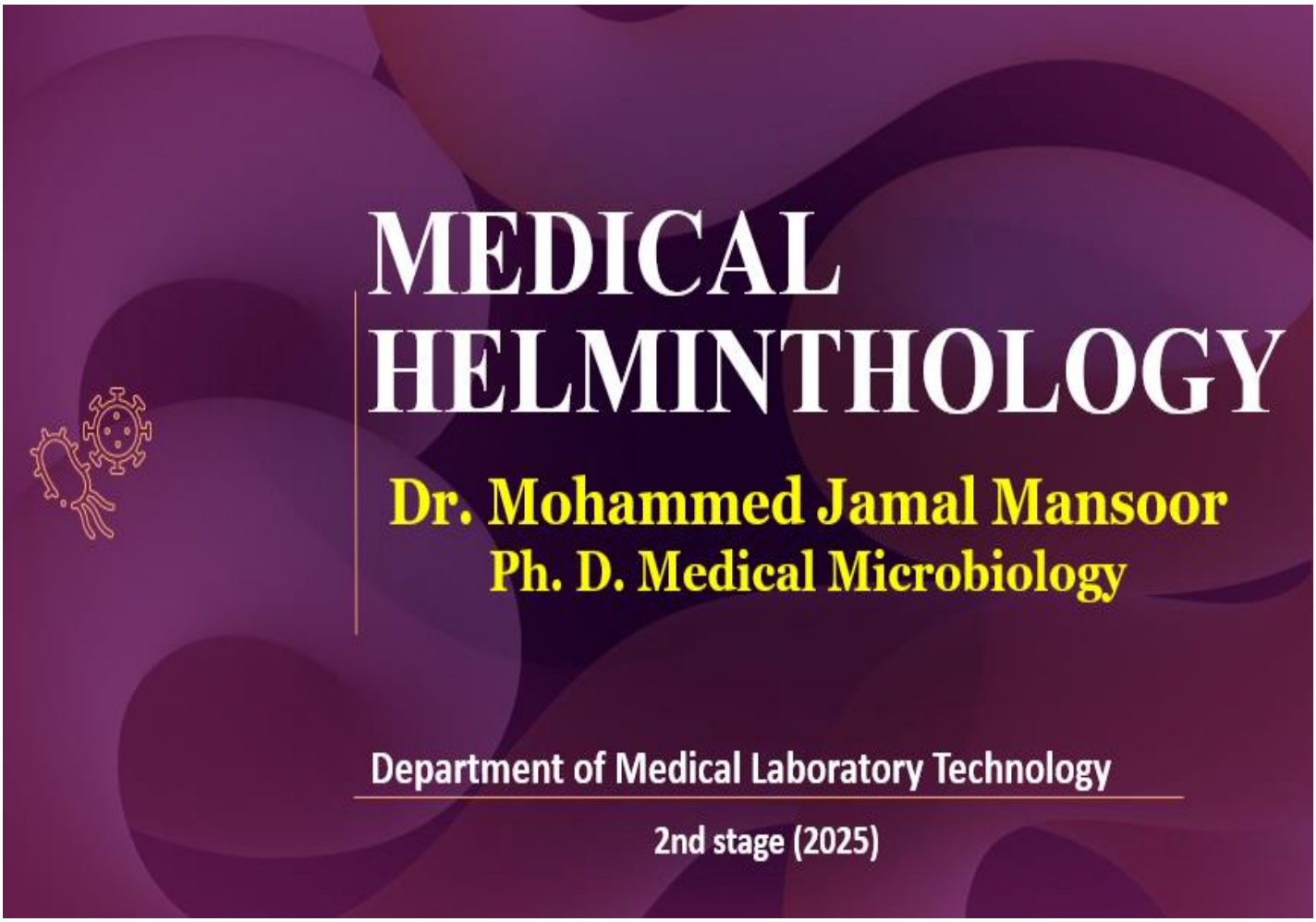
MEDICAL
HELMINTHOLOGY
Dr. Mohammed Jamal Mansoor
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Department of Medical Laboratory Technology
2nd stage (2025)

Medical Helminthology – 2nd stage (2025)
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Lec.14: Arthropods Transmitting disease

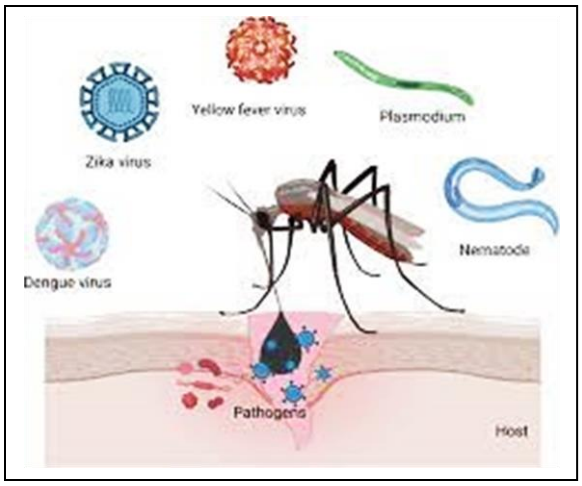
Order: Diptera ثنائية الاجنحة

1- Suborder Nematocera

Family Culicidae

Mouth parts: are adapted for piercing and sucking blood in females and sucking plant juices in males. فرق مهم

Larva and pupa are **aquatic** and **very active**.

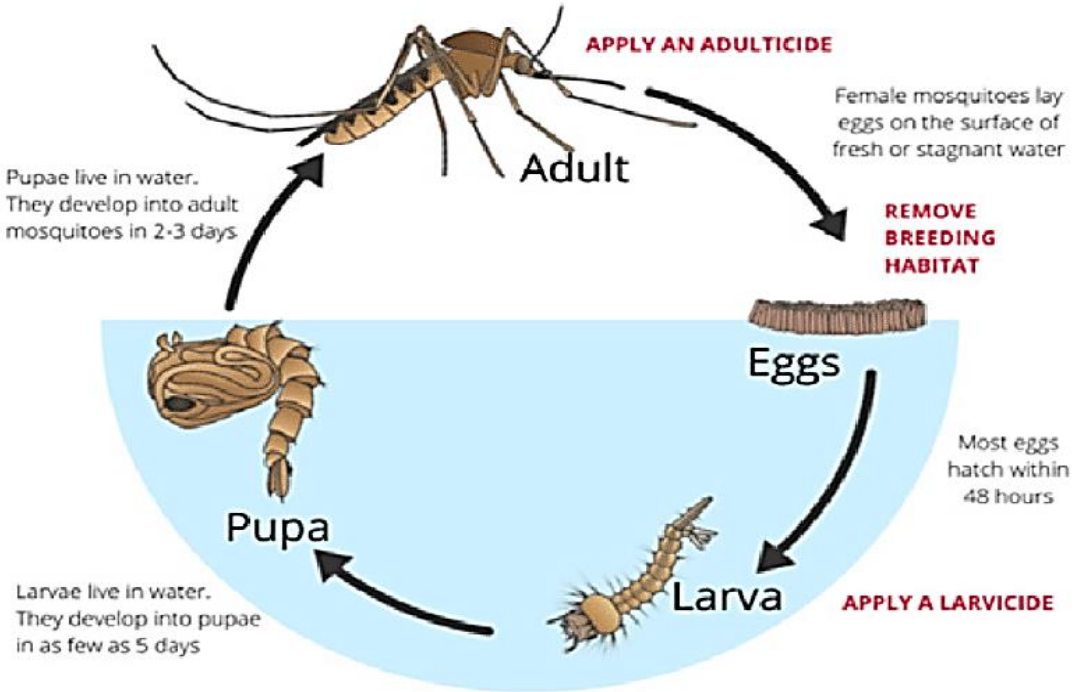


Life cycle of Mosquitoes

Complete metamorphosis

The fertilized female always needs a blood meal before egg laying. In a week, the female begins to lay its eggs.

Life cycle of Mosquitoes (*culex*)



Egyptian mosquitoes:

***Anopheles pharoensis*:** The chief vector of malaria in Egypt. It is common in rice growing areas.

***Anopheles sergenti*:** Found most commonly in Oasis, Sinai, and Fayum. Also breeds n rice fields and pools.

***Anopheles multicolor*:** Most common in Delta and Cairo. It breeds in small pools with or without weeds

***Anopheles gambia*:** This is not an Egyptian mosquito but it visited Egypt some years ago causing a severe epidemic of malaria.

Culicine:

1) ***Aedes aegypti***
2) ***Culex pipiens*:**

Medical importance:

1. Anopheles mosquitoes:

Transmit malaria and in some countries "Bancrofti's" filariasis.

2. Culex mosquitoes:

a- Filaria of man (*Wuchereria bancrofti*).
b- Rift valley fever. حمى الوادي المتصدع
c- Encephalitis virus فايروس تضخم الدماغ
d- Yellow fever, الحمى الصفراء
e- Dengue fever. حمى الضنك

3. Aedes mosquitoes:

- **Filaria of man (*W. bancrofti*).**
- **Filaria of dog (*D. immitis*).**
- **Dengue virus.**
- **Rift valley fever.**
- **Yellow fever.**
- **Zika virus**

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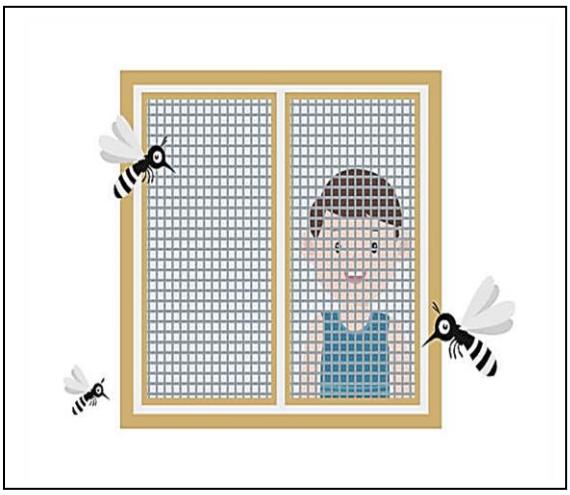
Control of mosquitoes السيطرة على البعوض



1- Using Better windows

Size of mesh and quality of material.

- Screened doors should be opened outwards, never inwards,

- Better to use sliding than hinged or swinging windows.

2- Spraying with chemicals: Kerosene Pyrethrum extracts (لا يبقى فترة طويلة ابدا), "D.D.T." or "Gammexane" are good insecticides تبقى لثلاثة اشهر.

3-Using of mosquito repellents: e.g "oil of citronella","indalone" and "dimethyl phthalate"

4- Animal barriers: تغيير سلوك البعوض الغذائية وجعله يتغذى على دم الحيوان بدل الانسان

5- Spraying oil on breeding places. This suffocates and poisons larvae and pupae. رش الزيت على مناطق التكاثر يعمل على تسمم واختناق اليرقات والشرنقات

6- Dusting with "Paris green". This is a green salt, the particles of which float over water for many hours. It is a stomach poison and is particularly effective against Anopheles larvae because they are surface feeders. It has no effect against pupae as they do not feed. It is used diluted with suitable material as oven dust (one part in 99 of diluent).

7- Spraying of "D.D.T." This is a contact toxic material, directly affecting the peripheral nervous system and also muscles causing irritability, paralysis and death. It has no effect on pupae.

8- Introduction of natural enemies as "Gambusia" fishes. These fishes are top feeders, feeding preferably on larvae. They possess marked fecundity and rapid rate of reproduction. They withstand handling and transport. These fishes are worthless as food for man.

2. Family *Psychodidae*

(Sand flies)

Genus *Phlebotomus*: occurs in Old World tropics, Mediterranean البحر الأبيض المتوسط region and West Africa.

Life cycle: Complete metamorphosis

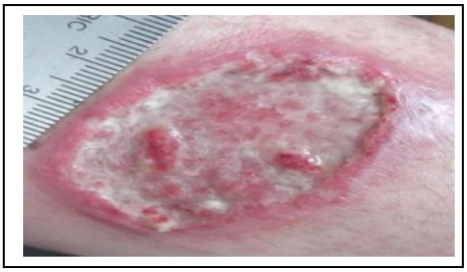
The adults are poor fliers. They tend to —hop‖ for short distances

- **They are active at night only and hide during the day in dark corners.**

Medical Importance:

• **Leishmaniasis** caused by ***Leishmania donovani. L.tropica (Phlebotomus)***

and L. braziliensis (Lutzomyia).



- **Sand fly fever (papataci fever or 3 days fever)**
- **Bartonellosis (*Bartonella henselae*)—Oroya fever or —Carrion's disease.**
- **Sand fly bites produces local indurated lesion.**

3. Family Simulidae

***Simulium spp.* (black flies)**

Called black flies, Coffee flies or buffalo gnats.
يُطلق عليها اسم الذباب الأسود، أو ذباب القهوة، أو ذباب الجاموس.

- **It breeds in rapidly running streams of water.**

Medical Importance:

1- **The bite of Simulium species, to man is painful followed by an intense itching, raised ulcerative lesions, and hemorrhagic spots at the site of bite due to the irritation produced by salivary secretion, fever, nausea and headache (black fly fever).** مهم جدا
2- **Simulium transmits: *Onchocerca volvulus* (roundworm) to man (river blindness).** مهم جدا

4. Family Tabanidae

Genus *Chrysops* —Deer fly or Horse fly (Females only are blood sucking).

Medical importance:

Chrysops* transmits *Loa loa مهم

5. Family Muscidae

1) *Musca domestica* "House fly" This is non-biting insect.

Complete metamorphosis

Medical importance:

(A)- Disease transmission: The adult fly transmits microorganisms to our food or body directly. Transmission may be either mechanical:

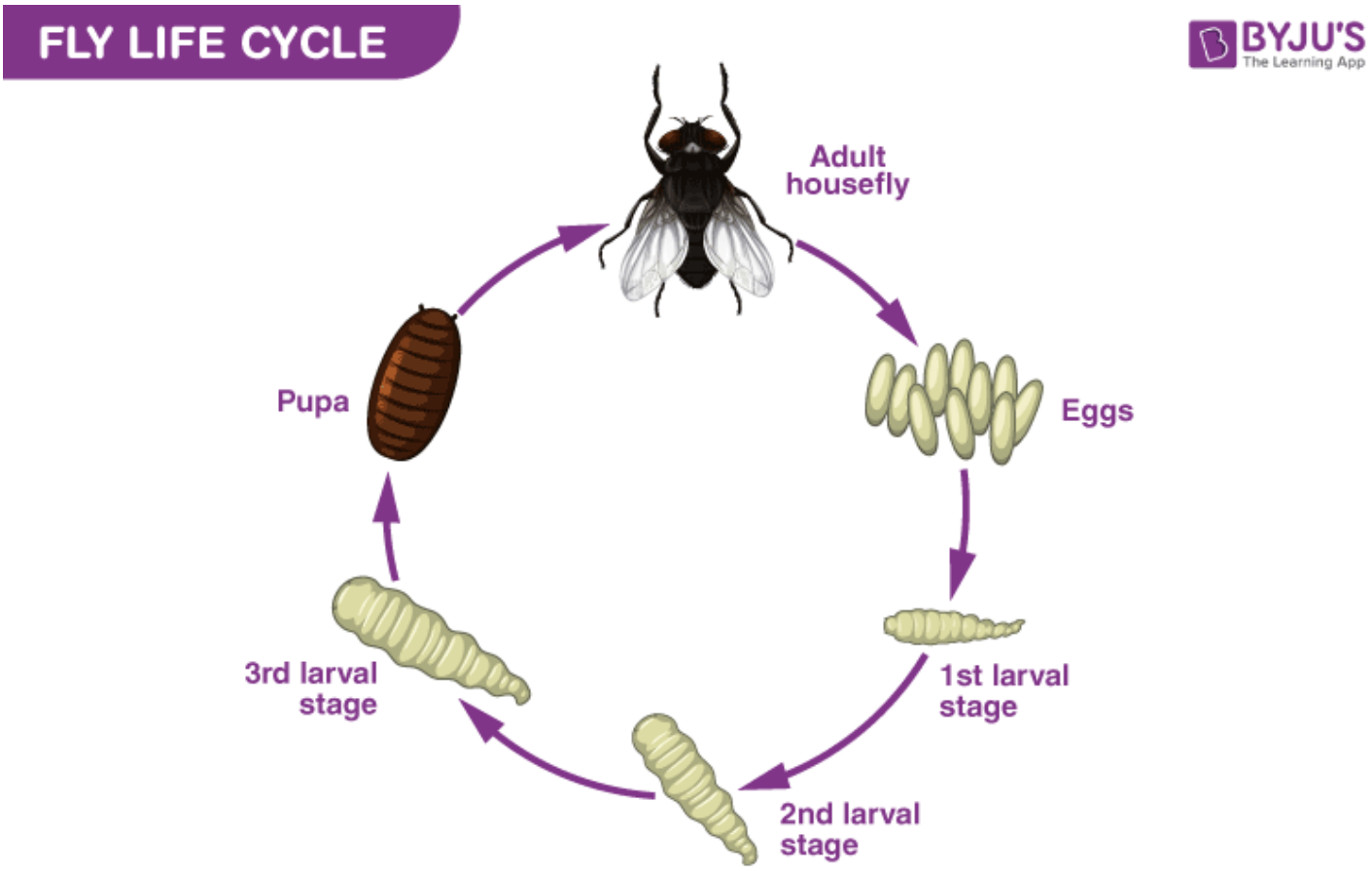
*** Contaminated legs and hairs of the fly.**
*** Through human faces, when ingested by the fly**
*** By the vomit drop.**

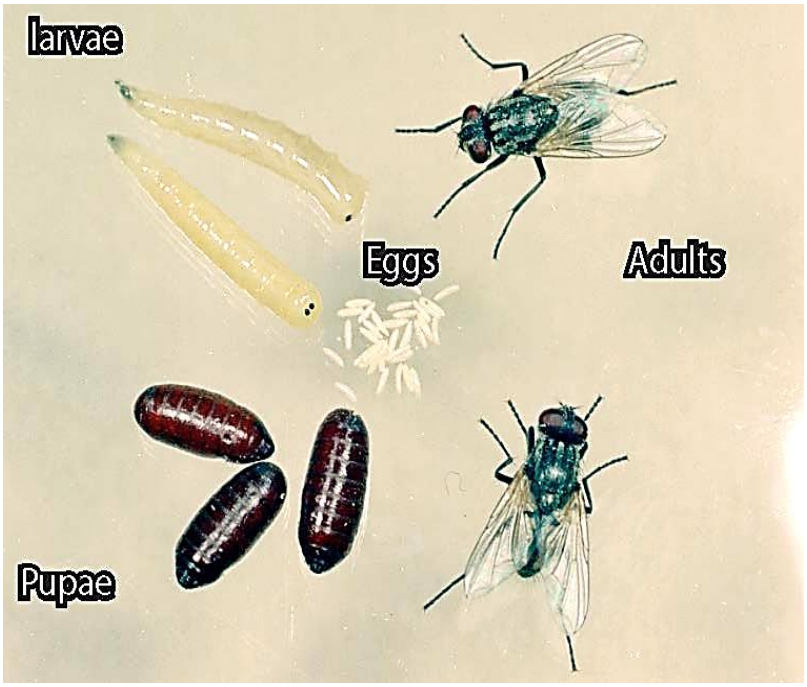
Organisms transmitted in this way are:

- **Bacteria:** ***Vibrio cholera, Streptococci. Shigella, Salmonella, Escherchia coli.***
- **Protozoa**: ***E. histolytica*** cysts, ***Giardia*** cysts, ***Balantidium*** cysts.
- **Helminth eggs:** as ***Taenia, Ascaris***, ***Trichuris, Oxyuris***, and ***Hymenolepis nana.***

(B)-Disease causation: **Larvae** of **muscid flies** may cause accidental intestinal myiasis, urogenital, aural or traumatic myiasis.

داء النغف هو مرض يُصيب الجلد نتيجة غزو يرقات من أنواع مختلفة من الذباب الجلد أو مناطق أخرى من الجسم، مثل: الأنف، والأذن، والعين، والمعدة، والنغف هو مرض بالأصل حيواني، لكنه بعد ذلك أصبح يُصيب الإنسان ويُسبب له العديد من المشكلات الجلدية.





2) *Stomoxys calcitrans* "Stable fly"

This fly differs from *Musca domestica* in:

1- **Proboscis is prominent** بارز
2- **The 4th vein of the wing curves gently and 1st posterior cell is widely opened.**
3- **Posterior spiracles of larvae have three S-shaped slits.**

تحتوي الفتحات التنفسية الخلفية لليرقات على ثلاث شقوق على حرف (S)

Medical importance:

1. **Painful bite**
2. **Mechanical transmitters of trypanosomiasis النوم الافريقي**

3. Genus *Glossina (G. palpalis & G. morsitans)*

Size: Comparatively big fly, about 2 or 3 times the size of the house fly.

The female is viviparous It gives one larva every 10-14 days

These two species are the most important **blood sucking flies** since they transmit the two species of **trypanosomes** which cause **sleeping sickness** to man, which is a fatal disease. They occur only in Central Africa. **مهم جدا**

Medical Importance: مهمة جدا كل واحدة ماذا تسبب

G. palpalis is essentially a **West African species** and it is the most important **vector of Gambian (chronic) sleeping sickness**. It occurs chiefly in **Congo** and **West Africa**. It prefers to live along **water courses** and **lakes**, **known as Wet fly**.

G. morsitans is the **vector of Rhodesian (acute)sleeping sickness.**
It is found in Sudan and Rhodesia. It lays larvae in dry open spaces.

خاتمة المحاضرات

الحمد لله الذي بنعمته تتم الصالحات، وبفضله وتوفيقه نكون قد وصلنا إلى ختام رحلتنا العلمية في مادة الديدان الطبية والحشرات حيث تعلمنا من خلال هذه المحاضرات أهمية الديدان والحشرات في المجال الطبي، وتأثيرها على صحة الإنسان، سواءً كمسببات للأمراض أو كموضوع للدراسة والبحث العلمي. من خلال فهمنا لدورات حياة هذه الكائنات، وطرق تشخيصها، ومكافحتها، ونكون قد خطونا خطوةً مهمةً في طريق الطب الوقائي والصحة العامة. أشكر لكم حسن متابعتكم، وجدّيتكم ومثابرتكم وجهودكم المبذولة في التحصيل العلمي والشكر موصول لجامعة المعارف– كلية التقنيات الطبية والصحية– قسم تقنيات المختبرات الطبية متمثلة برئيس الجامعة الأستاذ الدكتور أحمد عبد الملك السعدي المحترم وعميد الكلية الأستاذ المساعد الدكتور رائد عبيد صالح السبهاني المحترم لثقته وتكليفي بتدريس هذه المادة التقويمية وان شاء الله أكون انا وطلبتي على قدر المسؤولية في الحصول على نسبة نجاح عالية تقديرا للدعم اللامحدود الذي تقدمه هذه الجامعة المعطاء. والشكر موصول للسيد مقرر قسم المختبرات الطبية الدكتور علي مهدي عودة لجهوده المبذولة، رغم أنّ جميع كلمات الشكر لا تُوفيك ولو جزءًا بسيطًا من حقك، وذلك تقديراً لعطائك الدائم والمستمر.

أسأل الله أن يجعل هذا العلم نافعًا، وأن يوفقنا جميعًا لما فيه خير البشرية وخدمة العلم والمعرفة

والسلام عليكم ورحمة الله وبركاته

الدكتور محمد جمال منصور الطائي – مدرس مادة الطفيليات الطبية والحشرات – النظري

Medical Helminthology – 2nd stage (2025)
Dr. Mohammed Jamal Mansoor
Department of Medical Laboratory Technology

Important Questions

Q: Each of the following statements concerning sleeping sickness is correct EXCEPT

A- Sleeping sickness is caused by a trypanosome
B- Sleeping sickness occurs primarily in tropical Africa
C- Sleeping sickness can be diagnosed by finding eggs in the stool
D- Sleeping sickness is transmitted by tsetse flies
E- All false

Q: Vector for *Trypanosoma cruzi* is

A- Reduviid bug (kissing bugs) B- Tsetse fly
C- Sandfly D- Hard tick
E- House fly

Q: The sandflies are responsible for transmission of the following disease to humans

A- Filariasis B- Amoebiasis
C- Giardiasis D- Leishmaniasis
E- Toxoplasmosis

Q: Glossina spp. (TseTse fly) is the vector that transport:

A- *Trichomonas vaginalis* B- *Trypanosoma brucei gambiense*
C- *Leishmania donovani* D- *Toxoplasma gondii*
E- *Plasmodium spp.*

Q: Leishmaniasis is transmitted by

A- Sand fly B- By milk
C- By sexually D- by food and water
E- None of the above

Q: The following parasite is transmitted by insects EXCEPT:

A- *Leishmania donovani* B- *Toxoplasmosis*
C- *Plasmodium vivax* D- *Plasmodium falciparum*
E- *Leishmania tropica*

Q: Leishmania parasites are transmitted to humans by

A- Tsetse B- Sandflies C- Bugs D- Mosquito E- Unknown

Q: Trypanosoma is spread by
A- Bites from infected Tsetse flies
B- Fecal-oral contamination
C- Direct contact from an infected person
D- Sexually
E- Consuming undercooked meat

Q: Which of the following parasites is responsible for the cause of African sleeping sickness
A- Leishmania B- Trypanosoma C- Entamoeba D- Trichomonas E- Palasimodom

Q: What is the characteristic feature of the adult female mosquito's mouth parts?
ⓐ **Piercing and sucking blood**
ⓑ **Sucking nectar from flowers**
ⓒ **Chewing solid food**
ⓓ **Filtering water for nutrients**

Q: How do male and female mosquitoes differ in terms of antennae structure?
ⓐ **Males have longer antennae with plumose structure.**
ⓑ **Females have longer antennae with pilose structure.**
ⓒ **Both have similar antennae structure.**
ⓓ **Males have shorter antennae with pilose structure.**

Q: What is the purpose of the female mosquito taking a blood meal before laying eggs?
ⓐ **To nourish herself**
ⓑ **To grow larger in size**
ⓒ **To provide nutrients for egg development**
ⓓ **To avoid predation**

Q: Which mosquito species is described as the chief vector of malaria in Egypt and prefers breeding in pools with thick weed growth?

ⓐ Anopheles pharoensis
ⓑ Anopheles multicolor
ⓒ Anopheles sergenti
ⓓ Anopheles gambiae

Q: Where is *Anopheles sergenti* commonly found in Egypt?

ⓐ Oasis regions
ⓑ Sinai Peninsula
ⓒ Nile Delta
ⓓ Cairo

Q: Which mosquito species visited Egypt and caused a severe epidemic of malaria some years ago?

ⓐ Anopheles pharoensis
ⓑ Anopheles multicolor
ⓒ Anopheles sergenti
ⓓ Anopheles gambiae

Q: Which disease(s) is/are transmitted by Anopheles mosquitoes?

ⓐ Filariasis of man (Wuchereria bancrofti)
ⓑ Rift Valley fever
ⓒ Malaria
ⓓ Yellow fever
ⓔ Both A and C

Q: What disease(s) can be transmitted by Culex mosquitoes?

ⓐ Yellow fever
ⓑ Rift Valley fever
ⓒ Encephalitis virus
ⓓ Filariasis of man (Wuchereria bancrofti)
ⓔ All of the above

Q: Which mosquito species can transmit filariasis of both humans and dogs?

ⓐ Anopheles mosquitoes
ⓑAedes mosquitoes
ⓒ Culex mosquitoes
ⓓ None of the above

Q: Which of the following is NOT recommended as a measure against adult mosquitoes?

ⓐ Using wire screening and mosquito nets
ⓑ Spraying with kerosene
ⓒ Using mosquito repellents like oil of citronella
ⓓ Opening screened doors inwards
ⓔ Employing animal barriers

Q: Which chemical(s) are mentioned as having a prolonged residual killing effect against adult mosquitoes?

ⓐ Pyrethrum
ⓑD.D.T.
ⓒBoth C and D
ⓓ Kerosene
ⓔ Gammexane

Q: Which substance is mentioned as a mosquito repellent when applied to exposed skin?

ⓐ Kerosene
ⓑ Oil of citronella
ⓒ Gammexane
ⓓ Pyrethrum
ⓔ D.D.T.

Q: What is the purpose of introducing natural enemies like Gambusia fishes against mosquito larvae?

ⓐ To suffocate and poison larvae
ⓑ To act as a stomach poison for larvae
ⓒ To directly affect the peripheral nervous system of larvae
ⓓ To feed on larvae and control their population
ⓔ None of the above

Q: Which substance is a stomach poison and particularly effective against Anopheles larvae?

ⓐ Paris green
ⓑ D.D.T.
ⓒ None of the above
ⓓ Oil
ⓔ Gambusia fishes

Q: Which genus of sand flies occurs in the Old-World tropics, Mediterranean region, and West Africa?

ⓐ Phlebotomus
ⓑ Anopheles
ⓒ Aedes
ⓓ Lutzomyia
ⓔ Culex

Q: What is the mode of action of D.D.T. when sprayed to control mosquito larvae?

ⓐ Suffocates and poisons larvae
ⓑ Acts as a stomach poison
ⓒ Directly affects the peripheral nervous system
ⓓ Causes muscle paralysis and death
ⓔ Both A and D

Q: What is the primary habitat preference of sand flies?
ⓐ Open fields
ⓑ Dark corners
ⓒ Dense forests
ⓓ Brightly lit areas
ⓔ Water bodies

Q: What is the medical importance of sand flies?
ⓐ Transmitting malaria
ⓑ Transmitting Leishmaniasis
ⓒ None of the above
ⓓ Causing dengue fever
ⓔ Spreading yellow fever

Q: What are small species of Simulidae often called?
ⓐ Mosquitoes
ⓑ Black flies
ⓒ Horse flies
ⓓ Sand flies
ⓔ Tsetse flies

Q: Where do black flies typically breed?
ⓐ Stagnant ponds
ⓑ Rapidly running streams
ⓒ Desert areas
ⓓ Slow-moving rivers
ⓔ Wetlands

Q: What is the medical importance of Simulium species?
ⓐ Transmitting malaria
ⓑ Causing dengue fever
ⓒ Transmitting River blindness (*Onchocerca volvulus*)
ⓓ Spreading yellow fever
ⓔ None of the above

Q: What is the medical importance of Chrysops flies?
ⓐ Transmitting *Loa loa*
ⓑ Causing dengue fever
ⓒ Transmitting malaria
ⓓ Spreading yellow fever

Q: Which species is known as the "House fly"?
ⓐ Chrysops
ⓑ Anopheles
ⓒ Musca domestica
ⓓ Simulium

Q: How is the life cycle of Musca domestica described?
ⓐ Hemimetabolous metamorphosis
ⓑ Direct development
ⓒ Holometabolous metamorphosis
ⓓ Incomplete metamorphosis

Q: What is the primary mode of disease transmission by Musca domestica?
ⓐ Mechanical transmission through contaminated legs and hairs
ⓑ Direct injection of pathogens into the host's bloodstream
ⓒ Through saliva during blood-feeding
ⓓ Through airborne transmission

Q: What type of myiasis can be caused by the larvae of Musca domestica?
ⓐ Intestinal myiasis
ⓑ Ocular myiasis
ⓒ Dermatological myiasis
ⓓ All of the above

Q: What is a characteristic feature of the thorax of Musca domestica?
ⓐ Four longitudinal dark stripes
ⓑ Prominent brightly colored eyes
ⓒ Bilaterally plumosed arista
ⓓ Closed first posterior cell in the wing

Q: How does Stomoxys calcitrans differ from Musca domestica?

ⓐ It has a prominent proboscis adapted for piercing and sucking blood.
ⓑ It has bilaterally plumosed arista.
ⓒ Its wings have a closed first posterior cell.
ⓓ It lacks longitudinal stripes on the thorax.

Q: What is a medical importance of Stomoxys calcitrans (Stable fly)?

ⓐ Transmitting malaria
ⓑ Transmitting dengue fever
ⓒ Causing painful bites
ⓓ Spreading yellow fever

Q: What is the primary medical importance of Glossina palpalis and Glossina morsitans?

ⓐ Transmitting malaria
ⓑ Transmitting dengue fever
ⓒ Transmitting trypanosomes causing sleeping sickness
ⓓ Spreading yellow fever

Q: What is the distinguishing feature of Glossina species compared to other flies like Stomoxys calcitrans?

ⓐ Long, chitinized proboscis adapted for piercing and sucking
ⓑ Prominent brightly colored eyes
ⓒ Closed first posterior cell in the wing
ⓓ Lack of longitudinal stripes on the thorax

Q: Which species of Glossina is the most important vector of Gambian (chronic) sleeping sickness?

ⓐ Glossina palpalis
ⓑ Glossina morsitans
ⓒ Both species equally transmit Gambian sleeping sickness
ⓓ Neither species transmits Gambian sleeping sickness

Q: Where does Glossina palpalis prefer to live and lay larvae?

ⓐ Dry open spaces
ⓑ Along water courses and lakes
ⓒ Shores in the shade of trees
ⓓ Urban areas

Q: Which species of Glossina is the vector of Rhodesian (acute) sleeping sickness?

ⓐ Glossina palpalis
ⓑ Glossina morsitans
ⓒ Both species equally transmit Rhodesian sleeping sickness
ⓓ Neither species transmits Rhodesian sleeping sickness

Q: How often does a female Glossina give birth to larvae?

ⓐ Every day
ⓑ Every 10-14 days
ⓒ Every week
ⓓ Every month

The end

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