Lab 4 Nematodes : Blood and other body fluids and skin

Kingdom: Animalia
Phylum: Nematoda
Class: Secernentea
4-Order: Camallanida
Family: Dracunculidae(There is one worm with clear medical importance
Genus: <u>Dracunculus</u> <u>medinensis</u>

5-Order:Spirurida Worms of this order need intermediate hosts for their life cycles.

1-Family: Gnathostomatidae
Genus: <u>Gnathostoma</u> <u>spinigerum</u>
2- Family: Filaridae
1-Genus: <u>Wuchereria</u> <u>bancrofti</u>
2- Genus: <u>Brugia</u> <u>malayi</u>
3- Genus: <u>Onchocerca</u> <u>volvulus</u>
4-Genus: <u>Loa</u> <u>loa</u>

Dracunculus medinensis

Comman name: Dragon Worm, Guinea worm
Disease name: Dracunculasis
Site of infection**:** legs, ankle and foot
Definitive host: Human
Intermediate host: (copepods)*Cyclops*.

Morphology

The male is short with a coiled tail, The female longer than male reaches 4 feets .

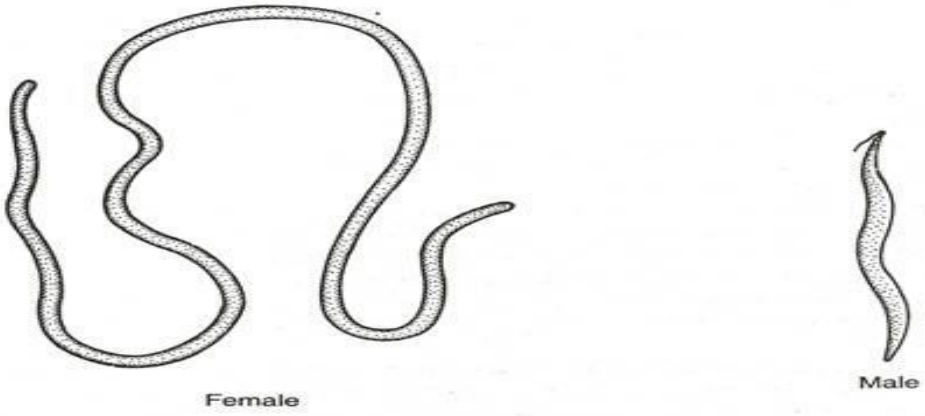
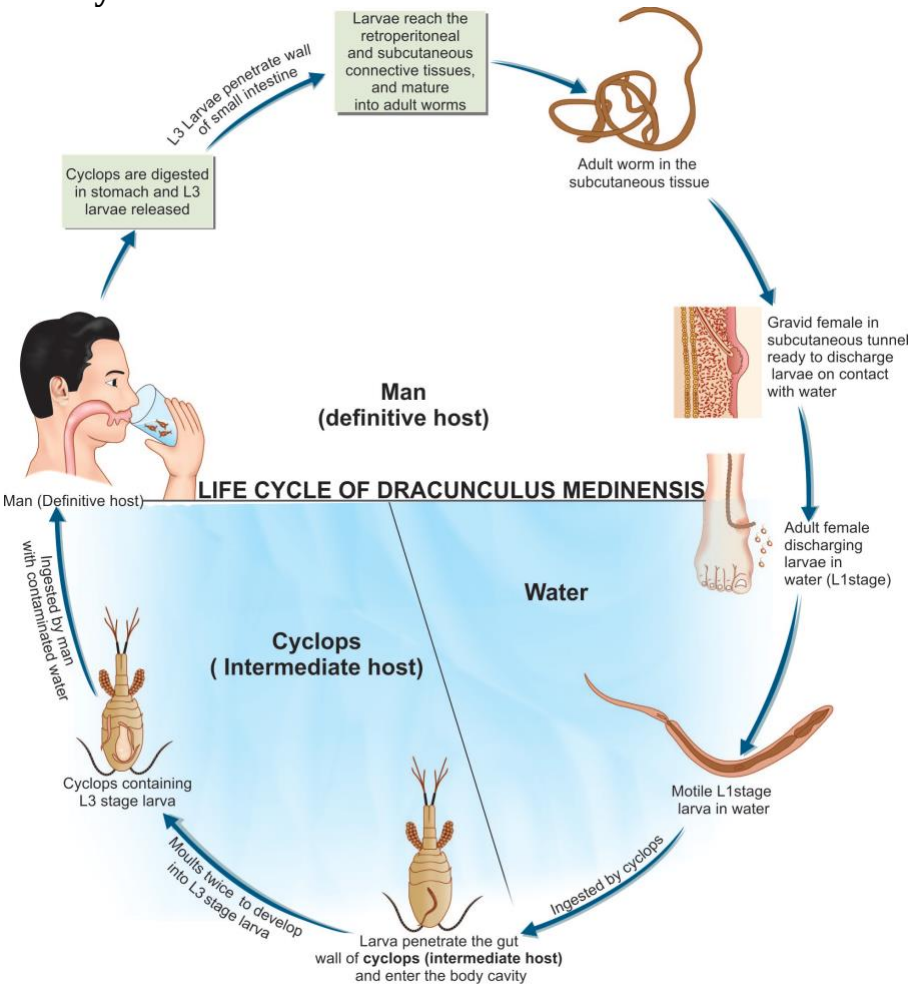


Fig. 201. Morphology of *Dracunculus medinensis*

* The anterior larva is rounded, but the posterior end is prolonged into a tapering tail.

Life cycle

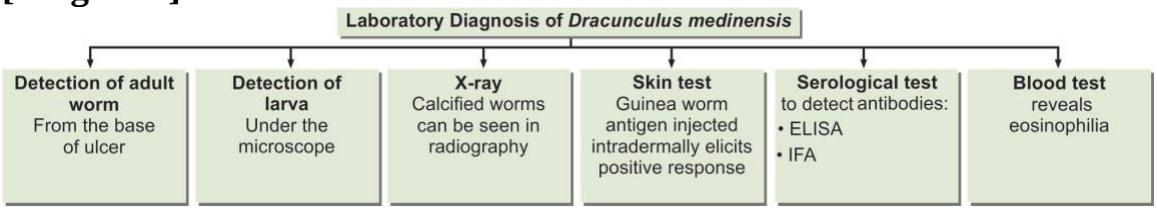


Infective stage:L3
Diagnostic stage:L1

Symptoms:

* allergic and toxic manifestation.
* After rupture of the blisters, a secondary infection may spread along the track of the worm, with severe inflammatory reactions.
* Ruptures of the worm during removal may cause a severe reaction.

[Diagnosis]



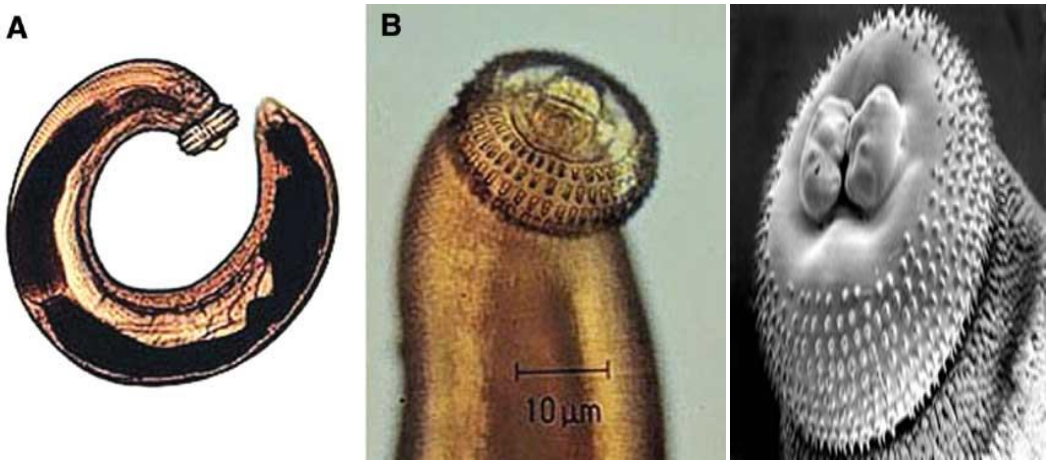
Gnathostoma spinigerum

Disease name: gnathostomiasis

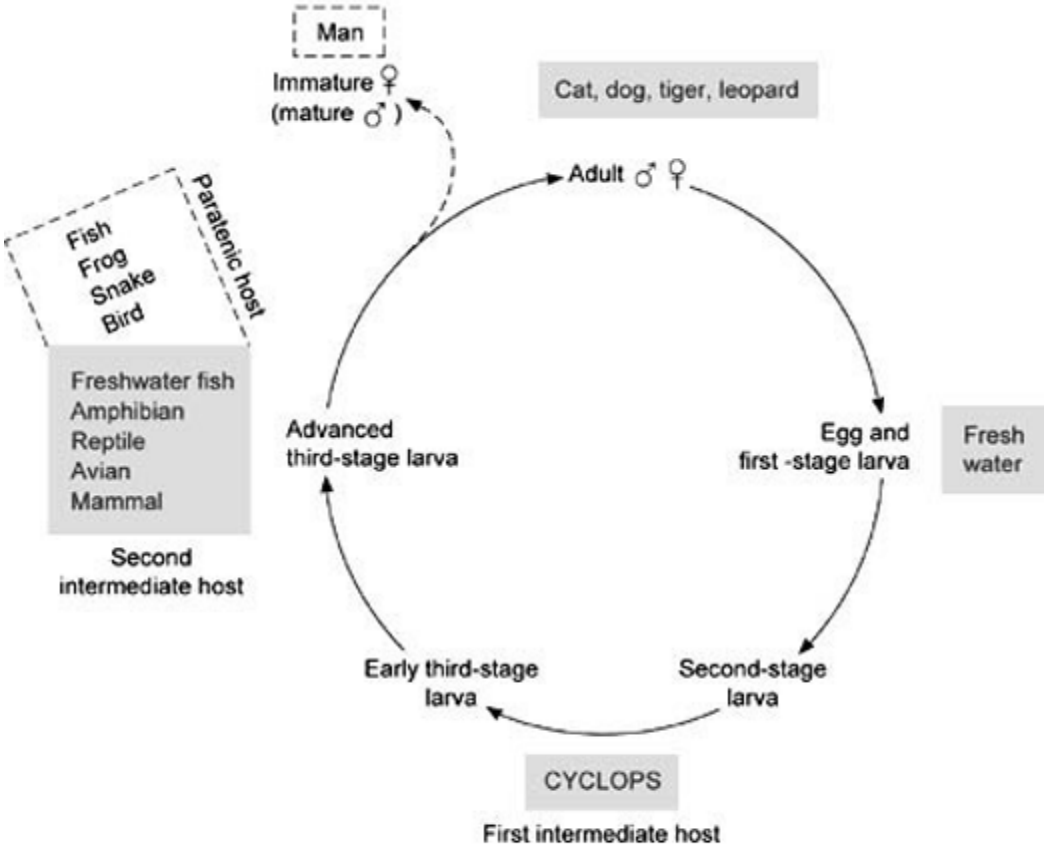
Site of infection: liver eye ,nerves, spinal cord and brain

Morphology

Species within the genus *Gnathostoma* are recognized by a bulbous head with a pair of lateral lips surrounding a mouth on the longitudinal axis. The cephalic region is covered by transverse rows of cuticular spines. The body is typically pink and is also covered anteriorly with circles of flat spines,



Life cycle



Infective stage: L2 or L3 Humans become infected by eating undercooked fish or poultry containing third-stage larvae, or reportedly by drinking water containing infective second-stage larvae in Cyclops
Diagnostic stage: L3
Definitive host: pigs, cats, dogs, wild animals
First intermediate host: copepod
Second Intermediate host: freshwater fishes, duck and the domestic chicken

Symptoms

- epigastric pain, nausea, vomiting, fever, malaise, anorexia
- symptoms specific to area of migration

- Mortality of if central nervous system involved due to eosinophilic meningitis
- **Diagnosis**
- **Serologic Tests:** ELISA (for IgG antibodies)

- **Family: Filaridae**
  Wuchereria bancrofti and Brugia malayi

Disease name: Lymphatic Filariasis - Elephantiasis

Site of infection**:** lymphatic glands, lymphatic vessels

W. bancrofti parasitizes in the superficial and deep lymphatic systems, including in the genitourinary lymphatic system.

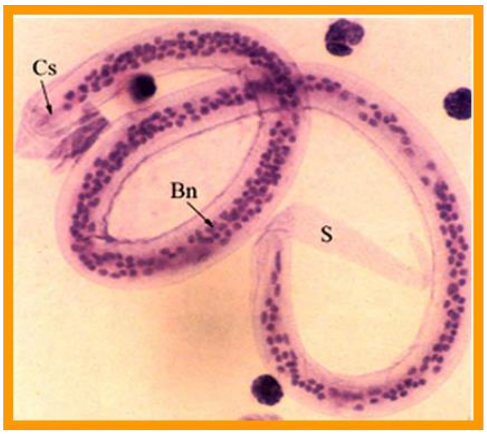
B. malayi parasitizes in the shallow lymphatic system only, especially in the lymphatics of limbs.

Morphology – Adult, Slender, thread-like, White in color, Long thread worms attack human and transmitted to him by mosquitoes.

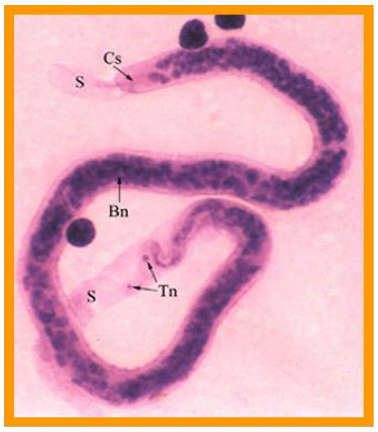
- Male :short and has a curved tail has unequal spicules..
- female longer than male and they produce embryos called microfilaria..

Wuchereria bancrofti adults
male on the left, female on the right

- **Microfilaria** sheathed with free endings. Bluntly rounded anteriorly and tapers to a point posteriorly. A large number of nuclei seen in the body



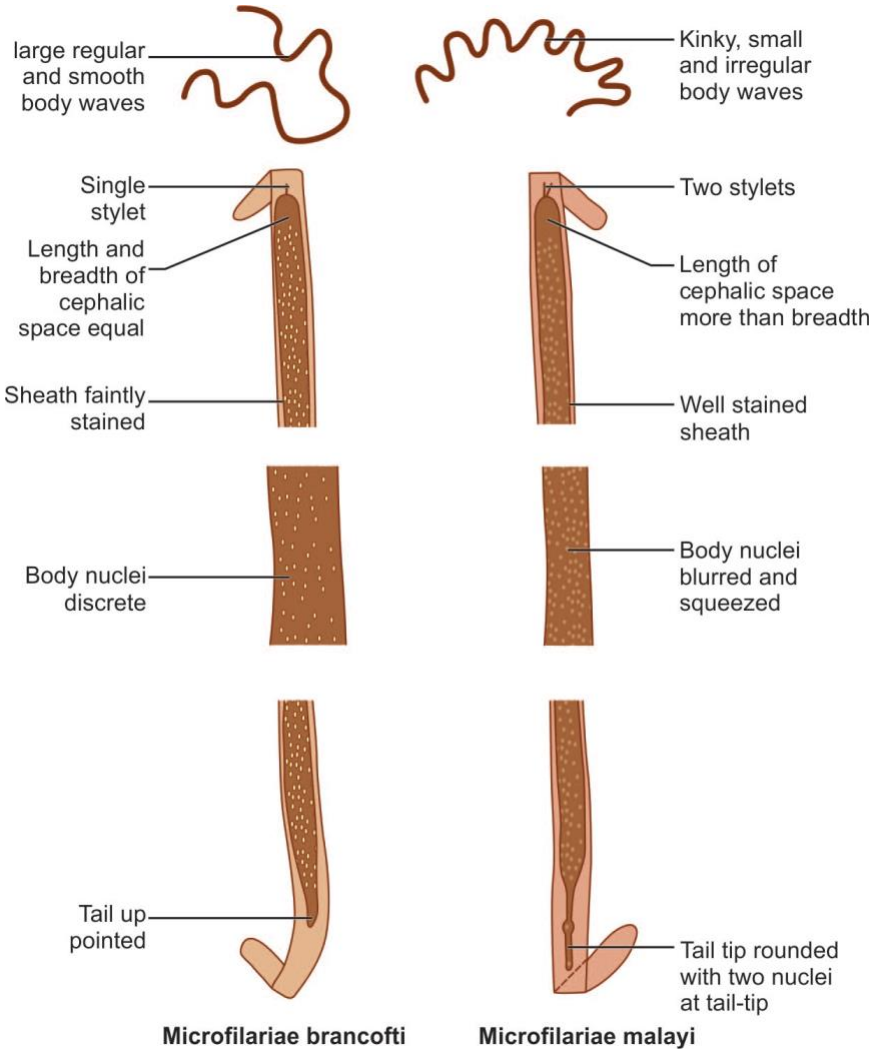
Wuchereria bancrofti

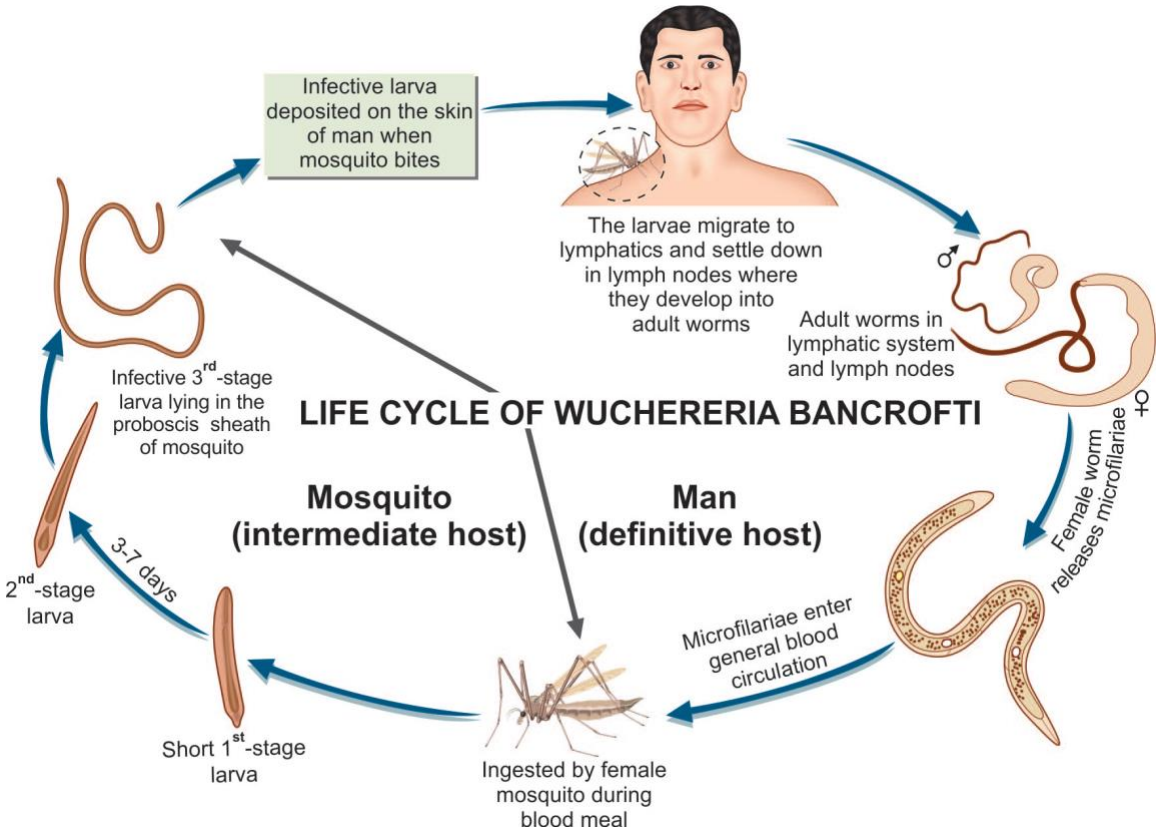


Brugia malayi

The morphological differentiation of bancroftian and malayan microfilariae

	W. bancrofti	*Brugia malayi*
Size	Larger, 244~296 by 5.3~7 μm	Smaller, 177~230 by 5~6 μm
Shape	Curves of body are natural, smooth	Curves of body are rigid, the small in larger curve
Cephalic space	Shorter (length is equal to or less than width)	Longer (length is two times as long as width)
Body nuclei	Equal sized, clearly defined, countable	Unequal sized, coalescing, uncountable
Terminal nuclei	No	Two


large regular and smooth body waves
Kinky, small and irregular body waves
Single stylet
Length and breadth of cephalic space equal
Sheath faintly stained
Two stylets
Length of cephalic space more than breadth
Well stained sheath
Body nuclei discrete
Body nuclei blurred and squeezed
Tail up pointed
Tail tip rounded with two nuclei at tail-tip
Microfilariae brancofti
Microfilariae malayi



- **Host:** mosquitoes as intermediate host, human as final host
- **Infective stage**: infective larvae
- **Diagnostic stage:** microfilariae

Symptoms:

dilatation of the lymphatics(infiltration by lymphocytes, plasma cells and eosinophils)
granuloma formation, fibrosis, lymphedema and elephantiasis

Diagnosis

- **Microfilariae:** demonstration of microfilarae in the peripheral blood in midnight between 10:00 pm to 2:00am
- biopsy of the nodes or lymphatic vessels

Immunological tests**:** antibody or circulating filarial antigen (CFA)

Onchocerca Volvulus

Disease name: Onchocerciasis

Comman disease name:River Blindness

intermediate host :Blackfly (genus Simulium)

definitive host Humans

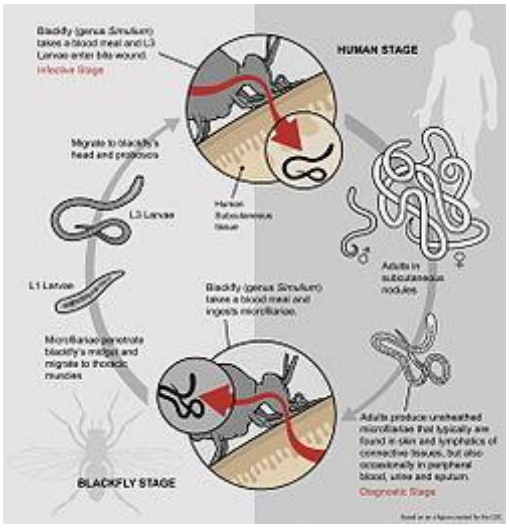
Morphology-

• The male is short, it has a coiled tail.

• The female is very long

• Microfilariae are found in the skin., They are unsheathed and non-periodic., The nuclei does not extend to the tail tip.

Life cycle:



Infective stage:L3

Diagnostic stage: unsheathed microfilariae

Symptoms:

Skin Nodules , edema ,corneal inflammation

Diagnosis

Skin-snip: Small snip of skin (only dermis), place on slide with saline, microfilariae crawl out overnight into saline

ELISA PCR tissue, Rapid serum antibody, Rapid urineantigen,

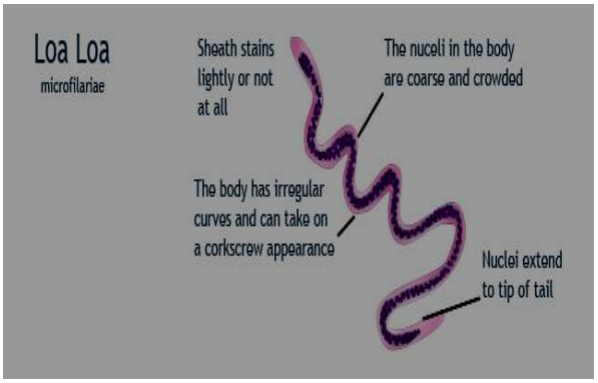
Loa Loa

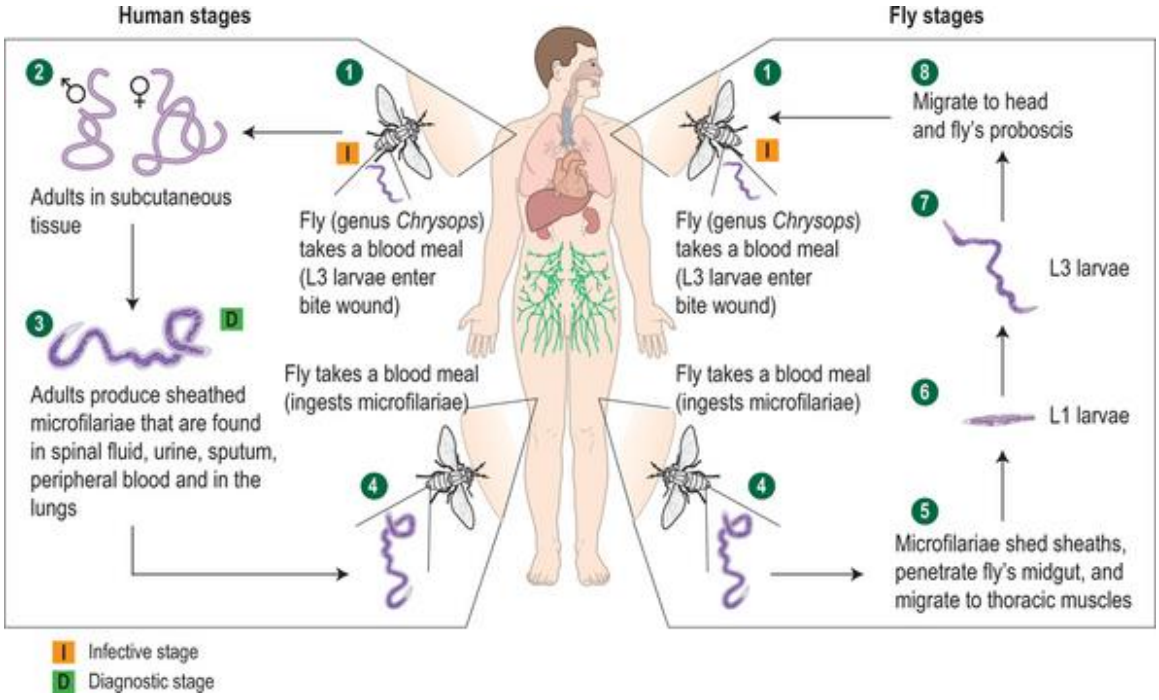
Common name : The African eye worm
Disease name**:** loisis
Vector: Tabanid fly G: Chrysops ,Deerfly/Mango fly(Mangrove fly)

Morphology-

Exists in three forms: Adult,• Microfilaria (sheathed ,nuclei extend to the tip of the tail),• Larval

• Adult male smaller than Adult female





Infective stage:L3

Diagnostic stage: microfilaria