INSECT AND ARTHROPOD THREATS IN SUB-SAHARAN AFRICA

Prints available for order at https://ephc.amedd.army.mil/HIPECatalog/

Mosquitoes

Mosquitoes rank first of all the arthropods that impact the he… deployments. Not only do they transmit disease, but they can occur in such high numbers that they negatively impact morale. Pest mosquitoes degrade mission readiness and combat effectiveness through severe annoyance, itching bites, loss of sleep, and nervousness.

Preventive Measures: Use the DoD Insect Repellent System, take your anti-malarial medication as directed, and ensure all required vaccinations are up-to-date.

Anopheles spp. are night-biting mosquitoes. They are vectors of:

- **Malaria** - Capable of debilitating a high percentage of personnel for over a week. Uncomplicated malaria may require three to seven days of inpatient care before return to duty. Severe malaria requires intensive care and MEDEVAC to fixed facilities. Fatalities may occur if treatment is delayed.
- **O'nyong-nyong** - Self-limited disease with high fever, headache, rash, and joint pain, requiring outpatient care before return to duty.
- **Lymphatic filariasis** - Causes a condition called elephantiasis. Elephantiasis is a crippling condition in which limbs or other parts of the body are grotesquely swollen or enlarged. People living in areas where the disease is common are at the greatest risk for infection.

NOTE: ***Aedes spp.***, ***Anopheles spp.***, ***Culex spp.***, ***Mansonia spp.***, and ***Coquillettidia spp.*** mosquitoes, depending on geographical distribution, can also be vectors of filariasis.


Anopheles spp.

Culex spp. are night-biting mosquitoes. They are vectors of:

- **West Nile virus** - Most cases are asymptomatic. Those who develop symptoms are likely to experience high fever and headache for one to seven days before returning to duty. Fatalities and long-term neurological complications are rare, but do occur.
- **Sindbis and Sindbis-like viruses** - Self-limited fever with joint pain in the hands and feet. Half of all patients report continued joint pain for over 12 months.


Culex spp.

Aedes spp. are day-biting mosquitoes. They are vectors of:

- **Dengue** - High fever and debilitating bone pain. Requires one to seven days of supportive care, followed by gradual return to duty. Dengue occasionally causes severe or fatal disease.
- **Yellow fever virus** - Fever and liver damage with a high fatality rate. Can be nearly 100 percent prevented with vaccination.
- **Chikungunya** - Fever and severe joint pain requiring one to seven days of supportive care before gradual return to duty. Joint pain is likely to persist for several months.
- **Zika virus** - Fever, rash, and red eyes, lasting about two to seven days before return to duty. Can also cause birth defects in pregnant women.


Aedes spp.

Mosquitoes and other Bloodsucking Insects

Can be vectors of:

- **Rift Valley fever** - Fever and liver abnormalities. One to seven days of supportive care, followed by return to duty. Fatalities can occur. During outbreaks, multiple species including ***Aedes spp.***, ***Culex spp.***, ***Anopheles spp.***, and other biting arthropods, such as ***Culicoides spp.***, may become infected and can transmit infection to humans on an explosive scale.

Preventive Measures: Use the DoD Insect Repellent System to protect against insect bites. Both the insect head net and parka are available (See Additional Protective Measures). Also, avoid contact with blood, body fluids, or tissues of infected animals.

Black Flies

Black flies are small, dark flies that fly about the face, enter the eyes and ears, and cause a burning sensation as they attempt to obtain a blood meal. Like mosquitoes, black flies use heat and carbon dioxide to locate humans. They are primarily found near rural agricultural areas in sub-Saharan Africa and develop in fast-flowing streams and rivers.

Preventive Measures: Use the DoD Insect Repellent System. Both the insect head net and parka are available (See Additional Protective Measures).

Simulium spp. bite during the day. They are vectors of:

- **Onchocerciasis** - The most serious manifestation consists of lesions in the eyes that can lead to visual impairment and blindness. There are no vaccines or drugs available to prevent Onchocerciasis.

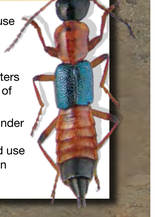
Lights

Adult Nairobi flies are attracted to bright light sources such as generator-powered light towers near guard shacks and security checkpoints. Avoid sitting or standing directly underneath these light sources to prevent contact with these beetles.

Nairobi Flies

Rove beetles in the genus ***Paederus*** are found in decaying vegetation in many parts of the world including sub-Saharan Africa. They are referred to as **"Nairobi flies"** or **"Kenya flies"** because they can fly and are often found near population centers such as Nairobi, Kenya. These beetles are a concern because they can release a toxin called pederin when they are crushed against the skin. Pederin can cause severe dermatitis and blisters, and a condition known as Nairobi eye can occur when the toxin enters the skin around the eye. This can result in swelling of tissues, irritation and lost duty time.

Preventive Measures: Avoid working or resting under bright lights when adult beetles are actively flying. Wear the uniform with the sleeves rolled down, and use gloves and wide-brimmed head gear to protect skin from contact with these beetles.



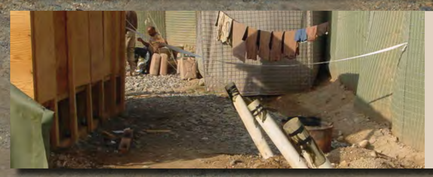
Tumbu Flies

Tumbu flies, also called **Putzi**, are common in sub-Saharan Africa. The fly lays its eggs on wet fabric outdoors, and its larvae then penetrate human skin to pupate, causing painful boils that must be removed surgically.

Preventive Measures: Avoid damp beach towels and line-drying clothes; dry all clothes in a dryer or iron them before wearing.

Cordylobia spp. lays its eggs on wet fabric outdoors. They cause:

- **Human or animal myiasis** - Myiasis is infection with a fly larva.



Latrines

Construct urinals so they do not soak the surrounding soil. Tumbu flies are attracted to urine-soaked ground. Sanitation is important. Avoid hanging laundry to dry within the vicinity of latrines.

Chigoe Fleas

Chigoe fleas, also called **Jiggers** or **Sand fleas**, are parasitic insects that can burrow into your feet if you walk barefoot across infested ground.

Preventive measures: Wear shoes and maintain proper sanitation around your living area. Avoid contact with dogs, cats, goats, chickens and other domestic reservoirs of jiggers. Suppress dust by wetting the ground.

Tunga penetrans cause:

- **Tungiasis** – Skin inflammation, severe pain, itching, and a circular lesion, almost like swiss cheese in the skin. Secondary infection with bacteria or fungus can lead to leg amputations or even death.

Filth Flies

The habits of **filth flies** favor the spread of bacteria and other disease-causing organisms. Filth flies often feed and lay eggs on garbage, manure and carrion before contaminating human foods and food preparation surfaces by landing on them.

Preventive measures: Fly control, sanitation and exclusion of flies through physical means (example: window screens).

Musca spp. – Mechanically transmit numerous pathogens and diarrheal agents.

Tsetse Flies

Adult male and female tsetse flies feed avidly and exclusively on vertebrate blood and transmit parasites. The flies are attracted to moving objects. Species of the ***Glossina palpalis*** group are found primarily in wet lowland forests, especially along the shores of lakes and rivers, closely associated with riverine vegetation. Species of the ***Glossina morsitans*** group are found primarily in the drier areas and savannas, especially within the bushlands and thickets, of sub-Saharan Africa.

Preventive Measures: Use the DoD Insect Repellent System. Both the insect head net and parka are available (See Additional Protective Measures). There are currently no vaccines or drugs available to prevent African trypanosomiasis.

Glossina spp. usually feed in broad daylight and bite easily through thin clothing. They cause:

- **African Trypanosomiasis** - African sleeping sickness. Potentially severe disease which may require hospitalization and convalescence over seven days. Untreated infection leads to death over a period of weeks to several years; treatment can be difficult if the infection is not identified early.

matter, particularly rodent burrows, and may be common around human habitation. Abandoned dwellings, sometimes used by troops as temporary quarters, can harbor significant numbers of sand flies. Stables and poultry pens may also harbor sand flies.

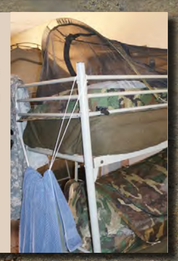
Preventive Measures: Outdoors, use the DoD Insect Repellent System. Indoors, stay in a well-screened or air-conditioned area. No vaccines or drugs are available to prevent infection. Conduct surveillance to determine abundance, and implement management plans.

Phlebotomus spp. are night biters and their bites are quite painful. They are vectors of:

- **Cutaneous Leishmaniasis** - causes skin sores. Lesions can be disfiguring. Currently, not all cases require evacuation.
- **Visceral Leishmaniasis** - affects several internal organs (usually spleen, liver, and bone marrow) and can be life-threatening.

Protection

The new self-supporting, low profile bed net weighs less (weighing only two pounds), is factory treated with permethrin, and is easier to set up and take down than the older bed net.
The Egret bed net, which has a larger interior space, is also available and comes pretreated with both permethrin and deltamethrin.



Bed Bugs

Bed bugs usually feed at night when people are asleep. They will bite all over a human body, especially around the face, neck, upper torso, arms and hands.

Preventive Measures: If staying in temporary quarters in countries where bed bugs are prevalent, inspect sleeping area and mattress prior to use. Be sure to wash all your linens and place them in a hot dryer for at least 20 minutes before use.

Cimex spp. cause:

- Localized allergic reactions. There are currently no diseases associated with bed bug bites.
- Their presence can be extremely disconcerning and cause loss of sleep which can result in lost duty time.

Body Lice

Human body lice are insects that use their piercing-sucking mouthparts to feed on human blood. In conditions of overcrowding and poor hygiene, such as in prisons and refugee camps, the risk of louse-borne typhus fever, or epidemic typhus, can increase.

Preventive Measures: Launder clothing in hot water (130°F or hotter) and bathe to remove body lice. Avoid sharing clothing or bedding materials. Use the DoD Insect Repellent System.

Pediculus humanus corporis - often found crawling on the clothing and bedding material of the host. They cause:

- Severe annoyance, mental unrest, itching bites, and loss of sleep.
- **Typhus fever** - Sudden high fever (105°F or 40°C), severe headache, chills, photophobia, confusion, rash, vomiting, and pain and stiffness in the muscles and joints. The course of the disease is rapid and the fever drops after about 12 to 14 days, followed by rapid recovery or death.

Scabies Mites and Chiggers

Scabies infestation is caused by the microscopic mite ***Sarcoptes scabiei***. The fertilized female mite burrows into the skin, depositing eggs in the tunnel behind her. After the eggs hatch, larvae migrate to the skin surface and eventually change into the adult form. Scabies spreads principally by direct skin-to-skin contact, and to a lesser extent, through contact with infested garments and bedclothes. **Chiggers** are the immature stage of a mite in the family Trombiculidae that can transmit scrub typhus and rickettsialpox. The chigger mite has a lifecycle similar to a tick, but only the chigger larvae bite humans. Chiggers live in a range of habitats but are most common in grassy or scrubby vegetation, shaded areas, leaf litter, rotten logs, and stumps.

Preventive measures: Personal hygiene. Use the DoD Insect Repellent System. They are vectors of:

- **Scabies** - The principal sign of the disease is a pimple-like rash that is most commonly found on the hands, especially the webbing between the fingers, the skin folds of the wrist, elbow or knee, the penis, the breast or the shoulder. Infestation often causes intense itching all over the body, especially at night. Scratching of itchy areas results in sores that may become infected by bacteria.
- **Scrub typhus** - Symptoms include fever, headache, muscle pain, cough, and gastrointestinal symptoms. The site of the chigger bite may form a black scab called an eschar and a spotted rash may appear on the trunk and spread to the arms and legs.
- **Rickettsialpox** - A mild, self-limited, zoonotic febrile illness characterized by a black, crusty scab formation at the location of a mite bite, followed by the onset of systemic symptoms and a more generalized rash.

Biting Midges

The most common biting midges, or "no-see-ums", are ***Culicoides spp.*** They are associated with aquatic or semiaquatic habitats, such as mud or moist soil around streams, ponds, and marshes. Biting midges are tiny gnats and, like black flies, inflict painful bites and suck the blood of their hosts, which includes people and livestock.

Preventive Measures: Use the DoD Insect Repellent System. Both the insect head net and parka are available (See Additional Protective Measures).

Culicoides spp. feed during the early mornings and evenings.

They are vectors of:

- **Mansonelliasis** - Mansonella are filarial nematodes (roundworms). Can cause swelling, itching, fever, headaches and neurologic manifestations.

DoD Insect Repellent System

Permethrin-Treated Uniform*

Insect Repellents Applied to Skin

Properly Worn Uniform

* Factory-treated uniforms will have a sewn-in label stating they are permethrin treated. If not factory-treated, field-treat the uniform with permethrin.

Untreated Mosquito Bed Nets (NSN 7210-00-266-9736) should be treated with 0.5% permethrin aerosol spray and assembled properly on a cot. Check for holes in netting and keep loose edges off the ground by tucking them under the sleeping bag.

Permethrin-Treated Bed Nets. Lightweight, self-supporting, pop-up bed nets factory-treated with permethrin are available in coyote brown (NSN 3740-01-518-7310), green camouflage (NSN 3740-01-516-4415) or the Egret bed net (NSN 3740-01-644-4953).

DEET alternatives

Additional Protective Measures:

- Insect Head Net (NSN 8415-00-935-3130 or NSN 8415-00-935-2914) is a finely-woven (30-mesh/inch), olive drab, nylon head covering that can be worn over the bare head, cap, helmet, or helmet liner.
- Insect Protective Mesh Parka (NSN 8415-01-483-2988) is worn over outer clothing. The small mesh size not only protects against mosquito bites, but also prevents bites from very small flying insects such as no-see-ums, sand flies, black flies, and gnats. The parka is waist-length, has a pocket, long sleeves, a drawstring and a mesh hood that covers the face and head.
- Unit Field Sanitation Teams - Company sized units will establish and employ manned, trained, and equipped unit Field Sanitation Teams according to Army Techniques Publication (ATP) 4-25.12.
- Consult medical personnel about country-specific required vaccines or anti-malarial medications.

Approved Insect Repellents

Approved military insect repellents for use on exposed skin come in a variety of formulations. Always refer to the label to determine frequency of repellent application based on activity. Do not apply repellent to eyes, lips, or to sensitive or damaged skin. Approved military insect repellents include:

- Ultrathon™ (NSN 6840-01-284-3982) contains 34% controlled-release DEET lotion; one application protects for up to 12 hours.
- Ultra 30™ Insect Repellent Lotion (NSN 6840-01-584-8393), contains 30% Lipo DEET; one application protects for up to 12 hours.
- Cutter ® pump spray (NSN 6840-01-584-8598) contains 25% DEET; one application protects for up to 10 hours.
- Natrapel ® pump spray (NSN 6840-01-619-4795) contains 20% picaridin; provides improved protection against Anopheles spp. mosquitoes (carriers of malaria) for up to 8 hours.
- Bullseye™ Bug Repellent pump spray (NSN 6840-01-656-7707), contains 20% IR3535®; provides protection for up to 8 hours.
- Chigg Away® (NSN 6840-01-137-8456), contains 10% sulfur; repels chiggers.

Resources

1. *Tech Guide 36 Personal Protective Measures Against Insects and Other Arthropods of Military Significance*
2. *Armed Forces Pest Management Board, http://www.acq.osd.mil/eie/afpmb/*
   - *Field Guide to Venomous and Medically Important Invertebrates Affecting Military Operations*
   - *Living Hazards Database*
3. *Army Public Health Center, Entomology Products Webpage, http://phc.amedd.army.mil/topics/envirohealth/epm/Pages/APHCEntomologyProducts.aspx*

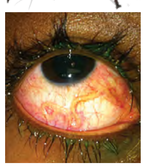
Deer Flies

Deer flies breed in decaying organic matter found in and around the rain forests of western and central Africa. Movement, bright blue colors, smoke and carbon dioxide attract these flies. Their bites are deep and painful and the wounds often continue to bleed after the flies have left. They can easily bite through clothing.

Preventive Measures: Use the DoD Insect Repellent System. Both the insect head net and parka are available (See Additional Protective Measures).

Chrysops spp. bite during the day. They vector:

- **Loiasis** - Known as African eye worm. Most people with loiasis do not experience signs or symptoms of infection. It takes five to six months after initial infection for the larvae to be found in the bloodstream. There are currently no vaccines or drugs available to prevent loiasis.



Animals and Shelters

Protect yourself from ticks and pests that may be associated with animals. Be wary or avoid abandoned shelters, stables or poultry pens that were used to house animals. These areas can still harbor large numbers of pests such as ticks, fleas and flies.

Bees, Wasps and Hornets

Bees, wasps and **hornets** are found throughout sub-Saharan Africa. African honey bees deserve special mention because they are extremely sensitive to the slightest disturbance, and the hive responds with massive and persistent stinging attacks.

Apis mellifera scutellata is active during the day. Stings can cause:

- Localized allergic reactions which can be fatal in extreme cases. Victims may receive hundreds of stings if they are unable to flee which can cause severe allergic reactions and result in death.

Preventive Measures: Bees, wasps and hornets dislike the noise, vibrations, and air movement created by power equipment or doors. A quick inspection of an area prior to starting generators or other equipment can often reveal bee, wasp or hornet colonies that would be disturbed by such actions. Because African honey bees will pursue a victim for substantial distances (up to two miles or three kilometers), the victim should flee the attack until they reach the safety of a house, vehicle or other enclosed space. Jumping into water for protection is not advised because the bees will stay in the area searching for their victim for up to an hour.

Driver Ants

Driver ants, also known as safari ants, or siafu, are a type of army ant in the genus ***Dorylus*** found primarily in central and eastern Africa. Colonies can contain as many as 20 million individuals. They form long marching columns and will fiercely defend themselves. These columns are easily avoided unless they enter a campsite. They will eat any edible object in their path and are capable of delivering a very painful bite.

Caterpillars

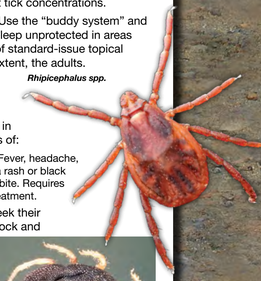
Do not handle caterpillars, especially ones with long hairs, spines or with bright red, orange, and yellow warning colorations. These hairs can be irritating or toxic. Contact with urticating hairs on caterpillars, their cocoons, or the adult moths can produce reactions ranging from a mild burning sensation to extreme pain. Swelling can last up to 12 hours or possibly longer. Residual pain can last for weeks.

…rious threat in Africa. The highest tick densities are generally correlated with areas of high mammal activity, along animal trails or bedding sites. Habitats such as the edges of forests and fields, trails or clearings typically have the highest tick concentrations.

Preventive Measures: Use the DoD Insect Repellent System. Use the "buddy system" and check for ticks often. Promptly remove attached ticks. Do not sleep unprotected in areas used to house livestock or other animals. Personal application of standard-issue topical repellents are effective against immature ticks and, to a lesser extent, the adults.


Hyalomma spp.

Amblyomma spp. and Rhipicephalus spp. passively wait for a passing host at an elevated location in vegetation. They are vectors of:


Rhipicephalus spp.

- **African tick-bite fever** - Fever, headache, muscle aches, chills, and a rash or black scab at the site of the tick bite. Requires seven days of antibiotic treatment.

Hyalomma spp. actively seek their hosts. Often found on livestock and around animal pens. They are vectors of:


Ornithodoros spp.

- **Crimean-Congo hemorrhagic fever (CCHF)** - Very severe viral illness typically requiring intensive care. Symptoms include headache, high fever, vomiting, joint pain, and large areas of severe bruising. Fatalities can occur. There is no vaccine.

Ornithodoros spp. soft tick, rapid feeder, lives in animal nests or burrows. They are vectors of:

- **Tick-borne relapsing fever** - Episodes of high fever lasting three days, with seven days between fevers. Without antibiotic treatment, this will repeat several times.

Termites

Termites can cause structural damage to buildings and equipment. They also build mud tubes as they forage, which can be a sign of an infestation during retrograde operations.

Preventive Measures: Frequently inspect shipping containers, store off the ground with cinder blocks, minimize soil-to-wood contact.

Equipment

Protect equipment from infestation.

Protective Measures: Store shipping containers and wooden objects off the ground while in sub-Saharan Africa. Use cinder blocks or metal racks to minimize soil-to-wood contact. Lay down a barrier (plastic sheet or long-lasting insecticidal bed net) on the soil before placing containers on the ground.

Scorpions, Spiders and Centipedes

Scorpions, Spiders and Centipedes are present in sub-Saharan Africa. Sanitation and exclusion are the most effective, long-term measures for reducing numbers around tents and structures. Sandbag ground edges of tents to seal entry gaps. Always shake out shoes, sleeping bags, and clothing prior to use. Never walk barefoot; wear shoes or boots (avoid open-toed footwear) when walking outdoors. If possible, avoid sleeping on the ground. Ensure bedding does not touch tent or room walls. In buildings, prevent entry by sealing and weather-stripping around thresholds and gaps where utilities enter structures. Use sticky boards placed along tent and building edges and under furniture to capture crawling specimens. Take proper precautions: wear gloves when handling tentage, rocks, crates, and lumber, or when moving materials that have been in contact with the ground. Look before you reach into, under, over, or around objects to prevent getting bitten.

Scorpions: Scorpions are a risk indoors and outdoors. They feed on insects and other small animals, including rodents. They are active at night, seeking prey in open places, and hiding during the day under tent flaps, stones, fallen trees, boards, and piles of lumber or debris. Some burrow in sand and loose soil; others will even climb trees and shrubs in search of prey.

Over 300 species present including ***Hottentotta spp.***, ***Leiurus spp.***, ***Lychas spp.*** ***Opistophthalmus spp.***, ***Pandinus spp.***, ***Parabuthus spp.***, ***Uroplectes spp.***, and others:

- Venomous – can cause extreme pain and even death if stung and not taken to a medical facility with appropriate antivenom.

Spiders: ***Loxosceles spp.*** (Recluse), ***Latrodectus spp***. (Widow or Button) and ***Sicarius spp.*** (Six-Eyed Sand Spiders) can be found under rocks and the loose bark of dead trees. Indoors they are found in shoes and clothes left out on the floor or stored in closets and garages, in cardboard boxes (especially under folded flaps), in cupboards, and behind bookcases and dressers. These spiders are:


Loxosceles spp.

- Venomous - ***Latrodectus spp.*** can cause latrodectism which can include pain, sweating, muscle stiffness, vomiting and paralysis.
- ***Loxosceles spp.*** and ***Sicarius spp.*** can cause loxoscelism which can result in pain and severe tissue necrosis.

Centipedes: ***Scolopendra spp.*** are the largest and most venomous centipedes, and there are roughly 80 species in this genus distributed worldwide, particularly in subtropical and tropical habitats. The bites of these large centipedes can cause severe pain that may last for several hours and cause localized swelling; redness; swollen, painful lymph nodes; headache; anxiety; heart palpitations; nausea and vomiting.

Arthropod threats listed on this poster occur in the ecoclimatic zone of the Sahel region and below, continuing down to the southern tip of Africa.

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