

Lyme Disease Action - Annual Conference

Lyme disease: understanding and managing the risk of infection

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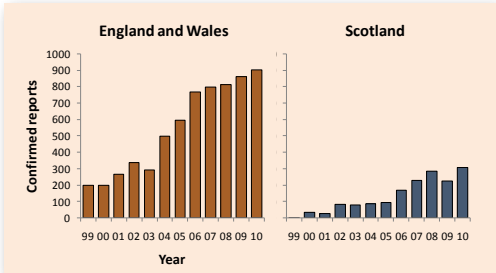



11th UK Lyme and Tick-borne Diseases Conference, University of Cumbria, Carlisle, 21 July 2012

Outline

- Background
 - Epidemiology of Lyme disease
 - The changing landscape of health and forests in Britain
- Ecology of *Ixodid* ticks and Lyme disease
 - Lifecycle of Ticks and Host Interactions
 - Habitat Issues and current research
- Public Education
 - Ticks and Lyme disease information
 - Case Studies
- Summary and Conclusions

Epidemiology of Lyme disease in the UK 1999-2010



England and Wales Scotland

Confirmed reports

Year


Data: HPA 2011 and HPS 2011

- Confirmed reports are thought to significantly underestimate true incidence
- Up to 20 percent of cases in any year are acquired abroad

Lyme disease: Factors and Trends

- Several factors thought to be responsible for the rising trend in the number of infections, such as:
 - Improved diagnostics
 - Increased awareness and reporting of infection
 - Improved habitat for host species
 - Successive mild winters enabling ticks to survive
 - Growth in recreational travel to high-risk areas (UK and overseas)

Policy Drivers in Health: Physical activity and health



Be Active, Be Healthy. Department of Health 2009.
 The Scottish Health Survey. Scottish Government 2009.

Natural Environments and Health

- **Primary evidence that natural places are beneficial for both physical and emotional well-being.**
- Many sports and passive recreational activities are possible in forests and outdoors
- Evidence to suggest that the spiritual and “connectedness” aspects of nature have an added impact on healing, sense of well-being and psychological restoration (e.g., Ulrich 1984).
- **This is something we are investigating in a range of urban green spaces** in Sheffield, with a paper coming soon (Jorgensen et al).
- However, the **health benefits need to be balanced with awareness of the health risks** in natural places, especially Lyme disease.

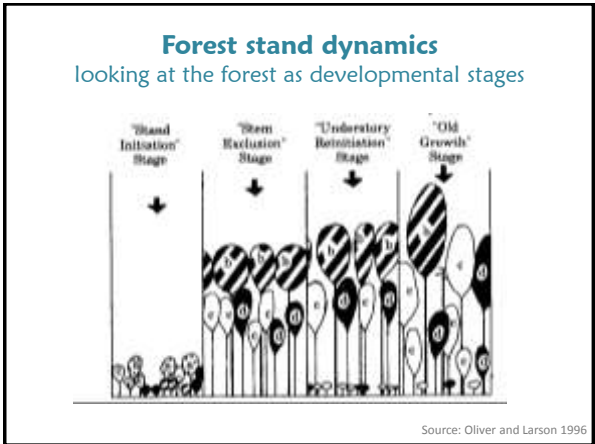


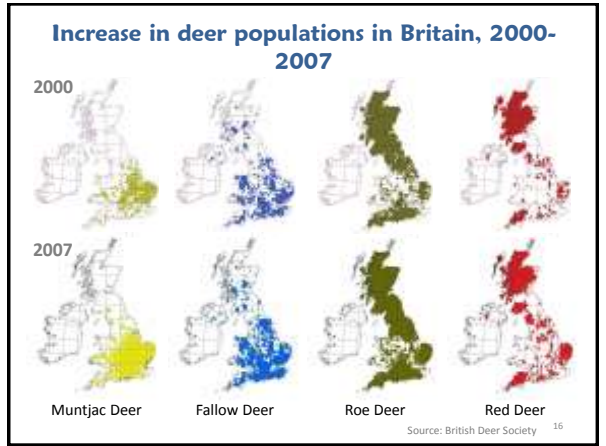
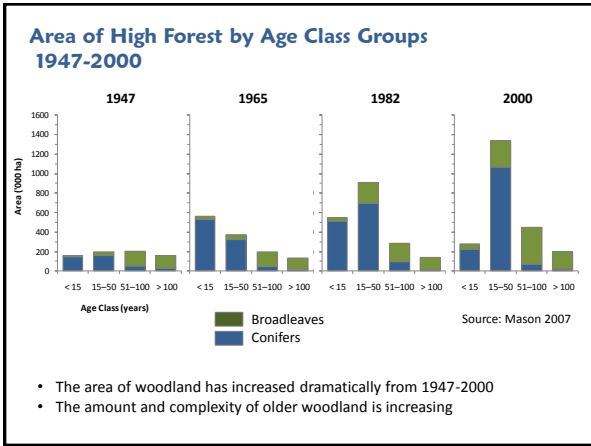
Forest Policy and Ecosystem Change (1)

- Recent attempts by Government to sell public forests stirred an enormous outcry.
- 500,000 signed a petition and there were “mass protests” in many woodlands.
- People want the forest to remain public, and accessible for wide range of uses, often linked to health.
- We recognise that the forests are important for many purposes, not least as a “sink” for carbon in our efforts to reduce our impact on the climate.

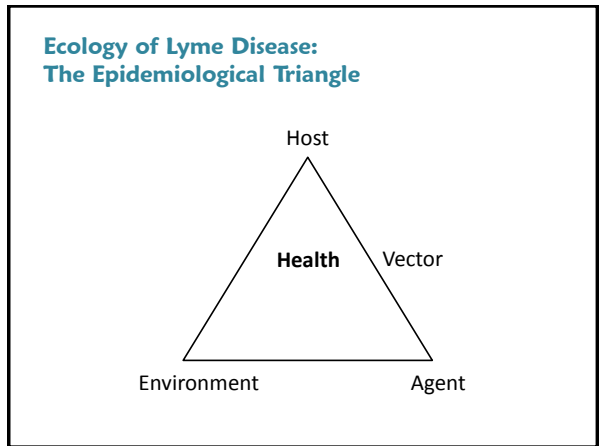
Forest Policy and Ecosystem Change (2)

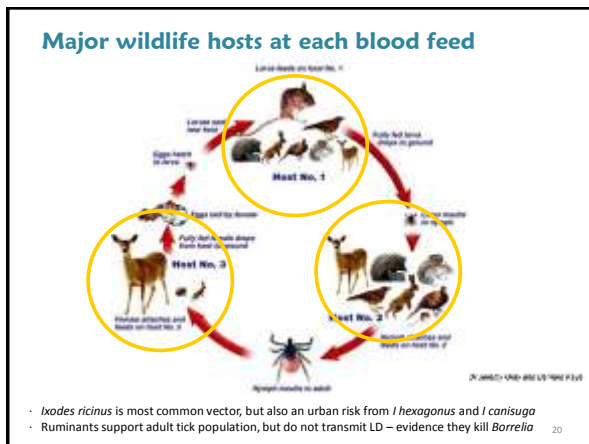
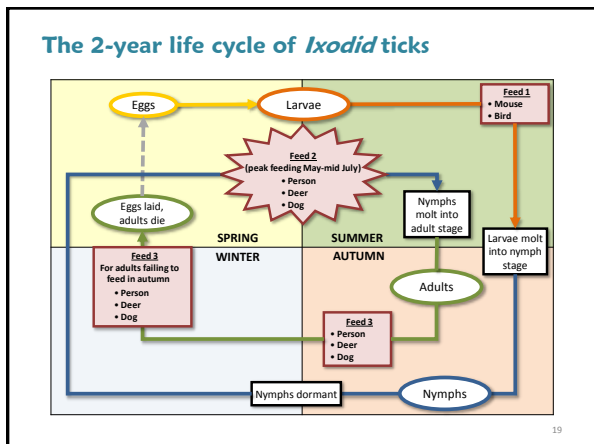
- Throughout the 20th century there has been a concerted effort to restore and enlarge the forest estate.
- Forests have become larger and more complex as they age.
- Now we are moving to a more ecological form of forest management to promote biodiversity and recreational values
- This policy is proving successful, but this may bring more people into habitats where there are large numbers of ticks.





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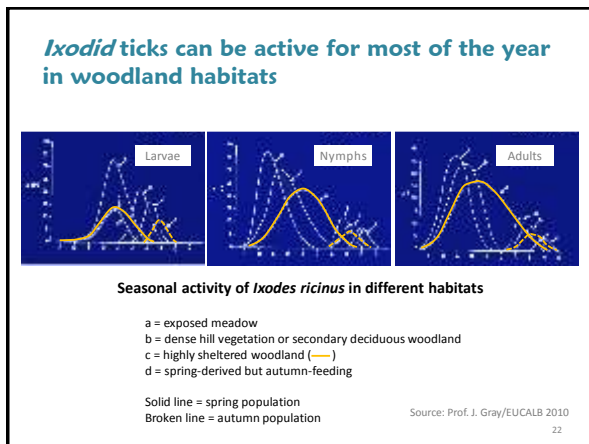


- *Ixodes ricinus* is most common vector, but also an urban risk from *I hexagonus* and *I canisuga*
- Ruminants support adult tick population, but do not transmit LD – evidence they kill *Borrelia*

Epidemiology of Lyme disease in the UK

- Who is at risk of acquiring Lyme disease?
 - Occupational: Forestry workers, deer managers, gamekeepers, farmers, soldiers, outdoor educators, conservationists
 - Recreational: ramblers, campers, ornithologists, nature photographers, returning travellers (from focal regions in US and EU)
- Where are “hotspots” in the UK?
 - New Forest, Thetford Forest, South Downs, Exmoor, woodland/heathland in southern England, North York Moors, Lake District, Scottish Highlands
 - Other local areas → $f(\text{habitat} \times \text{host species} \times \text{humans})$
 - Therefore, **important to note**, infected ticks can be found in both rural and urban green space – forests, parks, gardens

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Tick habitat

Image: BADA-UK

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Urban green space and gardens can be effective tick habitats

- Parks and gardens provide excellent habitat for squirrels, hedgehogs, rodents, birds
- Herbaceous vegetation especially interesting for children at play, pet dogs

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Options for managing habitat

- **Vector** - Direct control of tick populations
- **Host** - Control/cull host populations
- **Environment** – Modify/spray/trim vegetation to reduce ground cover/questing potential
- **Micro-manage habitats** using knowledge of ecosystem dynamics
- **Education** to increase awareness and personal protection

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Current research on ecology and habitats

- James Hutton Institute – Dr Lucy Gilbert
- Oxford University – Professor Sarah Randolph
- Forest Research – Dr Chris Quine

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A high risk area: forest clearing with broadleaf regeneration and a large mat of bracken



Making use of vegetation dynamics – maintain moderate shade in high access areas



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Accessible public health information is key



Online sources of information

UK Agencies

- Health Protection Agency (HPA) - www.hpa.org.uk
- Health Protection Scotland (HPS) - www.hps.scot.nhs.uk

International Agencies

- European Concerted Action on Lyme Borreliosis (EUCALB) - <http://meduni09.edis.at/eucalb>
- US Centers for Disease Control and Prevention (CDC) - www.cdc.gov/ncidod/dvbid/Lyme

UK Charities

- Borreliosis and Associated Diseases Awareness UK (BADA-UK) - www.bada-uk.org
- Lyme Disease Action (LDA) - www.lymediseaseaction.org.uk

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Awareness raising at a Royal Forestry Society Field Meeting in North Wales



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Ixodid tick morphology and development



Nymph

- 1 to 1.5 mm in size
- difficult to detect

Adult (female)

- 3 to 3.5 mm in size
- males are smaller
- can remain attached to host for several days

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Start and completion of a blood feed



Image: LDA

- Ticks are skilled at evading early detection - bites are painless
- They naturally focus on moist, warm areas of the body, often in skin folds
- Undisturbed, feeding will continue for several days
- A fully engorged tick will measure up to 10 mm in size, and appear like a small bean
- It usually takes several hours before a tick transfers the *Borrelia* bacteria to the host

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Ixodid tick head and mouthparts



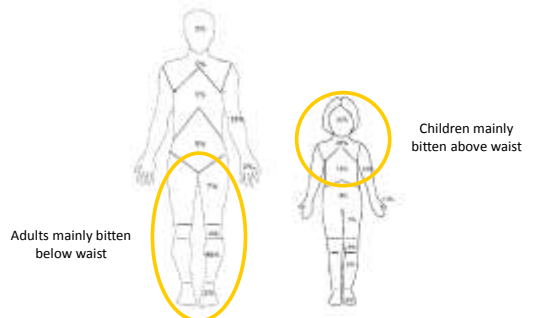
Head Chelicerae Hypostome Palps

Chelicerae

Images: D. Scharf/Brown Univ. USA 35

Anatomical distribution of nymphal tick bites

% of total nymphal bites, recreational forest site, England



Source: Robertson et al. 2000. Eur J Epidem 16: 647-652

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Erythema migrans (EM) – the target rash



Image: LDA



Image: 2007 J Gathany PHIL/CDC

- The rash expands from the site of the bite and gradually clears in the centre
- The rash appears over 3-30 days and may persist for several weeks
- The rash does not appear in over 40% of cases in Scotland
- The rash can be a wide variety of shapes depending on the location of the bite

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Symptoms and signs

Early:

- red, expanding target rash
- feeling unwell or 'flu-like'
- headache, stiff neck
- swollen lymph nodes
- sound or light sensitivity

Weeks, months, years:

- arthritis, typically of the knee
- sleep disorders
- extreme fatigue
- upset digestive system
- loss of weight
- muscle pain and/or weakness
- tendon pain
- tingling and numbness
- cognitive and psychological problems

Acute:

- facial palsy
- heart problems
- breathing problems

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Removal of ticks – the dos and don'ts!

Best practice

- Don't panic
- Aim to remove the tick promptly
- Grip the tick by its mouthparts
- Use a dedicated tick tool, follow instructions
- Use fine tweezers – pull firmly, steadily, no twisting
- Disinfect site of bite after removing the tick



Image: BADA-UK



Image: LDA

Unsafe practice

- Don't squeeze the body of the tick
- Don't twist (unless using a tick tool)
- Don't use fingernails
- Don't burn the tick
- Don't use oils, alcohol, nail varnish

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Case Studies: Positive Action in Practice

- **Case Study 1: Forestry Commission**
 - Staff induction and Health and Safety
 - Information (intranet) and training, tick tools
 - Risk assessments
- **Case Study 2: National Outdoor Centre, Glenmore Lodge, Cairngorms**
 - Staff induction
 - Awareness and training, tick tools
 - Annual testing (ELISA)
- **Case Study 3: Whinell Forest, Center Parcs Holiday Village, Penrith, Cumbria**
 - Education and awareness - ground staff and visitors
 - Medical Centre – trained staff and information leaflets
 - Bracken spraying and habitat modification (especially around footpaths)

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Awareness raising at Whinell Forest Village, Cumbria (Center Parcs)



Risk assessment and appropriate clothing required to access more natural woodland areas



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Health Information for Outdoor Users: Key Points

- 1. Enjoy the outdoors**
 - it's great for physical and emotional well-being!
- 2. Before going outdoors**
 - be aware of ticks and tick ecology
- 3. While outdoors**
 - minimise risk of being bitten: dress appropriately; apply acaricide; avoid dense vegetation (questing)
- 4. After being outdoors**
 - check for ticks on skin and clothes; check children; check the dog too!
- 5. If bitten by a tick**
 - remove promptly using a **safe technique**
- 6. Medical treatment**
 - seek early diagnosis and treatment if symptoms of infection develop after being bitten or after visiting tick habitat
 - early diagnosis is easier to treat with ABx
- 7. If in any doubt, speak with your GP**



Images: Forestry Commission

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Conclusions

- 1. The potential risk of Lyme disease is increasing for many social, environmental and ecological reasons.**
- 2. The risk of being bitten by an infected tick is modifiable through application of ecological knowledge, often at the local scale, and also an understanding of how people interact with natural environments.**
- 3. Public Health Information needs to be targeted, normalised and empowering so that more people can safely engage with the natural world for their physical and emotional well-being.**

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