MEDICAL ENTOMOLOGY

It is the study of those arthropods or other invertebrates which can cause or transmit various diseases in man.

Study of arthropods of medical importance

ARTHROPODS OF MEDICAL IMPORTANCE

TABLE 1

Arthropods of medical importance

Class Insecta	Class Arachnida	Class Crustacea
1. *Mosquitoes* Anophelines Culicines	1. *Ticks* Hard ticks Soft ticks	1. *Cyclops*
2. *Flies* Houseflies Sandflies Tsetse flies Blackflies	2. *Mites (Chiggers)* Leptotrombidium and trombiculid mites; Itch mite	
3. *Human Lice* Head and body lice; Crab lice		
4. *Fleas* Rat fleas Sand fleas		
5. *Reduviid*		

DISTINCTIVE CHARACTERS

Distinctive characters of arthropods of medical importance

	Insecta	Arachnida	Crustacea
1. Body divisions	Head. thorax abdomen	Cephalothorax and abdomen (no division) in some cases	Cephalothorax and abdomen
2. Legs	3 pairs	4 pairs	5 pairs
3. Antennae	1 pair	None	2 pairs
4. Wings	One or two pairs; some are wingless	None	None
5. Where found	On land	On land	In water

Features of class Insecta:

- 6 legs (hexapoda)
- Winged- mosquitoes, flies
- Wingless- louse, fleas, bed bugs

Arthropod-borne diseases

Arthropod	Diseases transmitted
1. Mosquito	Malaria, filaria, viral encephalitis (e.g., Japanese encephalitis), viral fevers (e.g., dengue, West Nile, viral haemorrhagic fevers (e.g., yellow fever, dengue haemorrhagic fever)
2. Housefly	Typhoid and paratyphoid fever, diarrhoea, dysentery, cholera, gastro-enteritis, amoebiasis, helminthic infestations, poliomyelitis, conjunctivitis, trachoma, anthrax, yaws, etc.
3. Sandfly	Kala-azar, oriental sore, sandfly fever, oraya fever.
4. Tsetse fly	Sleeping sickness
5. Louse	Epidemic typhus, relapsing fever, trench fever, pediculosis
6. Rat flea	Bubonic plague, endemic typhus, chiggerosis, hymenolepis diminuta
7. Blackfly	Onchocerciasis.
8. Reduviid bug	Chagas disease
9. Hard tick	Tick typhus, viral encephalitis, viral fevers, viral haemorrhagic fever, (e.g., Kyasanur forest disease), tularemia, tick paralysis, human babesiosis.
10. Soft tick	Q fever, relapsing fever.
11. Trombiculid mite	Scrub typhus, Rickettsial-pox.
12. Itch-mite	Scabies
13. Cyclops	Guinea-worm disease, fish tapeworm (D. latus).
[illegible]	Enteric p[illegible]

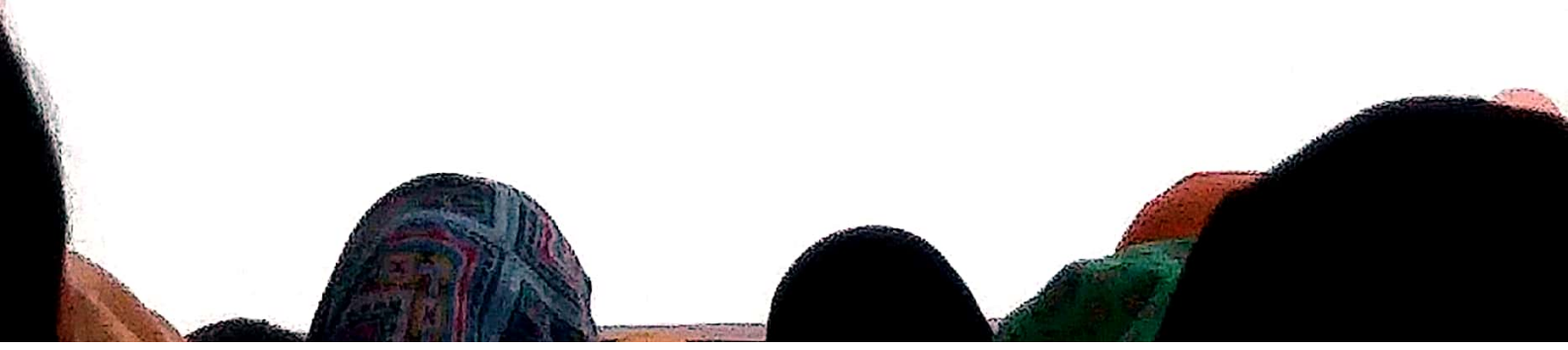
TRANSMISSION OF ARTHROPOD –BORNE DISEASES

- Direct
- Mechanical
- Biological

a. Propagative (plaque bacilli in rat flea)

b. cyclo propagative(malarial parasite in anopheleline mosquito)

c. cyclo developmental (filarial parasite in culex mosquito)



HOST

- Definitive host OR PRIMARY HOST

  Hosts in which the parasite attains maturity or passes its sexual stage, female anopheles in Malaria

- SECONDARY OR INTERMEDIATE HOST

  Hosts in which the parasite is in a larval or asexual stage, mosquito in filaria

INFESTATION

- For persons or animals the lodgemant , development, and reproduction of arthropods on the surface of the body or in the clothing , e.g lice ,itch mite

PRINCIPLES OF ARTHROPOD CONTROL

- Environmental control

Source reduction, filling and drainage operation, proper waste management, cleanliness.

Extensive health education

- Chemical control

Insecticides (organophosphorous, organo chlorine, carbamtes

Resistance??? And environmental pollution

- Biological control

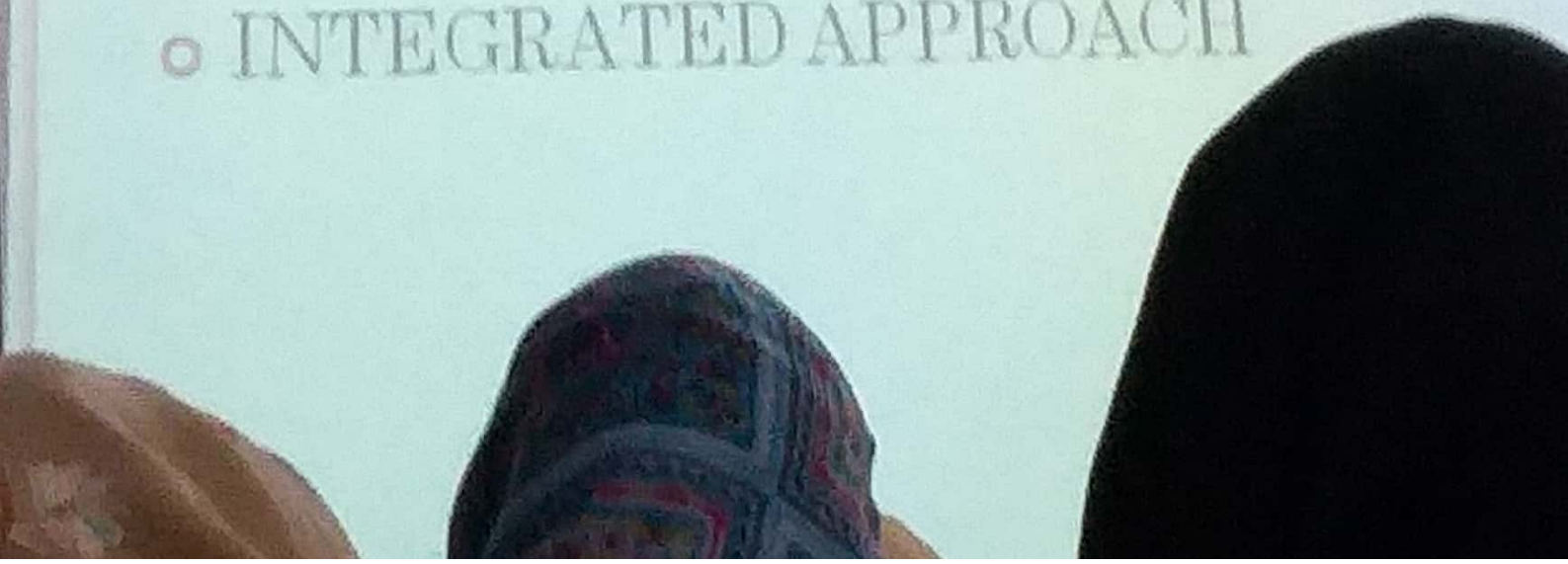
Gambusia fish... larvivorous fish

- Genetic control

- Newer methods

For example insect growth regulators

- INTEGRATED APPROACH



MOSQUITO

Four important groups

- Anopheles
- Culex (nuisance mosquitoes)
- Aedes (tiger mosquitoes, fearless biters)
- Mansonia

- Head
  - proboscis
  - antenna or feelers
- Thorax
  - Legs and wings
- Abdomen

- Buzzing voice

MOSQUITO CONTROL MEASURES

Anti larval measures

a) Environmental control

b) Chemical control

mineral oils,

paris green,

synthetic insectisides e.g abate, malathion

a) Biological control

Anti adult measures

a) Residual sprays (DDT, MALATHION, LINDANE)

b) Space sprays

c) Genetic control

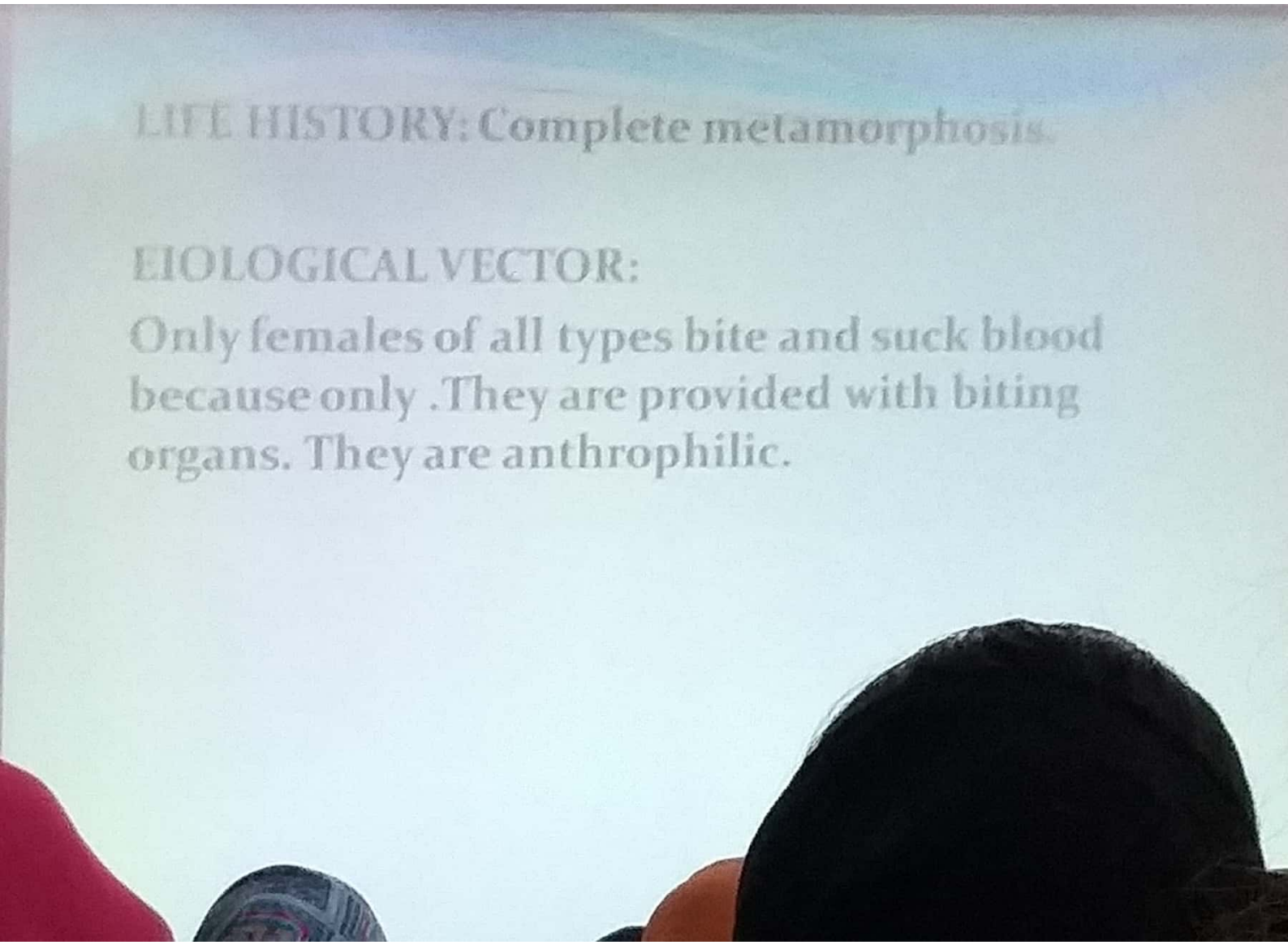
Protection against mosquito bites

- Mosquito net
- screening
- Repellents (deet)

GENERAL CHARACTERISTICS OF ADULT MOSQUITOES:

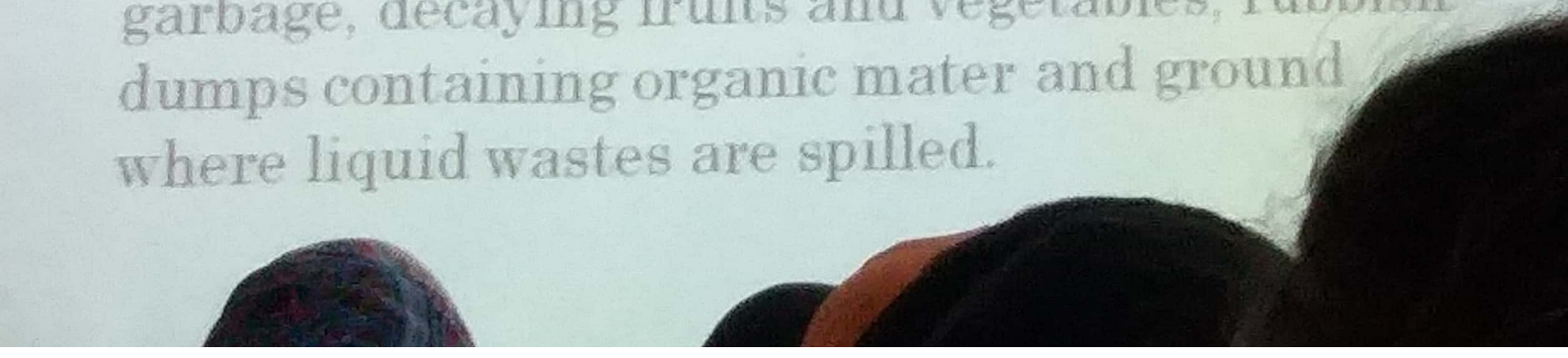
HABITAT: It is the place where they are found and breed.

- FEMALE ANOPHELES: Breeds on fresh water collection.
- FEMALE CULEX: Breeds on dirty water collection.
- FEMALE AEDES: breeds on artificial collection, very small amount of water as utensils, bottles, leaves, flowers.

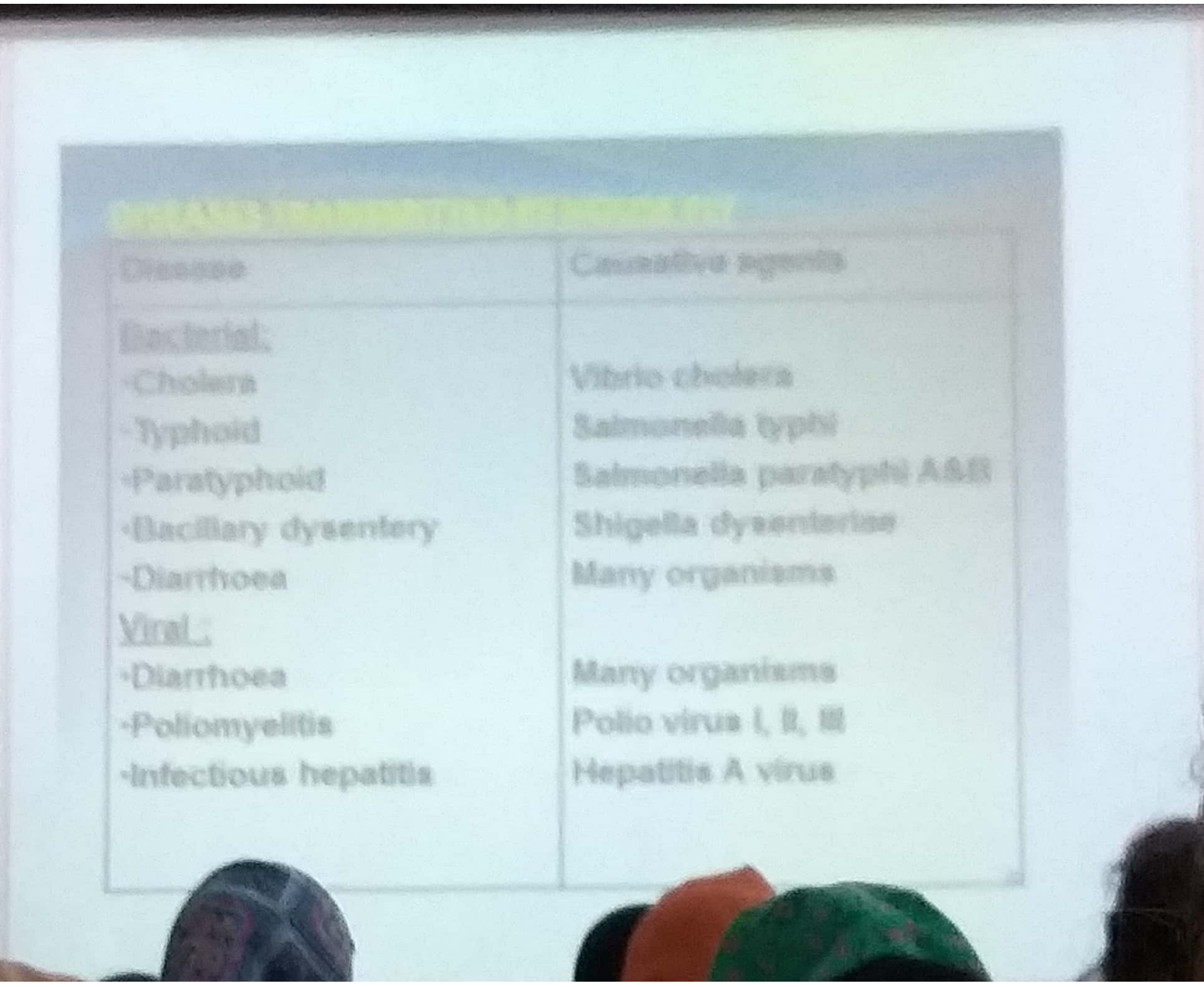


HOUSEFLY

- An arthropod breeding and surviving on filth, refuse, garbage, human and animal excreta.
- MECHANICAL VECTOR.
- SPECIES: 1. MUSCA DOMESTICA.
- 2. MUSCA NEBULA.
- HABITS:
- BREEDING HIBITS. Human excreta, fresh horse manure, manure of other animals garbage, decaying fruits and vegetables, rubbish dumps containing organic mater and ground where liquid wastes are spilled.



- FEEDING HABITS. Sense of smell, it can not eat solid food, it vomits, makes a solution, sucks. Lickes sputum, faeces, discharges from wounds and open sores,
- RESTLESSNESS: Between filth and food.
- VOMIT DROP: Frequently makes a culture of disease agent.
- DEFICATION: Constantly all the day.
- RESTING HABITS: On vertical surfaces/hanging objects.
- MYIASIS:
- It is defined as infestation of chronic bed sores in bed ridden patient or in external naries. Also in neglected female child lying naked, vaginal orifice is infested. It is in poor living conditions.



Disease	Causative agents
Bacterial:	
-Cholera	Vibrio cholera
-Typhoid	Salmonella typhi
-Paratyphoid	Salmonella paratyphi A&B
-Bacillary dysentery	Shigella dysenteriae
-Diarrhoea	Many organisms
Viral.:	
-Diarrhoea	Many organisms
-Poliomyelitis	Polio virus I, II, III
-Infectious hepatitis	Hepatitis A virus

Diseases	Causative agents
Protozoal:	
•Amoebiasis	Entamoeba histolytica
Helminths:	
•Ascariasis	Ascaris lumbricoides
•Entrobiasis	Entrobius vermicularis
Chlamydia:	
Trachoma	Chlamydia trachomatis

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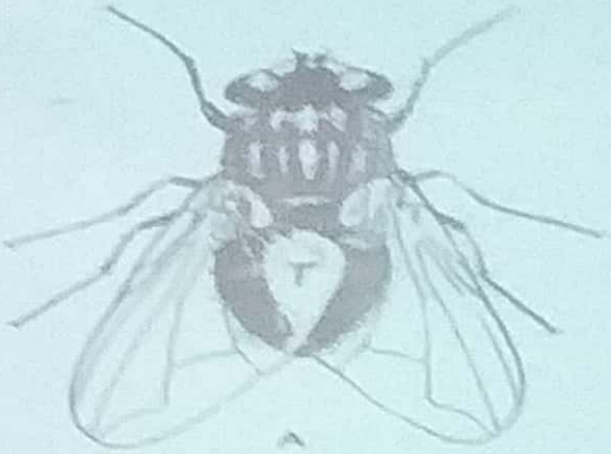
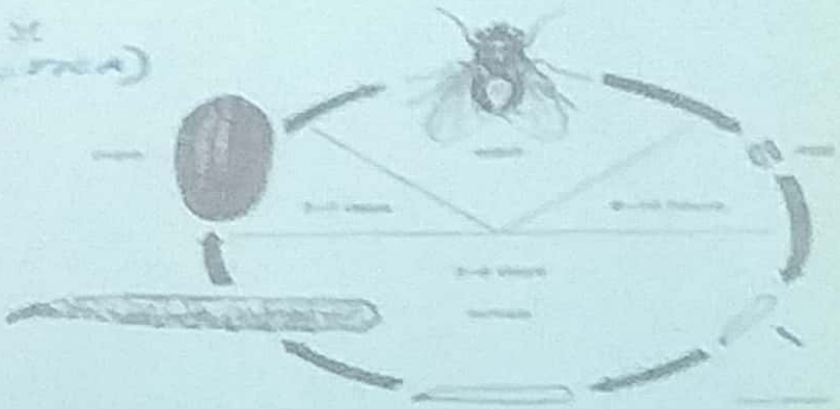


House Fly
(Musca domestica)

(ii)



Life - cycle

TRANSMISSION OF DISEASE

- Mechanical
- Vomit drop
- defecation