

Information about Sandflies & Mosquitoes

Sandflies are small robust insects with piercing and sucking mouthparts that belong to the family of flies Ceratopogonidae. Only a few groups within this family are known to suck blood and their distribution is almost world wide. These small flies are renowned for their nuisance biting associated with habitats such as coastal lagoons, estuaries, mangrove swamps and tidal flats. In Australia these flies are commonly known as sandflies but are correctly referred to as biting sandflies.

The biting activity of adult sandflies is mainly limited to the periods of dawn and dusk; they will remain inactive through very windy weather, finding shelter amongst vegetation. Biting sandflies will usually disperse only short distances from their breeding sites. Only female sandflies feed on blood, but both the females and males will feed on vegetable fluids and nectar. Adult sandflies are 1.5-4.0 mm long with stout short legs, and at rest fold their wings, which are often mottled, over the abdomen. Their mouthparts are short and projected down. Female sandflies may attack humans in large numbers, biting on any areas of exposed skin, and often on the face, scalp and hands. Some species will blood feed on a wide range of animal hosts. The egg batches contain between 30-100 eggs, and are laid on selected substrates such as mud, decaying leaf litter, damp soil or other vegetative materials, dependent on the species. The small eel-like larvae hatch in a few days; their larval habitat must contain a proportion of organic material with a high moisture content to provide optimum conditions for the larval stage to thrive and pupate. The whole life cycle takes 3-10 weeks, dependent on species and environmental conditions, particularly temperature.



Clinical Presentation

Biting sandflies are responsible for acute discomfort, irritation and severe local reactions. Itching may commence immediately after the bite, but often not for some hours later, and most individuals are unaware of being bitten at the time. Biting sandflies have their greatest impact on people arriving to an area or tourists. Local residents seem to build up some immunity to the biting. In some sensitive people, sandflies can produce persistent reactions that blister and weep serum from the site of each bite and these reactions may last for several days to weeks. Biting sandflies are not known to transmit any disease-causing pathogens to humans in Australia.

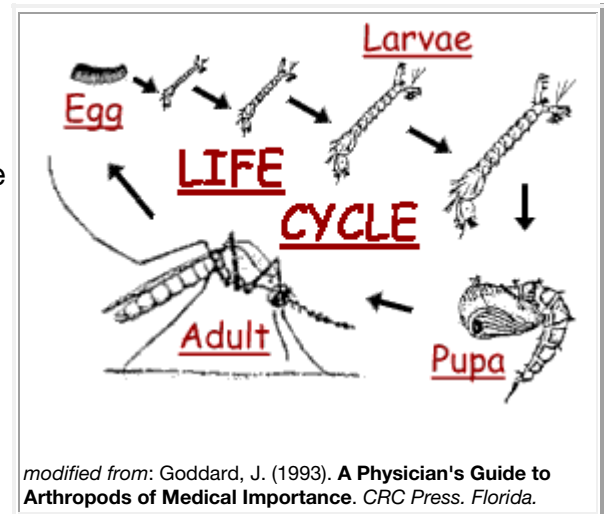
Treatment and Control

There are no known efficient methods of controlling biting sandflies, but personal protection will help in reducing exposure to their bites. Avoid localities, especially at dawn and dusk, that are known to be frequented by biting sandflies; wear protective clothing (long sleeves/pants), and apply a repellent to exposed skin. These measures will assist in limiting exposure to these biting flies

Mosquitoes are blood sucking insects that are responsible for the transmission of many diseases throughout the human and animal populations of the world. Within Australia there are more than 300 different species of mosquito but only a small number are of major concern. Several important human diseases are transmitted throughout Australia by these insects including Dengue fever, Australian encephalitis, Ross River virus disease and Barmah Forerst virus disease; malaria has been transmitted locally in Australia only rarely in recent decades. In addition to being disease vectors, mosquitoes can cause major disruptions, through their persistent biting, to occupational, recreational and social activities.

Mosquitoes belong to the family of flies called Culicidae and are small fragile insects

that have six delicate legs and two wings covered in scales. The head of a mosquito is equipped with a projecting proboscis which conceals and protects the long piercing and sucking mouthparts. These biting insects have a complex life cycle; the immature stage is totally aquatic and the adult is terrestrial. The adult female returns to a water habitat for a brief period to lay each batch of eggs. Mosquito species vary in their breeding habits, biting behaviour, host preferences and flight range. Most mosquitoes disperse less than two kilometres; some move only a few metres away from their original breeding place, others can fly some 5 or 10 kilometres, and a few species will disperse up to 50 kilometres downwind from the larval habitats.



On average, a female mosquito will live 2-3 weeks, but the male's lifespan is shorter. Within their lifetime both adult male and female will feed on nectar and plant fluids, but it is only the female that will seek a blood meal. The majority of species require this blood meal as a protein source for egg development. Female mosquitoes are attracted to a potential host through a combination of different stimuli that emanate from the host. The stimuli can include carbon dioxide, body odours, air movement or heat. Upon locating a suitable host, the female will probe the skin for a blood capillary then inject a small amount of saliva containing chemicals which prevent the host's blood from clotting. This is often the pathway for potential pathogens such as viruses to enter a host. After engorging on the host's blood the female will find a resting place to digest her meal and develop eggs before flying off to deposit them in a suitable aquatic habitat.

On hatching, the young larvae (wigglers) feed continuously and grow through four different instars or moults. Larval development is dependent on the availability of food and prevailing conditions, particularly temperature, but generally takes at least one to two weeks. The final larval instar develops into an active comma-shaped pupa (tumbler) from which the adult mosquito emerges about 2 days later to feed, mate and develop eggs for the next generation.

Mosquito-borne diseases in Australia

Diseases transmitted by mosquitoes in Australia include [Dengue fever](#), [Australian encephalitis](#), [Ross River virus disease](#) and [Barmah Forerst virus disease](#). [Dengue](#) is the most important viral disease transmitted by mosquitoes afflicting humans in a world context. Clinical symptoms range from mild fevers, to a severe and potentially life threatening haemorrhagic disease. In Australia, [Dengue](#) fever is restricted to Queensland where the major vector [Aedes aegypti](#) occurs. "Australian encephalitis" (AE), or "Murray Valley encephalitis" are synonyms for a clinical syndrome caused by infection with [Murray Valley encephalitis virus or Kunjin virus](#). Symptoms are variable, from mild to severe with permanent impaired neurological functions, to sometimes fatal. Cases of AE occur sporadically in northern Australia and especially in the northwest of WA, but there have been no cases of MVE recorded in southeastern Australia since 1974. [Ross River \(RR\) and Barmah Forest \(BF\) disease](#) have been collectively known as "Epidemic Polyarthritis", however the two diseases have a slightly different clinical picture. A wide variety of symptoms may occur from rashes with fevers, to arthritis that can last from months to years with RR virus infection. RR disease is the most commonly reported mosquito transmitted disease to humans (over 6,500 cases in 1997) and occurs in all states of Australia. There are occasional local epidemics with hundreds to thousands of infections, with many going unreported. BF disease occurs in most states of Australia, although the annual number of cases are around 1/10th that of RR disease. A series of outbreaks during the early 1990's has highlighted the increasing importance of BF disease. [Malaria](#) in Australia has been endemic, but was declared eradicated from the country in 1981. However, approximately 700-800 cases are imported annually from travellers infected elsewhere.

Clinical Presentation

Sensitivity to mosquito bites varies with individuals, most people have only a mild reaction but others can have severe symptoms from the saliva of mosquitoes. Typical symptoms include swelling, redness and irritation at the puncture site. If the bites are scratched or traumatized, they may become infected with bacteria and a secondary infection can be initiated, especially on the lower limbs. The diagnosis of mosquito-borne diseases including [Dengue](#), [Australian encephalitis](#), and [Ross River and Barmah Forest viruses](#) can only be confirmed with appropriate blood tests.

Treatment and Control

Simple measures can be taken by individuals to limit their contact with mosquitoes; Areas that are known to be infested with large numbers of mosquitoes should be avoided. Activities that are scheduled for outdoors, especially around dusk should be limited, as the biting activity of many mosquitoes will peak during this period. Clothing that has long sleeves and long pants should be worn when visiting areas that are infested with mosquitoes. Windows and doors should be screened; water tanks also, using a small gauge mesh to exclude mosquitoes from these potential breeding sites. Empty all containers throughout the garden that hold water such as pot plant saucers, tyres, roof guttering and tins to prevent breeding. Bed nets are an effective barrier against biting insects at home or camping, and can now be treated safely with an insecticide. Insecticidal sprays, and coils and electric mats, for use around the house can help in keeping mosquitoes at bay.

Information and identification of biting sandflies and mosquitoes, and all other medically important insects, is provided through the Medical Entomology Department at ICPMR, Westmead Hospital