

**MOUNTAINEERING COUNCIL OF SCOTLAND**

**\*\*\*Information Service\*\*\***

[www.mountaineering-scotland.org.uk](http://www.mountaineering-scotland.org.uk)

INFORMATION SHEET

March 2002: Updated 2006

# **\* \* Health \* \***

## **in the Hills of Scotland**



# Health in the Hills of Scotland

Walking and climbing in the Scottish Mountains will bring you into hazardous terrain such as rough, steep or loose ground, as well as conditions altered by weather (snow/wind/rain). You can learn how to cope safely with these hazards through experience and attending courses or training, but there are some common environmental hazards which are not so obvious to mountaineers, but which can have a significant impact on your enjoyment. This information sheet gives some basic information about these lesser-known “animal” hazards.

## General Hygiene Advice

It is not uncommon to get some form of stomach infection while camping. This is usually the result of diseases passed from other humans, but also passed from livestock. Visitors from other countries will not have been exposed to the range of even harmless bacteria in fresh mountain water in Scotland and this will cause some, usually minor, upset. To prevent the more serious infections concentrate on stopping flies, birds and other animals moving infection from human waste & food scraps to fresh food and food containers; to plates or cooking pots. Great care should be taken not to encourage rats, especially where these are living near livestock.

***NB: camping in even the remotest parts of Scotland, you will attract mice to your tent. They will eat through a tent and rucksack to get to open food, so keep it securely hidden. Mice do not carry the same infectious diseases as rats. Also, sheep are grazed over most Scottish land, wild Deer are distributed over large parts of the Highlands, cattle in more localised areas, and so cross-infection through rats is always a possibility.***

Areas more prone to the spread of infection:

- Crowded campsites
- Popular wild camping sites
- Areas around Bothies (unlocked mountain shelters)
- Highland Shooting Estate’s agricultural buildings
- Roadside pick-nick areas.

Common sources of infection:

- Pollution of water by human waste, cleaning cooking pans directly in water sources. This is not often a real problem if the water volume is high but is more serious in dry conditions and when using minor water sources.
- Areas where livestock are concentrated and faecal matter is concentrated and more likely to leach into fresh water.

What to do:

- ✓ Collect water from upstream of all habitation and don't drink untreated water from farmland or ‘inbye’ land with intensive livestock around
- ✓ Collect from a source of running water with a reasonable volume or an obviously clear lochan fed by a running stream
- ✓ If in doubt, boil the water before drinking or use sterilising tablets, solutions or filters
- ✓ Always wash vegetables and salads in boiled water
- ✓ Don't be casual about toilet functions – do it away from water sources and camping/bothy areas. See the MCofS advice leaflet on sanitation “Where to ‘GO’ in the Great Outdoors”

## Personal Camping Hygiene:

- ✓ Store food carefully and keep fresh food and stored water in covered containers
- ✓ Dispose of waste food and water in a small pit cut out of the turf, well away from water sources. Cover the pit with the sod of turf after each use to keep flies off. OR better, carry waste food out and dispose of at home.
- ✓ Inadequately cooked foods such as sausages, bacon and eggs should be cooked well as preserved meats go off quickly and raw eggs are infected with salmonella. Scramble eggs and cut sausages lengthways to ensure complete cooking.
- ✓ Have a set of personal cutlery, bowls, plates and cups. Always ensure they are adequately cleaned. Try not to share them communally.
- ✓ Clean cooking pans quickly after use so food scraps do not develop infectious germs as it is difficult to ensure they are removed after they have developed. Also food scraps attract flies, birds and vermin which act as vectors for disease.
- ✓ Empty food containers should be washed out, crushed and stored in a sealed poly bag until disposal.
- ✓ Hang up your food in a strong, sealed, poly bag where rats cannot get to it.

\* \* \* \* \*

# Disease and Infection in Scotland

## Detailed Papers:

There are relatively few natural hazards of this sort in Scotland compared to many other parts of the world, although some are becoming more prevalent. On the whole they cause discomfort and anxiety more than illness and should not be regarded as a serious hazard. Knowing how the infection spreads and taking simple precautions can prevent infection.

On the following pages are details of:

Water Borne Infection	(Bacterial, Protozoal, Viral and Algal infections)
Animal Borne Infection	( <b>Lyme disease and Louping Ill from Ticks</b> )
Plant Hazards	( <b>Spores</b> )
Biting Insects	( <b>Midges, Cleggs and insect repellent</b> )

# WATER BORNE INFECTION

There are three ways by which water borne infections can be contracted:

1. through cuts
2. through the mucous membranes (nose, mouth)
3. by swallowing

The most common infections are:

## 1. Bacterial Infections:

These can be divided into three categories:

### *1. Simple:*

The most common example is E Coli, this is probably contracted by swallowing water contaminated with sewerage.

**Symptoms:-** rapid onset of diarrhoea without blood

**Treatment:-** fast for 24hrs, drink clear fluids, water, tea without milk or commercial rehydration solutions

### *2. Require Treatment:*

If the symptoms persist after 24hrs then it may be more serious and require professional treatment. Examples include Shingella and Salmonella.

**Symptoms:-** generally start 24hrs after exposure and may include fever, vomiting and diarrhoea with blood.

**Treatment:-** visit your GP. Do not take anti-diarrhetics (for example, Imodium or Kaolin) because these may mask the symptoms. Do not cure the symptoms as this may make things worse.

### **E.coli O157**

The most virulent form of E. coli. An outbreak occurred on a Girl Guides camping trip in 2001 at a campsite near Inverkip, Fifteen campers were ill and E.coli O157 was identified from 14 of them. Samples of the tap water supplying the camp and a nearby cottage, and faecal samples from the cows were found to contain E.coli O157. The organism appeared to be the same in the campers, cattle and the water. The principal source of the organism had also been widely observed to be from contact with, or cross-contamination from, farm animals and/or their faeces. Sporadic events such as this now provide most of the cases of E.coli O157 infection in Scotland.

***NB: Do not drink from water sources that are shared by farm animals that are clearly concentrated into a small area.***

### *3. Complex:*

More serious infections such as Leptospirosis which has two forms: Weils Disease (a dangerous condition which results from infection carried in rats urine) and the Hardjo form transmitted to humans from cattle.

**Symptoms:-** fever and flue-like condition

**Treatment:-** full recovery is probable if a course of penicillin is taken in time but this depends upon immediate treatment. The time factor is crucial. Go straight to your GP, explaining the symptoms and possible source of infection from infected water. Ask for ten days of penicillin. Do not wait for a test as this wastes valuable time.

***NB: a small number of cases of Leptospirosis infection have occurred on occasion around the central highlands of Scotland.***

## 2. Protozoal Infections:

Common examples of these are Giardia and Amoebic Dysentery.

**Symptoms:-** these start 24hrs after exposure and may include vomiting, diarrhoea with mucous and blood, eggy sulphurous burps and foul smelling gas.

**Treatment:-** visit your GP. A stool test is recommended to get the diagnosis and treatment correct. However, the test may be negative in the case of Giardiasis.

***NB: in Scotland it is extremely rare to contract Giardia or Amoebic infection from mountain streams or lochans (small lakes) and fresh-water such as this can usually be drunk untreated well away from any human habitation.***

## 3. Viral Infections:

An example is Hepatitis A. These infections are extremely rare. There is no specific treatment. Normally your own immune system will sort them out. It is possible to get free immunisation from your GP. A course of 2 injections is needed for ten years protection.

## 4. Chemical or algal Infections:

There are other possible types of hazard in water such as blue-green algae and pollution by chemicals. Prevention is better than cure, so if the water looks suspect, for example, stagnant, discoloured, covered in a film of growth or has an oily surface, or looks otherwise polluted take the following advice:

- Do not wash, bathe in it or drink it,
- Always cover cuts with a waterproof plaster,
- Wear suitable clothes and footwear,
- If you are in contact try not to swallow it or open eyes under water,
- Dry hands before eating or smoking and;
- Take a shower as soon as possible after contact.

***Note: many small streams through areas of boggy ground or peat (a dark, black – coloured soil typical in upland glens) have an oily covering when slow running. This is not human pollution but natural chemical leaching from the peat. It is still best to avoid drinking it if possible.***

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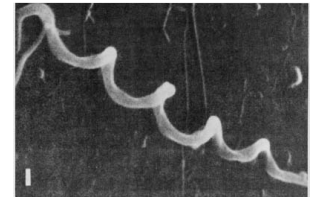
# Animal Borne Infection

Scotland does not have an array of insects or animals carrying nasty infection. The main problem concerns human reaction to their bite. However, there has been an increase in incidents of disease carried by Ticks and these are listed below.

## Lyme Disease

This has been a notifiable disease in Scotland since 1990. Identified in the early 1970's in Lyme, Connecticut, USA, as an arthritic-type disease, one of the symptoms being a skin rash.

It is spread by ticks infected by a bacterial spirochete named *Borrelia burgdorferi*, which is a distant cousin of the Syphilis bacterium. The skin rash has been described in European literature since the beginning of the century and it is endemic across large areas of Asia and Europe as well as the USA. The term Lyme disease has been adopted to describe the disease in Europe as well. It is increasingly regarded as a serious illness.



## The Tick:



The tick is an invertebrate related to spiders. There are over twenty species in Britain related to various different principle mammal or bird hosts. They carry various diseases from Louping Ill, Q-Fever, TBE virus, Haemorrhagic fevers as well as Lyme disease.

They are distributed across Scotland and particularly in the wetter west, in woodlands and moorlands, but particularly in grass pastures. There have been recorded as many as 800,000 ticks in thick vegetation in one area at the side of a path.

The tick has 3 life stages: larva, nymph and adult, taking between 1yr and 3yrs to complete a life-cycle. Each stage requires a single blood meal to grow. Larva and Nymph ticks can be extremely small – looking like specs of dust – and attach to small mammals and birds, and these act as the reservoir for the spirochete. It is the nymph stage that seems responsible for carrying the spirochete to other mammals. Both Laval and Nymph stages of the 'Sheep Tick' (*Ixodes ricinus*), the most common species found in Scotland, are the ones most commonly encountered by walkers and they generally feed on small mammals (but will also feed opportunistically on humans). They are often overlooked as they are so small. The spirochete found in the sheep ticks of Scotland (and indeed in the rest of Western Europe) is genetically different from those of North America, have different mammalian hosts and have different clinical symptoms.

Adult ticks feed on larger rodents and mammals such as Deer and Sheep. They will also feed on humans when given the chance. They climb to the top of foliage and attach to passing animals.

Climbers on sea cliffs will also be subjected to various tick species whose primary host is birds, The Seabird Tick (*Ixodus uriae*) being the most common and which carries various viruses and Lyme disease.



The tick's bite is painless, and it remains attached until it is gorged with blood, increasing greatly in size, before dropping off. This can take between a few days and 2 weeks. It takes up to 24hours before the bacteria are transmitted from the tick to the host.

## *The Disease in Scotland:*

Figures from the Information Statistics Division of the Scotland Office indicate that there have been no more than a maximum of 5 cases recorded in a year since 1995. However, it is estimated that the Scottish Highlands has one of the highest rates of Lyme disease in Northern Europe and in the north of Scotland, it has been reported there are 16 cases per 100,000 people each year. But researchers believe that this is probably an underestimation as not all cases are reported and that more cases go under-diagnosed as there is a lack of knowledge throughout Scotland about the disease. Moreover, no one has done an epidemiological study to look at it thoroughly although there have been reports of the occasional very serious infection in the press over the past few years and there is no doubt that Lyme disease is now treated in GP surgeries across Scotland on a regular basis.

Added to this, recent research at Raigmore Hospital in Inverness has identified a link between a B-cell lymphoma skin cancer and the bacteria. The American Journal of Surgical Pathology (September 2001) covered the story. This has already aroused interest in the United States where notices are erected in the countryside to warn people of the dangers of Lyme disease.

There is anecdotal evidence to suggest that the number of ticks has also dramatically increased in certain areas, possibly due to more favourable weather conditions. There are certainly known hot-spots where climbers have experienced plague numbers of ticks, such as the island of Pabbay near Barra and Weem woodland near Aberfeldy.

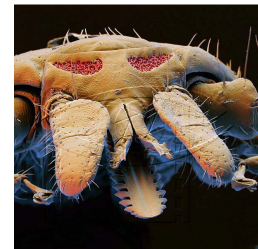
### The first Signs:

A rash appears around the area of the bite. This then expands outwards to form a larger circular, triangular or oval shaped rash, developing over a period of weeks. As infection spreads several rashes can appear at different sites on the body. This is often accompanied by fever, headaches, stiff neck, body aches and fatigue. Although these are flu-like symptoms, Lyme disease symptoms may be persistent or may occur intermittently.



### Treatment:

Early treatment with antibiotics is required in order to be effective in lessening the short-term symptoms and the long-term complications. Full recovery is possible, but treatment in the later stages of infection is more difficult and relapses are common.



### Long Term:

After several months of being infected, about 1/2 of those treated with antibiotics develop recurrent attacks of painful and swollen joints (arthritis) that last from a few days to a few months. The arthritis can shift from joint to joint, the knee being most commonly affected. About 10-20% of infected patients will develop chronic arthritis.

Research indicates that the variant found in Scotland is different to that found elsewhere in the UK. The Scottish variant seems to cause more neurological problems with symptoms ranging from stiff neck, severe headache, meningitis, temporary paralysis of the facial muscles (Bell's Palsy), numbness and poor motor coordination.

## *Tick distribution in Scotland:*

Some areas are more densely populated with ticks than others. Indeed neighbouring islands can be either heavily infected or almost clear. Woodland with dense undergrowth and open land with dense grass and bracken seem to attract ticks but this is by no means a good indication. Ask for local advice if possible.

Not all ticks are infected with the spirochete. Infection rates vary with species of tick and geographical region, from as few as 2% to 90%. Full information on this aspect of the disease in Scotland is unknown.

## Prevention:

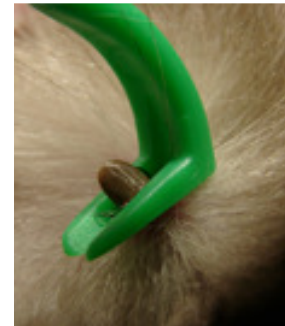
### When out in the hills try to:

- Stay out of areas of thick foliage.
- Leave no exposed skin on your legs, feet and ankles. Wear gaiters and trousers of thickly woven material. Wear Long sleeved shirts.
- Wear light coloured clothing so you can see the dark ticks and remove them. Inspect clothing often to remove the ticks.
- Spray insect repellent on clothing and socks.
- Keep to paths and tracks in heavily infested areas.
- Inspect your body (or your friends!) regularly, especially groin, navel, armpits, head and behind the ears and knees.

Of course much of this is impractical in the summer when its hot, and when the ticks are at their worse. The best advice is to frequently inspect your body and remove any you find early.

### Removing a tick:

- Don't panic – its most likely not infected and if you remove it early (within 24hours) it may not have passed on the bacteria.
- Don't use a lighted cigarette or match.
- Don't squeeze the tick (especially one that is engorged with blood) as this will inject the fluid in the tick back into your body.
- Don't pull the tick as its head may break off and remain in your skin.
  - ✓ Grasp the tick firmly with tweezers as close to the skin as possible,
  - ✓ Apply a little outward pull and it should come out,
  - ✓ Bathe the bite area in antiseptic cream.



Tick Twister

*If the mouthparts break off and remain in the skin,  
either remove them as you would a splinter or consult a doctor*

There are various commercial devices available for tick removal. Some specifically made for removing ticks from pets are available from your local Vets Practice and are equally effective on humans. There is also the 'Tick-Twister' from America which comes in different sizes for adult and nymph stages. See <http://www.otom.com/> for details and ordering as it seems it is unavailable in UK shops as yet.

## Further information

There are quite a few websites devoted to Lyme disease, but as most relate directly to the disease in the USA and the European disease is different in many respects, readers should beware of applying the American situation to that of Scotland. However, there appears to be one website that gives comprehensive information relating to the UK/Scottish situation: BADA-UK (Borreliosis & Associated Disease Awareness UK).

This charity, run by volunteers, was set up to help support the sufferers of Lyme disease, many being misdiagnosed and incorrectly treated. The website holds a range of information and downloadable pdf leaflets aimed at different countryside users and the charity is able to help with advice on treatment and prevention.

See [www.bada-uk.com](http://www.bada-uk.com)



## Ticks and your pets

Many people enjoy taking their dogs out on walks with them. Dogs are equally at risk from Lyme Disease and you should take all the precautions you would yourself. They can also bring infected ticks into your household. The following may also help:

- ✓ Keep pets out of known tick habitat.
- ✓ Check them daily.
- ✓ Brush them after a walk over a light coloured surface to find and discard any ticks.
- ✓ Possibly use tick repellent chemicals such as 'Permethrin', but only with veterinary advice.

## Ticks, your Pets, your Family & You

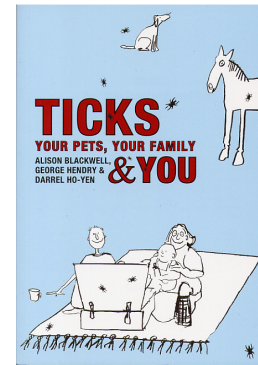
by Alison Blackwell, George Hendry and Darrel Ho-Yen.

Published by Mercat Press (2006 edition). 139 pages. Price £8.99.

ISBN: 1-84183-084-4

This excellent little book giving you all the information you need to know about ticks in Scotland is written by three experts in the field: George Hendry, a biochemist, ecologist and university reader, also responsible for the book *Midges in Scotland*; Darrel Ho-Yen, Head of Microbiology, NHS Highland where the department at Raigmore hospital provides a diagnostic service for Lyme disease in Scotland; and Alison Blackwell, an entomologist best known for her work on midges.

As well as explaining the history and the details of the disease, the authors have taken a pragmatic approach to the risks of contracting the disease and do not slip into the trap the press, government agencies and the medical profession often fall foul of – hysteria, hype and contradictory advice. Well worth reading if your' active outdoors.



## Louping Ill

This is another tick borne disease, which, although it is less important to humans, should not be underestimated. Louping Ill is a viral infection, which attacks the central nervous system and can result in high temperatures and fits. There is no known cure and the disease must simply take its course. Whilst it is capable of killing sheep, and regularly does, humans do recover from it, but generally feel quite ill for several weeks.



# Plant Hazards

There are no poisonous plants in Scotland which the walker or climber should avoid touching. However, one extremely common plant does give rise to a possible hazard that walkers and climbers should be aware of:

## Bracken Spores

Bracken is common over all the lower slopes of the Scottish highlands and elsewhere in the hill areas of the UK. It is believed to be increasing its coverage in some areas by about 3% per annum. A number of studies have shown that ingestion of bracken by live-stock leads to cancerous tumours, and the spores of bracken contain chemicals which are known to induce cancers in humans.

It is believed that a danger to humans arises from inhaling large quantities of spores, which are at best a major irritant and at worst may be cancer producing agents. Water supplies may become contaminated by toxins leaching from bracken beds. The concentration of chemicals (and the spores in the water supply) is likely to be higher in conditions of drought.

### The risk period:

The spores are released into the air by the plant during late August and September. Fine sunny summers with short rainy spells usually induce greater quantities. Higher quantities of spores are produced on average once in every four years.

### What you can do:

- ✓ Avoid excessive exposure during the releasing months.
- ✓ Avoid walking down wind of bracken beds during this time.
- ✓ If undertaking an activity during the release time and contact is unavoidable, wear a face mask.
- ✓ Try to avoid using water from streams that drain large areas of bracken covered ground, particularly during drought.



## Biting Insects

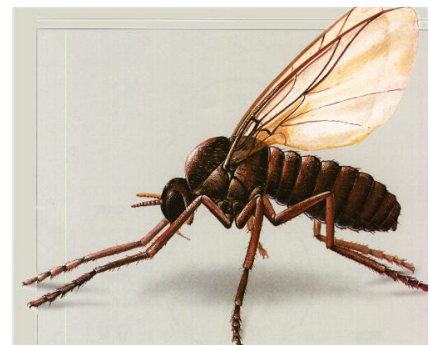
There are several types of biting insect found in Scotland. None carry disease but they can pose a severe threat to your enjoyment of the outdoors and one species in particular has become synonymous with Scotland. The main problem is the reaction the human body has to the anti-coagulant the insects use whilst they pierce human skin in order to take a drink of blood. Although small in size, certainly much smaller than mosquitoes found in Africa and Canada, they can swarm around humans in such great numbers that they become a real distraction and prevent your activity if this involves staying in one position for any length of time.

### The Mighty 'Midge'

These tiny flies are to be found across the whole of Scotland (indeed they are found to some extent across all the main hill areas of the UK), but are most noticeable in the north and west. Studies of the midge (*Culicoides impunctatus*) show that up to 40,000 can land on an unprotected arm in one hour with a potential 11 bites per second. Research has indicated that the nature of human sweat could be a critical factor in attracting midges. It appears that vegetarians and pregnant and breastfeeding mothers could be at greater risk of being bitten and that odours in exhaled breath may attract them. Midge antennae are sensitive to the breakdown products of chewing plants and to fermentation odours from lactic acid bacteria.

However, biting insects are attracted by carbon dioxide which is exhaled. Based on this fact, the company, Calor Gas, has recently come up with a partial solution to the midge menace at least around cafes, campsites and hotels. Their gas powered bug killer attracts midges to it by issuing carbon dioxide and sucks them into a collection chamber where they are killed. And it seems to work!

Another species of midge, found in North Africa, carries the virus 'bluetongue' which can be devastating to livestock. In Scotland, the midge does not carry any viruses that affect man or livestock.



### How can you avoid them?

They do not like excessive sun and are too small to fly during winds of more than about force 2. On calm, cloudy days they will search out the stationary walker, camper and climber, and make life a misery. Days of fine rain (drizzle) also attract large numbers of the insects but they hide in grass and other foliage during heavy rain. They are most active in the mornings and evenings in calm winds.

The numbers of flies and the periods of the year they are most prevalent depend to some extent on the ferocity and length of the winter season, which can kill off the eggs. When it has been cold, with snow or frost regularly down to sea-level throughout the winter and into April, Midges are not likely to be found to be a nuisance until later in June through to September. If the winter has been mild and wet, with warm or wet conditions in March and April, they can become problematic early in May.

It is recommended that tents have full, effective, fly-proof nets (midge-proofing requires a very small mesh size). Bivouacking and camping can be unpleasant in July and August because of the midge and the use of private bunkhouses, Bothies, Bed & Breakfast or Hotel accommodation is a more amenable option.

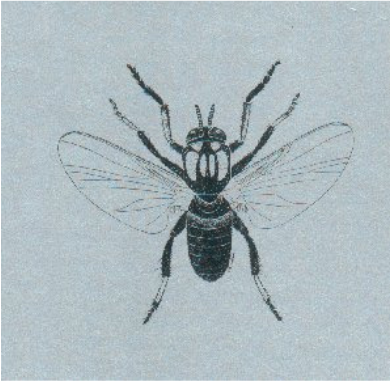
The final defence is to use an insect repellent but there are pro's and con's which are discussed below.

## Cleggs (Horse Flies)

Concentrated in the northern highlands, these relatively large insects have a vicious bite. The majority of people react to the bite with a large red weald, which is exceptionally itchy. The itch can continue for many days after (up to 2 weeks!). You will only feel the bite as the fly disengages to fly off, by which time it is too late. They do not swarm in large numbers and thankfully are relatively uncommon. They are most active in the summer months from June to September.

*Anti-histamine creams applied to the bite area help take the pain away and stop the itching.*

## Black (Birch) Flies



These flies belong to the genus *Simulium*, a part of the black fly family and, like the smaller Highland midge (*Culicoides impunctatus*), the females require a blood meal in order to reproduce. Most of these blood-sucking insects attack livestock but, according to entomologists, several species are known to bite humans: *Simulium posticatum*, found along the River Stour in Dorset where it is known as the Blandford Fly, and those on Speyside where they are known as Birch Flies. The predominant species on Speyside is *Simulium reptans*, with lesser numbers of *S. tuberosum* and *Prosimulium hirtipes*.

The worst affected areas appear to be localised, being confined to woodland around Loch Insh near Kincaig and along Speyside around Aviemore.

The Birch Fly appears when Birch trees start to leaf in May and black swarms of them congregate in shady areas under the trees, normally in the morning and particularly near running water where they breed.

The bite of the Birch Fly is extremely unpleasant and can cause extremely irritant sores, much worse than mosquito bites. The usual insect repellents do not seem to work. Locals are aware of the problem and resist picnicking or fishing under birch trees for a couple weeks in that area. Warm and very wet weather early in the spring provides ideal breeding conditions leading to a surge in the population of Birch Flies. Local businesses often place posters warning tourists of the danger. So taking an interest in the weather and reading notices may be prudent if you're staying down in the woods!

*(with thanks to Jeremy Watson of Scotland on Sunday, Rory Post of the Natural History Museum, London, and entomologists Jon Bass, Roger Crosskey and John Davies)*

## Insect repellents:

There is a range of chemical repellents on the market that help to prevent these insects biting. These repellents do not stop the midge swarming around humans although they do discourage it from landing on the skin and prevent biting. The Midge is attracted to an animal by detecting the carbon dioxide expired in exhaled breath, so there is not a lot we can do to go undetected.

***The active ingredient in most of these repellents is DEET (diethyltoluamide), which is also carcinogenic. To be fully effective requires the lotion to be about 90% proof.***

## Safe Use of Insect Repellent:

Although insect repellents containing DEET (or Permethrin) are both reasonably effective against midges and ticks, there have been some serious adverse reactions associated with DEET, particularly towards children.

### DEET:

In lotions containing under 50% DEET these reactions are restricted to transient and quickly disappearing effects to the skin in most people. The occasional extreme reaction has been recorded as acute dermatitis leading to permanent scarring. There is also one reported case of anaphylactic shock, although this is extremely rare, and there have been very occasional deaths associated with DEET in adults. Certainly ingestion by mouth when the repellent is sprayed onto the face can be dangerous when concentrations are greater than 50%. Children, however, are much more susceptible to toxic side effects and reported problems include neurological and cardiovascular toxicity, dermatitis, allergic reactions and death. These reactions occurred in repellents containing concentrations less than 20%.

#### Symptoms:

*Irritability, loss of balance, confusion, slurred speech, headaches and in sever cases, coma.*

### Permethrin:

This seems to have very few side effects and also appears to be a more effective repellent against ticks. It is also effective for longer, particularly when applied to clothing.

### What you can do:

- ✓ Keep out of the reach of children to prevent accidental ingestion.
- ✓ Do not apply to the hands of children and avoid the eyes, hands and mouth.
- ✓ Use creams, lotions and sticks rather than sprays.
- ✓ Avoid using repellents containing more than 50% DEET for adults and 20% for children. Better still avoid DEET altogether for children.
- ✓ Avoid long term use.
- ✓ Never apply to irritated skin and open cuts.
- ✓ Always wash when returning indoors.
- ✓ Use an alternative repellent, which does not contain DEET.

## Alternatives:

### Avon 'Skin So Soft' moisturising cream

This is not marketed as an insect repellent, but there is anecdotal evidence from many outdoor people that it works well. It is hypoallergenic, kind to your skin, non-toxic and is available in a fine aerosol form. It should be sprayed onto the face, hands and other exposed skin, but not rubbed in. It is available only from 'Avon Beauty Products'. Avon also produce a sun tan lotion containing a repellent, but the active ingredient is unknown.

### Citronella Oil

This natural compound is available in most health food shops and seems to deter excessive biting. Many 'friendly' insect repellents have this as their active ingredient.

### New Products in Development

The University of Aberdeen's zoology department, in association with the World Health Organisation, has developed a new variety of repellent, yet to be marketed. Watch this space!

### Bug Deterrents

There are also more technical measures available. Small devices, which emit low-frequency noise that mimics dragonflies, are marketed as being able to deter mosquito's for up to 10m in distance.

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Compiled by Nick Halls, Kevin Howett and with thanks to Mary Twomey.



**Mountaineering Council of Scotland**

**The Old Granary**

**West Mill Street**

**Perth**

**PH1 5QP**

**Tel: 01738 493 942**

**Fax: 01738 442 095**

**[info@mountaineering-scotland.org.uk](mailto:info@mountaineering-scotland.org.uk)**

**[www.mountaineering-scotland.org.uk](http://www.mountaineering-scotland.org.uk)**

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