



Insect/Arthropod Safety Guidelines

Most contents courtesy of USGS Safety and Health for Field Operations Handbook 445-3-H (2/2014)

Introduction and Scope

Any number of biological hazards may be encountered in the field. Some of the common wildlife present at UNLV field locations are discussed in the UNLV Wildlife Safety Guideline. Because field research can occur around the world, it is difficult to address all the situations that may occur. This guideline highlights additional hazards presented by arthropods (insects) at field locations and should be considered as part of the hazard assessment and mitigation planning for field projects.

Personnel may encounter a wide variety of biting and stinging insects, including bees, mosquitoes, ticks, fleas and flies, spiders, and scorpions at field locations. Several diseases in the U.S are spread by biting insects, including, but not limited to West Nile and Eastern Equine Encephalitis (mosquitoes); bubonic plague (fleas), Lyme Disease (deer or western black ticks) and Rocky Mountain Spotted Fever (ixodid or “hard” ticks). For this reason, prevention is of utmost importance.

In addition to being a vector for infectious diseases, stinging or biting arthropods can also be hazardous to outdoor employees due to their toxins. Health effects range from mild discomfort or pain to a lethal reaction for those employees who are allergic. Anaphylactic shock is the body’s severe allergic reaction to a bite or sting and requires immediate emergency care. Hundreds of thousands of people are stung by insects each year, and as many as 90-100 people in the United States die annually as a result of allergic reactions. This number may be underreported, as deaths may be mistakenly diagnosed as heart attacks or sunstrokes, or may be attributed to other causes.

The following pages will discuss preventive measures to avoid stings/bites, as well as first aid measures for stings/bites, for the following arthropods: bees/wasps/hornets, fire ants, scorpions, mosquitoes, venomous spiders, and ticks.

Insect/Arthropod Safety Guidelines

Bees, Wasps, and Hornets

Bees, wasps, and hornets are found throughout the United States and are most abundant in the warmer months. Nests and hives may be found in trees, under roof eaves, or on equipment such as ladders.

Prevention. Take the following steps to prevent bee, wasp, or hornet stings:

- Wear light-colored, smooth-finished clothing.
- Avoid perfumed soaps, shampoos, and deodorants.
- Do not wear cologne or perfume.
- Avoid bananas and banana-scented toiletries.
- Wear clean clothing and bathe daily. (Sweat may anger bees.)
- Wear clothing to cover as much of the body as possible.
- Avoid flowering plants when possible.
- Keep work areas clean. Social wasps thrive in places where humans discard food.
- Remain calm and still if a single stinging insect is flying around. (Swatting at an insect may cause it to sting.)
- If you are attacked by several stinging insects at once, run to get away from them. (Bees release a chemical when they sting, which may attract other bees.)
- Go indoors if feasible.
- A shaded area is better than an open area to get away from the insects.
- If you are able to physically move out of the area, do not attempt to jump into water. Some insects (particularly Africanized honey bees) are known to hover above the water, continuing to sting once you surface for air.
- If a bee comes inside your vehicle, stop the car slowly and open all the windows.
- Employees with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

First aid. If an employee is stung by a bee, wasp, or hornet:

- Have someone stay with the employee to be sure that he or she does not have an allergic reaction.
- Wash the site with soap and water.
- Remove the stinger using gauze wiped over the area or by scraping a fingernail over the area. Never squeeze the stinger or use tweezers.
- Apply ice to reduce swelling.
- Do not scratch the sting as this may increase swelling, itching, and risk of infection.

Fire Ants

Fire ants bite and sting. They are aggressive when stinging and inject venom, which causes a burning sensation. Red bumps form at the sting, and within a day or two they become white fluid-filled pustules.

Prevention

- Do not disturb or stand on or near ant mounds.
- Be careful when lifting items (including animal carcasses) off the ground, as they may be covered in ants.
- Fire ants may also be found on trees or in water, so always look over the area before starting to work.

First aid. Employees with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

Take the following steps if someone is stung or bitten by fire ants:

- Rub off ants briskly, as they will attach to the skin with their jaws.
- Antihistamines may help.
- Follow directions on packaging.
- Drowsiness may occur.
- Take the employee to an emergency medical facility immediately if a sting causes severe chest pain, nausea, severe sweating, loss of breath, serious swelling, or slurred speech.

Scorpions

Scorpions usually hide during the day and are active at night. They are sensitive to vibrations, either in the air or on the ground. When humans are stomping around, scorpions usually run for cover. They may be hiding under rocks, wood, or anything else lying on the ground. Some species may also burrow into the ground. Most scorpions live in dry, desert areas. However, some species can be found in grasslands, forests, and inside caves.

Symptoms. Symptoms of a scorpion sting may include:

- A stinging or burning sensation at the injection site (very little swelling or inflammation)
- Positive “tap test” (i.e., extreme pain when the sting site is tapped with a finger)
- Restlessness
- Convulsions
- Roving eyes

- Staggering gait
- Thick tongue sensation
- Slurred speech
- Drooling
- Muscle twitches
- Abdominal pain and cramps
- Respiratory depression

These symptoms usually subside within 48 hours, although stings from a bark scorpion can be life threatening.

Prevention

- Wear long sleeves and pants.
- Wear leather gloves.
- Shake out clothing or shoes before putting them on. Some of the most common encounters with scorpions occur when they crawl into shoes/boots and then sting the feet of persons putting them on without checking first.
- Employees with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

First aid. Take the following steps if you are stung by a scorpion:

- Contact a qualified health care provider or poison control center for advice and medical instructions.
- Ice may be applied directly to the sting site (never submerge the affected limb in ice water).
- Remain relaxed and calm.
- Do not take any sedatives.
- Capture or take a picture of the scorpion for identification if it is possible to do so safely.

Mosquitoes

Many diseases are carried by mosquitoes and transmitted to humans. Thousands of people in the United States have been infected with West Nile virus (WNV). There are no medications to treat or vaccines to prevent WNV infection. Fortunately, most people infected with WNV will have no symptoms. About 1 in 5 people who are infected will develop a fever with other symptoms. Less than 1 percent of infected people develop a serious, sometimes fatal, neurologic illness.

Occasionally, an infected person will develop a more severe disease such as “West Nile encephalitis,” “West Nile meningitis,” or “West Nile meningoencephalitis.” Encephalitis refers to an inflammation of the brain, meningitis is an inflammation of the membrane around the brain and the spinal cord, and meningoencephalitis refers to inflammation of the brain and the membrane surrounding it. Almost 13,000 of the individuals who have been reported as having West Nile virus since 1999 have been seriously ill, and more than 1,200 have died.

Other mosquito-borne disease that are endemic in tropical and sub-tropical areas of the world include dengue fever, yellow fever, malaria, and Zika. If you plan to conduct field work in these areas, consult the Centers for Disease Control and Prevention Travel Health section (Yellow Book), and make sure you are up-to-date on any mandatory vaccinations for entry to all countries you will visit.

Zika virus can occasionally be transmitted in areas of the Southern United States, and spreads to people primarily through the bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*). Many people infected with Zika won't have symptoms or will only have mild symptoms. The most common symptoms are fever, rash, headache, joint pain, red eyes, and muscle pain. Symptoms can last for several days to a week. People usually don't get sick enough to go to the hospital, and they very rarely die of Zika. However, Zika infection during pregnancy can lead to microcephaly and other birth defects. Microcephaly is a birth defect in which a baby's head is smaller than expected when compared to babies of the same sex and age. There have also been increased reports of Guillain-Barré syndrome, an uncommon sickness of the nervous system, in areas affected by Zika.

Prevention

Use a repellent on exposed skin and clothes while outdoors. Repellents containing DEET, picaridin, IR3535, and some oil of lemon eucalyptus and para-menthane-3,8-diol products provide longer-lasting protection. To optimize safety and effectiveness, repellents should be used according to the label instructions.

- When weather permits, wear long sleeves, long pants, and socks when outdoors. Mosquitoes may bite through thin clothing, so spraying clothes with repellent containing permethrin or another EPA-registered repellent will give extra protection. Do not apply repellents containing permethrin directly to skin. Do not spray repellent on the skin under your clothing.
- Take extra care during peak mosquito biting hours. Take extra care to use repellent and protective clothing from dusk to dawn or consider avoiding outdoor activities during these times.

- Report dead birds to local authorities. Dead birds may be a sign that West Nile virus is circulating between birds and the mosquitoes in an area. By reporting dead birds to State and local health departments, you can play an important role in monitoring West Nile virus.

First aid is generally not indicated for mosquito bites or mosquito-borne illnesses that are contracted in the field, as the symptoms generally manifest after the field work is concluded. Supportive therapies, antibiotics, etc. should be provided by licensed health care providers.

Venomous Spiders

Venomous spiders found in the United States include the black widow, brown recluse, and hobo spiders. Spiders are usually not aggressive. Most bites occur because a spider is trapped or unintentionally contacted.

Black widow spiders. Black widow spiders are found throughout North America, but are most common in the southern and western areas of the United States. They are identified by the pattern of red coloration on the underside of their abdomen. They are usually found in undisturbed areas such as woodpiles, under eaves, fences, and other areas where debris has accumulated. They may also be found living in outdoor toilets where flies are plentiful.

Black widow spiders build webs between objects, and bites usually occur when humans come into direct contact with these webs. A bite from a black widow can be distinguished from other insect bites by the two puncture marks it makes in the skin. The venom is a neurotoxin that produces pain at the bite area and then spreads to the chest, abdomen, or the entire body.

Brown recluse spiders. The brown recluse spider, also known as the violin spider, is most commonly found in the Midwestern and Southern United States. It is brown in color with a characteristic dark violin-shaped (or fiddle-shaped) marking on its head and has six equal-sized eyes (most spiders have eight eyes). Brown recluse spiders are usually found in places with secluded, dry, sheltered areas such as underneath structures, logs, or in piles of rocks or leaves. If a brown recluse spider wanders indoors, it may be found in dark closets, shoes, or attics.

The brown recluse spider cannot bite humans without some form of counter pressure; for example, through unintentional contact that traps the spider against the skin. Bites may cause a stinging sensation with localized pain. A small white blister usually develops at the site of the bite. The venom of a brown recluse can cause a severe lesion by destroying skin tissue (skin necrosis). This skin lesion will require professional medical attention.

Hobo spiders. The hobo spider is found throughout the Pacific Northwest. It is large and brown with a distinct pattern of yellow markings on its abdomen. Unlike many other similar looking spiders, hobo spiders do not have dark bands on their legs. To catch their prey, hobo spiders build funnel webs in holes, cracks, and recesses. They may be found in outdoor spaces with

retaining walls, and in foundations, window wells, and stacks of firewood and bricks. Indoors, they can nest between boxes or other storage items, on window sills, under baseboard heaters or radiators, behind furniture, and in closets. Hobo spiders do not climb like most spiders but are fast runners. These spiders are much more likely to attack if provoked or threatened. The bite of a hobo spider may go unnoticed; however, a moderate to severe, slow-healing wound can develop.

Symptoms. Symptoms associated with spider bites can vary from minor to severe. Although extremely rare, death can occur in the most severe cases. Possible symptoms resulting from a spider bite include the following:

- Itching or rash
- Pain radiating from the site of the bite
- Muscle pain or cramping
- Reddish to purplish color or blister
- Increased sweating
- Difficulty breathing
- Headache
- Nausea and vomiting
- Fever
- Chills
- Anxiety or restlessness
- High blood pressure

Prevention

- Inspect or shake out any clothing, shoes, towels, or equipment before use.
- Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials.
- Minimize the empty spaces between stacked materials.
- Remove and reduce debris and rubble from around the outdoor work areas.
- Trim or eliminate tall grasses from around outdoor work areas.
- Store apparel and outdoor equipment in tightly closed plastic bags.
- Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.

First aid. Take the following steps if you are bitten by a spider:

- Stay calm. Identify the type of spider if it is possible to do so safely. Identification will aid in medical treatment
- Wash the bite area with soap and water.

- Apply a cloth dampened with cold water or filled with ice to the bite area to reduce swelling.
- Elevate bite area if possible.
- Do not attempt to remove venom.
- Notify your supervisor.
- Immediately seek professional medical attention.

Ticks

Tick-borne pathogens can be passed to humans by the bite of infected ticks. Ticks can be infected with bacteria, viruses, or protozoa. Some of the most common tick-borne diseases in the United States include: Lyme disease, babesiosis, ehrlichiosis, Rocky Mountain spotted fever, anaplasmosis, southern tick-associated rash illness, tick-borne relapsing fever, and tularemia. Other tick-borne diseases in the United States include: Colorado tick fever, Powassan encephalitis, and Q fever. Lyme disease is the most commonly reported tick-borne disease in the United States.

Working outdoors in sites where ticks are present puts you at risk of exposure to tick-borne diseases. Worksites with woods, bushes, high grass, or leaf litter are likely to have more ticks. Personnel in most regions of the United States should be extra careful to protect themselves in the spring, summer, and fall when ticks are most active. Ticks may be active all year in some regions with warmer weather.

Ticks are usually more active in the months of April through October, and peak in the summer months of June through August. The time of year when ticks are active may vary with the geographic region and climate. Be extra careful to protect yourself in the late spring and summer when immature ticks are most active.

Symptoms. There are many symptoms associated with tick-borne diseases. Infected persons may not have all of these symptoms, and many of these symptoms can occur with other diseases as well. Some common symptoms of infection with tick-borne diseases include:

- Body/muscle aches
- Fever
- Headaches
- Fatigue
- Joint pain
- Rash
- Stiff neck
- Facial paralysis

Prevention

- Wear a hat and light-colored clothing, including long-sleeved shirts and long pants tucked into boots or socks.
- Use insect repellents that provide protection for the amount of time you will be outdoors. Follow the repellent label directions for use.
- Use repellents containing 20 to 30 percent DEET on your exposed skin and clothing to prevent tick bites.
- Reapply repellents as needed.
- Use repellents such as permethrin for greater protection. Permethrin kills ticks on contact. Permethrin can be used on clothing but should not be used on skin. One application of permethrin to pants, socks, and shoes typically stays effective through several washings. Pre-treated clothing is available and remains protective for multiple (up to 70) washings.
- Check your skin and clothes for ticks every day. The immature forms of these ticks are very small and may be hard to see.
- Shower or bathe as soon as possible after working outdoors to wash off and check for ticks.
- Remember to check your hair, underarms, and groin for ticks.
- Immediately remove ticks from your body using fine-tipped tweezers.



- Grasp the tick firmly and as close to your skin as possible.
- Pull the tick's body away from your skin with a steady motion.
- Clean the area with soap and water.
- Removing infected ticks within 24 hours reduces your risk of being infected with the Lyme disease bacterium.
- Wash and dry work clothes in a hot dryer to kill any ticks present.
- Learn the symptoms of tick-borne diseases.
- If you develop symptoms of a tick-borne disease seek medical attention promptly. Be sure to tell your health care provider that you work outdoors in an area where ticks may be present.

Diagnosis and Treatment. If you develop symptoms of a tick-borne disease, seek medical attention promptly. Be sure to tell your health care provider that you work outdoors in an area where ticks may be present.

Tick-borne diseases are diagnosed based on symptoms and the possibility that the employee has been exposed to infected ticks. Most cases can be successfully treated with specific types of antibiotics, especially if treatment is started early. However, some employees may have symptoms such as arthritis, muscle and joint pain, or fatigue for an extended period of time.

Please contact UNLV Risk Management & Safety (702-895-4226) if you have any additional questions or concerns about insects/arthropods you might encounter during field operations.