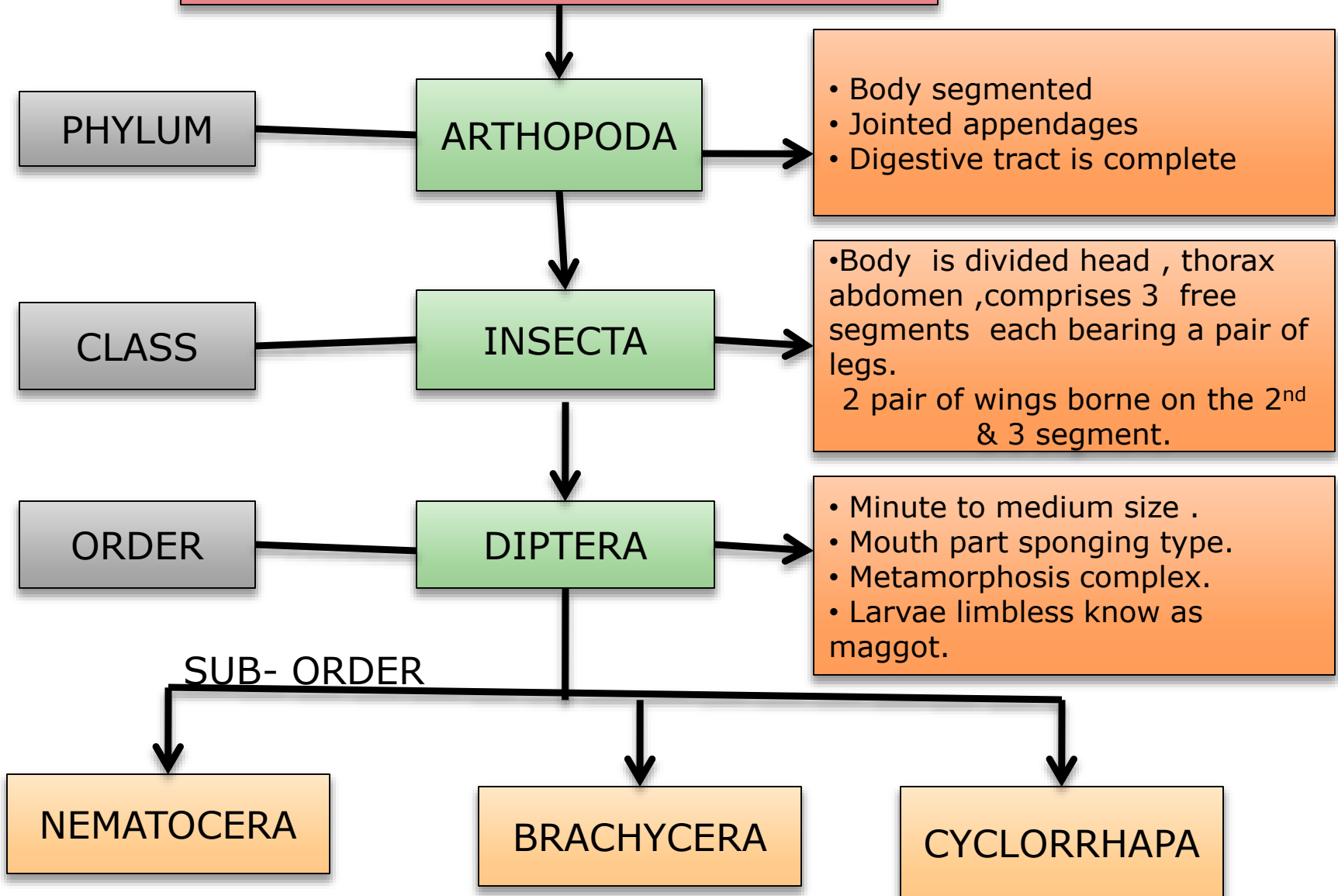


FLIES



SUBMITTED TO,
DEPARTMENT OF ZOOLOGY
ISABELLA THOBURN COLLEGE
LUCKNOW

CLASSIFICATIO OF DIPTERA



GENERAL STRUCTURE OF DIPTERA

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graph TD; A[GENERAL STRUCTURE OF DIPTERA] --> B[HEAD]; A --> C[THORAX]; A --> D[ABDOMEN];
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HEAD

- It has compound eyes 3 ocelli , a pair of antennae.
- Mouth part sponging type.
- Proboscis consist 3 pair a basal large rostrum middle houstellum and a distal labella or oral lobes.
- Food channel is formed by labrum –epipharynx & hypopharynx.

THORAX

- One pair of membranous wings ,the 2nd pair of wings represented only by an insignificant pair of knobbed rodlike appendages know as **HALTERS**.
- The legs consist of the usual segment generally with long coxae.
- The tarsi are usually terminated by twoclaws with pad like pulvilli.

ABDOMEN

- Its contain other key organs include an egg laying **ovipositor** (in female) and a sperm depositing **aedeagus** (in males)
- Both remain retracted when not in use.



Body divided
Head , thorax ,
Abdomen.
A pair of
compound eyes.
Antenna-small
& 3 segmented.
Eyes are closer
in males &for a
part in female.

ADULT



150-200 eggs /sitting
1mm long pearly
white 2
longitudinal ridges in
dorsal side.

EGG

LIFE CYCLE OF FLIES



White in early stages ,
later
it become dark Brown.
Barrel shaped.

PUPA



Fly Larvae
grown are

White
segmented 13
footles ,
worm like ½
inch , narrow
anterior end
& broad
posterior end
.no eyes and
appendages

LARVA

PHLEBOTOMUS (SAND FLY)

GENERAL MORPHOLOGY

- The female feed exclusively on blood *p.minutus* feeds partially entirely on cold blooded animals.
- They are found in nearly all warm and tropical climates of the world with the exception of Australia and the East Indian island.
- The sand flies are small dull colored insect yellowish or buff , slender in build with long & lanky legs.
- They are easily recognized by the characteristic wing venation
- It has long proboscis and suck blood.
- A blade like hypopharynx containing the salivary duct.
- The male genitalia consist of three appendages .
- Identification especially of females is difficult.



Body part divided
 Head thorax abdomen like a tiny moths very hairy bodies .
 Wings venation
 Long proboscis.

ADULT



Egg are elongated dark shiny brown colour , 40-60 in number ,viscid and adhere to the surfaces with which they come in contact.

EGG

LIFE CYCLE OF SAND FLY



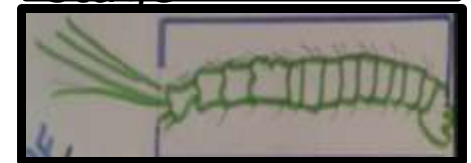
LARVA

Caterpillar like creature with a relatively large head and heavy jaws & 2 pair of long bristles.
 Body is provided with numerous toothed spine .
 Larva feed on decay material .
 Larva requires from 2 week or 2 months .
 Hibernation occur in its stage

Rough cuticle , identified by last larval skin .
 The pupae are less suspetiple to drying than larva 6-10 days.



PUPA



Disease

• **SAND FLY** –
• It was experimentally shown by **Doerr** in 1908 to be transmitted by *Phlebotomus papatasi*

LEISHMANIASIS

The disease can present in 3 main ways

- 1-cutaneous-from present with skin ulcers
- 2-mucocutaneous-from presents with ulcers of skin
- 3-visceral from skin ulcers and then later presents with fewer low red blood cells and enlarged spleen and liver.

OROYA FEVER

It is provided by *Bartonella bacilliformis*.

It is named after Daniel **Alcides Carrion**.

ACUTE PHASE-Its also called the hematic phase .temperature no greater than 102 degree F

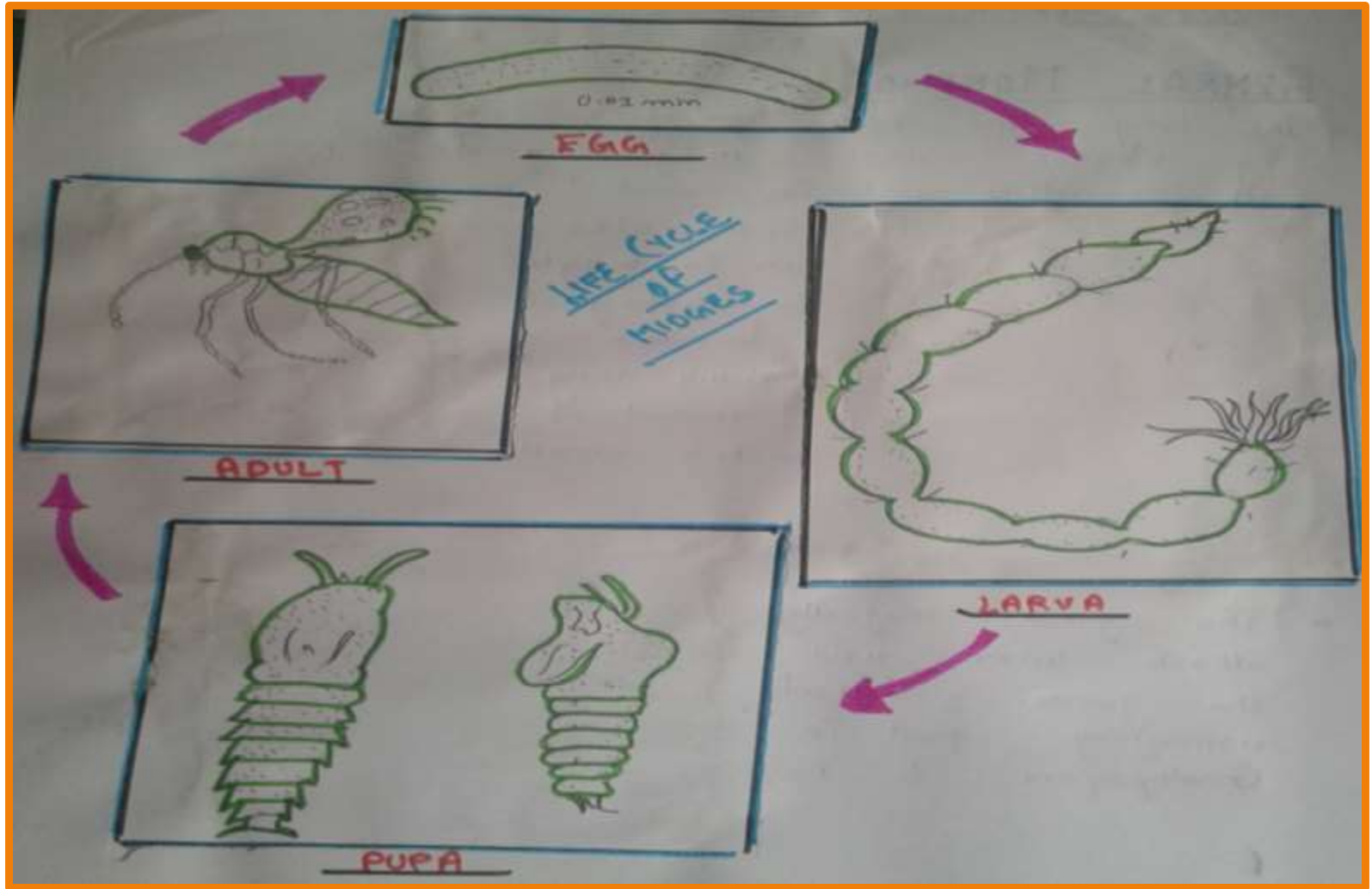
CHRONIC PHASE-its also called the eruptic phase or tissue phase in which patients develop a cutaneous cell and is also know as peruvian warts or verruga peruana.

CONTROLE – Sand flies are very easily controlle locally by DDT.

BITTING MIDGES

GENERAL MORPHOLOGY

- The tiny flies size 1 to 2 mm in length.
- They can usually be distinguished from allied insect by peculiar venation of the wings.
- The proboscis is never long even in the bloodsuckers and one marvels at the irritation which can be inflicted by such a small organ.
- Most species have characteristically mottled wings.
- The great majority of the species that attack man and animal belong to the genus *Culiseta*.
- *Culiseta* but there are annoying pest in the genera *Leptoconops*, *Ceratopogon* & *Forcipomyia* also



LIFE CYCLE OF MIDGES

LIFE CYCLE OF MIDGES

The egg of culicoides ,several hundred in number are deposited in gelatinous masses like miniature masses of frog egg and are usually moore to some object under wate in swamps or ponds , many sps favour brackish or salt water.

After few days the egg hatch and give rise to minute slender wormlike larvae which burrow in we mud or sand eiteher in or out of water their movement suggest giant spirochetes.

Culicoides larvae , unlike chironomid larvae do not have pseudopodia on the first or last segment of abdomen.

The pupa rather resembles that of a mosquito except that the abdomen.

Both larvae and pupa are hard to find

The presence of breeding place is more frequently discovered by finding the floating pupa cases from the adult larva emerged.

Life cycle occupied 2 week.

MIDGES AS DISEASE CARRIERS

- Blood sucking midges have been accused of transmitting a Peruvian form of dermal leishmaniasis
- They serve as intermediate hosts for two human filarial worms .*Acanthocheilium* *perstans* & *man sonella ozzardi*.

CULICOIDES AND FILARIAL INFECTION –

Sharp proved two species of culicoides ,*c.grahami* and *c.austeni* to be the intermediate hosts of the filarial worm *Acanthocheilium perstans*.

CONTROL

- **Dorsey** used 12 to 15 lb DDT per acre to control culicoides breeding in tidal mangrove swamps
- BHC or phenothiazine give better results.

BLACK FLIES OR BUFFALO (GNATS)

GENERAL MORPHOLOGY

- The blackflies as annoyers of domestic animals and man , are among the most important of insect pest since they often appear in overwhelming hordes.
- The female are most vicious bloodsuckers they may kill large no of animals.
- These small insect.
- Instead of the usual slender long legged ,midge like flies of this group .we have in the black flies small robust hump backed creatures with short legs and broad wings.
- The antennae are composed of 11 segment but they are short and stocky and have no hairs at the joints,
- The proboscis in the female is short but heavy and powerful in the males which are not bloodsuckers it is poorly developed.
- The mouthpart consisting of toothed daggerlike mandibles and maxillae and also a hypopharynx and labrum epipharynx resembles in general those of phlebotomus.

LIFE HISTORY OF BLACK FLIES

EGG

- The egg which have a peculiar slimy coating are laid in large masses up to many thousands by a number of females.
- They are deposited by some sps on leaves or blades of grass which are occasionally licked by running water.
- The weight of the egg sufficing to submerge them other species dart into the water and ovipost directly on the slimy surfaces of submerged stones or twings .
- The egg require 4 to 5 days or longer to hatch.

LARVA-

- the larva attaches itself to a stone or other submerged object by means of concentric circles of minute hooklets at the blunt posterior end of the body.
- The hooks hold fast to glutinous silken threads spun by the larvae.
- The mouth fans which are very delicate and elegant are used for sweeping microscopic particle into the mouth as they are brought by running water

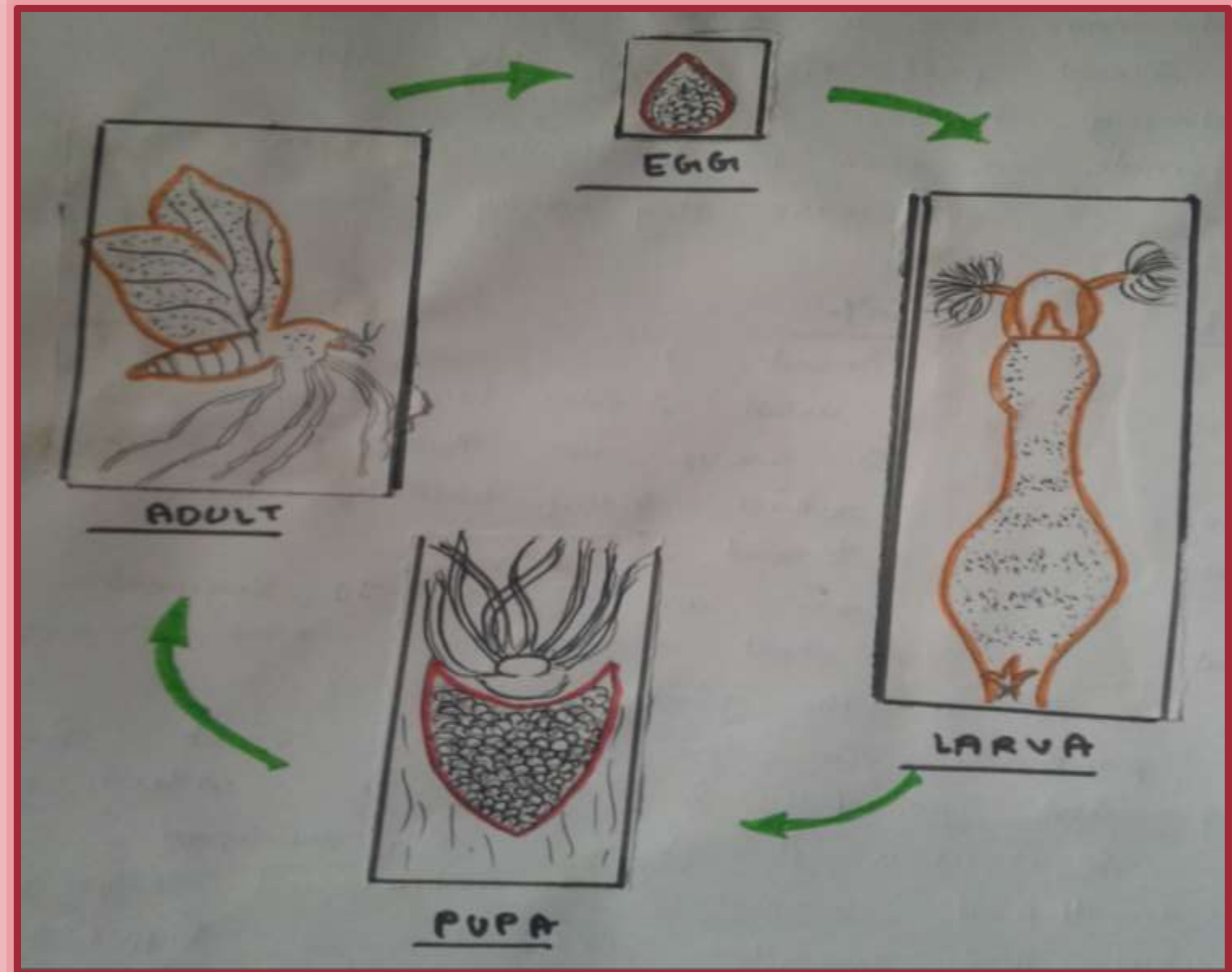
- The stump of a leg on the first segment is used in conjunction with the posterior suckers for creeping the larva looping along like a measuring worm . It is always constructing the silken cocoon from the secretion of the salivary glands.
- Larva r always found in colonies , sometimes forming veritable carpets on boards or stones.
- After 2 or 3 week or longer the larvae spin for themselves a partial cocoon which is variously shaped like a jelly glass , slipper wall pocket etc.open at the upper end for the extrusion of branching gill filament which are used as breathing organ.

PUPA

- The general form of the pupae can be seen in diagram. The breathing filament vary greatly in different species and may have from 4-to 6 branches.

ADULT

- The adult emerge in from 3 days to week days to week or more and are carried to the surface by a bubble of air which has been collected inside the old pupal skin .
- The adult are short lived and lay their eggs soon after emergence.
- Time period of whole life cycle from egg to adult is 6 weeks to 2 months or more.



LIFE CYCLE OF BLACK FLIES

DISEASE

ONCHOCERCIASIS-

It is known as river blindness is a disease caused by infection with parasitic worm onchocera volvulus symptoms include severe itching bumps under the skin and blindness .

It is the second most common cause of blindness due to infection after trachoma.

LEUCOCYTOZO INFECTION OF BIRD- O,Roke found simulium venustum to be the intermediate host of leucocytozoon simondi which cause a malaria like disease.

CONTROL

DDT has proved a very effective insecticide for destruction of black fly larvae.

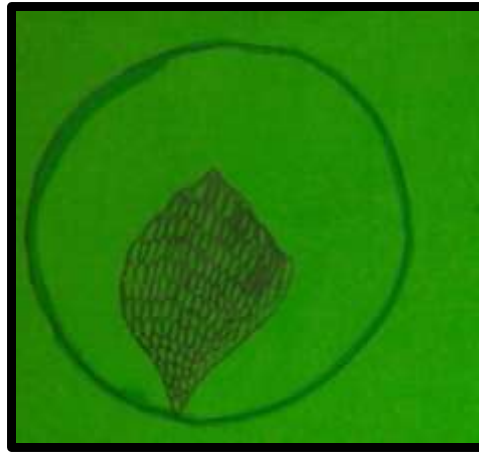
HORSE FLY

GENERAL MORPHOLOGY

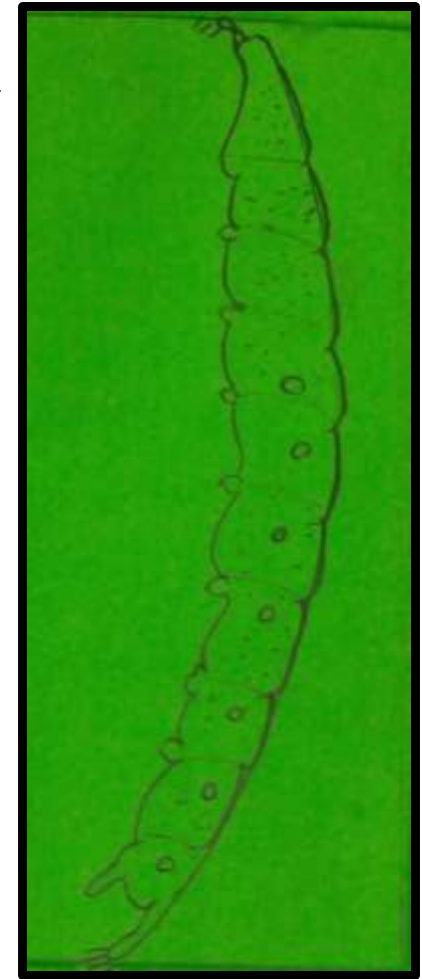
- The leptidae are easily distinguished by the long tapering abdomen and the form of antennae, the tabanids known as horseflies
- The tabanids are the large size and heavy build huge eyes are brown or black colour.
- The head is large in male.
- The antennae are of characteristic shape varying somewhat in the different genera.
- The mouth parts are almost exactly like those of the blackflies on large exactly like scale
- Thorax is relatively long and the wings are large.
- The markings of wings give an easiest identification.
- Haematopota is of moderate size and has wings with profuse scroll-like markings.



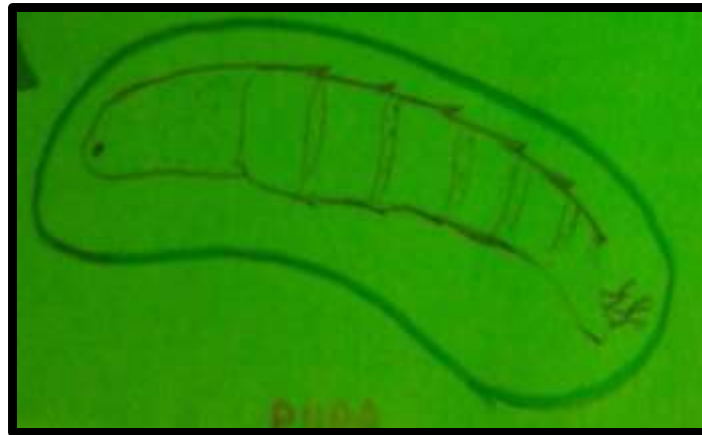
ADULT



EGG MASS



LARVA



PUPA



LIFECYCLE OF HORSE
FLIES

LIFE CYCLE OF HORSE FLY

EGG

- The egg several hundred in no are laid in definitely shaped masses on the leaves of marsh or water plants on the leaves or twing of trees overhanging water or in crevices of rock along the sides of stream.
- Hatch in 4-7 days

LARVA

- The newly hatch larva fall into the water or to wet ground.
- Larva ae cylindrical legless creatures tapering at each end.
- The body has eleven segment exclusive of the very small and often retracted head.
- The larva are voracious feeders.

PUPA

- The pupa often resembles the chrysalis of butterfly in form.
- The pupal is relatively brief according to Cameron 1926 it seldom extends beyond 2 week and may be as short as 5 days.

ADULT

- The adult flies are strictly diurnal and are often active in the clear sunlight of a summer day , though many forest dwelling forms.
- They are strong fly.
- They don't go in swarms as do many other insect but are usually solitary in habit.

TABANIDS AND DISEASE

- TRYPANOSOMA
- TRANSMISSION OF OTHER DISEASE BY INTERRUPTED FEEDING
- ANAPLASMOSIS
- ANTHROX
- TULAREMIA
- LOA-LOA


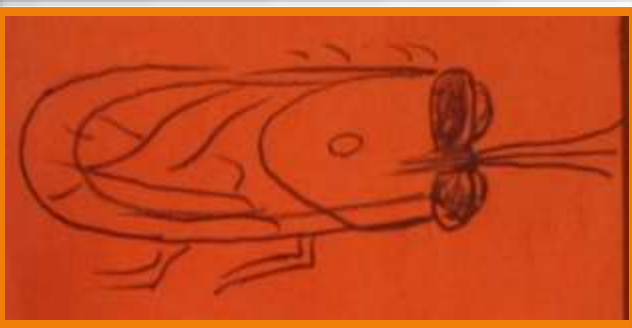

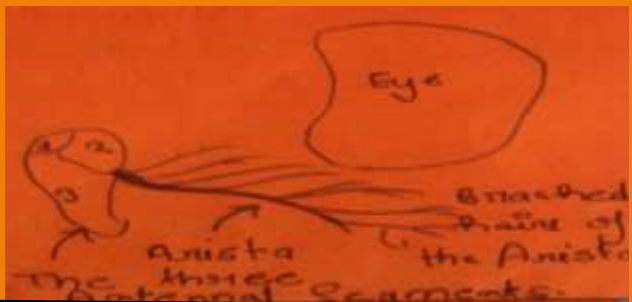
CONTROL

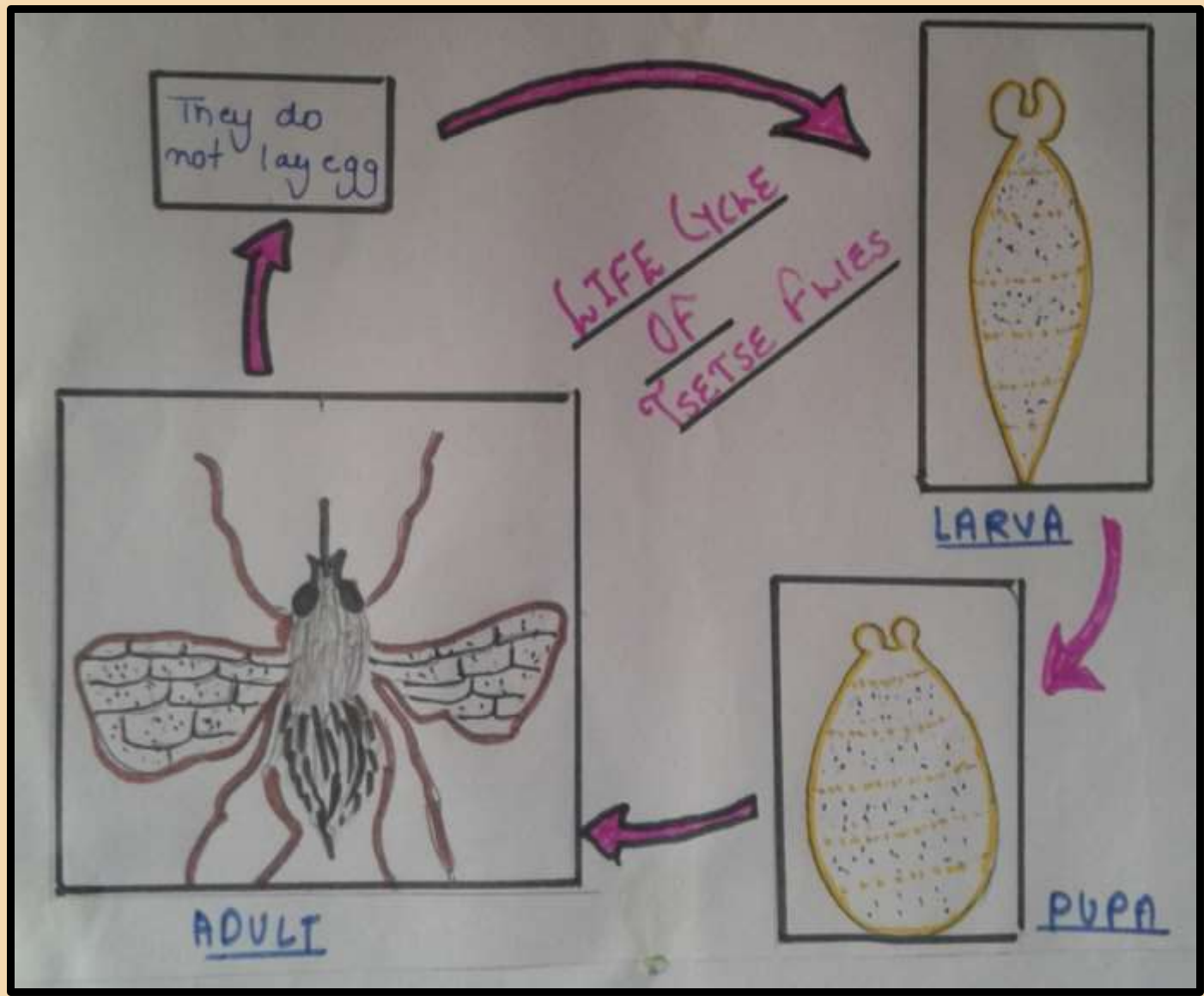
- Prevention of bites from tabanids . Especially during an epidemic of anthrax or where disease which may be transmitted by tabanids are prevalent
- DDT , BHC , Phenothiazine is better.

TSETSE FLIES (Glossina)

GENERAL MORPHOLOGY

- Sometimes spelled tsetze and also known as tik-tik are large biting flies that inhabit much of tropical Africa.
- Tsetse flies include all species in the genus *Glossina* which are placed in Glossinidae.
- It is an obligate parasite
- These flies are multivoltine
- The tsetse fly are elongated dark brown or yellowish-brown flies, some species so larger than blowflies.
- The mouth parts and antennae are characteristic given below
- The thorax is relatively large and quadrangular with a characteristic pattern which however is conspicuous in some species.
- Tsetse are diurnal.

<p>Proboscis</p>	<p>Tsetse have a distinct proboscis a long thin structure attached to the bottom of the head and pointing forward.</p>	
<p>Folded wings</p>	<p>When at rest tsetse fold their wings completely one on top of the other.</p>	
<p>Hatchet cell</p>	<p>The distal medial (middle) cell of the wing has a characteristic hatchet shape resembling a meat cleaver or a hatchet</p>	
<p>Branched arista hairs</p>	<p>The antennae have arista with hairs which are themselves branched</p>	



LIFE CYCLE OF TSETSE FLY

The don't lay egg and the single developing larva is retained with body being nourished by special milk gland on the wall of uterus while lying with its stigmal plates containing the spiracles close to the genital opening of the mother.

The larva is a yellowish white creature about 8 to 10mm in length immediately after birth it hides it self at a depth of 1 to 2 m in louse soil or under dead leaves and transform to pupa.

This turns a dark purplish brown colour .
It is shaped like a small olive and has at the tip of the body the blackish knobs which are so characterstic of the larval stage also.
The duration of pupal stage may be from 17 days to nearly 3 months,

Adult

