

Mosquito Biology

Typical mosquito life cycle



Pest Status and Medical Importance

Mosquito bites are irritating and can cause painful wheals. When a female mosquito lands on a host it pushes her proboscis into the skin finding a blood capillary. It injects saliva to prevent the blood clotting and takes a meal. It is the saliva that causes the wheal. Several diseases have a life cycle that requires transmission between individuals by a mosquito. When the female mosquito takes a blood meal from an infected person or animal, she may also take up the virus or parasite that needs to complete its life cycle within the body of the mosquito. It will then penetrate the salivary glands and be ready to be injected into a new host when the mosquito takes subsequent blood meals.

Examples of Mosquito Borne Diseases

Disease	Distribution	Global cases	Global deaths
Malaria	Af. As. S.Am Pa	350 – 500 million	1 – 2 million
Dengue	Af. As. S.Am Pa	50 million	20,000
Yellow fever	Af. S.Am	200,000	30,000
West Nile Fever	Af. M Ea. N Am, Eu	<10,000	Ca. 500

Af. Africa, As. Asia, S Am. S.America, N Am. N.America M. Ea. Middle East, EU. Europe, Pa. Pacific

Mosquito Control Methods

Source reduction: Removal of the larval breeding sites, can be successful, but often impractical.

Larvicides: Application of microbial, insecticidal or Insect Growth Regulators (IGR) to mosquito breeding sites.

Space Sprays: Application of an insecticide as a mist or fog from either the air or ground for area wide adult mosquito control.

Residual spraying: Application of residual insecticides to the surfaces mosquitoes rest upon, can give three to six months control.

Insecticide treated bed nets and curtains: Highly effective, especially for the prevention of malaria transmission. Chemical control of adult mosquitoes is an essential component of malaria vector control.

Further Reading



WHO (2006): Pesticides and their application.
WHO/CDS/NTD/WHOPES/GCDPP 6th edition, 114pp
www.who.int/whopes/en/

Prevention and management of insecticide resistance in vectors and pests of public health importance
www.irc-online.org



Insecticide Resistance & Management

Resistance issues

There have been no new classes of insecticide introduced for adult mosquito control for over 20 years. In parts of the world mosquitoes are becoming resistant to the only products that can be effectively used to control them. **Available products have to be used wisely to sustain effective control of vector mosquitoes.**

Resistance management

Although insecticide resistance is widespread, especially in parts of Africa, there are steps that can be taken to delay further development. Do not apply the same class of insecticide against larvae and adults in a given location. Rotate between insecticides with different modes of action according to IRAC classification.

The IRAC mode of action classification groups insecticides that have the same mode of action, and hence provide pressure for the same resistance mechanism to develop. For further details of the IRAC mode of action classification visit www.irc-online.org

Insecticide classes for mosquito control		
Group	Mode of Action	Chemical sub-group or exemplifying active ingredient
1A	Acetylcholinesterase inhibitor	Carbamates
1B		Organophosphates
3A & 3B	Sodium channel modulators	pyrethroids and pyrethrins, DDT
5	Nicotinic acetylcholine receptor agonists	Spinosyns
7A	Juvenile hormone mimics	Juvenile hormone analogues
7C		Pyriproxyfen
11	Microbial disruptors of insect midgut membranes	<i>Bacillus thuringiensis var. israelensis</i>
		<i>Bacillus sphaericus</i>
15	Inhibitors of chitin biosynthesis	Benzoylureas
17	Moulting disruptor, Dipteran	Cyromazine