

VECTORS AND THEIR CONTROL MEASURES

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What is a Vector

- A vector is a living organism that spreads disease-causing pathogens from an infected person or animal to a non-infected person.
- Most of the vectors are Arthropods

Blood-sucking insects: These vectors ingest disease-producing microorganisms and transmit the disease to a new host when they bite.

Mechanical vectors: These vectors, like flies, pick up infectious agents on the outside of their bodies and transmit them through physical contact.

Arthropods of Medical importance

Class Insecta	Class Arachnida	Class Crustacea
Mosquitoes: Anopheles, Aedes, Culex, etc.	Ticks: Hard ticks, soft ticks	Cyclops
Flies: Houseflies, Sandflies, Tsetse flies, Black fleas	Mites: Lepto throbidium and trombiculid mites Itch mite	
Human Lice: Head and body lice, Crab lice		
Fleas: Rat fleas, Sand fleas		
Reduviid bugs		

Arthropod borne diseases

Arthropod	Disease s transmitted
Mosquito	Malaria, Filaria, Dengue fever, Chikungunya fever, Japanese Encephalitis
House fly	Typhoid, Paratyphoid, Cholera
Sand fly	Kala azar
Tsetse fly	Sleeping sickness
Louse	Epidemic typhus
Rat flea	Bubonic plague
Hard tick	Tick typhus
Soft tick	Q fever
Itch mite	Scabies
Cyclops	Guinea worm disease, Fish tapeworm

Anopheles and other mosquitoes

Character	Anopheles	Culex, Aedes, Mansonia
Eggs	Laid singly	Laid in clusters
	Eggs are boat shaped and provided with lateral floats	Eggs are boat shaped and not provided with lateral floats
Larvae	Rest parallel to water surface	Suspended with head downwards at angle to water surface
	No siphon tube	Siphon tube present
	Palmate hair present on abdominal segments	No palmate hair
Pupae	Siphon tube is broad and short	Siphon tube is long and narrow

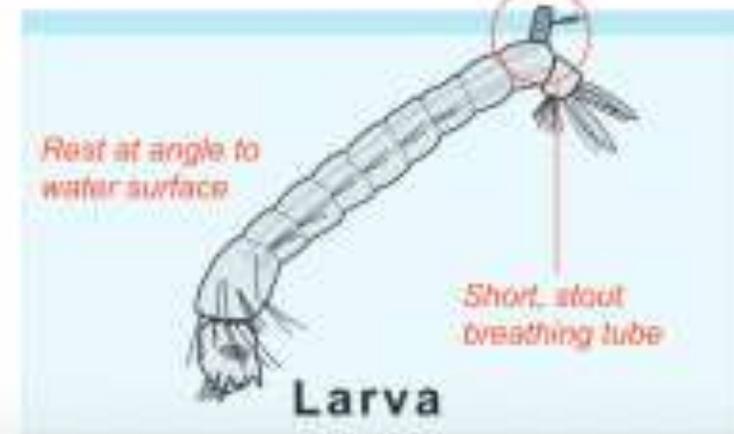
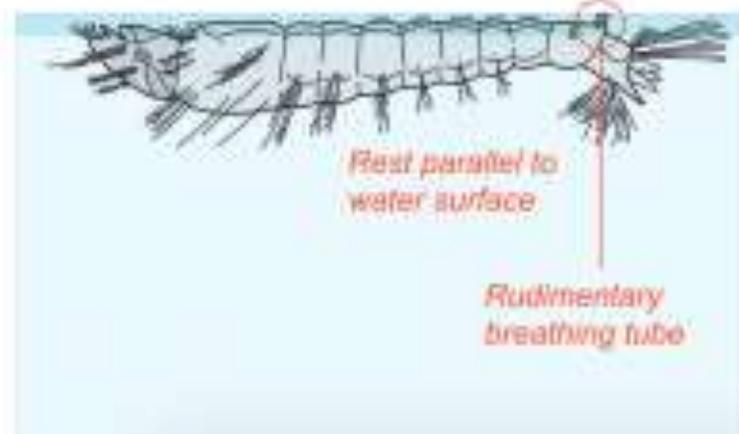
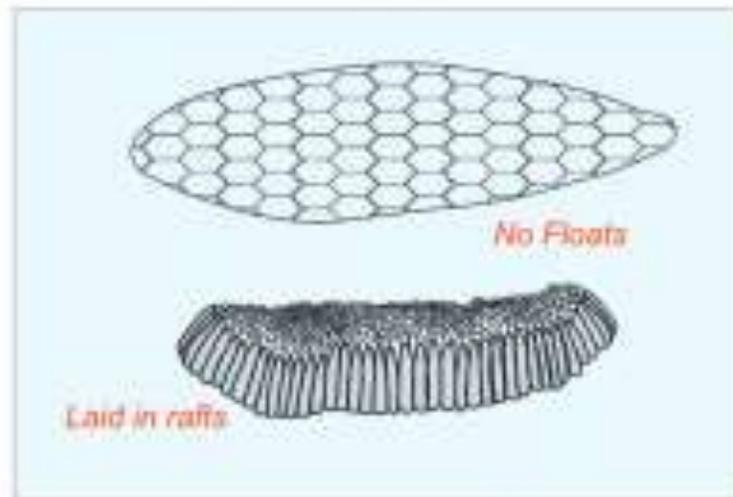
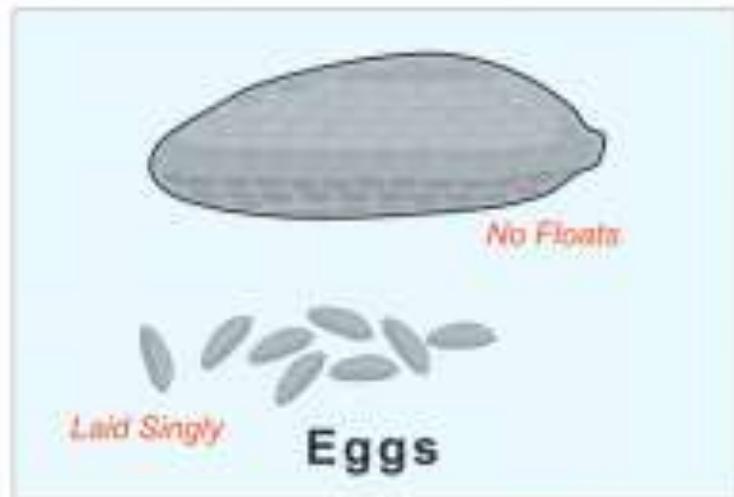
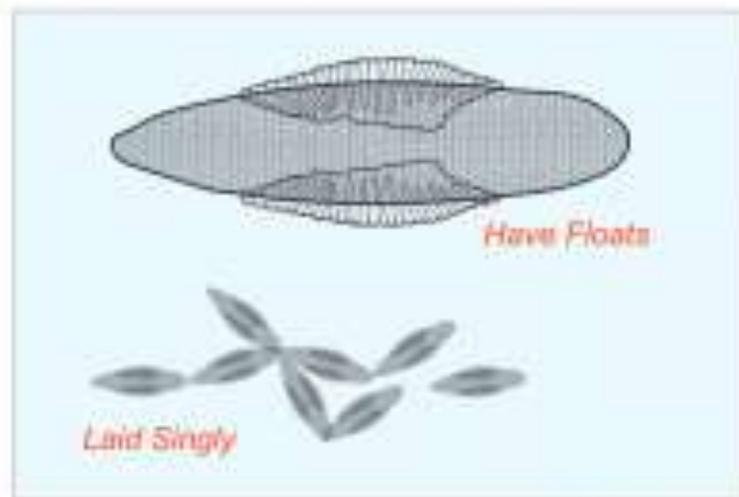
Anopheles and other mosquitoes

Character	Anopheles	Culex, Aedes, Mansonia
Adult	When at rest, inclined at angle to surface	When at rest, the body exhibits a hunch back
	Wings spotted	Wings unpotted
	Palpi long in both sexes	Palpi short in female

ANOPHELES

AEDES

CULEX



Larva

Aedes



Anopheles



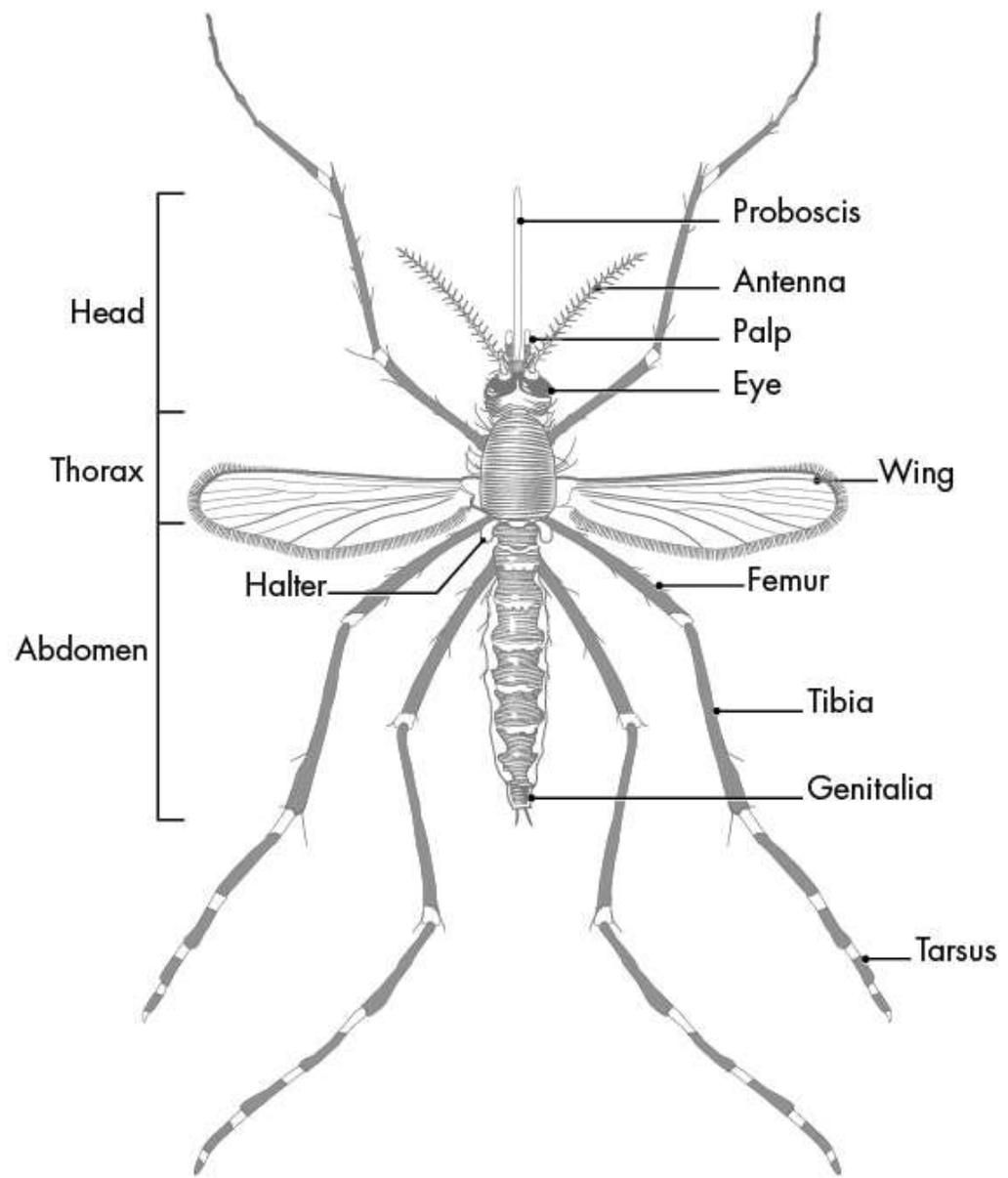
Culex

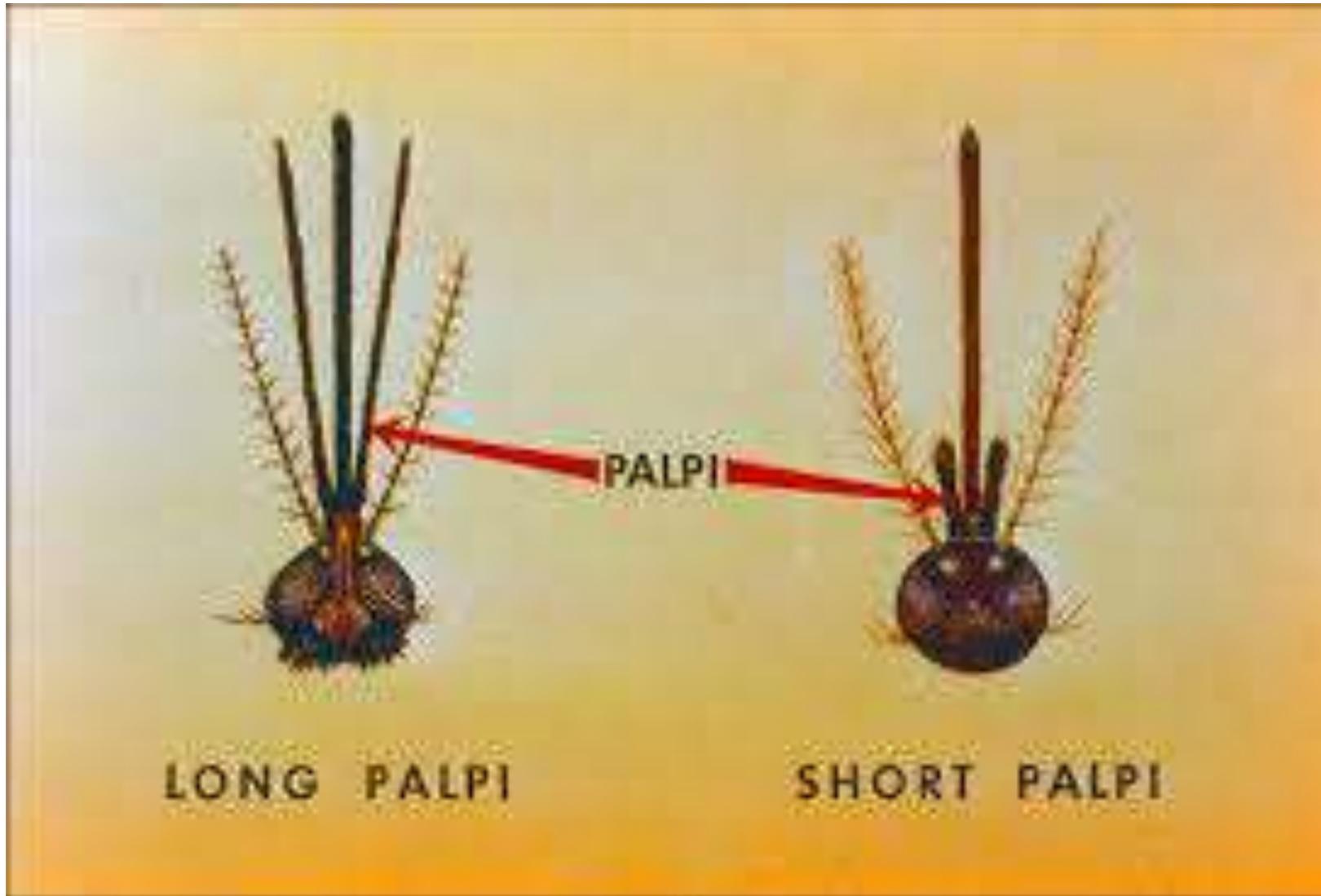


Adult

Pupa

Larva





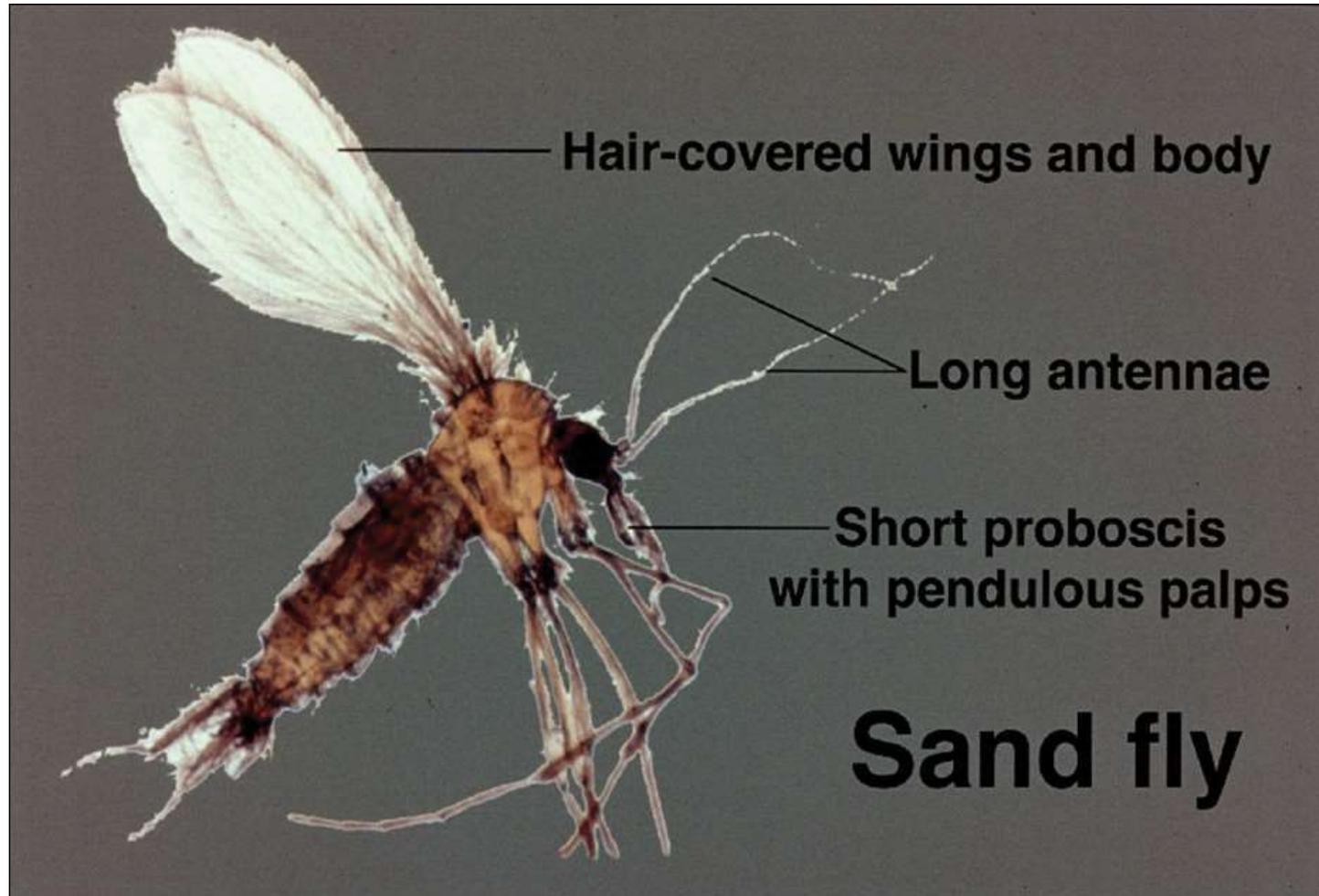
Anopheles

Other Mosquitoes

House Fly (Typhoid, Paratyphoid, Cholera)



Sand Fly (Kala azar)



Tsetse fly (Sleeping sickness)



Louse (Epidemic typhus)



Rat fly (Bubonic plague)



Hard tick (Tick typhus)

black-legged, or deer, tick
(*Ixodes scapularis*)

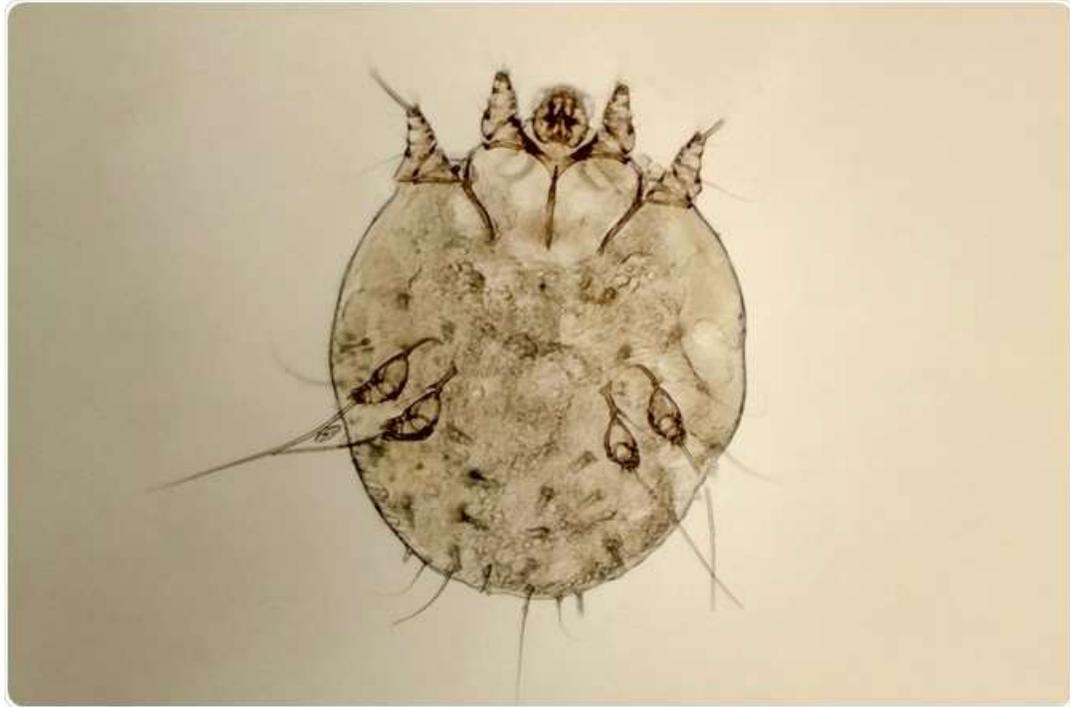


Soft tick (Q fever)

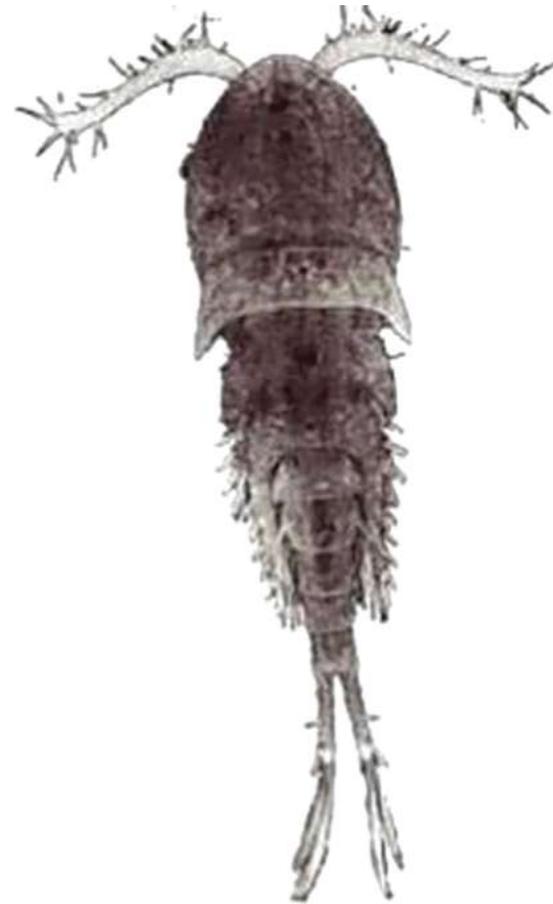


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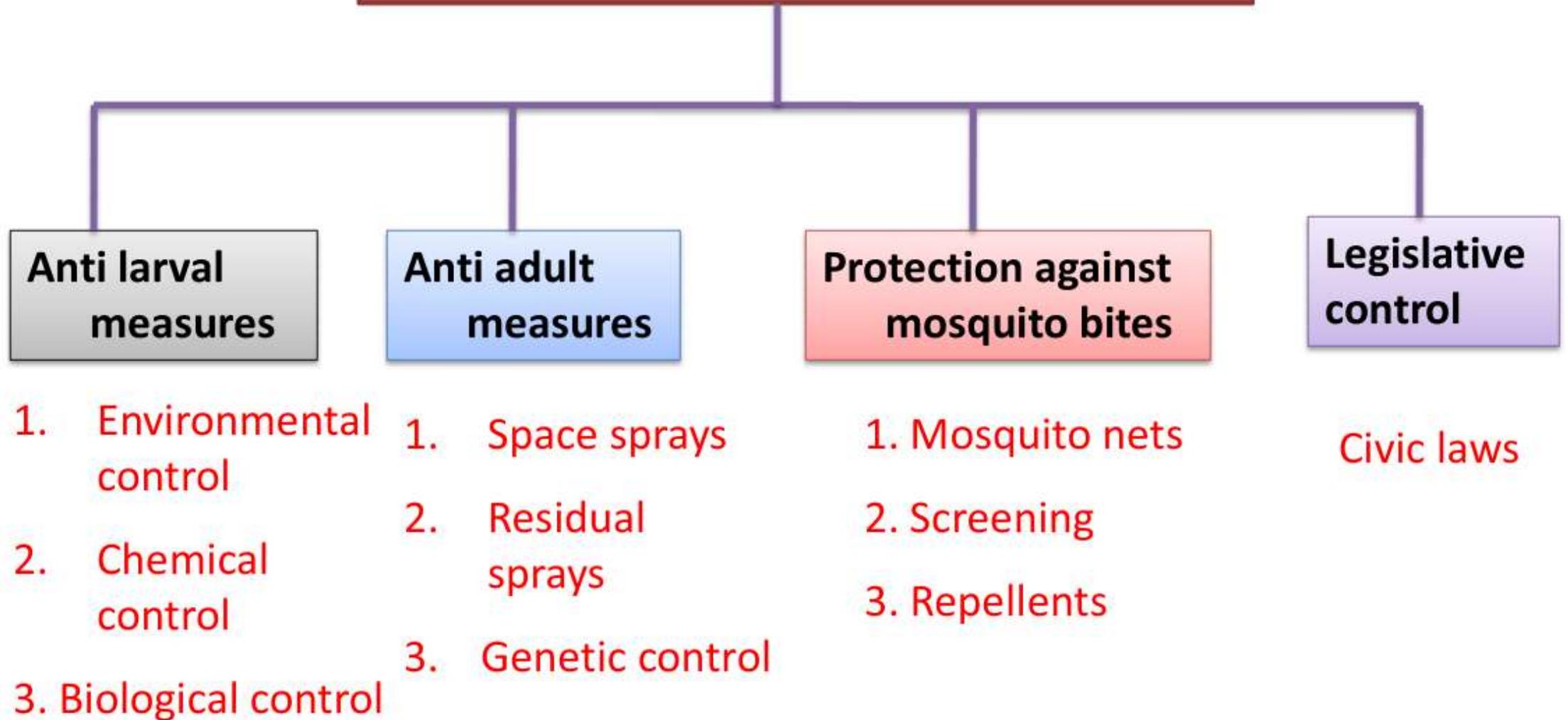
Itchmite (Scabies)



Cyclops (Guinea worm disease)



Mosquito Control Measures



Environmental Control

- **Elimination of breeding places – source reduction**
- Filling and drainage operation
- Proper waste water management
- Cleanliness in and around house

Chemical Control

- Using organochlorine, organophosphorus & carbamate group products
- This method is no longer effective as many species developed resistance
- Petroleum oil, Paris green, Temephos, Abate, Biotex solutions are commonly used as antilarval chemical control method



Paris green

Biological Control

- Larvivorous fish like Gambusia and Guppy



Space Sprays

- Space sprays are those where the insecticidal formulations is sprayed into the atmosphere in the form of mist or fog or aerosols
- **Will be done where immediate results are needed like during outbreaks of malaria, dengue fever, and typhoid fever. It is used to bring down mosquito population drastically.**



Space Sprays

Sl. no	Name of Insecticide	Formulation	Preparation of formulation	Equipment used	Remarks
1	Pyrethrum extract	2.0% extract	1:19 i.e., 1 part of 20% pyrethrum extract in 19 parts of kerosene	Flit pump or hand operated fogging machine	Used for indoor spray
2.	Technical Malathion	5 parts of tech. Malathion in 95 parts of Diesel oil	Vehicle mounted thermal fogging machine Speed of vehicle 6 km/hour	Outdoor thermal fogging	Used for outdoor spray
3	Deltamethrin 1.25ULV	1 litre in 199 litre Diesel	Thermal fogging machine	Outdoor thermal fogging	Used for outdoor spray

Indoor Residual Sprays

Application of insecticides to surfaces, so that the insecticide particles remain on the surface in the form, When mosquitos contact with these particles, they will show lethal effect on mosquitos

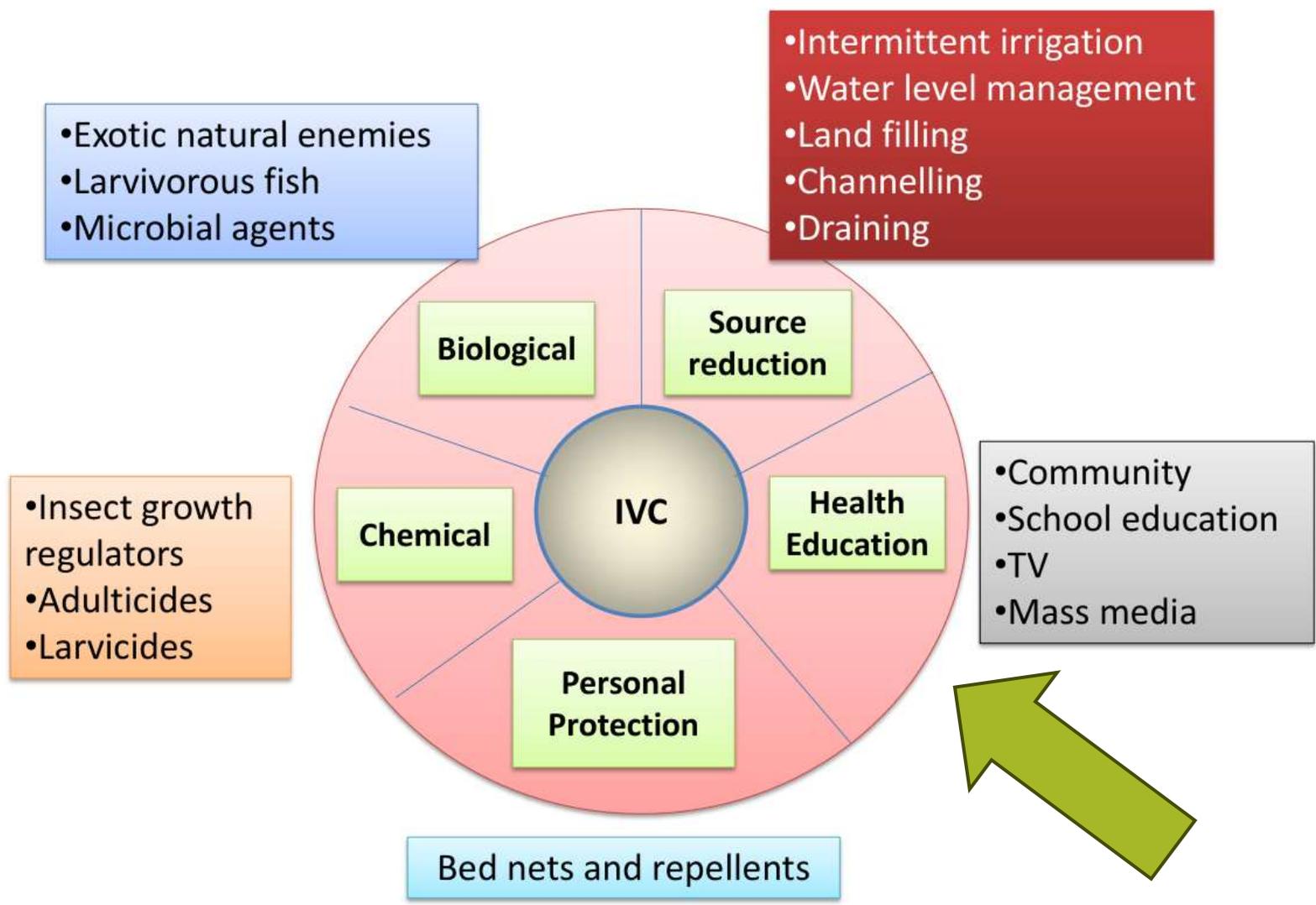


Genetic control

- Genetically Modified mosquitoes are released into an area.
- When the eggs hatch, the mosquitoes mate with wild females.
- The genes are passed on to the offspring.
- The expected result is that the number of mosquitoes in the area decreases.

Protection against mosquito bites

- Clothing
- Insect repellent
- Place screens on windows and doors
- Bed Nets Long lasting Insecticide treated Nets



Thank you

