

Annexe 3

Summary tables of vector-borne infections, vectors and their control

Table A3.1: Vector-borne infections with their vectors (3,73)

Infection	Mosquito	Tsetse fly	Sandfly	Blackfly	Deer fly	Redwood bug	Flea	Body louse	Mite	Tick
Yellow fever	Ae									
Dengue fever	Ae									
Filariasis	Ae; Cu; Ma; An									
Mosquito-borne arboviral encephalitis	Cu									
Mosquito-borne arboviral fevers	Ae; Cu									
Mosquito-borne arboviral arthritis	Ae; Cu; Ma; An									
Malaria	An									
Sleeping sickness		✓								
Leishmaniasis			✓							
Bartonellosis			✓							
Sandfly-borne arboviral fevers			✓							
River blindness				✓						
Loiasis					✓					
American trypanosomiasis										✓

Mosquito: Ae (*Aedes* spp.); Cu (*Culex* spp.); Ma (*Mansonia* spp.); An (*Anopheles* spp.)

Table A3.1: Vector-borne infections with their vectors (continued) (3.73)

Infection	Mosquito	Tsetse fly	Sandfly	Blackfly	Deer fly	Redwired bug	Flea	Body louse	Mite	Tick
Plague						✓				
Murine typhus fever						✓	Oc.	Oc.	Oc.	
Louse-borne typhus fever							✓			
Louse-borne relapsing fever							✓			
Trench fever							✓			
Scrub typhus								✓		
Tick-borne relapsing fever									✓	
... tick typhus									✓	
Tick-borne typhus fever									✓	
Tick-borne arboviral haemorrhagic fever									✓	
Tick-borne arboviral encephalitis									✓	
Lyme disease									✓	

... tick typhus: African tick typhus, Siberian tick typhus, Queensland tick typhus
 Oc.: occasional transmission is possible.

Table A3.2: The vectors and their characteristics (rats have been included) (from 61,67,77,80)

Vector	I/O ^(a)	D/N ^(b)	Breeding sites	Resting sites	Range	Additional information
Mosquito <i>Aedes</i> spp.	I/O	D	water bodies with fluctuating water levels, containers in refuse, water storage tanks, usually clean water	most species outdoors, but <i>Aedes aegypti</i> in and around houses	0.1-0.8 km	eggs can withstand desiccation for months. Generation cycle: 8-10 days
Mosquito <i>Culex</i> spp.	I/O	N	organically polluted water: latrines, septic tanks, blocked drains	indoors and outdoors in sheltered, shaded places	0.1-0.8 km	Generation cycle: 8-10 days
Mosquito <i>Mansonia</i> spp.	I/O	N	water bodies with permanent vegetation: swamps, ponds, canals	usually outdoors	?	
Mosquito <i>Anopheles</i> spp.	I/O	N	lakes, pools, puddles, slow-flowing streams; often in sunlight and with vegetation, clean water	indoors and outdoors in sheltered places	2 km	Generation cycle: 10-14 days
Tsetse fly (<i>Glossina</i> spp.)	O	D	in shaded moist soil: under bushes, logs, stones, leaf litter	in shaded places in forests, vegetation	2-4 km	Generation cycle: 60 days
Sandfly (<i>Phlebotomus</i> spp.; <i>Lutzomyia</i> spp.)	I/O	D/N	humus-rich damp soil; deep cracks in soil, rodent burrows, termite hills	shaded, sheltered, humid places	200 m	Generation cycle: 6-8 weeks
Blackfly (<i>Simulium</i> spp.)	O	D	fast-flowing, shallow, 'white water' in rivers and streams	outdoors	10 km	Generation cycle: 2-3 weeks
Reduviid bug (<i>Triatoma</i> spp.)	I	N	cracks in walls, other indoor hiding places	cracks in walls or floors, furniture, thatched roofs	10-20 m	The bugs can survive for up to 4 months without a blood meal. Generation cycle: 6-24 months

^(a) I/O: the biting place is indoors (I) or outdoors (O)^(b) D/N: the time of activity is during the day (D) or during the night (N)

n/a: not applicable

Table A3.2: The vectors and their characteristics (continued) (from 61, 67, 77, 80)

Vector	I/O ^(a)	D/N ^(b)	Breeding sites	Resting sites	Range	Additional information
Flea (<i>Xenopsylla</i> spp.; <i>Pulex irritans</i>)	I	D/N	close to sleeping and resting place of the host; in cracks in walls or floors, animal burrows	animals, beds, clothing	n/a	vector fleas are associated with rats; may survive for up to 1 year in vacant houses. Generation cycle: 8 weeks
Body louse (<i>Pediculus humanus corporis</i>)	n/a	D/N	seams in clothing	clothes	n/a	can only survive for up to 1 week off people. Generation cycle: 3 weeks
Mite (<i>Leptotrombidium</i> spp.)	O	D	often artificially created environments: where jungle has been replaced by scrubs, jungle grass	often artificially created environments: where jungle has been replaced by scrubs, jungle grass	n/a	
Tick (many different types)	I/O	D	depending on the sort	indoors: cracks in walls, floors and furniture; outdoors: sheltered places	n/a	different ticks can act as vector of different diseases
Domestic fly (<i>Musca</i> spp.)	n/a	D	organic material: faeces, corpses, food	outdoors and indoors	5 km	domestic flies are mechanical vectors. Generation cycle: 7-14 days
Cockroach (several types)	n/a	N	sheltered, warm and damp places	sheltered, warm and damp places	?	Generation cycle: 2-3 months
Rat (<i>Rattus</i> spp.)	n/a	N	buildings, burrows, sewers, refuse dumps	buildings, burrows, sewers, refuse dumps	50-80 m	Generation cycle: 3-4 months

^(a) I/O: the biting place is indoors (I) or outdoors (O)

^(b) D/N: the time of activity is during the day (D) or during the night (N)

n/a: not applicable

Table A3.3: Preventative measures against vectors (rats have been included) (adapted from 21,61,67,73,77,78)

Vector	Use of repellents, protective clothes		Improve personal hygiene		Improve sanitation		Improve drainage management		Improve food storage		Improve housing		Clear land vegetation		Clear aquatic vegetation		Changing flow velocity		Chemical control		Traps		Additional measures	
	++	+	++	+	++	+	++	+	++	+	++	+	++	+	++	+	++	+	++	+	(a)	(b)	(b), (c)	(d)
Mosquito: Aedes	++	+	++	+	++	+	++	-	++	++	+	+	+	+	+	+	+	++	++	-	-	(a)	-	-
Mosquito: Culex	++	++	++	++	++	++	++	-	++	++	+	+	+	+	+	+	+	++	++	-	-	-	-	-
Mosquito: Mansonia	++	++	+	-	+	-	-	-	++	++	+	+	+	+	+	+	+	-	-	-	-	(b)	-	-
Mosquito: Anopheles	++	++	++	-	++	-	-	-	++	++	+	+	+	+	+	+	+	++	++	-	-	(b), (c)	-	-
Tsetse fly	+	-	-	-	-	-	-	-	-	-	++	++	-	-	-	-	-	+	++	++	-	-	-	-
Sandfly	++	++	n.s.	n.s.	n.s.	n.s.	-	-	++	++	++	++	-	-	-	-	-	++	++	-	-	(d)	-	-
Blackfly	++	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	++	++	-	-	(e)	-	-

++ : effective; + : limited effect; n.s. : extent of effectiveness is not specified; - : not effective

⁽¹⁾: increasing velocities in streams, rivers, channels

⁽²⁾: modifying streams so that the creation of 'white', turbulent water is avoided

(a): fill up, remove, cover or repair all 'vessels' in the domestic area (e.g. old tyres, buckets, domestic water storage reservoirs, barrels, gutters, holes in construction blocks, old cars or machines)

(b): introduce larvivorous fish

(c): it is sometimes possible to divert mosquitoes to domestic animals

(d): destruction of rodent colonies; avoiding places where sandflies rest or breed

(e): avoidance of areas where the blackfly is abundant (e.g. rapids in streams)

Table A3.3: Preventative measures against vectors (continued) (adapted from 21, 61, 67, 73, 77, 78)

Vector	Additional measures												
	Use of repellents, protective clothes	Use of bednets	Improve personal hygiene	Improve sanitation	Improve drainage	Improve solid waste management	Improve food storage	Improve housing	Clear land vegetation	Clear aquatic vegetation	Changing flow velocity	Chemical control	Traps
Reduviid bug	-	+	-	-	n.s.	-	++	n.s.	-	-	++	-	-
Flea	++	-	-	++	++	-	++	-	-	-	++	-	(f)
Body louse	-	-	-	-	-	-	-	-	-	-	++	-	(g)
Mite	++	-	-	-	-	-	-	+	-	-	++	-	(h)
Tick	++	++ ⁽³⁾	-	-	-	-	n.s. ⁽³⁾	n.s.	-	-	++	-	(i)
Domestic fly	-	-	++	n.s.	++	n.s.	+	-	-	-	++	++	
Cockroach	-	++ ⁽⁴⁾	-	n.s.	++	n.s.	+	-	-	-	n.s.	n.s.	
Rat⁽⁵⁾	-	-	n.s.	n.s.	++	n.s.	++ ⁽⁶⁾	n.s.	-	-	++	++	

++ : effective; + : limited effect; n.s. : extent of effectiveness is not specified; - : not effective

⁽³⁾: only effective against soft ticks (the vector of tick-borne relapsing fever) which live in the house

⁽⁴⁾: correct use of fly-nets will prevent flies and cockroaches from reaching food or babies

⁽⁵⁾: where flea-borne infections (plague, murine typhus fever) are present, or a risk, fleas must be successfully controlled before rat control begins

^(f): improve hygiene of the house

^(g): clothing has to be cleaned and treated with insecticide; mass treatment is necessary; treatment of bedding

^(h): avoid 'mite islands'

⁽ⁱ⁾: check body after visiting tick-infested areas; treating domestic animals with insecticide

