to make educated decisions to protect their pets from such diseases. Some of the diseases discussed includes: rabies, alveolar echinococcosis, leishmaniosis, dirofilariosis, and ticks and tickborne diseases.

Publication Type

Journal article.

<79>

Accession Number

20123263185

Author

McGarry, J.; Fisher, M.

Title

Invading ticks pose new health threat.

Source

Veterinary Times; 2012. 42(32):10-11. 10 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Many practices see the occasional tick on their clients' pets; nasty blood-sucking parasites that cause skin damage and should be removed. Ticks are also responsible for Lyme borreliosis and louping ill in dogs in this country, but such conditions are rather unusual and rarely progress to severe disease. All this has changed with, from January this year, the removal of the former requirement under PETS for tick control of returning dogs. We should now expect to see unusual types of ticks on dogs and an array of exotic canine diseases, due to the rickettsia, protozoa, viruses and spirochaeres that these ticks carry. Untreated dogs can harbour large numbers of ticks, especially the brown dog tick, *Rhipicephalus sanguineus*, which is very common in many countries. There is now a real risk that previously exotic tick populations will take hold in

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parts of the UK and become routine pests of resident dogs and human households. Ticks associated with dogs in Europe are of increasing public health importance as they transmit serious human rickettsial and viral diseases. The situation calls for an immediate campaign to stress the importance of treating the pets for ticks while abroad, and for continued treatment on return.

Publication Type

Journal article.

<80>

Accession Number

20123320939

Author

Cartlidge, H.

Title

Do clients know enough to protect their pets and themselves from tick-borne diseases?

Source

The Veterinary Nurse; 2012. 3(7):450-456. 20 ref.

Publisher

MA Healthcare Limited

Location of Publisher

London

Country of Publication

UK

Abstract

Background: In the past risks from ticks and tick-borne diseases (TBDs) have been limited to particular times of the year and particular areas of the UK. However, in recent years the abundance and distribution of ticks in the UK has increased and ticks have been found to be active for prolonged periods. This has led to an increased risk from ticks and native TBDs. Additionally since the introduction of the Pet Travel Scheme (PETS) in 2000 the risks from exotic ticks and exotic TBDs have increased. Client and staff knowledge is therefore essential to minimize the impact of these increased risks. **Aim:** To investigate client and staff knowledge of ticks and related issues in different areas of the UK. **Materials and methods:** Client and staff questionnaires were produced to test their knowledge of ticks and related issues via multiple-choice quiz type questions. They were distributed to five practices in a zoonotic high-risk area and five in a zoonotic low-risk area, determined according to the prevalence of borreliosis (Lyme disease). Once completed, client and staff questionnaires were marked and given a knowledge score with one mark for every correct answer selected. **Results:** Analysis of variance (ANOVA) revealed that clients and staff in zoonotic high-risk areas had significantly ($p < 0.001$ and $p = 0.006$ respectively) better knowledge compared with those in zoonotic low-risk areas. No significant difference was found in the knowledge of clients who were members of PETS and those who were not. **Conclusions:** Risks posed by ticks and TBDs are no longer confined to high-risk areas. Tick populations are growing and expanding, people travel within the UK as well as abroad with their pets, and due to PETS the risk of exposure to exotic diseases both abroad and within the UK is increasing (especially in view of changes to the scheme in January 2012). All clients whether residing in high or low-risk areas need to be made aware of ticks, the potential for tick-borne diseases and how to protect their pets from such diseases.

Publication Type

Journal article.

<81>

Accession Number

20113007219

Author

Couper, D.; Margos, G.; Kurtenbach, K.; Turton, S.

Title

Prevalence of *Borrelia* infection in ticks from wildlife in south-west England.

Source

Veterinary Record; 2010. 167(26):1012-1014. 21 ref.

Publisher

BMJ Publishing Group

Location of Publisher

London

Country of Publication

UK

Abstract

A total of 75 ticks collected from 8 wild European hedgehogs (*Erinaceus europaeus*), 5 Eurasian badgers (*Meles meles*), 1 red fox (*Vulpes vulpes*) and 1 roe deer (*Capreolus capreolus*) in south-west England in the UK [date not given] were screened for the presence of *Borrelia* spp. 57 hedgehog ticks (*Ixodes hexagonus*), 16 fox ticks (*I. canisuga*) and 2 deer ticks (*I. ricinus*) were identified. 31 ticks from all host species were positive for *Borrelia* spp., which were identified as *B. garinii*, *B. valaisiana*, *B. afzelii* and *B. lusitaniae*. In conclusion, these wildlife species may serve as hosts for ticks which can transmit Lyme disease to humans.

Publication Type

Journal article.

<82>

Accession Number

20113061834

Author

Hartfield, M.; White, K. A. J.; Kurtenbach, K.

Title

The role of deer in facilitating the spatial spread of the pathogen *Borrelia burgdorferi*.

Source

Theoretical Ecology; 2011. 4(1):27-36. 28 ref.

Publisher

Springer

Location of Publisher

Dordrecht

Country of Publication

Netherlands

Abstract

Borrelia burgdorferi is a vector-borne zoonosis which propagates in wild populations of rodents and deer. The latter are incompetent for the pathogen but are required for the life cycle of hard-backed ticks which act as a vector for the pathogen. Increasing the diversity of hosts has previously suggested the presence of a 'dilution effect' in which such an increase reduces successful pathogen transmission as it increases the chance that a tick will encounter an incompetent host. This paper will produce a model which shows that whilst a dilution effect is possible for a system in which deer are the only incompetent host, this effect is not likely to be strong. Extending the population dynamics to include movement of deer into regions previously only inhabited by competent hosts, we find that, although ticks come in with the deer, there is a significant time lag before *Borrelia* appears.

Publication Type

Journal article.

<83>

Accession Number

20113100347

Author

Tijssen-Klasen, E.; Jameson, L. J.; Fonville, M.; Leach, S.; Sprong, H.; Medlock, J. M.

Title

First detection of spotted fever group rickettsiae in *Ixodes ricinus* and *Dermacentor reticulatus* ticks in the UK.

Source

Epidemiology and Infection; 2011. 139(4):524-529. 31 ref.

Publisher

Cambridge University Press

Location of Publisher

Cambridge

Country of Publication

UK

Abstract

A preliminary study was conducted to determine the presence of spotted fever rickettsiae in two species of British tick (*Ixodes ricinus* and *Dermacentor reticulatus*). The 16S rRNA gene of *Rickettsia* spp. was detected in 39/401 (9.7%) of ticks tested, including 22/338 (6.5%) *I. ricinus* and 17/63 (27%) *D. reticulatus*.

Some positive *I. ricinus* samples showed 100% homology with *Rickettsia helvetica* (10/22), and most positive *D. reticulatus* showed 100% homology with *R. raoultii* (13/17). Five other *Rickettsia* spp. were detected exhibiting 96-99% homology. Ticks positive for rickettsiae were collected from various hosts and from vegetation from eight counties across Great Britain. The distribution of *R. helvetica* in various engorged and unfed stages of *I. ricinus* suggests that *R. helvetica* is widespread. *R. raoultii* was found in questing adult *D. reticulatus* in Wales and England. This is the first evidence of potentially pathogenic spotted fever rickettsiae in British ticks.

Publication Type

Journal article.

<84>

Accession Number

20113123922

Author

James, M. C.; Furness, R. W.; Bowman, A. S.; Forbes, K. J.; Gilbert, L.

Title

The importance of passerine birds as tick hosts and in the transmission of *Borrelia burgdorferi*, the agent of Lyme disease: a case study from Scotland.

Source

Ibis (London); 2011. 153(2):293-302. 44 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Borrelia burgdorferi sensu lato (s.l.) is the causative agent of Lyme borreliosis, the most common tick-borne zoonosis of humans in Europe and North America. Here, we assessed the relative importance of different passerine bird species as tick hosts and their contribution to the *B. burgdorferi* s.l. transmission cycle in a rural residential area in Scotland. We caught 1229 birds of 22 species during the tick-questing season. On average, 29% carried larval ticks (0.8 larvae per individual) and 5% carried nymph ticks (0.06 nymphs per individual). All attached ticks tested were *Ixodes ricinus*. Using a nested-PCR, we found that 20% of nymphs tested positive to *B. burgdorferi* s.l. and all these were of the genospecies *Borrelia garinii*. We identified two new bird species carrying infected nymphs: Eurasian Siskin *Carduelis spinus* and European Greenfinch *Carduelis chloris*. Ground-foraging species were more important than arboreal species in hosting *I. ricinus* nymphs and *B. burgdorferi* s.l. Common Blackbirds *Turdus merula* were the most common hosts, with Song Thrushes *Turdus philomelos*, Dunnocks *Prunella modularis*, European Greenfinches and Chaffinches *Fringilla coelebs* also hosting high rates of infection.

Publication Type

Journal article.

<85>

Accession Number

20113154516

Author

Jameson, L. J.; Medlock, J. M.

Title

Tick surveillance in Great Britain.

Source

Vector Borne and Zoonotic Diseases; 2011. 11(4):403-412. 22 ref.

Publisher

Mary Ann Liebert, Inc.

Location of Publisher

New Rochelle

Country of Publication

USA

Abstract

The ability for public/veterinary health agencies to assess the risks posed by tick-borne pathogens is reliant on an understanding of the main tick vector species. Crucially, the status, distribution, and changing trends in tick distribution and abundance are implicit requirements of any risk assessment; however, this is contingent on the quality of tick distribution data. Since 2005 the Health Protection Agency has promoted an enhanced tick surveillance program. Through engagement with a variety of public and veterinary health agencies and practitioners (e.g., clinicians and veterinarians), wildlife groups (deer society, zoos, animal refuge centers, and academics), and amateur entomologists, >4000 ticks from 900 separate records across Great Britain have been submitted, representing 14 tick species (*Ixodes ricinus*, *Ixodes hexagonus*, *Ixodes acuminatus*, *Ixodes arboricola*, *Ixodes canisuga*, *Ixodes frontalis*, *Ixodes lividus*, *Ixodes trianguliceps*, *Ixodes ventralloi*, *Carios vespertilionis*, *Dermacentor reticulatus*, *Haemaphysalis punctata*, *Hyalomma marginatum*, and *Amblyomma* species). The majority of ticks submitted were *I. ricinus* (81%), followed by *I. hexagonus* (10%) and *I. frontalis* (2.5%). Predominant host groups include companion animals (411 records), humans (198 records), wild birds (111 records), and large wild mammals (88 records), with records also from small/medium wild mammals, livestock, the environment and domestic/aviary birds. The scheme has elucidated the detection of two nonnative tick species, the expansion of previously geographically restricted *D. reticulatus* and produced ground data on the spread of *I. ricinus* in southwest England. It has also provided a forum for submission of ticks from the concerned public and particularly those infected with Lyme borreliosis, thus raising awareness among public health agencies of the increased peri-urban tick problem in Britain. Our results demonstrate that it is possible to run a cost-effective nationwide surveillance program to successfully monitor endemic tick species, identify subtle changes in their distribution, and detect the arrival and presence of exotic species.

Publication Type

Journal article.

<86>

Accession Number

20113130635

Author

Tappin, S.

Title

Lyme disease in dogs: diagnosis, drug treatment and prevention.

Source

Veterinary Times; 2011. 41(16):8, 10. 7 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

Lyme disease is a relatively new clinical entity caused by the spirochaete *Borrelia burgdorferi*. It is transmitted by a variety of tick vectors, depending on the geographical location, with *Ixodes ricinus* being the most common vector in the UK. Only five to 10 per cent of dogs exposed to *Borrelia* develop clinical signs, which classically present as fever - with associated lethargy - followed by shifting limb lameness. These signs are not pathognomonic, and PCR-based tests to document the presence of the *Borrelia* spirochaetes are needed to confirm borreliosis. Serology documents exposure to *Borrelia* and a high or rising antibody level can support the diagnosis. Treatment with doxycycline leads to resolution of clinical signs in most cases. However, chronic non-erosive polyarthritis and glomerular nephritis are seen in chronic infections. The aetiology of these signs is not fully understood, but are most likely due to the ability of *Borrelia* to evade the immune system and the chronic inflammatory response this evokes. Prevention is based on preventive acaricide treatments and prompt tick removal.

Publication Type

Journal article.

<87>

Accession Number

20113197548

Author

Dobson, A. D. M.; Taylor, J. L.; Randolph, S. E.

Title

Tick (*Ixodes ricinus*) abundance and seasonality at recreational sites in the UK: hazards in relation to fine-scale habitat types revealed by complementary sampling methods.

Source

Ticks and Tick-borne Diseases; 2011. 2(2):67-74.

Publisher

Elsevier GmbH

Location of Publisher

Munich

Country of Publication

Germany

Abstract

The seasonal risk to humans of picking up *Ixodes ricinus* ticks in different habitats at 3 recreational sites in the UK was assessed. A comprehensive range of vegetation types was sampled at 3-weekly intervals for 2 years, using standard blanket-dragging complemented by woollen leggings and square 'heel flags'. Ticks were found in all vegetation types sampled, including short grass close to car parks, but highest densities were consistently found in plots with trees present. Blankets picked up the greatest number of ticks, but heel flags provided important complementary counts of the immature stages in bracken plots; they showed clearly that the decline in tick numbers on blankets in early summer was due to the seasonal growth of vegetation that lifted the blanket clear of the typical questing height, but in reality ticks remained abundant through the summer. Leggings picked up only 11% of the total nymphs and 22% of total adults counted, but this still represented a significant hazard to humans. These results should prompt a greater awareness of the fine-scale distribution of this species in relation to human activities that determines the most likely zones of contact between humans and ticks. Risk communication may then be designed accordingly.

Publication Type

Journal article.

<88>

Accession Number

20113247303

Author

Dobson, A. D. M.; Randolph, S. E.

Title

Modelling the effects of recent changes in climate, host density and acaricide treatments on population dynamics of *Ixodes ricinus* in the UK.

Source

Journal of Applied Ecology; 2011. 48(4):1029-1037. 44 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

A population model for the tick *Ixodes ricinus*, the most significant vector of pathogens in Europe, is used to explore the relative impact of changes in climate, host density and acaricide-treated hosts on tick abundance and seasonality. A rise in temperature of the sort witnessed since 1989 speeds up the interstadial development of ticks, thereby reducing the cumulative effect of constant daily mortality rates and potentially raising population levels. The predicted earlier onset of tick-questing activity in the spring, due to stage-specific temperature thresholds, could increase contact between ticks and humans during recreational visits to the countryside in spring holidays. These tick population effects vary geographically with background climate. The significant increase in deer abundance across Europe, including the UK, in recent decades is predicted to drive tick population increases, the effect varying with the initial density of hosts. In areas only recently colonized by deer, tick numbers are predicted to rise dramatically (given suitable climatic conditions). Where host densities are already high, however, further increases may reduce numbers of questing ticks; unfed ticks leave the questing population more rapidly, even though the overall tick population (and therefore pathogen transmission potential) increases. Culling high-density deer populations as a control measure could, therefore, initially cause an apparent increase in questing ticks, with the predicted long-term population trajectory depending on the severity of the cull. Conversely, the further addition of large hosts (e.g. sheep) would effectively reduce the number of questing ticks and therefore the risk to humans. If such sheep were treated with acaricide, tick populations are predicted to decrease rapidly, to an extent that depends on the relative abundance of wild (untreated) and treated hosts. Tick control in designated areas may be achieved by using sheep in this way as 'lethal mops', as used to occur in the past when sheep were regularly dipped. Synthesis and applications. Both abiotic and biotic environmental changes witnessed recently could have contributed to apparent increases in tick populations, especially where these environmental factors were limiting in the past. The release of additional hosts treated with long-lasting acaricide is potentially an effective control strategy.

Publication Type

Journal article.

<89>

Accession Number

20113247302

Author

Dobson, A. D. M.; Finnie, T. J. R.; Randolph, S. E.

Title

A modified matrix model to describe the seasonal population ecology of the European tick *Ixodes ricinus*.

Source

Journal of Applied Ecology; 2011. 48(4):1017-1028. 40 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

The sheep tick *Ixodes ricinus* is the most multicompetent vector in Europe, which is responsible for significant diseases of humans and livestock throughout the northern hemisphere. Modelling the tick's complex seasonal dynamics, upon which pathogen transmission potential depends, underpins the analysis of tick-borne disease risk and potential tick control. We use laboratory- and field-derived empirical data to construct a population model for *I. ricinus*. The model is a substantially modified stage-classified Leslie matrix and includes functions for temperature-dependent development, density-dependent mortality and saturation deficit-mediated probability of questing. The model was fitted to field data from three UK sites and successfully simulated seasonal patterns at a fourth site. After modification of a single parameter, the model also replicated divergent seasonal patterns in central Spain, but any biological factors underlying this geographical heterogeneity have not yet been identified. The model's applicability to wide geographical areas is thus constrained, but in ways that highlight gaps in our knowledge of tick biology. Sensitivity analysis indicated that the model was generally robust, particularly to changes in density-independent mortality values, but was most sensitive to changes in parameters related to density-dependent mortality. Synthesis and applications. Vector population models allow investigation into the effects of individual environmental factors on population dynamics in ways not easily possible by experimental manipulation of in situ populations. Our model can be used to evaluate public health risk, tick management strategies and potential effects of future environmental change.

Publication Type

Journal article.

<90>

Accession Number

20113253679

Author

Bown, K. J.; Lambin, X.; Telford, G.; Heyder-Bruckner, D.; Ogden, N. H.; Birtles, R. J.

Title

The common shrew (*Sorex araneus*): a neglected host of tick-borne infections?

Source

Vector Borne and Zoonotic Diseases; 2011. 11(7):947-953. 38 ref.

Publisher

Mary Ann Liebert, Inc.

Location of Publisher

New Rochelle

Country of Publication

USA

Abstract

Although the importance of rodents as reservoirs for a number of tick-borne infections is well established, comparatively little is known about the potential role of shrews, despite them occupying similar habitats. To address this, blood and tick samples were collected from common shrews (*Sorex araneus*) and field voles (*Microtus agrestis*), a known reservoir of various tick-borne infections, from sites located within a plantation forest in northern England over a 2-year period. Of 647 blood samples collected from shrews, 121 (18.7%) showed evidence of infection with *Anaplasma phagocytophilum* and 196 (30.3%) with *Babesia microti*. By comparison, of 1505 blood samples from field voles, 96 (6.4%) were positive for *A.*

phagocytophilum and 458 (30.4%) for *Ba. microti*. Both species were infested with the ticks *Ixodes ricinus* and *Ixodes trianguliceps*, although they had different burdens: on average, shrews carried almost six times as many *I. trianguliceps* larvae, more than twice as many *I. ricinus* larvae, and over twice as many nymphs (both tick species combined). The finding that the nymphs collected from shrews were almost exclusively *I. trianguliceps* highlights that this species is the key vector of these infections in this small mammal community. These findings suggest that common shrews are a reservoir of tick-borne infections and that the role of shrews in the ecology and epidemiology of tick-borne infections elsewhere needs to be comprehensively investigated.

Publication Type

Journal article.

<91>

Accession Number

20113284364

Author

O'Connell, S.

Title

Lyme borreliosis in the UK and Ireland. (Advances in Molecular and Cellular Microbiology, No.20)

Source

Lyme disease: an evidence-based approach; 2011. :127-139. many ref.

Publisher

CABI

Location of Publisher

Wallingford

Country of Publication

UK

Abstract

This book chapter reviews the epidemiology, clinical aspects, diagnosis, treatment, prognosis and prevention of Lyme borreliosis in the UK and Ireland. Controversies associated with the definition, diagnosis and management of chronic Lyme disease are also discussed.

Publication Type

Book chapter.

<92>

Accession Number

20113387435

Author

Smith, F. D.; Ballantyne, R.; Morgan, E. R.; Wall, R.

Title

Prevalence, distribution and risk associated with tick infestation of dogs in Great Britain.

Source

Medical and Veterinary Entomology; 2011. 25(4):377-384. 41 ref.

Publisher

Wiley-Blackwell

Location of Publisher

Oxford

Country of Publication

UK

Abstract

Current concerns over the potential impacts of climate change and the increased movement between countries of people and companion animals on the distribution of ectoparasites, highlight the need for accurate understanding of existing prevalence patterns. Without these future changes will not be detected. Here, the distribution and prevalence of tick infestations of domestic dogs in Great Britain were examined. A total of 173 veterinary practices were recruited to monitor tick attachment to dogs in their local areas between March and October 2009. Practices selected five dogs at random each week from those brought to the surgery and undertook a thorough, standardized examination for ticks. Each veterinary practice participated for 3 months before being replaced. Any ticks identified were collected and a sample sent to the investigators for identification, along with a clinical history of the dog. A total of 3534 dogs were examined; 810 dogs were found to be carrying at least one tick. *Ixodes ricinus* (Linnaeus) (Acari: Ixodidae) was identified in 72.1% of cases, *Ixodes hexagonus* Leach in 21.7% and *Ixodes canisuga* Johnston in 5.6% of cases. Five samples of *Dermacentor reticulatus* (Fabricius) (Acari: Ixodidae) were also found, adding to the growing evidence that an established population of *D. reticulatus* now exists in south-eastern England. Almost all the ticks found were adults. Overall, 19.2% of the veterinary practices reported no tick detections, 50% reported that $\geq 14.9\%$ of the dogs seen were infested and 14.6% reported that $>50\%$ of the dogs inspected carried ticks. The estimated incidence of tick attachment was 0.013 per day in March (lowest) and 0.096 per day in June (highest). A number of risk factors affected the likelihood of tick attachment on dogs. Gundog, terrier and pastoral breed groups were more likely to carry ticks, as were non-neutered dogs. Dogs with shorter hair were less likely to have ticks, and dogs were most likely to carry a tick in June. This study is of value because, unusually, it presents the results of a randomized sample of dogs and gives a prevalence which is higher than those previously recorded in Great Britain.

Publication Type

Journal article.

<93>

Accession Number

20103004050

Author

Gilbert, L.

Title

Altitudinal patterns of tick and host abundance: a potential role for climate change in regulating tick-borne diseases?

Source

Oecologia; 2010. 162(1):217-225.

Publisher

Springer-Verlag GmbH

Location of Publisher

Heidelberg

Country of Publication

Germany

Abstract

The impact of climate change on vector-borne infectious diseases is currently controversial. In Europe the primary arthropod vectors of zoonotic diseases are ticks, which transmit *Borrelia burgdorferi sensu lato* (the agent of Lyme disease), tick-borne encephalitis virus and louping ill virus between humans, livestock and wildlife. *Ixodes ricinus* ticks and reported tick-borne disease cases are currently increasing in the UK. Theories for this include climate change and increasing host abundance. This study aimed to test how *I. ricinus* tick abundance might be influenced by climate change in Scotland by using altitudinal gradients as a proxy, while also taking into account the effects of hosts, vegetation and weather effects. It was predicted that tick abundance would be higher at lower altitudes (i.e. warmer climates) and increase with host abundance. Surveys were conducted on nine hills in Scotland, all of open moorland habitat. Tick abundance was positively associated with deer abundance, but even after taking this into account, there was a strong negative association of ticks with altitude. This was probably a real climate effect, with temperature (and humidity, i.e. saturation deficit) most likely playing an important role. It could be inferred that ticks may become more abundant at higher altitudes in response to climate warming. This has potential implications for pathogen prevalence such as louping ill virus if tick numbers increase at elevations where competent transmission hosts (red grouse *Lagopus lagopus scoticus* and mountain hares *Lepus timidus*) occur in higher numbers.

Publication Type

Journal article.

<94>

Accession Number

20093358737

Author

Mayne, T.

Title

It's time for vigilance on 'exotic diseases' in travelling pets.

Source

VN Times; 2009. 9(5):8...10.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough
Country of Publication
UK
Publication Type
Journal article.

<95>

Accession Number
20103054719

Author
Jameson, L. J.; Phipps, L. P.; Medlock, J. M.

Title
Surveillance for exotic ticks on companion animals in the UK.

Source
Veterinary Record; 2010. 166(7):202-204. 19 ref.

Publisher
BMJ Publishing Group

Location of Publisher
London

Country of Publication
UK

Abstract

This study aimed to provide greater clarity on the current tick surveillance data available to the Health Protection Agency (HPA) and the Veterinary Laboratories Agency (VLA). Data on exotic ticks found in quarantine kennels between 1976 and 2007 and on animals travelling to the UK under Defra's Pet Travel Scheme (PETS) between 2002 and 2009 were presented. The tick species identified by the VLA included *Rhipicephalus sanguineus* (53 dogs), *Haemaphysalis leachi* (one cat and seven dogs), *Dermacentor albipictus* (one dog), *D. variabilis* (5 dogs), *Ixodes ricinus* (one cat and five dogs), *I. hexagonus* (one dog), *I. pacificus* (one dog) and *Amblyomma americanum* (2 dogs). Of these ticks, only *I. ricinus* and *I. hexagonus* were native to the UK. These ticks were removed from dogs and cats imported from Africa, Asia, Europe, the Middle East and North America. It was concluded that a broad spectrum of tick species had the potential to be introduced into the UK, several of which were known disease vectors and had been previously highlighted as potential high risk for importation and establishment in the UK.

Publication Type
Journal article.

<96>

Accession Number
20103109117

Author

Rubasinska, V.

Title

The Pet Travel Scheme and the threat of tick-borne diseases.

Source

VN Times; 2010. 10(4):12...14. 10 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<97>

Accession Number

20083328123

Author

Bown, K. J.; Lambin, X.; Telford, G. R.; Ogden, N. H.; Telfer, S.; Woldehiwet, Z.; Birtles, R. J.

Title

Relative importance of *Ixodes ricinus* and *Ixodes trianguliceps* as vectors for *Anaplasma phagocytophilum* and *Babesia microti* in field vole (*Microtus agrestis*) populations.

Source

Applied and Environmental Microbiology; 2008. 74(23):7118-7125. 36 ref.

Publisher

American Society for Microbiology (ASM)

Location of Publisher

Washington

Country of Publication

USA

Abstract

The importance of *Ixodes ricinus* in the transmission of tick-borne pathogens is well recognized in the United Kingdom and across Europe. However, the role of coexisting *Ixodes* species, such as the widely distributed species *Ixodes trianguliceps*, as alternative vectors for these pathogens has received little attention. This study aimed to assess the relative importance of *I. ricinus* and *I. trianguliceps* in the transmission of *Anaplasma phagocytophilum* and *Babesia microti* among United Kingdom field voles

(*Microtus agrestis*), which serve as reservoir hosts for both pathogens. While all instars of *I. trianguliceps* feed exclusively on small mammals, *I. ricinus* adults feed primarily on larger hosts such as deer. The abundance of both tick species and pathogen infection prevalence in field voles were monitored at sites surrounded with fencing that excluded deer and at sites where deer were free to roam. As expected, fencing significantly reduced the larval burden of *I. ricinus* on field voles and the abundance of questing nymphs, but the larval burden of *I. trianguliceps* was not significantly affected. The prevalence of *A. phagocytophilum* and *B. microti* infections was not significantly affected by the presence of fencing, suggesting that *I. trianguliceps* is their principal vector. The prevalence of nymphal and adult ticks on field voles was also unaffected, indicating that relatively few non-larval *I. ricinus* ticks feed upon field voles. This study provides compelling evidence for the importance of *I. trianguliceps* in maintaining these enzootic tick-borne infections, while highlighting the potential for such infections to escape into alternative hosts via *I. ricinus*.

Publication Type

Journal article.

<98>

Accession Number

20093131544

Author

Bars, C. le

Title

Tick-borne disease management.

Source

Veterinary Times; 2009. 39(19):14, 16.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Abstract

The treatment, control and prevention of ticks and tickborne diseases such as Lyme disease, babesiosis and ehrlichiosis in domestic animals in the UK.

Publication Type

Journal article.

<99>

Accession Number

20093326903

Author

Medlock, J. M.; Pietzsch, M. E.; Rice, N. V. P.; Jones, L.; Kerrod, E.; Avenell, D.; Los, S.; Ratcliffe, N.; Leach, S.; Butt, T.

Title

Investigation of ecological and environmental determinants for the presence of questing *Ixodes ricinus* (Acari: Ixodidae) on Gower, South Wales.

Source

Journal of Medical Entomology; 2008. 45(2):314-325.

Publisher

Entomological Society of America

Location of Publisher

Lanham

Country of Publication

USA

Abstract

The spatial heterogeneity of questing *Ixodes ricinus* (L.) (Acari: Ixodidae) within endemic areas in Great Britain is well established. Their presence is acutely responsive to blood host availability and their ability to maintain water balance, which are in turn governed by a variety of ecological and environmental factors. This article details the findings of a 3-yr study on the Gower peninsula, south Wales, which investigated the contribution of such factors (both ground- and geographic information systems [GIS]-derived) for predicting the presence of questing *I. ricinus* (Q_P), at a local scale. Statistically significant univariate associations were found between Q_P and calcareous/neutral grassland and heathland habitats, particularly those grazed by livestock, and various factors that intuitively promote tick survival. For example, topographical features, such as certain aspects, that reduce exposure to cold northerly winds and the hot midday sun, favored Q_P. Similarly, positive associations were found with substrata composed of less permeable soil types and less permeable superficial/bedrock geologies that promote a moist microhabitat and reduce the likelihood of desiccation. Q_P was also higher in areas of high soil moisture. This study highlighted a number of GIS-derived data sets that could be applied in the development of local and national predictive maps for *I. ricinus* in Great Britain. An understanding of the influence of these factors on questing *I. ricinus* can aid targeted tick control programs and help to educate the public, and those occupationally exposed, in understanding likely *I. ricinus* prolific areas within an *I. ricinus* endemic region.

Publication Type

Journal article.

<100>

Accession Number

20093360886

Author

Evans, N. J.; Bown, K.; Timofte, D.; Simpson, V. R.; Birtles, R. J.

Title

Fatal borreliosis in bat caused by relapsing fever spirochete, United Kingdom.

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Source

Emerging Infectious Diseases; 2009. 15(8):1331-1333. 9 ref.

Publisher

National Center for Infectious Diseases, Centers for Disease Control and Prevention

Location of Publisher

Atlanta

Country of Publication

USA

Abstract

This paper reports the discovery of a spirochaete causing fatal borreliosis in a bat in the UK. The infected bat was a juvenile female *Pipistrellus* species that was found alive but on the ground near the town of Mevagissy in southwestern England, in August 2008. Despite rehabilitation efforts, it died a few days later. Postmortem examination showed pale skeletal muscles, anaemia, excess blood-tinged pleural fluid, a healthy thymus, but enlarged cranial thoracic lymph nodes. The liver was greatly enlarged and mottled, the spleen was also large and unusually dark, and the adrenal glands were enlarged and pale with areas of haemorrhage. The kidneys were pale with a fine speckling pattern over the cortex. Histopathological examination of the liver showed multifocal necrosis and vacuolation of hepatocytes and infiltration by macrophages. The lungs were congested and infiltrated by inflammatory cells, and large numbers of granulocytes were found in the blood vessels. The spleen showed marked extramedullary haemopoiesis. Tissue sections exhibited numerous long, undulating, argophilic bacilli. These organisms were present in large numbers in the liver lesions, and also found in the parenchyma of lung and spleen and in blood vessels. A diagnosis of fatal hepatitis and septicaemia caused by a spirochete was made. Polymerase chain reaction and sequencing of DNA extracted from the bat's liver identified an unambiguous sequence data for all 3 loci, comprising of 1364 bp of the 16S rRNA-encoding gene (GenBank accession no. FJ868583), 1239 bp of *flaB* and flanking regions (GenBank accession no. FJ868584) and 480 bp of *glpQ* (GenBank accession no. FJ868585). Each of these was aligned with homologous sequences available for other *Borrelia* species and used for phylogenetic analyses. Inferences made by using all loci were congruent, with the UK bat-associated spirochaete lying close to, but distinct from, a cluster containing *B. recurrentis*, *B. duttonii* and *B. crocidurae*, which are associated with relapsing fevers in Africa and Asia. An *Argas vespertilionis* [*Carios vespertilionis*] larval tick was also found attached to the infected bat and may have been the source of its infection.

Publication Type

Correspondence.

<101>

Accession Number

20083047161

Author

Mougeot, F.; Moseley, M.; Leckie, F.; Martinez-Padilla, J.; Miller, A.; Pounds, M.; Irvine, R. J.

Title

Reducing tick burdens on chicks by treating breeding female grouse with permethrin.

Source

Journal of Wildlife Management; 2008. 72(2):468-472. 28 ref.

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Publisher

Wildlife Society

Location of Publisher

Bethesda

Country of Publication

USA

Abstract

Ticks are important arthropod vectors of diseases of human, livestock, and wildlife hosts. In the United Kingdom, the sheep tick (*Ixodes ricinus*) is increasingly recognized as a main limiting factor of red grouse (*Lagopus lagopus*) populations, a game bird of high economic value. We evaluated the effectiveness of a new practical technique that could help managers reduce negative impacts of ticks on young grouse. In a replicated field experiment, we treated breeding females with leg bands impregnated with permethrin, a slow-releasing potent acaricide. We found that treatment reduced tick burdens on young chicks. Because this treatment is easily applied, it offers a new practical management tool to tackle problems caused by ticks in game bird populations.

Publication Type

Journal article.

<102>

Accession Number

20083078695

Author

Elsheikha, H. M.

Title

Canine vector-borne diseases - treating this growing threat.

Source

Veterinary Times; 2008. 38(11):20-21. 2 ref.

Publisher

Veterinary Business Development Ltd

Location of Publisher

Peterborough

Country of Publication

UK

Publication Type

Journal article.

<103>

Accession Number

20083200345

Author

Evans, N. J.; Brown, J. M.; Demirkan, I.; Murray, R. D.; Vink, W. D.; Blowey, R. W.; Hart, C. A.; Carter, S. D.

Title

Three unique groups of spirochetes isolated from digital dermatitis lesions in UK cattle.

Source

Veterinary Microbiology; 2008. 130(1/2):141-150. 33 ref.

Publisher

Elsevier

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

Bovine digital dermatitis (BDD) is a severe infectious cause of lameness which has spread through dairy cattle populations worldwide, causing serious welfare and agricultural problems. Spirochetes are the main organisms implicated and have previously proven difficult to isolate. This study aimed to isolate and characterize the range of spirochetes associated with BDD in the UK. Twenty-three spirochete isolates were obtained from 30 BDD lesions, which by 16S rRNA gene and flaB2 gene analysis clustered within the genus *Treponema* as three phylogroups; groups 1 (*Treponema medium*/*Treponema vincentii*-like), 2 (*Treponema phagedenis*-like) and 3 (*Treponema denticola*/*Treponema putidum*-like). The treponemes displayed large genotypic and phenotypic diversity between phylogroups and differed from named treponeme species. A previously isolated contagious ovine digital dermatitis spirochete was located within one of the three phylogroups, group 3, and could also be identified within this group on the basis of phenotype testing, suggesting BDD and contagious ovine digital dermatitis may share the same aetiological agent. A strain isolated from a bovine interdigital dermatitis lesion, could be identified as part of BDD isolate group 2, suggesting bovine interdigital dermatitis and BDD may have the same causative agent. Two common enzyme activities, C4 esterase and C8 esterase lipase, were identified in all BDD associated treponemes suggesting common metabolic pathways for sharing this novel niche or even common virulence traits. Further studies are required to determine whether the three groups of novel treponemes are representative of new treponeme taxa and to delineate how they interact with bovine tissues to cause disease.

Publication Type

Journal article.

<104>

Accession Number

20083225585

Author

Pietzsch, M. E.; Mitchell, R.; Jameson, L. J.; Morgan, C.; Medlock, J. M.; Collins, D.; Chamberlain, J. C.; Gould, E. A.; Hewson, R.; Taylor, M. A.; Leach, S.

Title

Preliminary evaluation of exotic tick species and exotic pathogens imported on migratory birds into the British Isles.

Source

Veterinary Parasitology; 2008. 155(3/4):328-332. 12 ref.

Publisher

Elsevier

Location of Publisher

Amsterdam

Country of Publication

Netherlands

Abstract

Field studies were carried out to determine whether ticks are being imported into the British Isles on migratory birds. During spring and autumn migration 2004, ticks were collected from ringed birds at 11 bird observatories and 3 inland Riparia riparia colonies. A total of 38 ticks of 4 species (*Ixodes ricinus*, *I. frontalis*, *I. lividus*, *I. arboricola*) were collected from 12 species of bird. Ticks were tested for viruses in the Flavivirus and Nairovirus genera, with no positives found. This data demonstrates that ticks are being imported into the British Isles on migratory birds with future work recommended to determine the quantity of ticks imported and to detect low prevalence pathogens.

Publication Type

Journal article.

<105>

Accession Number

20083223652

Author

Gray, J. S.

Title

Ixodes ricinus seasonal activity: implications of global warming indicated by revisiting tick and weather data.

Source

International Journal of Medical Microbiology; 2008. 298S1(Supplement 44):19-24. 18 ref.

Publisher

Elsevier GmbH

Location of Publisher

Jena

Country of Publication

Germany

Abstract

A recent climate experiment predicted that average maximum summer temperatures in southern regions of the British Isles may approach 30 degrees C by the year 2020. An opportunity for retrospective analysis of the implications of such a change for tick phenology and disease transmission was presented by the coincidence of unusually high early summer temperatures in 1976 with the collection of tick data from sites in Ireland where host availability was controlled. Subsequent identification of diapause threshold periods and simulation of temperature-dependent tick development showed that high summer temperatures can cause mass transfer of ticks between development cohorts, resulting in increased activity and therefore increased disease transmission in late autumn and early spring. This suggests that in northern temperate regions of Europe global warming is likely to cause changes in the seasonal patterns of tick-borne diseases.

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Title

Trends in ixodid tick abundance and distribution in Great Britain.

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Abstract

The popular, but rarely documented, view in Britain is that ticks have increased in distribution and abundance over recent years. To assess this, we gathered evidence for changes in tick distribution and abundance by distributing a survey questionnaire throughout Britain and by analysing trends in the prevalence of tick infestation on red grouse chicks *Lagopus lagopus scoticus* Latham (Galliformes: Tetranoidae), gathered over 19 years at three Scottish sites, and on deer (*Cetartiodactyla*: Cervidae) culled over 11 years on 26 Ministry of Defence (MoD) estates. Based on the survey, the current known distribution of *Ixodes ricinus* Linnaeus (Acari: Ixodidae) has expanded by 17% in comparison with the previously known distribution. The survey indicated that people perceive there to be more ticks today than in the past at 73% of locations throughout Britain. Reported increases in tick numbers coincided spatially

with perceived increases in deer numbers. At locations where both tick and deer numbers were reported to have increased, these perceived changes occurred at similar times, raising the possibility of a causal link. At other locations, tick numbers were perceived to have increased despite reported declines in deer numbers. The perceptions revealed by the survey were corroborated by quantitative data from red grouse chicks and culled deer. Tick infestation prevalence increased over time on all grouse moors and 77% of MoD estates and decreased at six locations.

Publication Type

Journal article.